NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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May 14, 2021

Grace van der Ven
Roux Associates, Inc.
12 Gill Street, Suite 4700
Woburn, Massachusetts 01801

Dear Ms. van der Ven;

Re: Work Plan for Subsurface Investigation and Remediation Activities, April 22, 2021
Site #828191- Residential Properties
City of Rochester, Monroe County

The New York State Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH; collectively referred to as the Departments) have completed their review of the document entitled "Work Plan for Subsurface Investigation and Remediation Activities" dated April 22, 2021 (the Work Plan), and prepared by ROUX Environmental Engineering and Geology, D.P.C. for three residential properties on Exchange Street in the City of Rochester, Monroe County. The Departments have determined that the Work Plan is in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010 (DER-10) and other applicable guidance and policy. The Work Plan is hereby approved upon execution of an oversight agreement between NYSDEC and ExxonMobil.

Please contact me via email at frank.sowers@dec.ny.gov if you have any questions regarding this letter.

Sincerely,

Frank Sowers, P.E.
Professional Engineer 1

ec:

Sara Bogardus	David Pratt
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WORK PLAN FOR SUBSURFACE INVESTIGATION AND REMEDIATION ACTIVITIES

[redacted] Exchange Street, [redacted] Exchange Street, and [redacted] Exchange Street
Rochester, New York

April 22, 2021

Prepared for:

Mr. Frank Sowers, P.E.
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CERTIFICATION

"I _____certify that I am currently a [NYS registered professional engineer] and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)."

1.0 INTRODUCTION

Roux Associates, Inc. and Roux Environmental Engineering and Geology D.P.C. (collectively referred to as "Roux"), on behalf of ExxonMobil Environmental and Property Solutions Company (ExxonMobil), has prepared the following Remedial Action Work Plan ("Work Plan") for soil sampling and remediation activities on certain properties adjacent to the former automotive junk yard and footprint of the former Vacuum Oil Refinery (hereafter referred to as the "facility") located in Rochester, New York. Specifically, the area of the proposed soil sampling and excavation activities encompasses the following three residential properties: [redacted] Exchange Street, [redacted] Exchange Street, and [redacted] Exchange Street (hereafter referred to as the "Site"). This Work Plan was designed to assess and address impairments to surface and subsurface soil at the Site due to alleged former industrial activities which transpired on abutting properties.

Following preliminary site investigation activities performed by LaBella Associates D.P.C. ("LaBella") on June 1, 2018, the Site was identified by the New York State Department of Environmental Conservation (NYSDEC) as meriting additional investigation and remediation. In response to requests by the NYSDEC, ExxonMobil has voluntarily prepared this Work Plan to further evaluate soil conditions at the Site and provide a plan for remediation for the area. A Site Location Map and Site Plan are provided as **Figure 1** and **Figure 2**, respectively.

This Work Plan has been prepared in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010. Roux will be on-Site to supervise all activities associated with implementing the Department approved Work Plan described herein. In addition, Roux Environmental Engineering and Geology, D.P.C. will have primary, direct responsibility for implementation of remediation activities as the certifying professional engineering firm.

2.0 SITE DESCRIPTION

The Site is located in the southern section of the City of Rochester, Monroe County, New York, just west of the Genesee River (**Figure 1**). The Site is comprised of three residential parcels ([redacted] Exchange Street, [redacted] Exchange Street, and [redacted] Exchange Street).

2.1 Existing Site Features

According to historic Sanborn Maps,[1] the Site appears to have been separate residential properties with residential structures since at least 1892. The neighboring 15 Flint Street property which is currently vacant was once within the footprint of the former Vacuum Oil Refinery which operated from 1892 to 1941; since that time, it has been operated as a scrap metal salvage yard, an automobile wrecking and salvage yard, and an automotive junkyard. The current owner of 15 Flint Street is One Flint Street LLC.

2.2 Previous Site Investigations

On June 1, 2018, LaBella conducted a preliminary site investigation to evaluate the potential for impairment to the soil of the Site and submitted a letter report to NYSDEC titled *Former Vacuum Oil* [redacted] *Exchange Street* dated August 29, 2018 (hereafter referred to as "2018 LaBella Report" and included as **Appendix A**). The investigation area included four parcels (950 Exchange St.,[2] [redacted] Exchange St., [redacted] Exchange St., and [redacted] Exchange St.). Of the eight shallow soil samples, six were located on the Site area addressed under this Work Plan (SS-03, SS-04, SS-05, SS-06, SS-07 and SS-08). The shallow soil samples were collected with a hand auger. Three soil samples were collected from each location at the following depths: 0-2 inches (in) below ground surface (bgs), 2-12 in bgs, and 12-24 in bgs. This investigation concluded that semi-volatile organic compounds (SVOCs) and Target Analyte List (TAL) metals were detected in shallow soils (0-2 feet [ft] bgs) at concentrations greater than Residential and Unrestricted Use Soil Cleanup Objectives (SCOs) on all three properties at the Site. It should be noted that upon reviewing the data, there were several laboratory quality control issues identified with the LaBella data including:

- Iron exceedances in every Site sample were qualified by the laboratory with a "B" indicating that the compound was found in the blank and the sample.
- The chromium exceedance in SS-07 (12-24) was qualified by the laboratory with a "B" indicating that the compound was found in the blank and the sample.
- Many of the SVOC exceedances were qualified by the laboratory with a "J" indicating that the result was less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
- Select samples were qualified by the laboratory with an "F2" indicating that the Matrix Spike (MS)/Matrix Spike Duplicate (MSD) exceeded control limits.
- Select samples were qualified by the laboratory with an "F1" indicating that the MS and/or MSD recovery was outside acceptance limits.

[1] June 13, 2005. AMEC Former Vacuum Oil Refinery Property Historic and Current Site Conditions Report Certified Sanborn Map.
[2] Based on subsequent discussions with the NYSDEC, no further assessment or remediation associated with the 950 Exchange Street property was deemed necessary to be addressed under this Work Plan.

3.0 CONTAMINATION CONDITIONS AND REMEDIAL ACTION OBJECTIVES

The following section generally discusses the Site contamination conditions; including Site contaminants of concern (COCs) and a Conceptual Site Model (CSM). This section also presents the Remedial Action Objectives (RAOs) for the Site.

3.1 Site Contaminants of Concern

The 2018 LaBella Report identified the following COCs present at the Site:

SVOCs

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Indeno(1,2,3-cd)pyrene

TAL Metals

- Arsenic
- Chromium
- Lead

Note that COCs at the Site may be amended pending additional soil sampling activities planned as discussed below.

3.1.1 SVOCs

SVOCs detected in Site soil samples collected by LaBella at concentrations exceeding applicable Residential Use SCOs are summarized below.

Analytical Compound	Soil Sample(s) Exhibiting Exceedance
Benzo(a)anthracene	SS-03 (0-2 in bgs and 12-24 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-07 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-08 (0-2 in bgs)
Benzo(a)pyrene	SS-03 (0-2 in bgs and 12-24 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-07 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-08 (0-2 in bgs)
Benzo(b)fluoranthene	SS-03 (0-2 in bgs and 12-24 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-07 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-08 (0-2 in bgs)
Benzo(k)fluoranthene	SS-04 (12-24 in bgs) SS-06 (12-24 in bgs)
Chrysene	SS-03 (0-2 in bgs and 2-12 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-07 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-08 (0-2 in bgs)
Indeno(1,2,3-cd)pyrene	SS-03 (0-2 in bgs and 2-12 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-07 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-08 (0-2 in bgs)

The nature and extent of these SVOC concentrations at the Site are discussed in the conceptual site model (CSM) below.

3.1.2 TAL Metals

TAL metals detected in Site soil samples collected by LaBella at concentrations exceeding applicable Residential Use SCOs are summarized below:

Analytical Compound	Soil Sample(s) Exhibiting Exceedance
Arsenic	SS-05 (2-12 in bgs) SS-05 (2-12 in bgs)
Calcium*	SS-03 (12-24 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs)
Chromium	SS-07 (12-24 in bgs)
Iron*	SS-03 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-04 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-05 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-05 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs) SS-06 (0-2 in bgs, 2-12 in bgs and 12-24 in bgs)
Lead	SS-04 (2-12 in bgs) SS-06 (2-12 in bgs)

** Calcium and iron are not considered a Site COC.*

The nature and extent of the TAL metals at the Site are discussed in **Section 3.2**.

3.2 Conceptual Site Model and Nature and Extent of Contamination

The properties surrounding the Site have an over 100-year history of industrial operations during which time numerous entities have owned and/or operated on these properties and may have contributed to the existing environmental conditions at the Site as a result of off-site migration of contaminants.

Based on limited logging information provided in the 2018 LaBella Report, the geology beneath the areas subject to the investigation generally consists of topsoil underlain by gravel between 0 and 2 ft bgs, fill material between 2 and 5 ft bgs, and sand from 5 to 14 feet. Note that the deepest soil boring advanced at the Site was to 14 ft bgs. Groundwater beneath the Site occurs under unconfined conditions and the water table is located at approximately 10 ft bgs.

Results of the 2018 LaBella preliminary site investigation revealed SVOC and TAL metals impacts to soil in the upper 2 feet of soil at the Site. Additional soil sampling activities planned at the Site are pending approvals to access third-party owned properties. Information gained during the soil sampling activities will be used to confirm and/or update the estimated extent of impacts, if any.

3.3 Remedial Action Objectives

RAOs are media-specific objectives for the protection of public health and the environment. The following Site-specific RAOs have been developed for the Site:

Soil

- Prevent ingestion or direct contact with soil impacted by COCs (SVOCs and TAL metals[3]) exceeding Residential Use SCOs.

Based on the RAOs described above, the general response action (GRA) for the Site is removal of impacts in soil through excavation. Further descriptions of GRA including estimates of areas, volumes, and methods of implementation are described below.

Note that RAOs and GRAs for the Site may be amended pending additional soil sampling activities planned as discussed in **Section 4.2**.

Specifically, the intent of the GRAs (i.e., excavation) to meet the RAOs is to remove soil impacted by COCs (SVOCs and TAL metals) exceeding Residential Use SCOs at the Site in soil to a maximum depth of 8 feet below ground surface, if required. Due to the history of the Site, which, as discussed above, appears to have remained residential prior to and throughout neighboring industrial property use, 8 ft bgs is a conservative depth to evaluate impacts that may have migrated unto or may have become located on the Site as a result of the neighboring operations.

As discussed in **Section 4.2**, additional soil sampling activities are planned to adequately delineate and characterize the Site and determine the horizontal and vertical excavation limits. Once the additional soil sampling activities have been completed, removal of impacted soil at the Site will be based on these predetermined limits. In addition, if during the excavation activities, visual/olfactory observations and soil headspace screening results indicate that impacts extend beyond the predetermined limits, or new significant information is obtained, the conceptual site model, RAOs, and the excavation extents may need to be reassessed and reviewed with the NYSDEC. Confirmatory samples may need to be collected if the proposed area of excavation expands.

[3] Note that this Work Plan and conceptual site model are based on findings by Labella that indicate SVOCs and metals are the COCs and their presence is associated with surface/near surface deposition or placement. VOC and odor issues are not expected; however, if encountered, the conceptual site model, COCs and remedy may need to be reassessed based on that new information and ExxonMobil's involvement in future activities may be reevaluated.

4.0 PRE-REMEDIATION TASKS

Pre-remediation tasks to be performed prior to remediation activities will consist of the following tasks:

- Obtain Site access from third-party property owners and arrange meetings with each property owner to discuss any special concerns they have, including trees of sentimental value, gardens, pet burial areas, etc.;
- A property survey (elevation and property lines) and photo documentation of the pre-excavation conditions of the remediation area;
- An inventory and mapping of landscape plants (trees, shrubs, perennials, etc.) landscaping (walkways etc.), sheds, fences, etc. within the remediation area;
- Preparation of property specific drawings and restoration specifications in collaboration with and for review and approval of property owners, DEC and DOH;
- Clearing for access roads and workspace, as needed (15 Flint Street property);
- Additional soil sampling activities including soil boring advancement to confirm/delineate existing Site conditions;
- Identify underground utilities in the anticipated remediation area;
- Preparation of a Site-specific Health and Safety Plan (HASP);
- Mobilization to the Site and preparation for remediation activities; and
- Implementation of facilities and Site controls (i.e., field trailer, portable toilets, safety fencing, odor and dust suppression, and erosion control).

4.1 Site Access Activities

Prior to initiation of soil sampling and remediation activities, access will need to be obtained from the Site properties ([redacted] Exchange Street, [redacted] Exchange Street and [redacted] Exchange Street). Access may also need to be obtained from the owner of the 15 Flint Street property in order to access the Site.

4.2 Soil Sampling Activities

The objective of additional soil sampling is to further characterize the nature and extent of contamination at the Site and determine the extent of remedial work necessary. The proposed soil sampling activities include the advancement of borings to facilitate the collection of soil samples to evaluate soil conditions at the Site. The proposed boring locations and the soil sampling activities are discussed below.

Roux proposes to advance up to 21 soil borings at the Site. The proposed soil boring locations are shown on **Figure 2**. As shown on **Figure 2**, the soil boring locations are to be advanced along the southeastern Site boundaries where the properties slope down toward the adjacent 15 Flint Street former junkyard property. The soil borings are proposed to be advanced using direct push methodologies including track and/or truck mounted Geoprobe™ as well as hand-held tools/equipment. It is anticipated that each soil boring location will be advanced to approximately 8 ft bgs. Note that refusal has been documented in the vicinity of the proposed borings and may limit advancement to desired depths.

Note that as portions of the Site contain trees, steep/uneven terrain and gardens, access to certain soil boring locations may be limited and, therefore, some boring locations may be modified. Attempts will be made to locate the soil borings as close as possible to the locations identified on **Figure 2**; however, the sample locations are approximate and will be verified in the field with NYSDEC and boring locations may be modified.

Drill cuttings and other soil generated on-Site from the installation of soil borings used for soil sampling will be returned to the borehole that generated them (in accordance with DER-10 Section 2.1). Any soil not suitable for backfill will be placed in New York State Department of Transportation (NYSDOT) approved 55-gallon steel drums and temporarily stored off-Site on the 15 Flint Street property or City of Rochester owned property, pending access agreements, in a secure area pending disposal characterization and profiling.[4] Upon characterization and profiling, the drum(s) will be shipped to a permitted/registered disposal/recycling facility. All tools and equipment used during the soil boring installation work will be decontaminated between each location. To the extent possible, workers will enter the Site via Exchange street and not via 15 Flint street to avoid tracking contaminants from 15 Flint Street onto the Site. If workers need to enter the Site via 15 Flint Street, boots will be decontaminated prior to coming on Site. To the extent practicable, equipment will remain on 15 Flint Street to avoid tracking contaminants from 15 Flint Street onto the Site. When equipment needs to be brought onto the Site, all equipment tires/tracks will be decontaminated prior to entering the Site. Field decontamination procedures will be conducted in accordance with Roux Standard Operating Procedures (SOPs) included as **Appendix B**. Vehicle and equipment tires will be cleaned so that no visible dirt is tracked onto the roads upon demobilization from the Site. Any dirt tracked onto the roads will be cleaned immediately.

4.2.1 Soil Sample Collection Methodology

Soil samples will be collected continuously during boring advancement using either hand tools or a direct push sampler (macro-core soil sampler or equivalent) lined with an acetate sleeve. Upon retrieval, each sample will be visually inspected for the presence of impacts, and any observations will be noted. Sample headspace will be screened using a photoionization detector (PID) calibrated daily to a Benzene response standard. Visual and textural soil characterizations will be based on the Unified Soil Classification System (USCS).

Select soil samples collected during boring advancement activities will be submitted for laboratory analysis in accordance with Section 2.1 of NYSDEC DER-10. Up to six samples per boring will be submitted for laboratory analysis. Surface soil samples (0-2, 2-12 and 12-24 in bgs) will be collected from each location to assess potential human exposures to soil. Subsurface soil samples will be collected from 2-4 ft bgs, 4-6 ft bgs and 6-8 ft bgs in an effort to provide a profile of subsurface conditions.

A structured tiered approach will be used to analyze the soil samples collected from each boring. Initially, all 12-24 in bgs and 2-4 ft bgs samples will be analyzed for each boring. Samples may be submitted to the laboratory with rushed turnaround time instructions to ensure that all analyses are completed within the required hold times. Based on presence of Site COCs detected above the regulatory standards in these samples, the next depth tier (4-6 ft bgs) will then be analyzed followed by the maximum depths sampled in each boring location (6-8 ft bgs). In addition, if Site COCs are not detected above regulatory standards in the 12-24 in bgs samples, the shallower samples (0-2 in bgs and 2-12 in bgs) will then be analyzed starting with the 2-12 in bgs sample followed by the 0-2 in bgs. Soil sampling activities will be conducted in accordance with Section 3.5 of the NYSDEC DER-10 and Roux SOPs.[5] Samples collected for laboratory analysis will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory approval Program (ELAP) certified laboratory. Sampling activities will be conducted in accordance with NYSDEC standards as well as Roux SOPs.

[4] Roux will work with the identified off-Site property owners to arrange and identify suitable secure storage areas.
[5] Any deviations from these guidance documents will be reviewed with the NYSDEC prior to implementing.

All soil samples submitted for laboratory analysis under the tiered approach will be analyzed for SVOCs plus tentatively identified compounds (TICs) by EPA Method 8270C, as well as for TAL Metals by EPA Method SW846 6010B and 7470A. The subsurface soil samples submitted for laboratory analysis under the tiered approach and any samples that screen at or above 10 ppm on the PID will also be analyzed for Volatile Organic Compounds (VOCs) plus TICs by EPA Method 8260B. Due to the short laboratory hold times for VOC analysis, all samples collected for VOCs will be analyzed upon submittal. Additional parameters may be submitted (i.e., from stockpiles) to determine if the soil meets 6 NYCRR Part 360 Beneficial Use Determination (BUD) criteria and can be re-used, including PFAS compounds and 1,4-dioxane. Based on conversation with the NYSDEC, a potential location for soil reuse is the neighboring BCP Site No. C828190 where future BCP activities being performed by the City of Rochester are expected to include importing fill to raise the grade in some areas. It is expected that a portion of the soil to be removed from the three residential properties will be suitable as fill below an appropriate cover system. Roux has initiated conversations with the City of Rochester (owner of neighboring BCP Site No. C828190) regarding this matter. As an additional provision in the event that the soil may not be re-used, parameters may also be submitted for waste pre-characterization and analyzed in accordance with the disposal requirements of the selected permitted commercial solid waste disposal facility. Soils that are suitable for reuse will be managed separately from soils that are not suitable for reuse.

4.3 Underground Utilities Location

Prior to performing soil sampling and excavation activities, DigSafelyNewYork, Inc. and the City of Rochester, New York water and sewer departments will be contacted to identify and mark, if applicable, known utilities, sewer lines, storm water drainage lines and/or pipelines in the vicinity of the proposed boring locations. Any current and/or historical as-built maps found in the Site file or obtained from ExxonMobil, the City of Rochester, property owners/lessees, etc. will also be reviewed for potential subsurface structure locations. Soil boring locations will also be cleared to a depth of at least 4 ft bgs using an air-knife, vacuum truck and/or hand tools prior to the advancement of soil borings with mechanical equipment.

4.4 Health and Safety Plan Development

Roux has prepared a Site-specific HASP that will be adhered to by all personnel involved in the work activities (see **Appendix C**). The Site-specific HASP was prepared in accordance with the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response Standards (29 CFR 1910.120 and 1926.65) and other OSHA requirements for job safety and health protection, as well as DER-10 Section 1.9 and Roux's SOPs (**Appendix B**). The HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be used by personnel to address potential health and safety hazards during investigation at the Site. The Site-specific HASP includes Safety Data Sheets (SDS) for chemicals and materials being used and personal protective equipment (PPE) requirements specific to the type of work that will be conducted. Various documents were consulted while preparing the HASP, including the National Institutes of Safety and Health (NIOSH's) Occupation Safety and Health Guidance Manual for Hazardous Waste Activities. The Site-specific HASP will be adhered to by all personnel involved in the work activities. A copy of the HASP will be on Site at all times during work activities.

Site-specific information in the HASP includes:

- Personnel training requirements;
- Description of field activities;
- Decontamination procedures;
- Waste disposal protocols;
- Monitoring procedures for Site operations;
- A hazard assessment;
- The designation of a Site Health and Safety Officer (SHSO);
- A heavy equipment exclusion zone policy; and
- A Community Air Monitoring Plan (CAMP).

The HASP designates a SHSO who will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is identified during the field investigation and/or remedial activities.

Remedial construction specialty contractors (Contractors) working under the direction of Roux will be required to prepare and submit a Site-specific HASP prior to initiation of work activities that will cover their employees and their project-specific tasks. Contractors will monitor general Site conditions for safety hazards to verify that all OSHA requirements outlined in 29 CFR Part 1910 and 1926 are adhered to.

4.5 Mobilization and Site Preparation

A project kick-off meeting will be conducted with NYSDEC, Roux, and Contractors prior to the commencement of remediation activities. Contractors shall supply any labor and materials required for the removal and disposal of contaminated soil and placement of backfill. In addition, all necessary insurance certificates, disposal facility permits, imported clean fill documentation, and any other required documents shall be obtained prior to mobilization. Core work hours will be from 8:00 am to 5:00 pm. Minimal trucking will occur at the Site provided excavated material can be re-used at neighboring BCP site(s). Efforts will be made to minimize disruption and traffic through the neighborhood.

Mobilization and Site preparation activities will include the following (as discussed in further detail in the following sections):

- Mobilization of equipment to the work area.
- Installation of safety fencing in order to delineate the work zones, act as work area security measures, and mark the truck loading and decontamination areas.
- Implementation of erosion and sediment control measures in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.[6]
- Set-up of temporary facilities (e.g., construction field trailer and portable toilets) and decontamination facilities, including decontamination pad, in order to decontaminate trucks and other vehicles/equipment entering and exiting the work area.

[6] NYSDEC Division of Water, New York State Standards and Specifications for Erosion and Sediment Control, August 2005.

4.6 Temporary Facilities and Controls

Temporary facilities for use during the remedial work may include a construction field trailer and portable toilets. Controls, including safety fencing, odor and dust suppression, and erosion control (silt fencing will be installed around the work areas), will be employed for protection against off-Site migration of soil and safety hazards during construction. The controls are discussed in more detail below.

4.6.1 Access Controls

Site access is provided by private paved driveways from Exchange Street. Pending agreement from third party constituents, additional access to the Site may be provided via the south westerly abutting 15 Flint Street property. Access to this property is restricted by a locked 6-foot-tall chain link fence. Additional Site access is limited. Temporary safety construction fencing (i.e., 3-foot-tall orange plastic) will be placed around the perimeter of the work area to distinguish the work zone and further limit access. Site access controls will take into consideration on-Site and off-Site personnel who may be working at or living by the Site.

4.6.2 Dust and Odor Management

In accordance with the NYSDOH Generic CAMP and the Site-Specific CAMP included within the HASP (**Appendix C**), community air monitoring, as more fully described in Section 5.2.1, will be implemented during all ground intrusive or soil handling activities (including investigation activities) to monitor dust and odor potentially emanating from the work area. CAMP implementation will include air monitoring and periodic odor inspections during drilling, excavation, backfill or soil management activities. Air monitoring and odor inspection results will be documented and reported in accordance with the CAMP.

If community air monitoring indicates the need for dust suppression or if dust is visually observed leaving the Site or impacting the residences adjacent to the Site, Roux will spray water across the excavation, surrounding areas, and on-Site haul roads as necessary to mitigate airborne dust formation and migration. Water and spray equipment will be on-Site and ready to use prior to the start of excavation activities. Water will either be obtained from a public hydrant or provided by the on-Site water service, if available. Other dust suppression techniques that may be used to supplement the water spray include:

- Hauling materials in properly covered containers or vehicles;
- Restricting vehicle speeds on-Site; and
- Hydro-seeding of disturbed areas (as needed).

If the results of the soil boring activities indicates that VOC concentrations may be present during soil handling activities, BioSolve Pinkwater® (BioSolve)[7], or other commercially available vapor suppression product, will be applied to: the active excavation areas; material contained in on-Site roll off containers or dump trailers; stockpiled material (if any); or other areas emitting VOCs or odors. Other techniques to control migration of fugitive organic vapors and/or odors may be employed, including:

- Limiting the excavation size;
- Backfilling portions of the excavation;
- Spraying water onto the excavation faces and equipment;
- Covering soil stockpiles (if any) with 6-mil polyethylene sheeting;

[7] The need to have vapor suppression products on-Site prior to the start of excavation activities will be based on the results of the soil borings. It is not expected that odors will be a concern for this project.

- Hauling waste materials off-Site in properly covered container;
- Odor masking; and/or
- Pausing operations until the wind conditions change such that fugitive organic vapors and/or odors are not migrating toward downwind receptors.

4.6.3 Erosion and Sedimentation Control, and Stormwater Management

Erosion and sedimentation control will be implemented in accordance with the New York State Standards and Specifications for Erosion and Sediment Control. Soil erosion and sedimentation control measures will be employed by the Contractors to control stormwater runoff from entering or exiting the excavation or other work areas and to minimize any impact to surface water quality. The Contractors will install these measures around all work areas. These measures include installation of stabilized construction entrances, silt fencing, straw wattles, etc. Erosion and sedimentation control measures will be properly maintained at the down-gradient perimeter of the work area to reduce erosion and retain sediment on-Site during and after remediation activities. The down-gradient erosion and sedimentation controls will be left in place until all disturbed areas are permanently stabilized. Construction, maintenance, and implementation of soil erosion and sedimentation control practices will be performed by the Contractors as directed by Roux.

Stormwater Management Practices (SWMPs) to minimize stormwater impacts from stabilizing amendments, impacted soil, and waste materials include maintaining good housekeeping and spill control practices, and appropriately managing stockpiles. Visual inspections of cleared and graded areas of the Site, SWMPs, and soil and erosion control measures will be performed regularly to verify that the control mechanisms intended to minimize stormwater impacts and erosion are in good condition. The inspections will be documented, and records will be maintained on-Site during performance of the work.

5.0 SITE REMEDIATION ACTIVITIES

The remediation activities for this Work Plan will consist of the following tasks to achieve the RAOs and Site closure:

- Excavation of soil impacted by Site COCs exceeding Residential Use SCOs
- Excavation support activities including:
  - Community air monitoring;
  - Photo documentation of conditions to be appended in the Final Engineering Report;
  - Stockpiling of excavated material and backfill brought to the Site, if necessary;
  - Waste pre-characterization sampling;
  - Transport and disposal of excavated material at a permitted commercial solid waste disposal facility and/or exported off-Site for re-use as fill material upon approval of NYSDEC and the receiving property; and
  - Backfill and compaction of excavations with acceptable backfill material
- Site Restoration

5.1 Excavation of Contaminated Soil

Contaminated soil at the Site will be excavated to the greatest extent feasible and transported off-Site for disposal and/or BUD re-use. Excavation of contaminated soil is expected to result in a bulk-reduction/removal of SVOC and TAL metals soil contamination exceeding Residential Use SCOs. An estimated **1,000-3,000 cubic yards (cy)** of contaminated soil is estimated at the Site based on data provided in the 2018 LaBella Report. Note that this amount may change based on data collected during additional soil sampling activities planned at the Site.

Contaminated soil to be excavated has been observed based on information presented in the 2018 LaBella Report as shown on **Figure 2**. As noted, the determination of contaminated soil will be confirmed following the completion of further investigation activities planned at the Site. Excavation will proceed vertically and laterally based on the validated confirmatory data collected during the planned investigation activities. As discussed above, a tiered approach will be utilized to determine the extents of excavation. The lateral extent of excavation will be determined based on COCs detected in soil samples that exceed Residential RSOs. In the event that the extent of excavation is not established during soil boring activities, endpoint samples may be collected to confirm excavation extents. The vertical extent will be determined based on COCs detected in the deepest soil samples that exceed Residential RSOs. If COCs are detected in any of the 0-2 in bgs, 2-12 in bgs, or 12-24 in bgs, as a conservative approach, soil will be excavated to 2 ft bgs. The excavation limits will extend from the base of the slope adjacent to the abutting former junkyard property to where the backyards of the residential properties level off (see **Figure 2**). These limits with respect to the slope will be field verified by NYSDEC during soil boring activities. The depth, average thickness, and estimated volume of contaminated soil will be determined based on the data collected during the planned additional soil sampling activities.

The excavation sidewalls will be sloped to maintain both excavation sidewall stability and the geotechnical integrity of the surrounding ground surface and work area, as well as any nearby structures (e.g., buildings, trees, walls, etc.). The sloping will be determined by Roux personnel in consultation with the Contractors and will comply with Roux's SOPs and OSHA requirements (29 CFR 1926 Subpart P). All efforts will be made to implement sloping such that no contaminated soil will remain on-Site. If for some reason impacts are identified near large trees that cannot be taken down, Roux will work collectively with NYSDEC and NYSDOH to develop a path forward. The vertical extent of excavation is not anticipated to extend below the water table based on soil logging information in

the 2018 LaBella Report, which indicates that the water table is at an approximate depth of greater than 10 feet (the maximum vertical extent of excavation will not exceed 8 feet). If excavation in the vicinity of underground utilities is required, soft-digging techniques (e.g., hand digging, air knifing) will be utilized and additional excavation sidewall stabilization measures may be employed (e.g., trench box). Vibration monitoring will be assessed and likely be implemented based on the proximity of the excavation extents to nearby structures.

As discussed in more detail below, soil that is removed during the excavation will be segregated, stockpiled, and characterized for solid waste disposal and disposed of off-Site at a permitted commercial solid waste disposal facility and/or exported to a BUD re-use location.

The extent of contaminated soil to be removed will be delineated by soil analytical data collected during the planned investigation activities and prior to excavation activities. Roux will provide experienced personnel to document soil conditions during excavation activities at the Site. Upon completion of the excavation, a Final Engineering Report will be submitted and will include a P.E. Stamped as-built drawing showing the surveyed limits of the excavation(s).

5.2 Excavation Support Activities

5.2.1 Community Air Monitoring

As discussed above, a Site-specific CAMP has been prepared to ensure that investigation and remediation activities do not adversely affect nearby workers, residents or pedestrians on Site or in the area immediately surrounding the Site and to preclude or minimize airborne migration of VOCs and particulates to on and off-Site areas. The CAMP is included with the HASP (**Appendix C**) and will be available on-Site during the remediation activities.

Real-time community air monitoring will be performed during all ground intrusive and soil handling activities (for example, transferring excavated soils from stockpiles) at the Site. Roux will monitor for airborne particulates and VOCs along the downwind perimeter of the work area, including in the vicinity of the Site. Air monitoring will occur during soil boring, soil handling, excavation, grading, and soil/fill handling activities. CAMP monitoring shall be performed in accordance with the NYSDOH Generic CAMP, moreover, per NYSDEC's request and Special Requirements CAMP, VOCs and particulates will also be monitored in the direction of the nearest occupied structure in addition to the downwind monitoring location. This monitoring station is in addition to the downwind monitoring station unless the nearest occupied structure is also downwind of the work area. Air monitoring data gathered in accordance with the CAMP will be provided to the NYSDEC and NYSDOH daily to allow for evaluation of potential off-Site migration as well as response to community questions or concerns. Any monitoring results which exceed the action levels set by the CAMP or visual observations of dust leaving the Site will be reported to the Departments immediately.

The Final Engineering Report will include electronic appendices with all CAMP monitoring data and the exceedance reports described above. Any monitoring results which exceed the action levels set by the CAMP will also be summarized in a CAMP section of the report. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, the CAMP follows procedures and practices outlined under NYSDEC DER-10, including NYSDOH's Generic Community Air Monitoring Plan, and Fugitive Dust and Particulate Monitoring.

5.2.1 Stockpiling

To the extent practicable, soil intended for off-Site disposal and/or exported off-Site for re-use as fill material will be either live-loaded and immediately transported to the disposal facility and/or designated area for re-use pending access arrangements with third-party property owners. Soil intended for off-Site disposal and/or re-use (including 55-gallon drums) may not be stored on Site and must be immediately removed from the Site and stored either on the adjacent 15 Flint Street property or neighboring City of Rochester owned property in a secure location. Once neighboring Site access has been finalized and final soil disposal locations are determined, a figure showing trucking routes and stockpile locations will be provided for DEC and DOH approval. Backfill material for use on the Site (e.g., clean fill delivered to the Site) may be stockpiled. In the event that stockpiling is necessary, the soil/fill will be stockpiled in a segregated staging area lined with two layers of 10-mil poly sheeting and a perimeter berm. The Contractors will be responsible for installation, operation, and maintenance of the staging area. Stockpile(s) will be kept covered at all times with appropriately anchored polyethylene tarps of 12-mil thickness or greater except where soil is being placed or removed. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of stockpile inspections will be recorded in a logbook and included in the Final Engineering Report.

5.2.2 Waste Pre-Characterization Sampling

Waste pre-characterization samples will be analyzed in accordance with the disposal requirements of the selected permitted commercial solid waste disposal facility. In addition, samples will be collected to meet the criteria outlined in 6 NYCRR Part 360.12 (Beneficial Use) and DER-10 Table 5.4(10), including 1,4-dioxane and PFAS compounds[8] to petition for export as re-use of fill material at a qualifying site (i.e., adjacent City of Rochester BCP Site No. C828190). The analytical results will be sent to the selected disposal facilities for approval. All laboratory testing will be performed by an independent, NYSDOH ELAP-approved laboratory.

A waste disposal profile and/or BUD petition will be obtained prior to excavation, to facilitate live-loading of excavated material for transportation and off-Site disposal and/or export to BUD re-use location, respectively, to the extent practical. If necessary, additional waste disposal characterization and/or BUD samples will be collected during the excavation according to the analytical requirements of the selected solid waste disposal facility and/or off-Site re-use location, respectively.

5.2.3 Off-Site Transportation and Disposal/Re-use of Soil/Fill

As discussed above, BUD re-use samples and waste disposal pre-characterization samples will be collected prior to excavation, to facilitate live-loading of excavated material for transportation and off-Site re-use or disposal, to the extent practical. BUD re-use samples may also be collected from stockpiles if additional analysis is required. Material that has been pre-characterized and meets the BUD re-use location requirements will be directly loaded into lined dump trailers or stockpiled off-Site at a neighboring BCP Site pending access agreements if re-use location arrangements cannot immediately occur. If material cannot be re-used, it will either be direct loaded into trucks or stockpiled separately and will be disposed of at an ExxonMobil approved permitted commercial solid waste disposal facility. If scheduling of trucks, disposal facility acceptance, or other factors impedes the off-Site shipment, excavated material will be retained in soil stockpiles, as discussed above. Once neighboring Site access has been finalized and final soil disposal locations are determined, a figure showing trucking routes and stockpile locations will be provided for DEC and DOH approval. All transport of materials will be performed by licensed haulers in accordance with

[8] The composite samples in DER-10 Table 5.4(10) will also be analyzed for PFAS compounds and 1,4-Dioxane. PFAS sampling and data interpretation will be performed in accordance with the document entitled *Sampling, Analysis, And Assessment of Per-And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs* Dated January 2021.

appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). The selected commercial solid waste disposal facility will provide waste manifests and disposal receipts, which will be included in the Final Engineering Report submitted to NYSDEC.

Efforts will be made to minimize disruption and truck traffic through the neighborhood. Until the excavation is complete, the Contractors will be responsible for ensuring that all outbound trucks are inspected and will be brushed or washed, in the work area, or on the decontamination pad, to remove loose soil, prior to leaving the Site. Decontamination includes cleaning tires to prevent any dirt from being tracked onto roadways. Any dirt that is tracked onto a roadway will be immediately cleaned. To the extent possible, workers will enter the Site via Exchange street and not via 15 Flint street to avoid tracking contaminants from 15 Flint Street onto the Site. If workers need to enter the Site via 15 Flint Street, boots will be decontaminated prior to coming on Site. To the extent practicable, equipment will remain on 15 Flint Street to avoid tracking contaminants from 15 Flint Street onto the Site. When equipment needs to be brought onto the Site, all equipment tires/tracks will be decontaminated prior to entering the Site.

5.2.4 Backfill and Compaction with Acceptable Backfill Material

The excavation will be backfilled with acceptable backfill materials placed and compacted as outlined below. Placement of backfill will be to existing grade and will be suitable to sustain the growth of vegetation as specified in the restoration plan for each property (i.e., topsoil or loam). Grade elevations will be surveyed before and after work is completed to ensure that proper elevations have been restored. Each property will be returned to pre-existing conditions, to the extent feasible, in accordance with the design specifications for the property. Design and restoration specifications will be discussed and agreed upon with the property owner(s) prior to the start of work. The agreed upon design and restoration specifications for each property will also be submitted to DEC and DOH for approval.

5.2.4.1 Acceptable Backfill Materials

In accordance with Section 5.4(e) of NYSDEC DER-10, backfill material used on-Site may consist of the following materials:

1. Gravel, rock, or stone, consisting of virgin material, from a permitted mine or quarry may be imported, without chemical testing, if it meets the requirements of Section 5.4(e)5 of NYSDEC DER-10, or as otherwise approved by NYSDEC;
2. Imported soil/fill from known off-Site sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes. The imported soil/fill must meet allowable constituent levels for residential use, as specified in Appendix 5 of NYSDEC DER-10. No off-Site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2(a) shall be used as backfill. All backfill must be free of extraneous debris and solid waste and be recognizable soil or other unregulated material as set forth in 6 NYCRR Part 360 and materials for which NYSDEC has issued a BUD;
3. Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the Site; and,
4. On-Site soil, which meets 6 NYCRR, Part 375 Residential SCO, may be used on-Site without limitation.

All soil/fill brought to the Site will be appropriate for residential use. The top 6 inches as well as any material surrounding plantings per the design specifications for each property (including trees) will be suitable to sustain the growth of vegetation, and will be approved by NYSDEC prior to being brought to the work area. A *Request to Import/Reuse Fill or Soil* form will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. Backfill material will not be brought to the Site or project staging area until approved by NYSDEC.

5.2.4.2 Backfill Characterization Requirements

The backfill testing will be conducted according to the following characterization requirements in accordance with NYSDEC DER-10 Table 5.4(e)10:

Table 5.4(e)10
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site

Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
➢ 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Each composite sample will be comprised of a minimum of three grab samples (samples for VOC analysis will be collected as individual grabs in lieu of composites). Samples will be analyzed for VOCs, SVOCs (including 1,4-dioxane), metals, pesticides and polychlorinated biphenyls (PCBs) as identified in Appendix 5 of NYSDEC DER-10 and per- and polyfluoroalkyl substances in accordance with the document entitled *Sampling, Analysis, And Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Program* dated January 2021. All laboratory testing will be performed by an independent, NYSDOH ELAP-approved laboratory.

5.2.4.3 Placement of Backfill

Backfilling will closely follow the excavation work to minimize the amount of open excavation. Backfill will be brought to the Site on an as needed basis in order to minimize stockpiling. To prevent cross contamination, excavated material will not be stockpiled in areas that have been backfilled. A sufficient distance will be maintained between the backfill placed into the excavation and the working face of the excavation to prevent contact or mixing with contaminated soil designated for removal. Wetting of the backfill soil during placement, spreading, and compaction will be performed as needed to maintain fugitive dust below the CAMP action limits. The backfill will be compacted to meet the appropriate requirements and Proctor compaction testing will be conducted upon completion. In addition, the upper 6 inches of soil and any soil surrounding trees or other plantings (per the design specifications for each property) will be suitable to sustain the growth of vegetation.

5.3 Site Restoration Activities and Demobilization

The equipment, materials, and temporary facilities installed during the remedial activities will be removed from the Site after implementation of the remedy. A certification from the Contractors will be prepared to confirm that all equipment used during the performance of the work has been properly decontaminated prior to leaving the Site. As stated above, decontamination includes cleaning tires to prevent any dirt from being tracked onto roadways. Upon final demobilization, any dirt that is tracked onto a roadway will immediately be cleaned.

Final Site restoration shall include:

- The following of a preconceived restoration and planting plan that has been developed jointly with the property owner(s) and has been submitted to the NYSDEC and NYSDOH for approval, particularly regarding appropriate, allowable, non-invasive species planting and acceptable maintenance and monitoring.
- Restoration of disturbed portions of the Site to pre-remediation conditions with respect to topography, hydrology, and vegetation, to the extent practicable.
- Restoration sufficient to ensure the effectiveness and compliance with the remedial program. Any disturbance to or removal of above or below grade structures such as raised garden beds, lawn ornaments, irrigations systems, etc. will be returned to preexisting condition per the aforementioned restoration and planting plan.
- If there is a condition where a tree remains in place and contamination is left, NYSDEC and NYSDOH will be included in the discussion and decision on how to proceed.
- Photo documentation will be collected to document the pre-excavation and post-restoration site conditions and will be included as an appendix in the Final Engineering Report.

6.0 QA/QC PROTOCOLS

The following Quality Assurance Project Plan (QAAP) has been prepared for the soil sampling activities.

6.1 Project Organization

This QAAP was prepared in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and has been reviewed by Jim Dick, the Quality Assurance Officer for Roux. This project is managed by Ian Reed of Roux under the direction of Elizabeth Zinkevicz, Project Manager of ExxonMobil.

6.2 Sampling Procedures and Equipment Decontamination Procedures

Soil samples will be collected in accordance with applicable Roux SOPs (**Appendix C**). Field screening using a PID will be performed in accordance with Roux SOPs. All sampling equipment will be decontaminated in accordance with Roux SOPs.

6.3 Sampling Locations

As previously indicated, up to 21 soil borings are proposed to be advanced at the Site. Soil samples will be collected at continuous intervals from ground surface to the final depth of the boring. At least four soil samples collected from each of the soil borings are proposed to be submitted for laboratory analysis. The proposed soil boring locations are shown on **Figure 2**.

6.4 Analytical Methods/Quality Assurance

The following Analytical Methods/Quality Assurance Summary Table has been prepared for the environmental and quality control samples associated with the proposed soil sampling activities:

Surface Soil:

Field Samples	Trip Blank	MS/MSD	Duplicate	Analytical Method	Preservative	Container/Volume	Holding time
Approximately 63 soil samples	1/cooler	4	4	SVOCs USEPA 8270	Ice	1x16-oz jar	14-day
				TAL Metals EPA Methods SW846 6010B & 7470A	Ice	1x16-oz jar	28+-day

Subsurface Soil:

Field Samples	Trip Blank	MS/MSD	Duplicate	Analytical Method	Preservative	Container/Volume	Holding time
Approximately 63 soil samples	1/cooler	4	4	VOCs USEPA 8260	MeOH & Ice	2x40-ml vial	48-hour*
				TAL Metals EPA Methods SW846 6010B & 7470A	Ice	1x16-oz jar	28+-day
				SVOCs USEPA 8270	Ice	1x16-oz jar	14-day

BUD Re-Use Soil:

Field Samples	Trip Blank	MS/MSD	Duplicate	Analytical Method	Preservative	Container/Volume	Holding time
6 grab soil samples	1/cooler	1	1	VOCs USEPA 8260	MeOH & Ice	2x40-ml vial	48-hour*
3 composite samples				SVOCs USEPA 8270	Ice	1x16-oz jar	14-day
				PAFS USEPA 537.1[9]	Ice	3x250-mL HDPE bottles	14+-day
				1,4-dioxane USEPA 8270 SIM	Ice	1x16-oz jar	7-day
				Pesticides/PCBs	Ice	1x16-oz jar	+28-day
				TAL Metals EPA Methods SW846 6010B & 7470A	Ice	1x16-oz jar	+28-day

Notes:
MS/MSD = Matrix Spike/Matrix Spike Duplicate
mL = milliliter
MeOH = Methanol
oz = ounce
*VOC samples must be frozen within 48 hours of collection. Upon freezing, hold time is 14 days.
If additional samples are collected, one Duplicate, MS/MSD will be collected for every 20 samples per sampling method.
BUD re-use soil samples analyzed for VOCs may be collected in conjunction with surface and subsurface soil samples.
Additional parameters may be collected based on disposal facility requirements.

All data deliverables submitted as part of this Work Plan will be requested in NYSDEC Analytical Services Protocol (ASP) Category B deliverables and a Data Usability Summary Report (DUSR) will be prepared in accordance with the requirements of Section 2.2 and Appendix 2B of DER-10 for all data used to characterize the Site. All analytical data generated as part of this Work Plan will be submitted to the NYSDEC EQuIS system. Data providers will be instructed to submit a complete data package to EQuIS.

6.5 Sampling Storage Methodology and Handling Requirements

Each soil sample interval will be collected using either hand-held devices or a track or truck mounted Geoprobe™ with a direct push sampling device lined with a dedicated acetate sleeve. All soil samples collected for laboratory analysis will be properly preserved in accordance with laboratory requirements, placed in appropriate containers, and transported on ice under a chain of custody to a NYSDOH ELAP-certified laboratory.

[9] Isotope dilution techniques will be utilized for the analysis of PFAS and reporting limits for PFOA and PFOS shall not exceed 0.5 ug/kg

7.0 PRINCIPAL PERSONNEL, WORK SCHEDULE AND REPORTING

7.1 List of Principal Personnel/Contact Information

Provided below is a list of key personnel involved in the work, contact information, and their responsibilities:

Elizabeth Zinkevicz – Project Manager
ExxonMobil Environmental and Property Solutions Company
647 Rt 1, Suite 14, PMB 253
York, Maine
(207) 363-8345
Elizabeth.e.zinkevicz@exxonmobil.com

Ian Reed – Principal Hydrogeologist
Roux Associates, Inc.
12 Gill Street, Suite 4700
Woburn, Massachusetts
(781) 569-4000
ireed@rouxinc.com

Noelle Clarke, P. E. – Principal Engineer
Roux Environmental Engineering and Geology, D.P.C.
209 Shafter Street
Islandia, New York
(631) 232-2600
nclarke@rouxinc.com

Jim Dick – Senior Scientist/Quality Assurance Officer
Roux Associates, Inc.
12 Gill Street, Suite 4700
Woburn, Massachusetts
(781) 569-4000
jdick@rouxinc.com

Grace van der Ven – Project Geologist/Site Operations Manager
Roux Associates, Inc.
12 Gill Street, Suite 4700
Woburn, Massachusetts
(781) 569-4000
mvanderven@rouxinc.com

7.2 Work Schedule and Reporting

Roux proposes to perform the work described herein in Spring 2021 depending on 1.) executing access agreements with third-party property owners and 2.) NYSDEC approval of this Work Plan. The additional soil sampling field activities are expected to take up to 5 days and excavation field activities are anticipated to take up to 10 days. A letter report summarizing the soil data along with the design specifications for each property as agreed upon with the property owner(s) will be provided to the NYSDEC within 60 days of completion of the investigation activities. Roux will not begin excavation work until NYSDEC and NYSDOH have reviewed the data. A Final Engineering Report for the Departments and property specific summary reports for the individual property owners will be submitted within 90 days of completion of the excavation and site restoration work. In response, Roux expects a No Further Action letter prepared by the NYSDEC.

Respectfully Submitted,

ROUX ASSOCIATES, INC.

Grace van der Ven
Geologist/Project Manager

Jim Dick
Senior Scientist

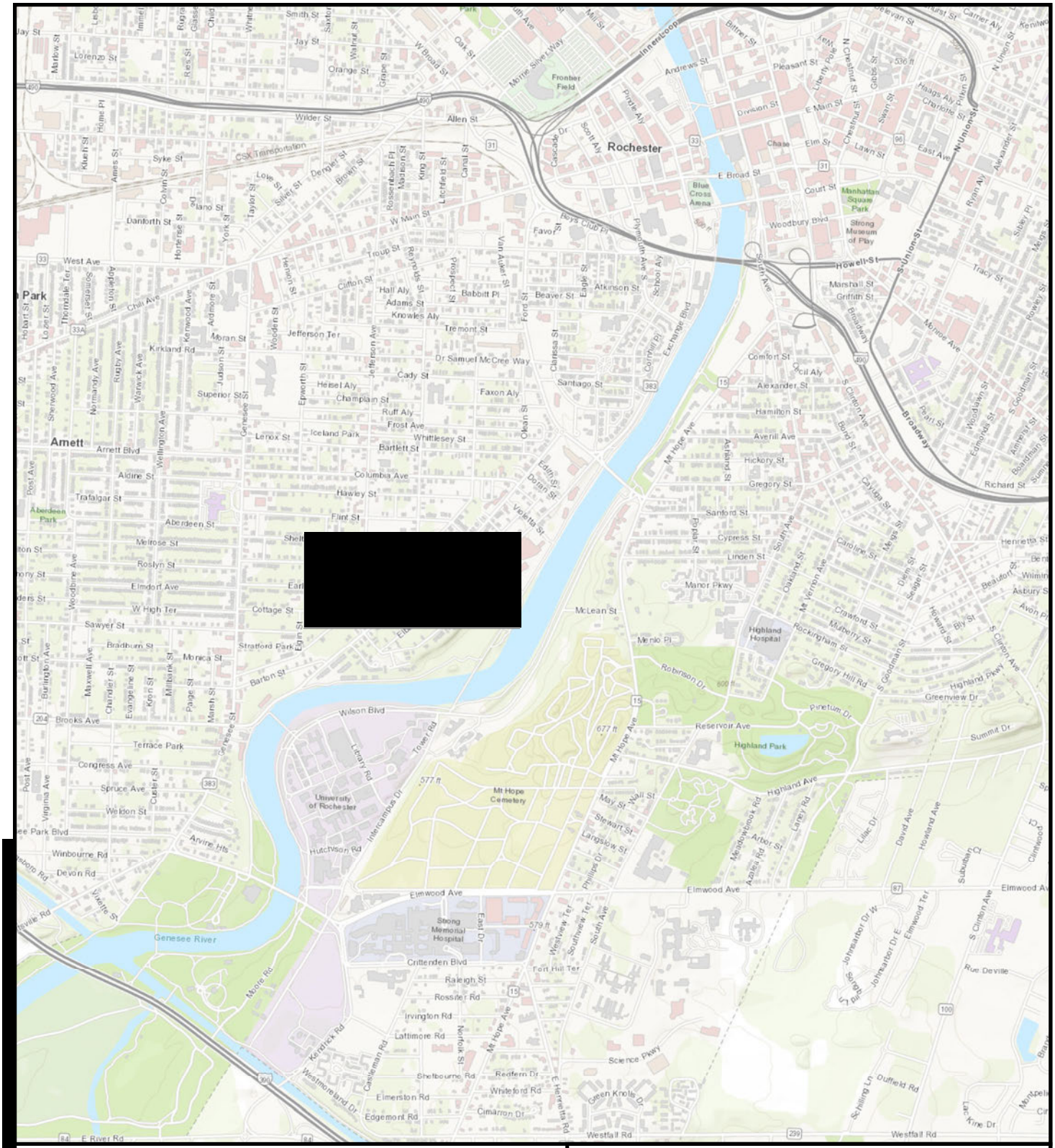
Ian T. Reed
Principal Hydrogeologist

Roux Environmental Engineering and Geology, D.P.C.

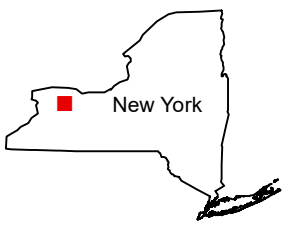
Noelle Clarke
Principal Engineer

FIGURES

1. Site Location Map
2. Site Plan



QUADRANGLE LOCATION



N

1,000 0 1,000'

Title:

SITE LOCATION MAP

EXCHANGE STREET RESIDENTIAL PROPERTIES
ROCHESTER, NEW YORK

Prepared for:

EXXONMOBIL ENVIRONMENTAL AND PROPERTY SOLUTIONS

ROUX

Compiled by: SB	Date: 01/13/21	FIGURE
Prepared by: SB	Scale: AS SHOWN	1
Project Mgr: IR	Project: 0172.0180M012	
File: Fig. 1 Site Location - NY.mxd		

N

10 0 10 20
Feet

Title:
PROPOSED SOIL BORING AND EXCAVATION AREA

EXCHANGE ST RESIDENTIAL PROPERTIES
ROCHESTER, NEW YORK

Prepared For:
EXXONMOBIL ENVIRONMENTAL & PROPERTY SOLUTIONS

ROUX

Compiled by: SB	Date: 21APR21	FIGURE
Prepared by: GV	Scale: AS SHOWN	2
Project Mgr: IR	Project: 0172.0180M012	
File: Residential Work PlanRev3.mxd		

APPENDICES

A. August 29, 2018 Former Vacuum Oil [redacted] Exchange Street by Labella Associates, D.P.C.

B. Roux Standard Operating Procedures (SOPs)

C. Health and Safety Plan (HASP)

APPENDIX A

August 29, 2018 Former Vacuum Oil [redacted] Exchange Street by Labella Associates, D.P.C.

August 29, 2018

Mr. Frank Sowers
New York State Department of Environmental Conservation
6274 Avon-Lima Rd. (State Rtes. 5 and 20)
Avon, NY 14414-9516

RE: **Former Vacuum Oil**
[redacted] Exchange Street,
Rochester, New York, 14608
Spill No. 0370583, CallOut ID: 134788

Dear Mr. Sowers,

LaBella Associates, D.P.C. ("LaBella") is pleased to submit this letter summarizing soil sampling activities by LaBella on June 1, 2018 at the properties located at [redacted] Exchange Street, Rochester, New York, 14608 hereinafter collectively referred to as the "Site". Shallow and subsurface samples were taken of soil from the Site and submitted for analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and target analyte list metals.

Site Background

The Site is comprised of four (4) parcels [redacted] Exchange St. "Property 1," [redacted] Exchange St. "Property 2," [redacted] Exchange St. "Property 3," and [redacted] Exchange St. "Property 4"). Property 1 and the western adjacent area (15 Flint Street) were formerly developed as the Vacuum Oil Refinery. This investigation was designed to assess for impairment to the subsurface of all properties in proximity to the western Site borders and the former industrial activity which transpired there.

Scope of Work

To achieve the project objectives the following Scope of Work was performed:

1. Prior to the initiation of subsurface work, an underground utility stake-out, via *Dig Safely New York*, was completed at the four (4) properties (ticket numbers: 05248-540-032, 05248-540-035, 05248-540-036, 05248-540-038) to locate utilities in the areas where the subsurface assessment would take place.
2. Eight (8) shallow soil borings were advanced with a hand auger, two (2) each proximate the western borders of Properties 1 through 4. At each property samples were collected from 2 locations along the approximate centerline of the property perpendicular to the property line shared with 15 Flint Street. One location was 5 to 10 feet (ft) from the property line shared with 15 Flint Street. The second sample will be 15 to 20 ft from the property line shared with 15 Flint Street. Shallow borings were advanced with a hand auger to depths of 2 ft below ground surface (bgs). Three (3) soil samples were collected from each location at the following depths: 0 to 2 inches (in) bgs (below the sod layer), 2 to 12 in bgs, and 12 to 24 in bgs. Soil boring locations are depicted on Figure 2.

3. A direct push soil boring and sampling program of the overburden at the Site was implemented. Soil borings were advanced with a track-mounted Geoprobe® Systems Model 54-LT direct-push sampling system. A total of two (2) soil borings were advanced at the Site to depths ranging from 15 to 20 ft bgs. Soil boring locations are depicted on Figure 2.
4. Soils from the borings were continuously assessed for visible impairment, olfactory indications of impairment, and/or indication of detectable volatile organic compounds (VOCs) with a MiniRae® 3000 photo-ionization detector (PID). Positive indications from any of these screening methods are collectively referred to as "evidence of impairment."
5. Soil samples were placed in a cooler on ice and sent under standard chain of custody procedures to TestAmerica Laboratories, Inc. in Amherst, New York.

Soil Borings

LaBella mobilized to the Site on June 1, 2018 for the purposes of soil characterization. In total, LaBella advanced eight (8) soil borings at the Site to depths ranging from 0 to 24 inches below the ground surface (ft bgs). Two (2) deep soil borings were advanced on Property 1; Soil boring SB-02 encountered shallow refusal on apparent concrete fill at a depth of 1.2 feet below ground surface (ft bgs). Soil boring SB-03 was advanced to a total depth of 14.2 ft bgs. Soil Boring Logs are included in Attachment 1. Soil boring locations are detailed on Figure 2.

Soils from the soil borings were continuously assessed for visible impairment, olfactory indications of impairment, and indication of detectable VOCs with a MiniRae® PID. Select soil samples were placed in a cooler on ice and sent under standard chain of custody procedures to TestAmerica Laboratories Inc. (TestAmerica) in Amherst, New York. All samples were analyzed for Commissioner Policy-51 (CP-51) List and Target Compound List (TCL) semi-volatile organic compounds (SVOCs) plus tentatively identified compounds (TICs). Surface soil samples were analyzed for Target Analyte List (TAL) metals and deep soil samples were analyzed for CP-51 List and TCL VOCs plus TICs.

Findings

Field Screenings

Soil boring logs were completed for the two (2) deep soil boring locations SB-02 and SB-03 on Property 1 (Attachment 1). Slightly elevated PID readings (6.9 to 23.1 parts per million [ppm]) were encountered from approximately 11 ft bgs to boring refusal at 14.2 ft bgs in SB-03. Two (2) soil samples were collected from SB-03 (11 to 12 ft bgs and 13 to 14.2 ft bgs) and submitted for VOC and SVOC analysis. Since there was no evidence of impairment observed in the soil boring SB-02 and the shallow boring refusal depth of 1.2 ft bgs, no samples were submitted for laboratory analysis from this location.

No evidence of impairment was observed in the surface soil borings (shallow) advanced on the four (4) properties.

Laboratory Results

The analytical concentrations of VOCs, SVOCs and metals reported for the soil samples submitted for analysis are summarized in Tables 1, 2, and 3, respectively. TICs were reported with the VOC analytical results for samples SB-03(11-12 ft and 13-14.2 ft), TICs were reported with the SVOC analytical results for samples SS-03, SS-04, SS-05, SS-06 at all depths, SS-08 (2-12 in and 12-24 in), and SB-03 (11-12 ft and 13-14.2 ft). A copy of the laboratory report is included in Attachment 2.

The following is a summary of the laboratory analytical results for the soil samples collected from each property.

Property 1: Based on the laboratory analytical results, VOCs were detected at concentrations in the deep soil samples below NYSDEC Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (Unrestricted SCOs). VOC TICs were detected in both samples submitted for the samples collected at SB-03.

SVOCs benzo(a)pyrene and benzo(b)fluoranthene were detected at concentrations that exceed NYSDEC Part 375-6.8(a) Residential Use Soil Cleanup Objectives (Residential SCOs) in samples collected from SS-01 at depths of 2-12 inches and 12-24 inches.

Metals calcium, lead, and mercury were detected at concentrations greater than Unrestricted Use SCOs in samples collected from SS-01 and SS-02 at all depths. Zinc was detected at concentrations greater than Unrestricted Use SCO in samples collected from SS-01 at all depths. Copper was detected at concentrations greater than Unrestricted Use SCO in samples collected from SS-01 (2-12 in and 12-24 in). Iron was detected at concentrations greater than NYSDEC Part 375-6.8(a) Residential Use SCO.

Property 2: SVOCs benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected at concentrations that exceed Residential Use SCOs in samples collected from SS-03(0-2 in and 12-24 in) and SS-04 at all depths. SVOCs chrysene and indeno(1,2,3-cd)pyrene were detected at concentrations that exceed Residential Use SCOs in samples collected from SS-03 (0-2 in and 2-12 in) and SS-04 at all depths. Benzo(k)fluoranthene was detected at a concentration that exceeded Residential Use SCOs in sample SS-04 (12-24 in).

Iron was detected at concentrations greater than Residential Use SCO in samples collected from SS-03 and SS-04 at all depths. Lead was detected at a concentration greater than Unrestricted Use SCO in samples collected from SS-03 and SS-04 at all depth, except the sample collected at SS-04(2-12 in) where the concentration exceeded Residential Use SCO. Calcium was detected at concentrations greater than the Unrestricted Use SCO in samples collected from SS-03 (12-24 in) and SS-04 all depths. Zinc and mercury were detected at concentrations greater than Unrestricted Use SCOs in samples collected from SS-03 (0-2 in and 12-24 in) and SS-04 at all depth. Copper was detected at concentrations greater than Unrestricted Use SCOs in samples collected from SS-04 (2-12 in and 12-24 in).

Property 3: SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected at concentrations that exceed Residential Use SCOs in samples collected from SS-06 all depths. Benzo(k)fluoranthene was detected at concentrations that exceeded Residential Use SCOs in sample SS-06 (12-24 in).

Iron was detected at concentrations greater than Residential Use SCO in samples collected from SS-05 and SS-06 at all depths. Arsenic was detected at concentrations greater than Residential Use SCO in the sample SS-05(2-12 in). Lead, zinc, and mercury were detected at concentrations greater than Unrestricted Use SOCs in samples collected from SS-05 and SS-06 at all depths, except SS-06 (2-12 in) where lead was detected at a concentration greater than Residential Use SCO. Copper was detected at concentrations greater than Unrestricted use SCO in samples SS-05 (0-2 in and 2-12 in).

Property 4: SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected at concentrations that exceed Residential Use SCOs in samples collected from SS-07 at all depths and SS-08 (0-2 in). Benzo(k)fluoranthene was detected at concentrations that exceeded Unrestricted Use SCOs in sample SS-07 (0-2 in).

Iron was detected at concentrations greater than Residential Use SCO in samples collected from SS-07 and SS-08 at all depths. Arsenic was detected at concentrations greater than Residential Use SCO in the sample SS-08(2-12 in) and at concentrations greater than Unrestricted Use SCOs in

samples SS-08(0-2 in and 12-24 in). Calcium and lead were detected at concentrations greater than Unrestricted Use SCOs in samples collected from SS-07 and SS-08 at all depths. Chromium was detected at a concentration greater than Unrestricted Use SCO in sample SS-08(2-12 in) and at a concentration greater than Residential Use SCO in sample SS-07(12-24 in). Zinc and Mercury were detected at concentrations greater than Unrestricted Use SCOs in samples SS-07 (all depths) and SS-08(0-2 in).

Conclusions

In general, higher SVOC and metal concentrations were detected in the top 12 inches of the borings closest to the property boundaries shared with 15 Flint Street, with the exception of concentrations detected in soil samples collected from Property 4 which were higher at the soil boring farthest from the property boundary shared with 15 Flint Street. Observations made of the areas where the soil borings were advanced indicate gardening activities are conducted at Property 4, while the soil borings at the other properties were advanced in lawn areas or the brush line.

In general, iron concentrations detected in the soil borings across the four (4) properties ranged between 10,000 and 15,000 ppm. Since the iron concentrations detected were relatively consistent in most samples and are consistent with typical iron concentrations in soils throughout Monroe County, detections are indicative of natural background concentrations of iron rather than a release to the subsurface. However, iron concentrations detected in 2 samples, SS-03 (2-12 in) and SS-05 (2-12 in), were 4 to 5 times greater than the range detected in the other samples (45,500 ppm and 53,100 ppm, respectively).

We appreciate the opportunity to serve your professional environmental engineering needs. If you have any questions please do not hesitate to contact me at 585-454-6110.

Respectfully submitted,

LaBella Associates

Steven Rife
Environmental Geologist

Figure 1 – Site Location Map
Figure 2 – Testing Locations
Table 1 – Summary of Detected Volatiles in Soil
Table 2 – Summary of Detected Semi-Volatiles in Soil
Table 3 – Summary of Detected Metals in Soil
Attachment 1 – Soil Boring Logs
Attachment 2 - Laboratory Report

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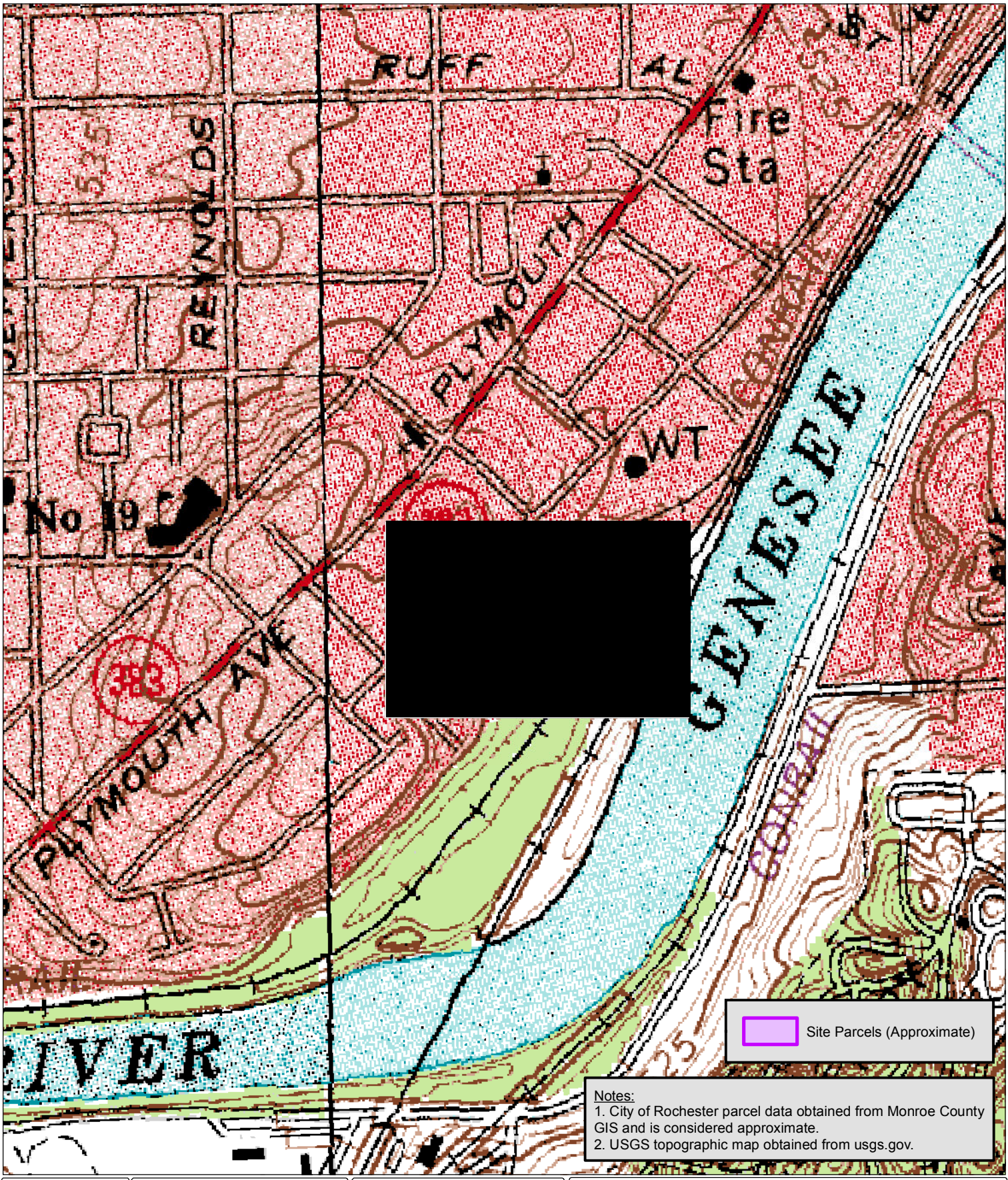
FIGURES



PROJECT/DRAWING NUMBER

2171937

FIGURE 2

DRAWING TITLE

Site Location Map

06/25/2018

DESIGNED BY: DKE
DRAWN BY: SMR
REVIEWED BY: SMR

PROJECT/CLIENT

Phase II Environmental Site Assessment

[redacted] Exchange Street, Rochester, New York

Client: NYSDEC

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0 250 500 1,000 Feet

1 inch = 500 feet

N W E S

Path: J:\NYSDEC\2161937 - Investigation & Remediation\022 - Former Vacuum Oil CallOut 134788\Drawings\Figure 1 - Site Location Map.mxd

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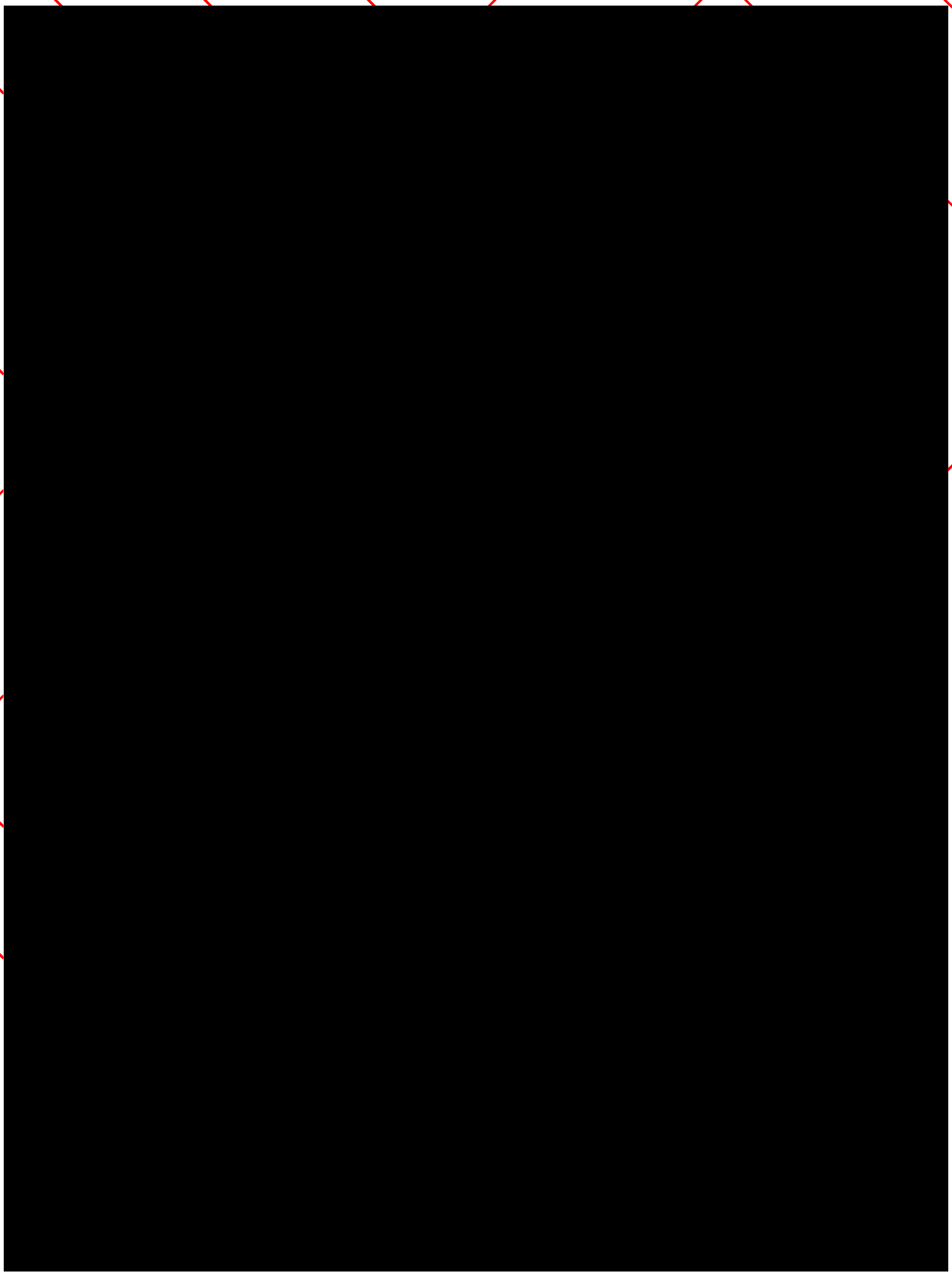

ANALYTICAL SUMMARY TABLES

Table 1 - Summary of Detected Volatiles in Soil
Phase II Environmental Site Assessment
[redacted] Exchange Street, Rochester, New York
Results in micrograms per kilogram (µg/kg) or parts per billion (ppb)

Sample ID	Part 375-6.8(a) Unrestricted Use SCOs	SB-03		SB-03	
Date Collected		6/1/2018		6/1/2018	
Sample Depth		11-12 ft bgs		13-14.2 ft bgs	
Location		Property 1		Property 1	
Volatile Organic Compounds					
4-Isopropyltoluene	NL	ND		2.8	J, vs
Acetone	50	5.8	J, vs	12	J, vs
Methyl Cyclohexane	NL	ND		1.2	J, vs
Methylene Chloride	NL	7.5	vs	5.3	J, vs
sec-Butylbenzene	11,000	5.4	J, vs	170	*, vs
Toluene	700	0.63	J, vs	1.7	J, vs
Trichloroethene	470	4.0	J, vs	5.1	J, vs

NOTES:

Volatiles analysis completed by Method 8260C

Orange highlighted cells indicate value above Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives.

"ND" indicates not detected.

"NL" indicates not listed.

All units in µg/kg (ppb)

Table 2 - Summary of Detected Semivolatiles in Soil - Page 1 of 2
Phase II Environmental Site Assessment
[redacted] Exchange Street, Rochester, New York
Results in micrograms per kilogram (µg/kg) or parts per billion (ppb)

Sample ID	Part 375-6.8(a) Unrestricted Use SCOs	Part 375-6.8(a) Residential Use SCOs	SS-01	SS-01	SS-01	SS-02	SS-02	SS-02	SB-03	SB-03	SS-03	SS-03	SS-03	SS-04	SS-04	SS-04
Date Collected			6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018
Sample Depth			0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	11-12 ft bgs	13-14.2 ft bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs
Location			Property 1	Property 1	Property 1	Property 1	Property 1	Property 1	Property 1	Property 1	Property 2	Property 2	Property 2	Property 2	Property 2	Property 2
Semivolatile Organic Compounds																
Acenaphthene	20,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	260 J	38 J	420 J	ND	ND	3,200 J
Acenaphthylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	230 J	52 J	280 J	ND	1,700 J	ND
Anthracene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	440 J	78 J	720 J	ND	ND	4,600
Benzo(a)anthracene	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	**2,500**	400	**2,200**	**2,400 J**	**8,100 J**	**13,000**
Benzo(a)pyrene	1,000	1,000	ND	**13,000 J, F2**	**1,900 J**	ND	ND	ND	ND	ND	**2,400**	410	**2,100**	**2,300 J**	**7,500 J**	**12,000**
Benzo(b)fluoranthene	1,000	1,000	ND	**16,000 J, F2**	**3,000 J**	ND	ND	ND	ND	ND	**3,000**	490	**2,500**	**3,200 J**	**9,900 J**	**14,000**
Benzo(g,h,i)perylene	100,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	1,700 J	330	1,600	1,900 J	4,900 J	9,400
Benzo(k)fluoranthene	800	1,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	260	ND	ND	ND	**7,000**
Carbazole	NL	NL	ND	ND	ND	ND	ND	ND	ND	ND	290 J	56 J	360 J	ND	ND	600 J
Chrysene	1,000	1,000	ND	ND	ND	ND	ND	ND	ND	ND	**2,800**	470	**2,800**	**3,000 J**	**7,600 J**	**12,000**
Dibenzofuran	7000*	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND	63 J	220 J	ND	ND	ND
Dibenz(a,h)anthracene	330	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	100,000	3,300 J	ND F2	3,900 J	1,100 J	1,300 J	ND	ND	ND	5,300	870	5,300	5,600	15,000	31,000
Fluorene	30,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	230 J	47 J	410 J	ND	ND	1,000 J
Indeno(1,2,3-cd)pyrene	500	500	ND	ND	ND	ND	ND	ND	ND	ND	**1,500 J**	270	**1,300**	**1,800 J**	**4,800 J**	**8,700**
2-Methylnaphthalene	NL	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND	130 J	ND	ND	ND	ND
Napthalene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	54 J	180 J	ND	ND	ND
Phenanthrene	100,000	100,000	2,500 J	ND	2,600 J	ND	ND	ND	ND	ND	3,100	560	4,400	2,400 J	5,200 J	15,000
Pyrene	100,000	100,000	3,200 J	ND F2	3,400 J	ND	ND	ND	ND	ND	4,800	740	5,100	4,600	12,000	26,000

NOTES:

Semivolatiles analysis completed by Method 8270D.

Bold numbers indicate value above Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives.

Orange highlighted cells indicate value above Part 375-6.8(a) Residential Use Soil Cleanup Objectives.

"*" indicates CP-51 Soil Cleanup Guidance dated October 21, 2010 - Supplemental Protection of Groundwater SCO criteria substituted.

"ND" indicates not detected.

"NL" indicates not listed.

All units in µg/kg (ppb)

"J" indicates result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

"F2" indicates MS/MSD RPD exceeds control limits.

"F1" indicates MS and/or MSD Recovery is outside acceptance limits.

Table 2 - Summary of Detected Semivolatiles in Soil - Page 2 of 2
Phase II Environmental Site Assessment
[redacted] Exchange Street, Rochester, New York
Results in micrograms per kilogram (µg/kg) or parts per billion (ppb)

Sample ID	Part 375-6.8(a) Unrestricted Use SCOs	Part 375-6.8(a) Residential Use SCOs	SS-05	SS-05	SS-05	SS-06	SS-06	SS-06	SS-07	SS-07	SS-07	SS-08	SS-08	SS-08
Date Collected			6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018
Sample Depth			0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs
Location			Property 3	Property 3	Property 3	Property 3	Property 3	Property 3	Property 4	Property 4	Property 4	Property 4	Property 4	Property 4
Semivolatile Organic Compounds														
Acenaphthene	20,000	100,000	ND	66 J	ND	ND	190 J	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	100,000	ND	27 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100,000	100,000	ND	130 J	ND	370 J	390 J	330 J	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	1,000	1,000	450 J	560	180 J	**1,400**	**1,500**	**1,100**	**1,800** J	**7,700** J	**2,000** J	**4,800** J	ND	290
Benzo(a)pyrene	1,000	1,000	470 J	560	160 J	**1,500**	**1,600**	**1,200** J	**2,100** J	**7,300** J	**2,000** J	**3,500** J	400 J	340
Benzo(b)fluoranthene	1,000	1,000	640 J	650	200 J	**1,700**	**2,100**	**1,100** J	**2,900** J, F2, F1	**8,700** J	**2,700** J	**4,900** J	530 J	430
Benzo(g,h,i)perylene	100,000	100,000	400 J	500	130 J	1,200	1,400	890 J	1,700 J	5,100 J	1,600 J	2,500 J	290 J	300
Benzo(k)fluoranthene	800	1,000	ND	340	ND	ND	ND	**890** J	**910** J	ND	ND	ND	150 J	140 J
Carbazole	NL	NL	ND	66 J	ND	ND	130 J	130 J	ND	ND	ND	ND	ND	ND
Chrysene	1,000	1,000	490 J	610	170 J	**1,500**	**1,600**	**1,100**	**2,100** J, F1	**7,500** J	**2,200** J	**3,500** J	360 J	320
Dibenzofuran	7000*	NL	ND	37 J	ND	ND	ND	240 J	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	330	330	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	100,000	950 J	1,200	350	3,400	3,400	2,800	3,400 J	15,000	4,600	9,400 J	580 J	460
Fluorene	30,000	100,000	ND	53 J	ND	150 J	160 J	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	500	380 J	390	120 J	**950** J	**1,100**	**820** J	**1,200** J	**4,500** J	**1,100** J	**1,900** J	260 J	220
2-Methylnaphthalene	NL	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	12,000	100,000	ND	ND	ND	ND	ND	ND	ND F2	ND	ND	ND	ND	ND
Phenanthrene	100,000	100,000	480 J	620	220	1,600	1,800	1,500	1,700 J	7,600 J	3,300 J	6,800 J	230 J	190
Pyrene	100,000	100,000	820 J	1,000	330	2,800	3,200	2,400	3,500 J	15,000	4,600	8,200 J	510 J	450

NOTES:

Semivolatiles analysis completed by Method 8270D.

Bold numbers indicate value above Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives.

Orange highlighted cells indicate value above Part 375-6.8(a) Residential Use Soil Cleanup Objectives.

"*" indicates CP-51 Soil Cleanup Guidance dated October 21, 2010 - Supplemental Protection of Groundwater SCO criteria substituted.

"ND" indicates not detected.

"NL" indicates not listed.

All units in µg/kg (ppb)

"J" indicates result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

"F2" indicates MS/MSD RPD exceeds control limits.

"F1" indicates MS and/or MSD Recovery is outside acceptance limits.

Table 3 - Summary of Detected Metals in Soil - Page 1 of 2
Phase II Environmental Site Assessment
[redacted] Exchange Street, Rochester, New York
Results in micrograms per kilogram (mg/kg) or parts per million (ppm)

Sample ID	Part 375-6.8(a) Unrestricted Use SCOs	Part 375-6.8(a) Residential Use SCOs	SS-01		SS-01		SS-01		SS-02		SS-02		SS-02		SS-03		SS-03		SS-03		SS-04		SS-04		SS-04	
Date Collected			6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018		6/1/2018	
Sample Depth			0-2 in bgs		2-12 in bgs		12-24 in bgs		0-2 in bgs		2-12 in bgs		12-24 in bgs		0-2 in bgs		2-12 in bgs		12-24 in bgs		0-2 in bgs		2-12 in bgs		12-24 in bgs	
Location			Property 1		Property 1		Property 1		Property 1		Property 1		Property 1		Property 2		Property 2		Property 2		Property 2		Property 2		Property 2	
Heavy Metals																										
Aluminum	10,000*	NL	5,110	B, F1	5,910	B	6,170	B	5,780	B	5,740	B	6,190	B	5,620	B	4,240	B	6,670	B	4,940	B	5,520	B	4,780	B
Antimony	12*	NL	ND	F1	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Arsenic	13	16	4.8		5.2		5.0		7.1		6.2		7.6		7.0		10		7.0		6.3		7.9		6.3	
Barium	350	350	47.4	F1, F2	56.8		56.9		52.1		56.6		71.2		116.0		70.4		84.4		117		153		107	
Beryllium	7.2	14.0	0.28		0.32		0.34		0.31		0.33		0.35		0.61		0.63		0.45		0.27		0.33		0.30	
Cadmium	2.5	2.5	0.34		0.41		0.40		0.30		0.36		0.44		1.2		0.20	J	0.21	J	1.0		0.97		0.69	
Calcium	10,000*	NL	**30,600**	B	**31,200**	B	**34,300**	B	**21,600**	B	**25,200**	B	**27,700**	B	5,220	B	1,900	B	**10,300**	B	**20,100**	B	**24,700**	B	**15,800**	B
Chromium	30	36	11.6		12.3	B	13.2	B	15.2	B	11.9	B	13.3	B	27.5	B	16.4	B	12.6		17.2	B	15.5	B	17.6	B
Cobalt	20*	20*	6.1		8.5		10.2		5.7		5.7		6.6		6.5		6.4		6.1		4.3		4.6		4.4	
Copper	50	270	35.1	B	**50.1**	B	**51.7**	B	34.8	B	25.7	B	32.1	B	48.9	B	38.6	B	38.4	B	46.2	B	**63.2**	B	**71.5**	B
Iron	2,000**	2,000**	**11,800**	B	**13,500**	B	**13,100**	B	**14,600**	B	**13,800**	B	**16,400**	B	**15,500**	B	**45,500**	B	**13,700**	B	**12,000**	B	**12,700**	B	**11,100**	B
Lead	63	400	**84.2**		**104**		**118**		**85.9**		**126**		**99.2**		**332**		**66.7**		**267**		**398**		**497**		**395**	
Magnesium	NL	NL	15,500		16,200		18,000		9,390		9,730		13,800		1,170		432		4,980		3,970		4,340		3,370	
Manganese	1,600	2,000	327	B	378	B	407	B	358	B	405	B	489	B	181	B	81.1	B	258	B	320	B	320	B	300	B
Nickel	30	140	11.7	B	13.4	B	13.0	B	14.5	B	13.4	B	15.2	B	15.9	B	17.0	B	14.2	B	11.1	B	12.6	B	13.6	B
Potassium	NL	NL	1,110	F1	1,260		1,360		1,270		1,250		1,340		673		1,620		974		1,160		1,490		1,300	
Selenium	3.9	36.0	ND		ND		ND		ND		ND		ND		ND		0.91	J	ND		ND		ND		ND	
Silver	2	36	ND		ND		ND		0.40	J	ND		ND		0.58	J	ND		ND		0.40	J	0.54	J	0.37	J
Sodium	NL	NL	108	J	102	J	111	J	134	J	91.3	J	104	J	81.5	J	109	J	106	J	101	J	123	J	111	J
Thallium	5*	NL	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Vanadium	100**	100**	15.8		17.1		19.5		15.7		16.2		17.8		19.2		20.7		18.1		14.2		14.8		12.5	
Zinc	109	2,200	**106**		**110**		**114**		98.5		75.3		71.8		**217**		48.4		**128**		**268**		**314**		**250**	
Mercury	0.18	0.81	**0.27**		**0.33**		**0.24**		**0.25**		**0.29**		**0.33**		**0.31**		0.066		**0.50**		**0.32**		**0.41**		**0.46**	

NOTES:

Metals analysis completed by USEPA methods 6010 and 7471.

Bold numbers indicate value above Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives.

Orange highlighted cells indicate value above Part 375-6.8(a) Residential Use Soil Cleanup Objectives.

"*" indicates CP-51 Soil Cleanup Guidance dated October 21, 2010 - Supplemental Protection of Ecological Resources SCO criteria substituted.

"**" indicates Part 375-6.8(b) Residential SCO criteria substituted.

"B" indicates compound was found in the blank and sample.

"J" indicates result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

"F1" indicates MS and/or MSD Recovery is outside acceptance limits.

"F2" indicates MS/MSD RPD exceeds control limits.

"ND" indicates not detected.

"NL" indicates not listed.

All units in mg/kg (ppm)

Table 3 - Summary of Detected Metals in Soil - Page 2 of 2
Phase II Environmental Site Assessment
[redacted] Exchange Street, Rochester, New York
Results in micrograms per kilogram (mg/kg) or parts per million (ppm)

Sample ID	Part 375-6.8(a) Unrestricted Use SCOs	Part 375-6.8(a) Residential Use SCOs	SS-05	SS-05	SS-05	SS-06	SS-06	SS-06	SS-07	SS-07	SS-07	SS-08	SS-08	SS-08
Date Collected			6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018	6/1/2018
Sample Depth			0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs	0-2 in bgs	2-12 in bgs	12-24 in bgs
Location			Property 3	Property 3	Property 3	Property 3	Property 3	Property 3	Property 4	Property 4	Property 4	Property 4	Property 4	Property 4
Heavy Metals														
Aluminum	10,000*	NL	7,360 B	7,190 B	8,930	8,260 F1	7,050	7,250	7,720	6,880	8,080	7,040	6,530	5,060
Antimony	12*	NL	ND	ND	1.5 J	1.4 J, F1	2.3 J	0.94 J	1.0 J	1.2 J	0.85 J	1.1 J	1.1 J	0.65 J
Arsenic	13	16	11.3	**21.5**	12.7	8.1	8.5	8.7	5.3	6.4	5.8	**14.8**	**21.6**	**13.8**
Barium	350	350	60.4	63.8	64.4	85.5	75.2	76.9	84.7	74.0	49.9	77.2	48.5	42.1
Beryllium	7.2	14.0	0.34	0.33	0.40	0.39	0.36	0.37	0.34	0.32	0.35	0.37	0.32	0.26
Cadmium	2.5	2.5	0.43	0.38	0.30 B	0.84 B	0.80 B	0.74 B	1.1 B	0.69 B	0.33 B	0.78 B	0.34 B	0.21 J, B
Calcium	10,000*	NL	2,670 B	1,950 B	2,030 B	4,280 B, F1	3,060 B	3,320 B	**23,500** B	**17,600** B	**17,600** B	**22,800** B	**23,700** B	**44,600** B
Chromium	30	36	10.9	13.2 B	15.2	12.8	11.8	11.5	15.2	12.2	**40.2** B	16.0	**32.6** B	9.8
Cobalt	20*	20*	4.2	19.1	4.1	4.5	4.0	4.1	5.7	4.9	4.9	5.4	5.1	3.7
Copper	50	270	**72.3** B	**220** B	29.3 B	29.2 B	44.4 B	26.3 B	40.1 B	50.0 B	18.0 B	34.0 B	28.9 B	12.9 B
Iron	2,000**	2,000**	**13,500** B	**53,100** B	**12,900** B	**13,200** B	**12,900** B	**11,600** B	**15,100** B	**13,900** B	**13,700** B	**13,200** B	**12,500** B	**10,000** B
Lead	63	400	**143**	**132**	**104**	**232**	**2,010**	**200**	**202**	**219**	**175**	**265**	**141**	**72.5**
Magnesium	NL	NL	1,570	1,230	1,390	1,580	1,330	1,370	3,920	3,600	6,010	7,530	7,630	8,500
Manganese	1,600	2,000	313 B	404 B	331	355	308	328	366	671	303	338	300	388
Nickel	30	140	10.4 B	14.9 B	8.2 B	11.5 B	9.2 B	9.0 B	14.0 B	12.8 B	17.7 B	13.0 B	22.1 B	8.6 B
Potassium	NL	NL	786	692	793	1,090 F1	863	847	1,650	1,290	1,380	1,600	1,360	1,230
Selenium	3.9	36.0	ND	ND	ND	ND	ND	0.52 J	ND	ND	ND	ND	ND	ND
Silver	2	36	ND	ND	ND	0.42 J	0.40 J	0.29 J	0.48 J	0.38 J	ND	0.60 J	ND	ND
Sodium	NL	NL	51.2 J	51.9 J	68.7 J	81.8 J	57.3 J	64.6 J	233	122 J	87.1 J	119 J	89.9 J	145 J
Thallium	5*	NL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	100**	100**	17.1	20.8	19.8	20.0	17.3	17.2	21.5	17.5	18.4	18.5	16.8	14.9
Zinc	109	2,200	**168**	**133**	**116**	**267**	**248**	**222**	**424**	**239**	**114**	**221**	98.8	58.1
Mercury	0.18	0.81	**0.68**	**0.79**	**0.52**	**0.41**	**0.47**	**0.42**	**0.35**	**0.37**	**0.20**	**0.31**	0.16 B	0.11 B

NOTES:

Metals analysis completed by USEPA Methods 6010 and 7471.

Bold numbers indicate value above Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives.

Orange highlighted cells indicate value above Part 375-6.8(a) Residential Use Soil Cleanup Objectives.

"*" indicates CP-51 Soil Cleanup Guidance dated October 21, 2010 - Supplemental Protection of Ecological Resources SCO criteria substituted.

"**" indicates Part 375-6.8(b) Residential SCO criteria substituted.

"B" indicates compound was found in the blank and sample.

"J" indicates result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

"F1" indicates MS and/or MSD Recovery is outside acceptance limits.

"F2" indicates MS/MSD RPD exceeds control limits.

"ND" indicates not detected.

"NL" indicates not listed.

All units in mg/kg (ppm)

ATTACHMENT 1 – SOIL BORING LOGS

LaBella
Powered by partnership.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST BORING LOG

Phase II Environmental Site Assessment
Geoprobe® Overburden Soil Sampling
[redacted] Exchange Street, Rochester, New York
Client: NYSDEC

BORING: **SB-01**
SHEET 1 OF 1
JOB: **2161937 PH 022**
CHKD BY: SMR

CONTRACTOR: LaBella Environmental, LLC
DRILLER: D. Hitchcock
LABELLA REPRESENTATIVE: S. Rife

BORING LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 6/1/2018 END DATE: 6/1/2018

TIME: TO
DATUM: NA
WEATHER:

TYPE OF DRILL RIG: Geoprobe® 54-LT
AUGER SIZE AND TYPE: NA
OVERBURDEN SAMPING METHOD: Direct Push

DRIVE SAMPLER TYPE:
INSIDE DIAMETER: ~1.8"
OTHER:

DEPTH (FT)	SAMPLE DATA: SAMPLE NO. AND DEPTH	SAMPLE DATA: SAMPLE RUN/RECOVERY	SAMPLE DATA: STRATA CHANGE	VISUAL MATERIALS CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0	SS-01 0"-2"	0-2.2' /		Brown topsoil, root mat, C SAND, litle F SR GRAVEL, dry, no odor	0.0	
2	SS-01 2"-12"				0.0	
	SS-01 12"-24"			Refusal 2.2' BGS		
4						
6						
8						
10						
12						
14						
16						
18						
20						

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED
			NA		

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.
3) ABBREVIATIONS:

and = 35 - 50%
some = 20 - 35%
little = 10 - 20%
trace = 1 - 10%

C = Coarse
M = Medium
F = Fine
VF = Very Fine

BGS = Below Ground Surface
NA = Not Applicable
A = Angular
R = Rounded
SA = Subangular
SR = Subrounded

BORING: **SB-01**

LaBella
Powered by partnership.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST BORING LOG

Phase II Environmental Site Assessment
Geoprobe® Overburden Soil Sampling
[redacted] Exchange Street, Rochester, New York
Client: NYSDEC

BORING: **SB-02**
SHEET 1 OF 1
JOB: **2161937 PH 022**
CHKD BY: SMR

CONTRACTOR: LaBella Environmental, LLC
DRILLER: D. Hitchcock
LABELLA REPRESENTATIVE: S. Rife

BORING LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 6/1/2018 END DATE: 6/1/2018

TIME: TO
DATUM: NA
WEATHER:

TYPE OF DRILL RIG: Geoprobe® 54-LT
AUGER SIZE AND TYPE: NA
OVERBURDEN SAMPING METHOD: Direct Push

DRIVE SAMPLER TYPE:
INSIDE DIAMETER: ~1.8"
OTHER:

DEPTH (FT)	SAMPLE DATA: SAMPLE NO. AND DEPTH	SAMPLE DATA: SAMPLE RUN/RECOVERY	SAMPLE DATA: STRATA CHANGE	VISUAL MATERIALS CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0	NO SAMPLE	0-1.2' / 8"		Brown SANDY topsoil, dry, little F SR to R GRAVEL, no odor	0.2	Apparent fill
				Refusal 1.2' BGS		
2						
4						
6						
8						
10						
12						
14						
16						
18						
20						

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED
			NA		

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.
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some = 20 - 35%
little = 10 - 20%
trace = 1 - 10%
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SA = Subangular
SR = Subrounded

BORING: **SB-02**

LaBella
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300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST BORING LOG

Phase II Environmental Site Assessment
Geoprobe® Overburden Soil Sampling
[redacted] Exchange Street, Rochester, New York
Client: NYSDEC

BORING: SB-03
SHEET 1 OF 1
JOB: 2161937 PH 022
CHKD BY: SMR

CONTRACTOR: LaBella Environmental, LLC
DRILLER: D. Hitchcock
LABELLA REPRESENTATIVE: S. Rife

BORING LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 6/1/2018 END DATE: 6/1/2018

TIME: TO
DATUM: NA
WEATHER:

TYPE OF DRILL RIG: Geoprobe® 54-LT
AUGER SIZE AND TYPE: NA
OVERBURDEN SAMPING METHOD: Direct Push

DRIVE SAMPLER TYPE:
INSIDE DIAMETER: ~1.8"
OTHER:

DEPTH (FT)	SAMPLE DATA: SAMPLE NO. AND DEPTH	SAMPLE DATA: SAMPLE RUN/RECOVERY	SAMPLE DATA: STRATA CHANGE	VISUAL MATERIALS CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0						Apparent fill
				Brown SANDY topsoil, dry, loose, little F SR to R GRAVEL	0.0	
2		0-4' / 1.8'			0.9	
			2.5'			
	SB-03 3'-4'				30.5	
4				Concrete chunks - obstructs probe tip	0.0	
					0.0	
		4'-8' / 2.7'	5.5'			
6					0.0	Apparent native
					0.0	
8				Brown F SAND, trace root material, damp, no odor	0.7	
					1.4	
		8'-12' / 2.1'			0.8	
10						
			10.5'		6.9	
	SB-03 11'-12'			Brown MC SAND, wet, no odor		
12			12'		0.7	
		12'-14.2' / 1.5'		Brown MC SAND, wet, faint petroleum odor, trace black stain	12.7	
	SB-03 13-14.2'				23.1	
14						
				Refusal 14.2' BGS		
16						
18						
20						

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED
			NA		

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.
3) ABBREVIATIONS:

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SA = Subangular
SR = Subrounded

BORING: SB-03

LaBella
Powered by partnership.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST BORING LOG

Phase II Environmental Site Assessment
Geoprobe® Overburden Soil Sampling
[redacted] Exchange Street, Rochester, New York
Client: NYSDEC

BORING: **SB-04**
SHEET 1 OF 1
JOB: **2161937 PH 022**
CHKD BY: SMR

CONTRACTOR: LaBella Environmental, LLC
DRILLER: D. Hitchcock
LABELLA REPRESENTATIVE: S. Rife

BORING LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 6/1/2018 END DATE: 6/1/2018

TIME: TO
DATUM: NA
WEATHER:

TYPE OF DRILL RIG: Geoprobe® 54-LT
AUGER SIZE AND TYPE: NA
OVERBURDEN SAMPING METHOD: Direct Push

DRIVE SAMPLER TYPE:
INSIDE DIAMETER: ~1.8"
OTHER:

DEPTH (FT)	SAMPLE DATA: SAMPLE NO. AND DEPTH	SAMPLE DATA: SAMPLE RUN/RECOVERY	SAMPLE DATA: STRATA CHANGE	VISUAL MATERIALS CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0	SS-02 0"-2"	0-1.8' / 1.2'		Brown topsoil, root mat, VC SAND, little MC to F SA to SR GRAVEL, dry, no odor	0.0	
2	SS-02 2"-12"				0.0	
	SS-02 12"-24"			Refusal 1.8' BGS		
4						
6						
8						
10						
12						
14						
16						
18						
20						

WATER LEVEL DATA			DEPTH (FT)		
DATE	TIME	ELAPSED TIME	BOTTOM OF CASING	BOTTOM OF BORING	GROUNDWATER ENCOUNTERED
			NA		

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.
3) ABBREVIATIONS:

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some = 20 - 35%
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VF = Very Fine

BGS = Below Ground Surface
NA = Not Applicable
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R = Rounded
SA = Subangular
SR = Subrounded

BORING: **SB-04**

ATTACHMENT 2 – LABORATORY REPORT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-136903-1
Client Project/Site: Former Vacuum Oil #0370583 PIN 07888

For:
New York State D.E.C.
6274 E. Avon-Lima Rd.
Avon, New York 14414

Attn: Mike Zamiarski

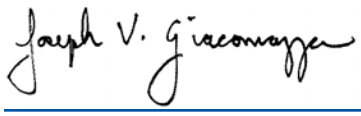
Joseph V. Giacomazza

Authorized for release by:
6/22/2018 12:05:03 PM
Joe Giacomazza, Project Management Assistant II
joe.giacomazza@testamericainc.com

Designee for

Orlette Johnson, Senior Project Manager
(484)685-0864
orlette.johnson@testamericainc.com

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed within the body of this report. Release of the data contained in this sample data package and in the electronic data deliverable has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.



Joe Giacomazza
Project Management Assistant II
6/22/2018 12:05:03 PM

Table of Contents

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
vs	Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.
*	ISTD response or retention time outside acceptable limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS VOA TICs

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Indicates an Estimated Value for TICs
N	Presumptive evidence of material.
T	Result is a tentatively identified compound (TIC) and an estimated value.

GC/MS Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

GC/MS Semi VOA TICs

Qualifier	Qualifier Description
J	Indicates an Estimated Value for TICs
N	Presumptive evidence of material.
T	Result is a tentatively identified compound (TIC) and an estimated value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F2	MS/MSD RPD exceeds control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-136903-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-136903-1

Comments
No additional comments.

Receipt
The samples were received on 6/5/2018 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.5º C.

GC/MS VOA
Method(s) 8260C: Internal standard responses were outside of acceptance limits for the following samples: SB-03 11'-12' (480-136903-1) and SB-03 13-14.2' (480-136903-2). The samples show evidence of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-419187 recovered above the upper control limit for 4-Nitrophenol, Atrazine, Hexachlorobutadiene and Hexachlorocyclopentadiene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: SS-01 0"-2" (480-136903-3), SS-01 2"-12" (480-136903-4), SS-01 12"-24" (480-136903-5), SS-02 0"-2" (480-136903-6), SS-02 2"-12" (480-136903-7), SS-02 12"-24" (480-136903-8), SS-03 2"-12" (480-136903-10), SS-03 12"-24" (480-136903-11), SS-04 0"-2" (480-136903-12), SS-04 2"-12" (480-136903-13), SS-04 12"-24" (480-136903-14), SS-05 0"-2" (480-136903-15), SS-05 2"-12" (480-136903-16), SS-05 12"-24" (480-136903-17), SS-06 0"-2" (480-136903-18), SS-06 2"-12" (480-136903-19) and SS-06 12"-24" (480-136903-20).

Method(s) 8270D: The following samples were diluted due to color, appearance and viscosity: (480-136903-A-4-A MS) and (480-136903-A-4-B MSD). Because of this dilution, the surrogate spike and matrix spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: The following samples were diluted due to color, appearance and viscosity: SS-01 0"-2" (480-136903-3), SS-01 2"-12" (480-136903-4), SS-01 12"-24" (480-136903-5), SS-02 0"-2" (480-136903-6), SS-02 2"-12" (480-136903-7), SS-02 12"-24" (480-136903-8) and SS-04 2"-12" (480-136903-13). Elevated reporting limits (RL) are provided.

Method(s) 8270D: The following samples were diluted due to color and appearance: SS-03 12"-24" (480-136903-11), SS-04 0"-2" (480-136903-12), SS-04 12"-24" (480-136903-14), SS-05 0"-2" (480-136903-15), SS-06 0"-2" (480-136903-18), SS-06 2"-12" (480-136903-19) and SS-06 12"-24" (480-136903-20). Elevated reporting limits (RL) are provided.

Method(s) 8270D: The following samples required a dilution due to the nature of the sample matrix: SS-01 0"-2" (480-136903-3), SS-01 2"-12" (480-136903-4), SS-01 12"-24" (480-136903-5), SS-02 0"-2" (480-136903-6), SS-02 2"-12" (480-136903-7), SS-02 12"-24" (480-136903-8), SS-04 0"-2" (480-136903-12), SS-04 2"-12" (480-136903-13) and SS-04 12"-24" (480-136903-14). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: Six surrogates are used for this analysis. The laboratory's SOP allows one acid and one base of these surrogates to be outside acceptance criteria without performing re-extraction/re-analysis. The following sample contained an allowable number of surrogate compounds outside limits: SS-03 2"-12" (480-136903-10). These results have been reported and qualified.

Method(s) 8270D: The continuing calibration verification (CCV) associated with batch 480-419382 recovered above the upper control limit for bis (2-chloroisopropyl) ether, 4-Nitrophenol, Atrazine, Hexachlorobutadiene and Hexachlorocyclopentadiene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: SS-07 0"-2" (480-136903-21), SS-07 2"-12" (480-136903-22), SS-07 12"-24" (480-136903-23), SS-08 0"-2" (480-136903-24), SS-08 2"-12" (480-136903-25) and SS-08 12"-24" (480-136903-26).

Method(s) 8270D: The following samples were diluted due to color and appearance: (480-136903-A-21-A MS) and (480-136903-A-21-B MS). Because of this dilution, the surrogate spike and matrix spike concentration in the sample was reduced to a level where the recovery

Job ID: 480-136903-1 (Continued)

Laboratory: TestAmerica Buffalo (Continued)

calculation does not provide useful information.

Method(s) 8270D: The following samples were diluted due to color and appearance: SS-03 0"-2" (480-136903-9), SS-07 0"-2" (480-136903-21), SS-07 12"-24" (480-136903-23) and SS-08 2"-12" (480-136903-25). Elevated reporting limits (RL) are provided.

Method(s) 8270D: The following samples was diluted due to color, appearance and viscosity: SS-07 2"-12" (480-136903-22) and SS-08 0"-2" (480-136903-24). Elevated reporting limits (RL) are provided.

Method(s) 8270D: The following samples required a dilution due to the nature of the sample matrix: SS-07 0"-2" (480-136903-21), SS-07 2"-12" (480-136903-22), SS-07 12"-24" (480-136903-23) and SS-08 0"-2" (480-136903-24). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: Six surrogates are used for this analysis. The laboratory's SOP allows one acid and one base of these surrogates to be outside acceptance criteria without performing re-extraction/re-analysis. The following sample contained an allowable number of surrogate compounds outside limits: SS-03 0"-2" (480-136903-9). These results have been reported and qualified.

Method(s) 8270D: The following samples required a dilution due to the nature of the sample matrix: SB-03 11'-12' (480-136903-1) and SB-03 13-14.2' (480-136903-2). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Method(s) 8270D: The Method Blank (MB) for preparation batch 480-418982 and analytical batch 480-420374 recovered outside control limits for the following surrogate: p-Terphenyl-d14 (Surr). This surrogate is biased high and no detections were found for associated analytes in the following affected samples: SB-03 11'-12' (480-136903-1) and SB-03 13-14.2' (480-136903-2). Therefore, the data has been reported.

Method(s) 8270D: The following samples were diluted due to the nature of the sample matrix: SB-03 11'-12' (480-136903-1) and SB-03 13-14.2' (480-136903-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Method(s) 6010C: The method blank for preparation batch 480-418721 and analytical batch 480-419098 contained Total Iron above the reporting limit (RL). Associated sample(s) SS-05 12"-24" (480-136903-17), SS-06 0"-2" (480-136903-18), SS-06 2"-12" (480-136903-19), SS-06 12"-24" (480-136903-20), SS-07 0"-2" (480-136903-21), SS-07 2"-12" (480-136903-22), SS-07 12"-24" (480-136903-23), SS-08 0"-2" (480-136903-24), SS-08 2"-12" (480-136903-25) and SS-08 12"-24" (480-136903-26) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) 6010C: The method blank for preparation batch 480-418721 and analytical batch 480-419098 contained Total Chromium above the reporting limit (RL). Associated sample(s) SS-07 12"-24" (480-136903-23) and SS-08 2"-12" (480-136903-25) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) 6010C: The Serial Dilution (480-136903-A-18-B SD) in batch 480-418721, exhibited results outside the quality control limits for Total Magnesium. However, the Post Digestion Spike was compliant so no corrective action was necessary.

Method(s) 6010C: The recovery of Post Spike, (480-136903-A-18-B PD), in batch 480-418721 exhibited results outside the quality control limits for Total Aluminum, Barium, Iron, Manganese, and Zinc. However, the Serial Dilution of this sample was compliant. Therefore, no corrective action was necessary.

Method(s) 6010C: The Method Blank for preparation batch 480-418724 and analytical batch 480-419542 contained Total Chromium, Copper, Iron, and Manganese above the reporting limits (RLs). Associated samples SS-01 2"-12" (480-136903-4), SS-01 12"-24" (480-136903-5), SS-02 0"-2" (480-136903-6), SS-02 2"-12" (480-136903-7), SS-02 12"-24" (480-136903-8), SS-03 0"-2" (480-136903-9), SS-03 2"-12" (480-136903-10), SS-04 0"-2" (480-136903-12), SS-04 2"-12" (480-136903-13), SS-04 12"-24" (480-136903-14) and SS-05 2"-12" (480-136903-16) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the Method Blank.

Job ID: 480-136903-1 (Continued)

Laboratory: TestAmerica Buffalo (Continued)

Method(s) 6010C: The Method Blank for preparation batch 480-418724 and analytical batch 480-419542 contained Total Copper, Iron, and Manganese above the reporting limits (RLs). Associated samples SS-01 0"-2" (480-136903-3), SS-03 12"-24" (480-136903-11) and SS-05 0"-2" (480-136903-15) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the Method Blank.

Method(s) 6010C: The Serial Dilution and Post Spike (480-136903-A-3-B PDS) and (480-136903-A-3-B SD) exceeded the quality control limits for Total Iron, Manganese, and Zinc. Sample matrix is suspected, therefore, no corrective action was necessary.

Method(s) 6010C: The Serial Dilution (480-136903-A-3-B SD) in batch 480-418724, exhibited results outside the quality control limits for Total Barium, Calcium, and Vanadium. However, the Post Digestion Spike was compliant so no corrective action was necessary

Method(s) 6010C: The recoveries of Post Spike, (480-136903-A-3-B PDS), in batch 480-418724 exhibited results outside the quality control limits for Total Aluminum and Magnesium. However, the Serial Dilution of this sample was compliant. Therefore, no corrective action was necessary

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 3550C: Due to the matrix, the following samples could not be concentrated to the final method required volume: SS-01 2"-12" (480-136903-4), (480-136903-A-4 MS) and (480-136903-A-4 MSD). The reporting limits (RLs) are elevated proportionately.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 11'-12' — Lab Sample ID: 480-136903-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	5.8	J vs	30	5.1	ug/Kg	1	☼	8260C	Total/NA
Methylene Chloride	7.5	vs	6.1	2.8	ug/Kg	1	☼	8260C	Total/NA
sec-Butylbenzene	5.4	J * vs	6.1	0.53	ug/Kg	1	☼	8260C	Total/NA
Toluene	0.63	J vs	6.1	0.46	ug/Kg	1	☼	8260C	Total/NA
Trichloroethene	4.0	J vs	6.1	1.3	ug/Kg	1	☼	8260C	Total/NA

Client Sample ID: SB-03 13-14.2' — Lab Sample ID: 480-136903-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4-Isopropyltoluene	2.8	J * vs	5.4	0.43	ug/Kg	1	☼	8260C	Total/NA
Acetone	12	J vs	27	4.5	ug/Kg	1	☼	8260C	Total/NA
Methylcyclohexane	1.2	J vs	5.4	0.82	ug/Kg	1	☼	8260C	Total/NA
Methylene Chloride	5.3	J vs	5.4	2.5	ug/Kg	1	☼	8260C	Total/NA
sec-Butylbenzene	170	* vs	5.4	0.47	ug/Kg	1	☼	8260C	Total/NA
Toluene	1.7	J vs	5.4	0.41	ug/Kg	1	☼	8260C	Total/NA
Trichloroethene	5.1	J vs	5.4	1.2	ug/Kg	1	☼	8260C	Total/NA

Client Sample ID: SS-01 0"-2" — Lab Sample ID: 480-136903-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoranthene	3300	J	8900	950	ug/Kg	50	☼	8270D	Total/NA
Phenanthrene	2500	J	8900	1300	ug/Kg	50	☼	8270D	Total/NA
Pyrene	3200	J	8900	1100	ug/Kg	50	☼	8270D	Total/NA
Aluminum	5110	B F1	10.3	4.5	mg/Kg	1	☼	6010C	Total/NA
Arsenic	4.8		2.1	0.41	mg/Kg	1	☼	6010C	Total/NA
Barium	47.4	F1 F2	0.51	0.11	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.28		0.21	0.029	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.34		0.21	0.031	mg/Kg	1	☼	6010C	Total/NA
Calcium	30600	B	51.4	3.4	mg/Kg	1	☼	6010C	Total/NA
Chromium	11.6		0.53	0.21	mg/Kg	1	☼	6010C	Total/NA
Cobalt	6.1		0.51	0.051	mg/Kg	1	☼	6010C	Total/NA
Copper	35.1	B	1.0	0.22	mg/Kg	1	☼	6010C	Total/NA
Iron	11800	B	10.3	3.6	mg/Kg	1	☼	6010C	Total/NA
Lead	84.2		1.0	0.25	mg/Kg	1	☼	6010C	Total/NA
Magnesium	15500		20.6	0.95	mg/Kg	1	☼	6010C	Total/NA
Manganese	327	B	0.21	0.033	mg/Kg	1	☼	6010C	Total/NA
Nickel	11.7	B	5.1	0.24	mg/Kg	1	☼	6010C	Total/NA
Potassium	1110	F1	30.9	20.6	mg/Kg	1	☼	6010C	Total/NA
Sodium	108	J	144	13.4	mg/Kg	1	☼	6010C	Total/NA
Vanadium	15.8		0.51	0.11	mg/Kg	1	☼	6010C	Total/NA
Zinc	106		2.1	0.66	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.27		0.020	0.0081	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-01 2"-12" — Lab Sample ID: 480-136903-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]pyrene	13000	J F2	89000	13000	ug/Kg	50	☼	8270D	Total/NA
Benzo[b]fluoranthene	16000	J F2	89000	14000	ug/Kg	50	☼	8270D	Total/NA
Aluminum	5910	B	10.5	4.6	mg/Kg	1	☼	6010C	Total/NA
Arsenic	5.2		2.1	0.42	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Buffalo

Client Sample ID: SS-01 2"-12" (Continued)

Lab Sample ID: 480-136903-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	56.8		0.52	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.32		0.21	0.029	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.41		0.21	0.031	mg/Kg	1	☼	6010C	Total/NA
Calcium	31200	B	52.5	3.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	12.3	B	0.52	0.21	mg/Kg	1	☼	6010C	Total/NA
Cobalt	8.5		0.52	0.052	mg/Kg	1	☼	6010C	Total/NA
Copper	50.1	B	1.0	0.22	mg/Kg	1	☼	6010C	Total/NA
Iron	13500	B	10.5	3.7	mg/Kg	1	☼	6010C	Total/NA
Lead	104		1.0	0.25	mg/Kg	1	☼	6010C	Total/NA
Magnesium	16200		21.0	0.97	mg/Kg	1	☼	6010C	Total/NA
Manganese	378	B	0.21	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	13.4	B	5.2	0.24	mg/Kg	1	☼	6010C	Total/NA
Potassium	1260		31.5	21.0	mg/Kg	1	☼	6010C	Total/NA
Sodium	102	J	147	13.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.1		0.52	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	110		2.1	0.67	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.33		0.022	0.0087	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-01 12"-24"

Lab Sample ID: 480-136903-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]pyrene	1900	J	8800	1300	ug/Kg	50	☼	8270D	Total/NA
Benzo[b]fluoranthene	3000	J	8800	1400	ug/Kg	50	☼	8270D	Total/NA
Fluoranthene	3900	J	8800	930	ug/Kg	50	☼	8270D	Total/NA
Phenanthrene	2600	J	8800	1300	ug/Kg	50	☼	8270D	Total/NA
Pyrene	3400	J	8800	1000	ug/Kg	50	☼	8270D	Total/NA
Aluminum	6170	B	10.8	4.7	mg/Kg	1	☼	6010C	Total/NA
Arsenic	5.0		2.2	0.43	mg/Kg	1	☼	6010C	Total/NA
Barium	56.9		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.34		0.22	0.030	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.40		0.22	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	34300	B	53.8	3.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	13.2	B	0.54	0.22	mg/Kg	1	☼	6010C	Total/NA
Cobalt	10.2		0.54	0.054	mg/Kg	1	☼	6010C	Total/NA
Copper	51.7	B	1.1	0.23	mg/Kg	1	☼	6010C	Total/NA
Iron	13100	B	10.8	3.8	mg/Kg	1	☼	6010C	Total/NA
Lead	118		1.1	0.26	mg/Kg	1	☼	6010C	Total/NA
Magnesium	18000		21.5	1.0	mg/Kg	1	☼	6010C	Total/NA
Manganese	407	B	0.22	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	13.0	B	5.4	0.25	mg/Kg	1	☼	6010C	Total/NA
Potassium	1360		32.3	21.5	mg/Kg	1	☼	6010C	Total/NA
Sodium	111	J	151	14.0	mg/Kg	1	☼	6010C	Total/NA
Vanadium	19.5		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	114		2.2	0.69	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.24		0.021	0.0085	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-02 0"-2"

Lab Sample ID: 480-136903-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoranthene	1100	J	9400	990	ug/Kg	50	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-02 0"-2" (Continued)

Lab Sample ID: 480-136903-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	5780	B	10.8	4.8	mg/Kg	1	☼	6010C	Total/NA
Arsenic	7.1		2.2	0.43	mg/Kg	1	☼	6010C	Total/NA
Barium	52.1		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.31		0.22	0.030	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.30		0.22	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	21600	B	54.2	3.6	mg/Kg	1	☼	6010C	Total/NA
Chromium	15.2	B	0.54	0.22	mg/Kg	1	☼	6010C	Total/NA
Cobalt	5.7		0.54	0.054	mg/Kg	1	☼	6010C	Total/NA
Copper	34.8	B	1.1	0.23	mg/Kg	1	☼	6010C	Total/NA
Iron	14600	B	10.8	3.8	mg/Kg	1	☼	6010C	Total/NA
Lead	85.9		1.1	0.26	mg/Kg	1	☼	6010C	Total/NA
Magnesium	9390		21.7	1.0	mg/Kg	1	☼	6010C	Total/NA
Manganese	358	B	0.22	0.035	mg/Kg	1	☼	6010C	Total/NA
Nickel	14.5	B	5.4	0.25	mg/Kg	1	☼	6010C	Total/NA
Potassium	1270		32.5	21.7	mg/Kg	1	☼	6010C	Total/NA
Silver	0.40	J	0.65	0.22	mg/Kg	1	☼	6010C	Total/NA
Sodium	134	J	152	14.1	mg/Kg	1	☼	6010C	Total/NA
Vanadium	15.7		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	98.5		2.2	0.69	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.25		0.023	0.0092	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-02 2"-12"

Lab Sample ID: 480-136903-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoranthene	1300	J	9100	960	ug/Kg	50	☼	8270D	Total/NA
Aluminum	5740	B	10.2	4.5	mg/Kg	1	☼	6010C	Total/NA
Arsenic	6.2		2.0	0.41	mg/Kg	1	☼	6010C	Total/NA
Barium	56.6		0.51	0.11	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.33		0.20	0.029	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.36		0.20	0.031	mg/Kg	1	☼	6010C	Total/NA
Calcium	25200	B	51.1	3.4	mg/Kg	1	☼	6010C	Total/NA
Chromium	11.9	B	0.51	0.20	mg/Kg	1	☼	6010C	Total/NA
Cobalt	5.7		0.51	0.051	mg/Kg	1	☼	6010C	Total/NA
Copper	25.7	B	1.0	0.21	mg/Kg	1	☼	6010C	Total/NA
Iron	13800	B	10.2	3.6	mg/Kg	1	☼	6010C	Total/NA
Lead	126		1.0	0.25	mg/Kg	1	☼	6010C	Total/NA
Magnesium	9730		20.4	0.95	mg/Kg	1	☼	6010C	Total/NA
Manganese	405	B	0.20	0.033	mg/Kg	1	☼	6010C	Total/NA
Nickel	13.4	B	5.1	0.24	mg/Kg	1	☼	6010C	Total/NA
Potassium	1250		30.7	20.4	mg/Kg	1	☼	6010C	Total/NA
Sodium	91.3	J	143	13.3	mg/Kg	1	☼	6010C	Total/NA
Vanadium	16.2		0.51	0.11	mg/Kg	1	☼	6010C	Total/NA
Zinc	75.3		2.0	0.65	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.29		0.021	0.0084	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-02 12"-24"

Lab Sample ID: 480-136903-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	6190	B	10.5	4.6	mg/Kg	1	☼	6010C	Total/NA
Arsenic	7.6		2.1	0.42	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-02 12"-24" (Continued)

Lab Sample ID: 480-136903-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	71.2		0.53	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.35		0.21	0.029	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.44		0.21	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	27700	B	52.6	3.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	13.3	B	0.53	0.21	mg/Kg	1	☼	6010C	Total/NA
Cobalt	6.6		0.53	0.053	mg/Kg	1	☼	6010C	Total/NA
Copper	32.1	B	1.1	0.22	mg/Kg	1	☼	6010C	Total/NA
Iron	16400	B	10.5	3.7	mg/Kg	1	☼	6010C	Total/NA
Lead	99.2		1.1	0.25	mg/Kg	1	☼	6010C	Total/NA
Magnesium	13800		21.0	0.97	mg/Kg	1	☼	6010C	Total/NA
Manganese	489	B	0.21	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	15.2	B	5.3	0.24	mg/Kg	1	☼	6010C	Total/NA
Potassium	1340		31.5	21.0	mg/Kg	1	☼	6010C	Total/NA
Sodium	104	J	147	13.7	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.8		0.53	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	71.8		2.1	0.67	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.33		0.020	0.0081	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-03 0"-2"

Lab Sample ID: 480-136903-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	260	J	1800	260	ug/Kg	10	☼	8270D	Total/NA
Acenaphthylene	230	J	1800	230	ug/Kg	10	☼	8270D	Total/NA
Anthracene	440	J	1800	440	ug/Kg	10	☼	8270D	Total/NA
Benzo[a]anthracene	2500		1800	180	ug/Kg	10	☼	8270D	Total/NA
Benzo[a]pyrene	2400		1800	260	ug/Kg	10	☼	8270D	Total/NA
Benzo[b]fluoranthene	3000		1800	280	ug/Kg	10	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1700	J	1800	190	ug/Kg	10	☼	8270D	Total/NA
Carbazole	290	J	1800	210	ug/Kg	10	☼	8270D	Total/NA
Chrysene	2800		1800	400	ug/Kg	10	☼	8270D	Total/NA
Fluoranthene	5300		1800	190	ug/Kg	10	☼	8270D	Total/NA
Fluorene	230	J	1800	210	ug/Kg	10	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1500	J	1800	220	ug/Kg	10	☼	8270D	Total/NA
Phenanthrene	3100		1800	260	ug/Kg	10	☼	8270D	Total/NA
Pyrene	4800		1800	210	ug/Kg	10	☼	8270D	Total/NA
Aluminum	5620	B	10.8	4.7	mg/Kg	1	☼	6010C	Total/NA
Arsenic	7.0		2.2	0.43	mg/Kg	1	☼	6010C	Total/NA
Barium	116		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.61		0.22	0.030	mg/Kg	1	☼	6010C	Total/NA
Cadmium	1.2		0.22	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	5220	B	53.9	3.6	mg/Kg	1	☼	6010C	Total/NA
Chromium	27.5	B	0.54	0.22	mg/Kg	1	☼	6010C	Total/NA
Cobalt	6.5		0.54	0.054	mg/Kg	1	☼	6010C	Total/NA
Copper	48.9	B	1.1	0.23	mg/Kg	1	☼	6010C	Total/NA
Iron	15500	B	10.8	3.8	mg/Kg	1	☼	6010C	Total/NA
Lead	332		1.1	0.26	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1170		21.5	1.0	mg/Kg	1	☼	6010C	Total/NA
Manganese	181	B	0.22	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	15.9	B	5.4	0.25	mg/Kg	1	☼	6010C	Total/NA
Potassium	673		32.3	21.5	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-03 0"-2" (Continued)

Lab Sample ID: 480-136903-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Silver	0.58	J	0.65	0.22	mg/Kg	1	☼	6010C	Total/NA
Sodium	81.5	J	151	14.0	mg/Kg	1	☼	6010C	Total/NA
Vanadium	19.2		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	217		2.2	0.69	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.31		0.022	0.0088	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-03 2"-12"

Lab Sample ID: 480-136903-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Methylnaphthalene	130	J	190	37	ug/Kg	1	☼	8270D	Total/NA
Acenaphthene	38	J	190	27	ug/Kg	1	☼	8270D	Total/NA
Acenaphthylene	52	J	190	24	ug/Kg	1	☼	8270D	Total/NA
Anthracene	78	J	190	46	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]anthracene	400		190	19	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	410		190	27	ug/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	490		190	30	ug/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	330		190	20	ug/Kg	1	☼	8270D	Total/NA
Benzo[k]fluoranthene	260		190	24	ug/Kg	1	☼	8270D	Total/NA
Carbazole	56	J	190	22	ug/Kg	1	☼	8270D	Total/NA
Chrysene	470		190	42	ug/Kg	1	☼	8270D	Total/NA
Dibenzofuran	63	J	190	22	ug/Kg	1	☼	8270D	Total/NA
Fluoranthene	870		190	20	ug/Kg	1	☼	8270D	Total/NA
Fluorene	47	J	190	22	ug/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	270		190	23	ug/Kg	1	☼	8270D	Total/NA
Naphthalene	54	J	190	24	ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	560		190	27	ug/Kg	1	☼	8270D	Total/NA
Pyrene	740		190	22	ug/Kg	1	☼	8270D	Total/NA
Aluminum	4240	B	10.7	4.7	mg/Kg	1	☼	6010C	Total/NA
Arsenic	10		2.1	0.43	mg/Kg	1	☼	6010C	Total/NA
Barium	70.4		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.63		0.21	0.030	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.20	J	0.21	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	1900	B	53.6	3.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	16.4	B	0.54	0.21	mg/Kg	1	☼	6010C	Total/NA
Cobalt	6.4		0.54	0.054	mg/Kg	1	☼	6010C	Total/NA
Copper	38.6	B	1.1	0.23	mg/Kg	1	☼	6010C	Total/NA
Iron	45500	B	10.7	3.8	mg/Kg	1	☼	6010C	Total/NA
Lead	66.7		1.1	0.26	mg/Kg	1	☼	6010C	Total/NA
Magnesium	432		21.5	0.99	mg/Kg	1	☼	6010C	Total/NA
Manganese	81.1	B	0.21	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	17.0	B	5.4	0.25	mg/Kg	1	☼	6010C	Total/NA
Potassium	1620		32.2	21.5	mg/Kg	1	☼	6010C	Total/NA
Selenium	0.91	J	4.3	0.43	mg/Kg	1	☼	6010C	Total/NA
Sodium	109	J	150	13.9	mg/Kg	1	☼	6010C	Total/NA
Vanadium	20.7		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	48.4		2.1	0.69	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.066		0.022	0.0090	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-03 12"-24"

Lab Sample ID: 480-136903-11

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-03 12"-24" (Continued)

Lab Sample ID: 480-136903-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	420	J	970	140	ug/Kg	5	☼	8270D	Total/NA
Acenaphthylene	280	J	970	130	ug/Kg	5	☼	8270D	Total/NA
Anthracene	720	J	970	240	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]anthracene	2200		970	97	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]pyrene	2100		970	140	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	2500		970	150	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1600		970	100	ug/Kg	5	☼	8270D	Total/NA
Carbazole	360	J	970	110	ug/Kg	5	☼	8270D	Total/NA
Chrysene	2800		970	220	ug/Kg	5	☼	8270D	Total/NA
Dibenzofuran	220	J	970	110	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	5300		970	100	ug/Kg	5	☼	8270D	Total/NA
Fluorene	410	J	970	110	ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1300		970	120	ug/Kg	5	☼	8270D	Total/NA
Naphthalene	180	J	970	130	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	4400		970	140	ug/Kg	5	☼	8270D	Total/NA
Pyrene	5100		970	110	ug/Kg	5	☼	8270D	Total/NA
Aluminum	6670	B	11.2	4.9	mg/Kg	1	☼	6010C	Total/NA
Arsenic	7.0		2.2	0.45	mg/Kg	1	☼	6010C	Total/NA
Barium	84.4		0.56	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.45		0.22	0.031	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.21	J	0.22	0.034	mg/Kg	1	☼	6010C	Total/NA
Calcium	10300	B	56.0	3.7	mg/Kg	1	☼	6010C	Total/NA
Chromium	12.6		0.59	0.24	mg/Kg	1	☼	6010C	Total/NA
Cobalt	6.1		0.56	0.056	mg/Kg	1	☼	6010C	Total/NA
Copper	38.4	B	1.1	0.24	mg/Kg	1	☼	6010C	Total/NA
Iron	13700	B	11.2	3.9	mg/Kg	1	☼	6010C	Total/NA
Lead	267		1.1	0.27	mg/Kg	1	☼	6010C	Total/NA
Magnesium	4980		22.4	1.0	mg/Kg	1	☼	6010C	Total/NA
Manganese	258	B	0.22	0.036	mg/Kg	1	☼	6010C	Total/NA
Nickel	14.2	B	5.6	0.26	mg/Kg	1	☼	6010C	Total/NA
Potassium	974		33.6	22.4	mg/Kg	1	☼	6010C	Total/NA
Sodium	106	J	157	14.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	18.1		0.56	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	128		2.2	0.72	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.50		0.023	0.0093	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-04 0"-2"

Lab Sample ID: 480-136903-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	2400	J	4500	450	ug/Kg	20	☼	8270D	Total/NA
Benzo[a]pyrene	2300	J	4500	660	ug/Kg	20	☼	8270D	Total/NA
Benzo[b]fluoranthene	3200	J	4500	720	ug/Kg	20	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1900	J	4500	480	ug/Kg	20	☼	8270D	Total/NA
Chrysene	3000	J	4500	1000	ug/Kg	20	☼	8270D	Total/NA
Fluoranthene	5600		4500	480	ug/Kg	20	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1800	J	4500	560	ug/Kg	20	☼	8270D	Total/NA
Phenanthrene	2400	J	4500	660	ug/Kg	20	☼	8270D	Total/NA
Pyrene	4600		4500	530	ug/Kg	20	☼	8270D	Total/NA
Aluminum	4940	B	13.5	6.0	mg/Kg	1	☼	6010C	Total/NA
Arsenic	6.3		2.7	0.54	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-04 0"-2" (Continued)

Lab Sample ID: 480-136903-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	117		0.68	0.15	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.27		0.27	0.038	mg/Kg	1	☼	6010C	Total/NA
Cadmium	1.0		0.27	0.041	mg/Kg	1	☼	6010C	Total/NA
Calcium	20100	B	67.7	4.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	17.2	B	0.68	0.27	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.3		0.68	0.068	mg/Kg	1	☼	6010C	Total/NA
Copper	46.2	B	1.4	0.28	mg/Kg	1	☼	6010C	Total/NA
Iron	12000	B	13.5	4.7	mg/Kg	1	☼	6010C	Total/NA
Lead	398		1.4	0.33	mg/Kg	1	☼	6010C	Total/NA
Magnesium	3970		27.1	1.3	mg/Kg	1	☼	6010C	Total/NA
Manganese	320	B	0.27	0.043	mg/Kg	1	☼	6010C	Total/NA
Nickel	11.1	B	6.8	0.31	mg/Kg	1	☼	6010C	Total/NA
Potassium	1160		40.6	27.1	mg/Kg	1	☼	6010C	Total/NA
Silver	0.40	J	0.81	0.27	mg/Kg	1	☼	6010C	Total/NA
Sodium	101	J	190	17.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	14.2		0.68	0.15	mg/Kg	1	☼	6010C	Total/NA
Zinc	268		2.7	0.87	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.32		0.026	0.011	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-04 2"-12"

Lab Sample ID: 480-136903-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthylene	1700	J	11000	1400	ug/Kg	50	☼	8270D	Total/NA
Benzo[a]anthracene	8100	J	11000	1100	ug/Kg	50	☼	8270D	Total/NA
Benzo[a]pyrene	7500	J	11000	1600	ug/Kg	50	☼	8270D	Total/NA
Benzo[b]fluoranthene	9900	J	11000	1700	ug/Kg	50	☼	8270D	Total/NA
Benzo[g,h,i]perylene	4900	J	11000	1100	ug/Kg	50	☼	8270D	Total/NA
Chrysene	7600	J	11000	2400	ug/Kg	50	☼	8270D	Total/NA
Fluoranthene	15000		11000	1100	ug/Kg	50	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	4800	J	11000	1300	ug/Kg	50	☼	8270D	Total/NA
Phenanthrene	5200	J	11000	1600	ug/Kg	50	☼	8270D	Total/NA
Pyrene	12000		11000	1300	ug/Kg	50	☼	8270D	Total/NA
Aluminum	5520	B	12.7	5.6	mg/Kg	1	☼	6010C	Total/NA
Arsenic	7.9		2.5	0.51	mg/Kg	1	☼	6010C	Total/NA
Barium	153		0.64	0.14	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.33		0.25	0.036	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.97		0.25	0.038	mg/Kg	1	☼	6010C	Total/NA
Calcium	24700	B	63.7	4.2	mg/Kg	1	☼	6010C	Total/NA
Chromium	15.5	B	0.64	0.25	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.6		0.64	0.064	mg/Kg	1	☼	6010C	Total/NA
Copper	63.2	B	1.3	0.27	mg/Kg	1	☼	6010C	Total/NA
Iron	12700	B	12.7	4.5	mg/Kg	1	☼	6010C	Total/NA
Lead	497		1.3	0.31	mg/Kg	1	☼	6010C	Total/NA
Magnesium	4340		25.5	1.2	mg/Kg	1	☼	6010C	Total/NA
Manganese	320	B	0.25	0.041	mg/Kg	1	☼	6010C	Total/NA
Nickel	12.6	B	6.4	0.29	mg/Kg	1	☼	6010C	Total/NA
Potassium	1490		38.2	25.5	mg/Kg	1	☼	6010C	Total/NA
Silver	0.54	J	0.76	0.25	mg/Kg	1	☼	6010C	Total/NA
Sodium	123	J	178	16.5	mg/Kg	1	☼	6010C	Total/NA
Vanadium	14.8		0.64	0.14	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-04 2"-12" (Continued)

Lab Sample ID: 480-136903-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Zinc	314		2.5	0.81	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.41		0.026	0.011	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-04 12"-24"

Lab Sample ID: 480-136903-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthylene	3200	J	4000	510	ug/Kg	20	☼	8270D	Total/NA
Anthracene	4600		4000	980	ug/Kg	20	☼	8270D	Total/NA
Benzo[a]anthracene	13000		4000	400	ug/Kg	20	☼	8270D	Total/NA
Benzo[a]pyrene	12000		4000	580	ug/Kg	20	☼	8270D	Total/NA
Benzo[b]fluoranthene	14000		4000	630	ug/Kg	20	☼	8270D	Total/NA
Benzo[g,h,i]perylene	9400		4000	420	ug/Kg	20	☼	8270D	Total/NA
Benzo[k]fluoranthene	7000		4000	510	ug/Kg	20	☼	8270D	Total/NA
Carbazole	600	J	4000	470	ug/Kg	20	☼	8270D	Total/NA
Chrysene	12000		4000	890	ug/Kg	20	☼	8270D	Total/NA
Fluoranthene	31000		4000	420	ug/Kg	20	☼	8270D	Total/NA
Fluorene	1000	J	4000	470	ug/Kg	20	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	8700		4000	490	ug/Kg	20	☼	8270D	Total/NA
Phenanthrene	15000		4000	580	ug/Kg	20	☼	8270D	Total/NA
Pyrene	26000		4000	470	ug/Kg	20	☼	8270D	Total/NA
Aluminum	4780	B	11.7	5.2	mg/Kg	1	☼	6010C	Total/NA
Arsenic	6.3		2.3	0.47	mg/Kg	1	☼	6010C	Total/NA
Barium	107		0.59	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.30		0.23	0.033	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.69		0.23	0.035	mg/Kg	1	☼	6010C	Total/NA
Calcium	15800	B	58.5	3.9	mg/Kg	1	☼	6010C	Total/NA
Chromium	17.6	B	0.59	0.23	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.4		0.59	0.059	mg/Kg	1	☼	6010C	Total/NA
Copper	71.5	B	1.2	0.25	mg/Kg	1	☼	6010C	Total/NA
Iron	11100	B	11.7	4.1	mg/Kg	1	☼	6010C	Total/NA
Lead	395		1.2	0.28	mg/Kg	1	☼	6010C	Total/NA
Magnesium	3370		23.4	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	300	B	0.23	0.037	mg/Kg	1	☼	6010C	Total/NA
Nickel	13.6	B	5.9	0.27	mg/Kg	1	☼	6010C	Total/NA
Potassium	1300		35.1	23.4	mg/Kg	1	☼	6010C	Total/NA
Silver	0.37	J	0.70	0.23	mg/Kg	1	☼	6010C	Total/NA
Sodium	111	J	164	15.2	mg/Kg	1	☼	6010C	Total/NA
Vanadium	12.5		0.59	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	250		2.3	0.75	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.46		0.024	0.0098	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-05 0"-2"

Lab Sample ID: 480-136903-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	450	J	1000	100	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]pyrene	470	J	1000	150	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	640	J	1000	160	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	400	J	1000	110	ug/Kg	5	☼	8270D	Total/NA
Chrysene	490	J	1000	220	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	950	J	1000	110	ug/Kg	5	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-05 0"-2" (Continued)

Lab Sample ID: 480-136903-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno[1,2,3-cd]pyrene	380	J	1000	120	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	480	J	1000	150	ug/Kg	5	☼	8270D	Total/NA
Pyrene	820	J	1000	120	ug/Kg	5	☼	8270D	Total/NA
Aluminum	7360	B	11.7	5.1	mg/Kg	1	☼	6010C	Total/NA
Arsenic	11.3		2.3	0.47	mg/Kg	1	☼	6010C	Total/NA
Barium	60.4		0.58	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.34		0.23	0.033	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.43		0.23	0.035	mg/Kg	1	☼	6010C	Total/NA
Calcium	2670	B	58.4	3.9	mg/Kg	1	☼	6010C	Total/NA
Chromium	10.9		0.59	0.24	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.2		0.58	0.058	mg/Kg	1	☼	6010C	Total/NA
Copper	72.3	B	1.2	0.25	mg/Kg	1	☼	6010C	Total/NA
Iron	13500	B	11.7	4.1	mg/Kg	1	☼	6010C	Total/NA
Lead	143		1.2	0.28	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1570		23.4	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	313	B	0.23	0.037	mg/Kg	1	☼	6010C	Total/NA
Nickel	10.4	B	5.8	0.27	mg/Kg	1	☼	6010C	Total/NA
Potassium	786		35.0	23.4	mg/Kg	1	☼	6010C	Total/NA
Sodium	51.2	J	164	15.2	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.1		0.58	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	168		2.3	0.75	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.68		0.023	0.0094	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-05 2"-12"

Lab Sample ID: 480-136903-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	66	J	200	29	ug/Kg	1	☼	8270D	Total/NA
Acenaphthylene	27	J	200	26	ug/Kg	1	☼	8270D	Total/NA
Anthracene	130	J	200	49	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]anthracene	560		200	20	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	560		200	29	ug/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	650		200	32	ug/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	500		200	21	ug/Kg	1	☼	8270D	Total/NA
Benzo[k]fluoranthene	340		200	26	ug/Kg	1	☼	8270D	Total/NA
Carbazole	66	J	200	23	ug/Kg	1	☼	8270D	Total/NA
Chrysene	610		200	45	ug/Kg	1	☼	8270D	Total/NA
Dibenzofuran	37	J	200	23	ug/Kg	1	☼	8270D	Total/NA
Fluoranthene	1200		200	21	ug/Kg	1	☼	8270D	Total/NA
Fluorene	53	J	200	23	ug/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	390		200	25	ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	620		200	29	ug/Kg	1	☼	8270D	Total/NA
Pyrene	1000		200	23	ug/Kg	1	☼	8270D	Total/NA
Aluminum	7190	B	12.0	5.3	mg/Kg	1	☼	6010C	Total/NA
Arsenic	21.5		2.4	0.48	mg/Kg	1	☼	6010C	Total/NA
Barium	63.8		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.33		0.24	0.034	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.38		0.24	0.036	mg/Kg	1	☼	6010C	Total/NA
Calcium	1950	B	60.0	4.0	mg/Kg	1	☼	6010C	Total/NA
Chromium	13.2	B	0.60	0.24	mg/Kg	1	☼	6010C	Total/NA
Cobalt	19.1		0.60	0.060	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-05 2"-12" (Continued)

Lab Sample ID: 480-136903-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	220	B	1.2	0.25	mg/Kg	1	☼	6010C	Total/NA
Iron	53100	B	12.0	4.2	mg/Kg	1	☼	6010C	Total/NA
Lead	132		1.2	0.29	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1230		24.0	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	404	B	0.24	0.038	mg/Kg	1	☼	6010C	Total/NA
Nickel	14.9	B	6.0	0.28	mg/Kg	1	☼	6010C	Total/NA
Potassium	692		36.0	24.0	mg/Kg	1	☼	6010C	Total/NA
Sodium	51.9	J	168	15.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	20.8		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	133		2.4	0.77	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.79		0.023	0.0095	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-05 12"-24"

Lab Sample ID: 480-136903-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	180	J	210	21	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	160	J	210	31	ug/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	200	J	210	33	ug/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	130	J	210	22	ug/Kg	1	☼	8270D	Total/NA
Chrysene	170	J	210	47	ug/Kg	1	☼	8270D	Total/NA
Fluoranthene	350		210	22	ug/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	120	J	210	26	ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	220		210	31	ug/Kg	1	☼	8270D	Total/NA
Pyrene	330		210	24	ug/Kg	1	☼	8270D	Total/NA
Aluminum	8930		12.2	5.4	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.5	J	18.3	0.49	mg/Kg	1	☼	6010C	Total/NA
Arsenic	12.7		2.4	0.49	mg/Kg	1	☼	6010C	Total/NA
Barium	64.4		0.61	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.40		0.24	0.034	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.30	B	0.24	0.037	mg/Kg	1	☼	6010C	Total/NA
Calcium	2030	B	61.0	4.0	mg/Kg	1	☼	6010C	Total/NA
Chromium	15.2		0.62	0.25	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.1		0.61	0.061	mg/Kg	1	☼	6010C	Total/NA
Copper	29.3	B	1.2	0.26	mg/Kg	1	☼	6010C	Total/NA
Iron	12900	B	12.2	4.3	mg/Kg	1	☼	6010C	Total/NA
Lead	104		1.2	0.29	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1390		24.4	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	331		0.24	0.039	mg/Kg	1	☼	6010C	Total/NA
Nickel	8.2	B	6.1	0.28	mg/Kg	1	☼	6010C	Total/NA
Potassium	793		36.6	24.4	mg/Kg	1	☼	6010C	Total/NA
Sodium	68.7	J	171	15.9	mg/Kg	1	☼	6010C	Total/NA
Vanadium	19.8		0.61	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	116		2.4	0.78	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.52		0.023	0.0095	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-06 0"-2"

Lab Sample ID: 480-136903-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Anthracene	370	J	1200	300	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]anthracene	1400		1200	120	ug/Kg	5	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-06 0"-2" (Continued)

Lab Sample ID: 480-136903-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]pyrene	1500		1200	180	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	1700		1200	190	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1200		1200	130	ug/Kg	5	☼	8270D	Total/NA
Chrysene	1500		1200	270	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	3400		1200	130	ug/Kg	5	☼	8270D	Total/NA
Fluorene	150	J	1200	140	ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	950	J	1200	150	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	1600		1200	180	ug/Kg	5	☼	8270D	Total/NA
Pyrene	2800		1200	140	ug/Kg	5	☼	8270D	Total/NA
Aluminum	8260	F1	14.3	6.3	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.4	J F1	21.5	0.57	mg/Kg	1	☼	6010C	Total/NA
Arsenic	8.1		2.9	0.57	mg/Kg	1	☼	6010C	Total/NA
Barium	85.5		0.72	0.16	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.39		0.29	0.040	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.84	B	0.29	0.043	mg/Kg	1	☼	6010C	Total/NA
Calcium	4280	B F1	71.6	4.7	mg/Kg	1	☼	6010C	Total/NA
Chromium	12.8		0.73	0.29	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.5		0.72	0.072	mg/Kg	1	☼	6010C	Total/NA
Copper	29.2	B	1.4	0.30	mg/Kg	1	☼	6010C	Total/NA
Iron	13200	B	14.3	5.0	mg/Kg	1	☼	6010C	Total/NA
Lead	232		1.4	0.34	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1580		28.6	1.3	mg/Kg	1	☼	6010C	Total/NA
Manganese	355		0.29	0.046	mg/Kg	1	☼	6010C	Total/NA
Nickel	11.5	B	7.2	0.33	mg/Kg	1	☼	6010C	Total/NA
Potassium	1090	F1	42.9	28.6	mg/Kg	1	☼	6010C	Total/NA
Silver	0.42	J	0.86	0.29	mg/Kg	1	☼	6010C	Total/NA
Sodium	81.8	J	200	18.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	20.0		0.72	0.16	mg/Kg	1	☼	6010C	Total/NA
Zinc	267		2.9	0.92	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.41		0.029	0.012	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-06 2"-12"

Lab Sample ID: 480-136903-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	190	J	1000	150	ug/Kg	5	☼	8270D	Total/NA
Anthracene	390	J	1000	260	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]anthracene	1500		1000	100	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]pyrene	1600		1000	150	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	2100		1000	170	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1400		1000	110	ug/Kg	5	☼	8270D	Total/NA
Carbazole	130	J	1000	120	ug/Kg	5	☼	8270D	Total/NA
Chrysene	1600		1000	230	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	3400		1000	110	ug/Kg	5	☼	8270D	Total/NA
Fluorene	160	J	1000	120	ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1100		1000	130	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	1800		1000	150	ug/Kg	5	☼	8270D	Total/NA
Pyrene	3200		1000	120	ug/Kg	5	☼	8270D	Total/NA
Aluminum	7050		11.9	5.2	mg/Kg	1	☼	6010C	Total/NA
Antimony	2.3	J	17.9	0.48	mg/Kg	1	☼	6010C	Total/NA
Arsenic	8.5		2.4	0.48	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-06 2"-12" (Continued)

Lab Sample ID: 480-136903-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	75.2		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.36		0.24	0.033	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.80	B	0.24	0.036	mg/Kg	1	☼	6010C	Total/NA
Calcium	3060	B	59.6	3.9	mg/Kg	1	☼	6010C	Total/NA
Chromium	11.8		0.63	0.25	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.0		0.60	0.060	mg/Kg	1	☼	6010C	Total/NA
Copper	44.4	B	1.2	0.25	mg/Kg	1	☼	6010C	Total/NA
Iron	12900	B	11.9	4.2	mg/Kg	1	☼	6010C	Total/NA
Lead	2010		1.2	0.29	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1330		23.8	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	308		0.24	0.038	mg/Kg	1	☼	6010C	Total/NA
Nickel	9.2	B	6.0	0.27	mg/Kg	1	☼	6010C	Total/NA
Potassium	863		35.8	23.8	mg/Kg	1	☼	6010C	Total/NA
Silver	0.40	J	0.72	0.24	mg/Kg	1	☼	6010C	Total/NA
Sodium	57.3	J	167	15.5	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.3		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	248		2.4	0.76	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.47		0.024	0.0097	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-06 12"-24"

Lab Sample ID: 480-136903-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Anthracene	330	J	1100	260	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]anthracene	1100		1100	110	ug/Kg	5	☼	8270D	Total/NA
Benzo[a]pyrene	1200		1100	160	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	1100		1100	170	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	890	J	1100	110	ug/Kg	5	☼	8270D	Total/NA
Benzo[k]fluoranthene	890	J	1100	140	ug/Kg	5	☼	8270D	Total/NA
Carbazole	130	J	1100	120	ug/Kg	5	☼	8270D	Total/NA
Chrysene	1100		1100	240	ug/Kg	5	☼	8270D	Total/NA
Dibenz(a,h)anthracene	240	J	1100	190	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	2800		1100	110	ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	820	J	1100	130	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	1500		1100	160	ug/Kg	5	☼	8270D	Total/NA
Pyrene	2400		1100	120	ug/Kg	5	☼	8270D	Total/NA
Aluminum	7250		12.7	5.6	mg/Kg	1	☼	6010C	Total/NA
Antimony	0.94	J	19.0	0.51	mg/Kg	1	☼	6010C	Total/NA
Arsenic	8.7		2.5	0.51	mg/Kg	1	☼	6010C	Total/NA
Barium	76.9		0.63	0.14	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.37		0.25	0.036	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.74	B	0.25	0.038	mg/Kg	1	☼	6010C	Total/NA
Calcium	3320	B	63.5	4.2	mg/Kg	1	☼	6010C	Total/NA
Chromium	11.5		0.64	0.26	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.1		0.63	0.063	mg/Kg	1	☼	6010C	Total/NA
Copper	26.3	B	1.3	0.27	mg/Kg	1	☼	6010C	Total/NA
Iron	11600	B	12.7	4.4	mg/Kg	1	☼	6010C	Total/NA
Lead	200		1.3	0.30	mg/Kg	1	☼	6010C	Total/NA
Magnesium	1370		25.4	1.2	mg/Kg	1	☼	6010C	Total/NA
Manganese	328		0.25	0.041	mg/Kg	1	☼	6010C	Total/NA
Nickel	9.0	B	6.3	0.29	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-06 12"-24" (Continued)

Lab Sample ID: 480-136903-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Potassium	847		38.1	25.4	mg/Kg	1	☼	6010C	Total/NA
Selenium	0.52	J	5.1	0.51	mg/Kg	1	☼	6010C	Total/NA
Silver	0.29	J	0.76	0.25	mg/Kg	1	☼	6010C	Total/NA
Sodium	64.6	J	178	16.5	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.2		0.63	0.14	mg/Kg	1	☼	6010C	Total/NA
Zinc	222		2.5	0.81	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.42		0.024	0.0098	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-07 0"-2"

Lab Sample ID: 480-136903-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	1800	J	4000	400	ug/Kg	20	☼	8270D	Total/NA
Benzo[a]pyrene	2100	J	4000	590	ug/Kg	20	☼	8270D	Total/NA
Benzo[b]fluoranthene	2900	J F2 F1	4000	640	ug/Kg	20	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1700	J	4000	430	ug/Kg	20	☼	8270D	Total/NA
Benzo[k]fluoranthene	910	J	4000	520	ug/Kg	20	☼	8270D	Total/NA
Chrysene	2100	J F1	4000	900	ug/Kg	20	☼	8270D	Total/NA
Fluoranthene	3400	J	4000	430	ug/Kg	20	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1200	J	4000	500	ug/Kg	20	☼	8270D	Total/NA
Phenanthrene	1700	J	4000	590	ug/Kg	20	☼	8270D	Total/NA
Pyrene	3500	J	4000	470	ug/Kg	20	☼	8270D	Total/NA
Aluminum	7720		12.3	5.4	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.0	J	18.4	0.49	mg/Kg	1	☼	6010C	Total/NA
Arsenic	5.3		2.5	0.49	mg/Kg	1	☼	6010C	Total/NA
Barium	84.7		0.61	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.34		0.25	0.034	mg/Kg	1	☼	6010C	Total/NA
Cadmium	1.1	B	0.25	0.037	mg/Kg	1	☼	6010C	Total/NA
Calcium	23500	B	61.3	4.0	mg/Kg	1	☼	6010C	Total/NA
Chromium	15.2		0.58	0.23	mg/Kg	1	☼	6010C	Total/NA
Cobalt	5.7		0.61	0.061	mg/Kg	1	☼	6010C	Total/NA
Copper	40.1	B	1.2	0.26	mg/Kg	1	☼	6010C	Total/NA
Iron	15100	B	12.3	4.3	mg/Kg	1	☼	6010C	Total/NA
Lead	202		1.2	0.29	mg/Kg	1	☼	6010C	Total/NA
Magnesium	3920		24.5	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	366		0.25	0.039	mg/Kg	1	☼	6010C	Total/NA
Nickel	14.0	B	6.1	0.28	mg/Kg	1	☼	6010C	Total/NA
Potassium	1650		36.8	24.5	mg/Kg	1	☼	6010C	Total/NA
Silver	0.48	J	0.74	0.25	mg/Kg	1	☼	6010C	Total/NA
Sodium	233		172	15.9	mg/Kg	1	☼	6010C	Total/NA
Vanadium	21.5		0.61	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	424		2.5	0.78	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.35		0.025	0.010	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-07 2"-12"

Lab Sample ID: 480-136903-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	7700	J	10000	1000	ug/Kg	50	☼	8270D	Total/NA
Benzo[a]pyrene	7300	J	10000	1500	ug/Kg	50	☼	8270D	Total/NA
Benzo[b]fluoranthene	8700	J	10000	1600	ug/Kg	50	☼	8270D	Total/NA
Benzo[g,h,i]perylene	5100	J	10000	1100	ug/Kg	50	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-07 2"-12" (Continued)

Lab Sample ID: 480-136903-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chrysene	7500	J	10000	2300	ug/Kg	50	☼	8270D	Total/NA
Fluoranthene	15000		10000	1100	ug/Kg	50	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	4500	J	10000	1300	ug/Kg	50	☼	8270D	Total/NA
Phenanthrene	7600	J	10000	1500	ug/Kg	50	☼	8270D	Total/NA
Pyrene	15000		10000	1200	ug/Kg	50	☼	8270D	Total/NA
Aluminum	6880		12.0	5.3	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.2	J	18.0	0.48	mg/Kg	1	☼	6010C	Total/NA
Arsenic	6.4		2.4	0.48	mg/Kg	1	☼	6010C	Total/NA
Barium	74.0		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.32		0.24	0.034	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.69	B	0.24	0.036	mg/Kg	1	☼	6010C	Total/NA
Calcium	17600	B	60.1	4.0	mg/Kg	1	☼	6010C	Total/NA
Chromium	12.2		0.60	0.24	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.9		0.60	0.060	mg/Kg	1	☼	6010C	Total/NA
Copper	50.0	B	1.2	0.25	mg/Kg	1	☼	6010C	Total/NA
Iron	13900	B	12.0	4.2	mg/Kg	1	☼	6010C	Total/NA
Lead	219		1.2	0.29	mg/Kg	1	☼	6010C	Total/NA
Magnesium	3600		24.0	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	671		0.24	0.038	mg/Kg	1	☼	6010C	Total/NA
Nickel	12.8	B	6.0	0.28	mg/Kg	1	☼	6010C	Total/NA
Potassium	1290		36.1	24.0	mg/Kg	1	☼	6010C	Total/NA
Silver	0.38	J	0.72	0.24	mg/Kg	1	☼	6010C	Total/NA
Sodium	122	J	168	15.6	mg/Kg	1	☼	6010C	Total/NA
Vanadium	17.5		0.60	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	239		2.4	0.77	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.37		0.024	0.0097	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-07 12"-24"

Lab Sample ID: 480-136903-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	2000	J	4000	400	ug/Kg	20	☼	8270D	Total/NA
Benzo[a]pyrene	2000	J	4000	590	ug/Kg	20	☼	8270D	Total/NA
Benzo[b]fluoranthene	2700	J	4000	630	ug/Kg	20	☼	8270D	Total/NA
Benzo[g,h,i]perylene	1600	J	4000	420	ug/Kg	20	☼	8270D	Total/NA
Chrysene	2200	J	4000	890	ug/Kg	20	☼	8270D	Total/NA
Fluoranthene	4600		4000	420	ug/Kg	20	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1100	J	4000	490	ug/Kg	20	☼	8270D	Total/NA
Phenanthrene	3300	J	4000	590	ug/Kg	20	☼	8270D	Total/NA
Pyrene	4600		4000	470	ug/Kg	20	☼	8270D	Total/NA
Aluminum	8080		11.4	5.0	mg/Kg	1	☼	6010C	Total/NA
Antimony	0.85	J	17.1	0.46	mg/Kg	1	☼	6010C	Total/NA
Arsenic	5.8		2.3	0.46	mg/Kg	1	☼	6010C	Total/NA
Barium	49.9		0.57	0.13	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.35		0.23	0.032	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.33	B	0.23	0.034	mg/Kg	1	☼	6010C	Total/NA
Calcium	17600	B	57.1	3.8	mg/Kg	1	☼	6010C	Total/NA
Chromium	40.2	B	0.57	0.23	mg/Kg	1	☼	6010C	Total/NA
Cobalt	4.9		0.57	0.057	mg/Kg	1	☼	6010C	Total/NA
Copper	18.0	B	1.1	0.24	mg/Kg	1	☼	6010C	Total/NA
Iron	13700	B	11.4	4.0	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-07 12"-24" (Continued)

Lab Sample ID: 480-136903-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	175		1.1	0.27	mg/Kg	1	☼	6010C	Total/NA
Magnesium	6010		22.8	1.1	mg/Kg	1	☼	6010C	Total/NA
Manganese	303		0.23	0.037	mg/Kg	1	☼	6010C	Total/NA
Nickel	17.7	B	5.7	0.26	mg/Kg	1	☼	6010C	Total/NA
Potassium	1380		34.2	22.8	mg/Kg	1	☼	6010C	Total/NA
Sodium	87.1	J	160	14.8	mg/Kg	1	☼	6010C	Total/NA
Vanadium	18.4		0.57	0.13	mg/Kg	1	☼	6010C	Total/NA
Zinc	114		2.3	0.73	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.20	B	0.024	0.0096	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-08 0"-2"

Lab Sample ID: 480-136903-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	4800	J	11000	1100	ug/Kg	50	☼	8270D	Total/NA
Benzo[a]pyrene	3500	J	11000	1600	ug/Kg	50	☼	8270D	Total/NA
Benzo[b]fluoranthene	4900	J	11000	1700	ug/Kg	50	☼	8270D	Total/NA
Benzo[g,h,i]perylene	2500	J	11000	1200	ug/Kg	50	☼	8270D	Total/NA
Chrysene	3500	J	11000	2400	ug/Kg	50	☼	8270D	Total/NA
Fluoranthene	9400	J	11000	1200	ug/Kg	50	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	1900	J	11000	1300	ug/Kg	50	☼	8270D	Total/NA
Phenanthrene	6800	J	11000	1600	ug/Kg	50	☼	8270D	Total/NA
Pyrene	8200	J	11000	1300	ug/Kg	50	☼	8270D	Total/NA
Aluminum	7040		13.1	5.8	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.1	J	19.7	0.53	mg/Kg	1	☼	6010C	Total/NA
Arsenic	14.8		2.6	0.53	mg/Kg	1	☼	6010C	Total/NA
Barium	77.2		0.66	0.14	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.37		0.26	0.037	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.78	B	0.26	0.039	mg/Kg	1	☼	6010C	Total/NA
Calcium	22800	B	65.7	4.3	mg/Kg	1	☼	6010C	Total/NA
Chromium	16.0		0.66	0.26	mg/Kg	1	☼	6010C	Total/NA
Cobalt	5.4		0.66	0.066	mg/Kg	1	☼	6010C	Total/NA
Copper	34.0	B	1.3	0.28	mg/Kg	1	☼	6010C	Total/NA
Iron	13200	B	13.1	4.6	mg/Kg	1	☼	6010C	Total/NA
Lead	265		1.3	0.32	mg/Kg	1	☼	6010C	Total/NA
Magnesium	7530		26.3	1.2	mg/Kg	1	☼	6010C	Total/NA
Manganese	338		0.26	0.042	mg/Kg	1	☼	6010C	Total/NA
Nickel	13.0	B	6.6	0.30	mg/Kg	1	☼	6010C	Total/NA
Potassium	1600		39.4	26.3	mg/Kg	1	☼	6010C	Total/NA
Silver	0.60	J	0.79	0.26	mg/Kg	1	☼	6010C	Total/NA
Sodium	119	J	184	17.1	mg/Kg	1	☼	6010C	Total/NA
Vanadium	18.5		0.66	0.14	mg/Kg	1	☼	6010C	Total/NA
Zinc	221		2.6	0.84	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.31	F1 B	0.026	0.011	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-08 2"-12"

Lab Sample ID: 480-136903-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]pyrene	400	J	910	130	ug/Kg	5	☼	8270D	Total/NA
Benzo[b]fluoranthene	530	J	910	140	ug/Kg	5	☼	8270D	Total/NA
Benzo[g,h,i]perylene	290	J	910	96	ug/Kg	5	☼	8270D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SS-08 2"-12" (Continued)

Lab Sample ID: 480-136903-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[k]fluoranthene	150	J	910	120	ug/Kg	5	☼	8270D	Total/NA
Chrysene	360	J	910	200	ug/Kg	5	☼	8270D	Total/NA
Fluoranthene	580	J	910	96	ug/Kg	5	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	260	J	910	110	ug/Kg	5	☼	8270D	Total/NA
Phenanthrene	230	J	910	130	ug/Kg	5	☼	8270D	Total/NA
Pyrene	510	J	910	110	ug/Kg	5	☼	8270D	Total/NA
Aluminum	6530		10.6	4.7	mg/Kg	1	☼	6010C	Total/NA
Antimony	1.1	J	15.9	0.42	mg/Kg	1	☼	6010C	Total/NA
Arsenic	21.6		2.1	0.42	mg/Kg	1	☼	6010C	Total/NA
Barium	48.5		0.53	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.32		0.21	0.030	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.34	B	0.21	0.032	mg/Kg	1	☼	6010C	Total/NA
Calcium	23700	B	53.0	3.5	mg/Kg	1	☼	6010C	Total/NA
Chromium	32.6	B	0.53	0.21	mg/Kg	1	☼	6010C	Total/NA
Cobalt	5.1		0.53	0.053	mg/Kg	1	☼	6010C	Total/NA
Copper	28.9	B	1.1	0.22	mg/Kg	1	☼	6010C	Total/NA
Iron	12500	B	10.6	3.7	mg/Kg	1	☼	6010C	Total/NA
Lead	141		1.1	0.25	mg/Kg	1	☼	6010C	Total/NA
Magnesium	7630		21.2	0.98	mg/Kg	1	☼	6010C	Total/NA
Manganese	300		0.21	0.034	mg/Kg	1	☼	6010C	Total/NA
Nickel	22.1	B	5.3	0.24	mg/Kg	1	☼	6010C	Total/NA
Potassium	1360		31.8	21.2	mg/Kg	1	☼	6010C	Total/NA
Sodium	89.9	J	148	13.8	mg/Kg	1	☼	6010C	Total/NA
Vanadium	16.8		0.53	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	98.8		2.1	0.68	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.16	B	0.020	0.0082	mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: SS-08 12"-24"

Lab Sample ID: 480-136903-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	290		190	19	ug/Kg	1	☼	8270D	Total/NA
Benzo[a]pyrene	340		190	28	ug/Kg	1	☼	8270D	Total/NA
Benzo[b]fluoranthene	430		190	30	ug/Kg	1	☼	8270D	Total/NA
Benzo[g,h,i]perylene	300		190	20	ug/Kg	1	☼	8270D	Total/NA
Benzo[k]fluoranthene	140	J	190	25	ug/Kg	1	☼	8270D	Total/NA
Chrysene	320		190	43	ug/Kg	1	☼	8270D	Total/NA
Fluoranthene	460		190	20	ug/Kg	1	☼	8270D	Total/NA
Indeno[1,2,3-cd]pyrene	220		190	24	ug/Kg	1	☼	8270D	Total/NA
Phenanthrene	190		190	28	ug/Kg	1	☼	8270D	Total/NA
Pyrene	450		190	22	ug/Kg	1	☼	8270D	Total/NA
Aluminum	5060		10.9	4.8	mg/Kg	1	☼	6010C	Total/NA
Antimony	0.65	J	16.3	0.44	mg/Kg	1	☼	6010C	Total/NA
Arsenic	13.8		2.2	0.44	mg/Kg	1	☼	6010C	Total/NA
Barium	42.1		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Beryllium	0.26		0.22	0.031	mg/Kg	1	☼	6010C	Total/NA
Cadmium	0.21	J B	0.22	0.033	mg/Kg	1	☼	6010C	Total/NA
Calcium	44600	B	54.5	3.6	mg/Kg	1	☼	6010C	Total/NA
Chromium	9.8		0.56	0.22	mg/Kg	1	☼	6010C	Total/NA
Cobalt	3.7		0.54	0.054	mg/Kg	1	☼	6010C	Total/NA
Copper	12.9	B	1.1	0.23	mg/Kg	1	☼	6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 12"-24" (Continued)

Lab Sample ID: 480-136903-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	10000	B	10.9	3.8	mg/Kg	1	☼	6010C	Total/NA
Lead	72.5		1.1	0.26	mg/Kg	1	☼	6010C	Total/NA
Magnesium	8500		21.8	1.0	mg/Kg	1	☼	6010C	Total/NA
Manganese	388		0.22	0.035	mg/Kg	1	☼	6010C	Total/NA
Nickel	8.6	B	5.4	0.25	mg/Kg	1	☼	6010C	Total/NA
Potassium	1230		32.7	21.8	mg/Kg	1	☼	6010C	Total/NA
Sodium	145	J	153	14.2	mg/Kg	1	☼	6010C	Total/NA
Vanadium	14.9		0.54	0.12	mg/Kg	1	☼	6010C	Total/NA
Zinc	58.1		2.2	0.70	mg/Kg	1	☼	6010C	Total/NA
Mercury	0.11	B	0.022	0.0087	mg/Kg	1	☼	7471B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SB-03 11'-12'
Date Collected: 06/01/18 10:45
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-1
Matrix: Solid
Percent Solids: 79.9

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	6.1	0.44	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,1,2,2-Tetrachloroethane	ND	* vs	6.1	0.99	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	6.1	1.4	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,1,2-Trichloroethane	ND	vs	6.1	0.79	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,1-Dichloroethane	ND	vs	6.1	0.74	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,1-Dichloroethene	ND	vs	6.1	0.74	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2,4-Trichlorobenzene	ND	* vs	6.1	0.37	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2,4-Trimethylbenzene	ND	* vs	6.1	1.2	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2-Dibromo-3-Chloropropane	ND	* vs	6.1	3.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2-Dibromoethane	ND	vs	6.1	0.78	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2-Dichlorobenzene	ND	* vs	6.1	0.48	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2-Dichloroethane	ND	vs	6.1	0.31	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,2-Dichloropropane	ND	vs	6.1	3.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,3,5-Trimethylbenzene	ND	* vs	6.1	0.39	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,3-Dichlorobenzene	ND	* vs	6.1	0.31	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
1,4-Dichlorobenzene	ND	* vs	6.1	0.85	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
2-Butanone (MEK)	ND	vs	30	2.2	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
2-Hexanone	ND	vs	30	3.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
4-Isopropyltoluene	ND	* vs	6.1	0.49	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
4-Methyl-2-pentanone (MIBK)	ND	vs	30	2.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Acetone	**5.8**	**J vs**	30	5.1	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Benzene	ND	vs	6.1	0.30	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Bromodichloromethane	ND	vs	6.1	0.82	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Bromoform	ND	vs	6.1	3.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Bromomethane	ND	vs	6.1	0.55	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Carbon disulfide	ND	vs	6.1	3.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Carbon tetrachloride	ND	vs	6.1	0.59	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Chlorobenzene	ND	vs	6.1	0.80	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Chloroethane	ND	vs	6.1	1.4	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Chloroform	ND	vs	6.1	0.38	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Chloromethane	ND	vs	6.1	0.37	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
cis-1,2-Dichloroethene	ND	vs	6.1	0.78	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
cis-1,3-Dichloropropene	ND	vs	6.1	0.88	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Cyclohexane	ND	vs	6.1	0.85	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Dibromochloromethane	ND	vs	6.1	0.78	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Dichlorodifluoromethane	ND	vs	6.1	0.50	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Ethylbenzene	ND	vs	6.1	0.42	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Isopropylbenzene	ND	* vs	6.1	0.92	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
m,p-Xylene	ND	vs	12	1.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Methyl acetate	ND	vs	30	3.7	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Methyl tert-butyl ether	ND	vs	6.1	0.60	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Methylcyclohexane	ND	vs	6.1	0.92	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Methylene Chloride	**7.5**	**vs**	6.1	2.8	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Naphthalene	ND	* vs	6.1	0.82	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
n-Butylbenzene	ND	* vs	6.1	0.53	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
N-Propylbenzene	ND	* vs	6.1	0.49	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
o-Xylene	ND	vs	6.1	0.79	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
sec-Butylbenzene	**5.4**	**J * vs**	6.1	0.53	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Styrene	ND	vs	6.1	0.30	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1

Client Sample ID: SB-03 11'-12'
Date Collected: 06/01/18 10:45
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-1
Matrix: Solid
Percent Solids: 79.9

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	ND	* vs	6.1	0.63	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Tetrachloroethene	ND	vs	6.1	0.82	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Toluene	**0.63**	**J vs**	6.1	0.46	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
trans-1,2-Dichloroethene	ND	vs	6.1	0.63	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
trans-1,3-Dichloropropene	ND	vs	6.1	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Trichloroethene	**4.0**	**J vs**	6.1	1.3	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Trichlorofluoromethane	ND	vs	6.1	0.58	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Vinyl chloride	ND	vs	6.1	0.74	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1
Xylenes, Total	ND	vs	12	1.0	ug/Kg	☼	06/07/18 08:42	06/07/18 12:39	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Octane, 2,3-dimethyl-	*140*	*T H J N*	*ug/Kg*	☼	*8.80*	*7146-60-3*	*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*120*	*T H J*	*ug/Kg*	☼	*8.88*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*100*	*T H J*	*ug/Kg*	☼	*9.09*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*390*	*T H J*	*ug/Kg*	☼	*9.32*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*230*	*T H J*	*ug/Kg*	☼	*9.44*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*290*	*T H J*	*ug/Kg*	☼	*9.58*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*150*	*T H J*	*ug/Kg*	☼	*9.70*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*110*	*T H J*	*ug/Kg*	☼	*9.86*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*140*	*T H J*	*ug/Kg*	☼	*10.00*		*06/07/18 08:42*	*06/07/18 12:39*	*1*
Unknown	*98*	*T H J*	*ug/Kg*	☼	*10.64*		*06/07/18 08:42*	*06/07/18 12:39*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*64 - 126*	*06/07/18 08:42*	*06/07/18 12:39*	*1*
4-Bromofluorobenzene (Surr)	*77*		*72 - 126*	*06/07/18 08:42*	*06/07/18 12:39*	*1*
Dibromofluoromethane (Surr)	*103*		*60 - 140*	*06/07/18 08:42*	*06/07/18 12:39*	*1*
Toluene-d8 (Surr)	*107*		*71 - 125*	*06/07/18 08:42*	*06/07/18 12:39*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		11000	2900	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,4,6-Trichlorophenol	ND		11000	2100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,4-Dichlorophenol	ND		11000	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,4-Dimethylphenol	ND		11000	2600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,4-Dinitrophenol	ND		100000	49000	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,4-Dinitrotoluene	ND		11000	2200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2,6-Dinitrotoluene	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Chloronaphthalene	ND		11000	1700	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Chlorophenol	ND		11000	1900	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Methylnaphthalene	ND		11000	2100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Methylphenol	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Nitroaniline	ND		21000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
2-Nitrophenol	ND		11000	3000	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
3,3'-Dichlorobenzidine	ND		21000	12000	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
3-Nitroaniline	ND		21000	2900	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4,6-Dinitro-2-methylphenol	ND		21000	11000	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Bromophenyl phenyl ether	ND		11000	1500	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Chloro-3-methylphenol	ND		11000	2600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Chloroaniline	ND		11000	2600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Chlorophenyl phenyl ether	ND		11000	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50

Client Sample ID: SB-03 11'-12'
Date Collected: 06/01/18 10:45
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-1
Matrix: Solid
Percent Solids: 79.9

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methylphenol	ND		21000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Nitroaniline	ND		21000	5500	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
4-Nitrophenol	ND		21000	7400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Acenaphthene	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Acenaphthylene	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Acetophenone	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Anthracene	ND		11000	2600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Atrazine	ND		11000	3700	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzaldehyde	ND		11000	8400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzo[a]anthracene	ND		11000	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzo[a]pyrene	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzo[b]fluoranthene	ND		11000	1700	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzo[g,h,i]perylene	ND		11000	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Benzo[k]fluoranthene	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Biphenyl	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
bis (2-chloroisopropyl) ether	ND		11000	2100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Bis(2-chloroethoxy)methane	ND		11000	2200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Bis(2-chloroethyl)ether	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Bis(2-ethylhexyl) phthalate	ND		11000	3600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Butyl benzyl phthalate	ND		11000	1700	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Caprolactam	ND		11000	3200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Carbazole	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Chrysene	ND		11000	2400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Dibenz(a,h)anthracene	ND		11000	1900	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Dibenzofuran	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Diethyl phthalate	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Dimethyl phthalate	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Di-n-butyl phthalate	ND		11000	1800	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Di-n-octyl phthalate	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Fluoranthene	ND		11000	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Fluorene	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Hexachlorobenzene	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Hexachlorobutadiene	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Hexachlorocyclopentadiene	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Hexachloroethane	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Indeno[1,2,3-cd]pyrene	ND		11000	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Isophorone	ND		11000	2200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Naphthalene	ND		11000	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Nitrobenzene	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
N-Nitrosodi-n-propylamine	ND		11000	1800	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
N-Nitrosodiphenylamine	ND		11000	8600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Pentachlorophenol	ND		21000	11000	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Phenanthrene	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Phenol	ND		11000	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50
Pyrene	ND		11000	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 12:54	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Methylene Chloride	*22000*	*T J N*	*ug/Kg*	☼	*1.90*	*75-09-2*	*06/11/18 14:15*	*06/19/18 12:54*	*50*
Unknown	*9000*	*T J*	*ug/Kg*	☼	*9.66*		*06/11/18 14:15*	*06/19/18 12:54*	*50*

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 11'-12'
Date Collected: 06/01/18 10:45
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-1
Matrix: Solid
Percent Solids: 79.9

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	178	X	54 - 120	06/11/18 14:15	06/19/18 12:54	50
2-Fluorobiphenyl	92		60 - 120	06/11/18 14:15	06/19/18 12:54	50
2-Fluorophenol (Surr)	69		52 - 120	06/11/18 14:15	06/19/18 12:54	50
Nitrobenzene-d5 (Surr)	72		53 - 120	06/11/18 14:15	06/19/18 12:54	50
Phenol-d5 (Surr)	63		54 - 120	06/11/18 14:15	06/19/18 12:54	50
p-Terphenyl-d14 (Surr)	141	X	65 - 121	06/11/18 14:15	06/19/18 12:54	50

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 13-14.2'
Date Collected: 06/01/18 11:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-2
Matrix: Solid
Percent Solids: 91.2

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	vs	5.4	0.39	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,1,2,2-Tetrachloroethane	ND	* vs	5.4	0.87	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	vs	5.4	1.2	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,1,2-Trichloroethane	ND	vs	5.4	0.70	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,1-Dichloroethane	ND	vs	5.4	0.66	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,1-Dichloroethene	ND	vs	5.4	0.66	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2,4-Trichlorobenzene	ND	* vs	5.4	0.33	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2,4-Trimethylbenzene	ND	* vs	5.4	1.0	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2-Dibromo-3-Chloropropane	ND	* vs	5.4	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2-Dibromoethane	ND	vs	5.4	0.69	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2-Dichlorobenzene	ND	* vs	5.4	0.42	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2-Dichloroethane	ND	vs	5.4	0.27	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,2-Dichloropropane	ND	vs	5.4	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,3,5-Trimethylbenzene	ND	* vs	5.4	0.35	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,3-Dichlorobenzene	ND	* vs	5.4	0.28	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
1,4-Dichlorobenzene	ND	* vs	5.4	0.75	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
2-Butanone (MEK)	ND	vs	27	2.0	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
2-Hexanone	ND	vs	27	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
4-Isopropyltoluene	**2.8**	**J * vs**	5.4	0.43	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
4-Methyl-2-pentanone (MIBK)	ND	vs	27	1.8	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Acetone	**12**	**J vs**	27	4.5	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Benzene	ND	vs	5.4	0.26	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Bromodichloromethane	ND	vs	5.4	0.72	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Bromoform	ND	vs	5.4	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Bromomethane	ND	vs	5.4	0.48	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Carbon disulfide	ND	vs	5.4	2.7	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Carbon tetrachloride	ND	vs	5.4	0.52	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Chlorobenzene	ND	vs	5.4	0.71	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Chloroethane	ND	vs	5.4	1.2	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Chloroform	ND	vs	5.4	0.33	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Chloromethane	ND	vs	5.4	0.32	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
cis-1,2-Dichloroethene	ND	vs	5.4	0.69	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
cis-1,3-Dichloropropene	ND	vs	5.4	0.77	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Cyclohexane	ND	vs	5.4	0.75	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Dibromochloromethane	ND	vs	5.4	0.69	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Dichlorodifluoromethane	ND	vs	5.4	0.44	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Ethylbenzene	ND	vs	5.4	0.37	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Isopropylbenzene	ND	* vs	5.4	0.81	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
m,p-Xylene	ND	vs	11	0.90	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Methyl acetate	ND	vs	27	3.2	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Methyl tert-butyl ether	ND	vs	5.4	0.53	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Methylcyclohexane	**1.2**	**J vs**	5.4	0.82	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Methylene Chloride	**5.3**	**J vs**	5.4	2.5	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Naphthalene	ND	* vs	5.4	0.72	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
n-Butylbenzene	ND	* vs	5.4	0.47	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
N-Propylbenzene	ND	* vs	5.4	0.43	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
o-Xylene	ND	vs	5.4	0.70	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
sec-Butylbenzene	**170**	*** vs**	5.4	0.47	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Styrene	ND	vs	5.4	0.27	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1

Client Sample ID: SB-03 13-14.2'
Date Collected: 06/01/18 11:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-2
Matrix: Solid
Percent Solids: 91.2

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
tert-Butylbenzene	ND	* vs	5.4	0.56	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Tetrachloroethene	ND	vs	5.4	0.72	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Toluene	**1.7**	**J vs**	5.4	0.41	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
trans-1,2-Dichloroethene	ND	vs	5.4	0.55	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
trans-1,3-Dichloropropene	ND	vs	5.4	2.4	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Trichloroethene	**5.1**	**J vs**	5.4	1.2	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Trichlorofluoromethane	ND	vs	5.4	0.51	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Vinyl chloride	ND	vs	5.4	0.66	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1
Xylenes, Total	ND	vs	11	0.90	ug/Kg	☼	06/07/18 08:42	06/07/18 13:05	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Cyclohexane, 1,1,3,5-tetramethyl-, cis-	*610*	*T H J N*	*ug/Kg*	☼	*8.12*	*50876-32-9*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*850*	*T H J*	*ug/Kg*	☼	*8.18*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*1100*	*T H J*	*ug/Kg*	☼	*8.31*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*1100*	*T H J*	*ug/Kg*	☼	*8.48*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Nonane, 3-methyl-	*2700*	*T H J N*	*ug/Kg*	☼	*8.64*	*5911-04-6*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
Heptane, 3-ethyl-2-methyl-	*7300*	*T H J N*	*ug/Kg*	☼	*8.80*	*14676-29-0*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*1300*	*T H J*	*ug/Kg*	☼	*8.88*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*440*	*T H J*	*ug/Kg*	☼	*8.99*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*770*	*T H J*	*ug/Kg*	☼	*9.33*		*06/07/18 08:42*	*06/07/18 13:05*	*1*
Unknown	*430*	*T H J*	*ug/Kg*	☼	*9.45*		*06/07/18 08:42*	*06/07/18 13:05*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*64 - 126*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
4-Bromofluorobenzene (Surr)	*75*		*72 - 126*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
Dibromofluoromethane (Surr)	*100*		*60 - 140*	*06/07/18 08:42*	*06/07/18 13:05*	*1*
Toluene-d8 (Surr)	*104*		*71 - 125*	*06/07/18 08:42*	*06/07/18 13:05*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		9100	2500	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,4,6-Trichlorophenol	ND		9100	1800	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,4-Dichlorophenol	ND		9100	960	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,4-Dimethylphenol	ND		9100	2200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,4-Dinitrophenol	ND		89000	42000	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,4-Dinitrotoluene	ND		9100	1900	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2,6-Dinitrotoluene	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Chloronaphthalene	ND		9100	1500	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Chlorophenol	ND		9100	1700	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Methylnaphthalene	ND		9100	1800	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Methylphenol	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Nitroaniline	ND		18000	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
2-Nitrophenol	ND		9100	2600	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
3,3'-Dichlorobenzidine	ND		18000	11000	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
3-Nitroaniline	ND		18000	2500	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4,6-Dinitro-2-methylphenol	ND		18000	9100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Bromophenyl phenyl ether	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Chloro-3-methylphenol	ND		9100	2300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Chloroaniline	ND		9100	2300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 13-14.2'
Date Collected: 06/01/18 11:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-2
Matrix: Solid
Percent Solids: 91.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Chlorophenyl phenyl ether	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Methylphenol	ND		18000	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Nitroaniline	ND		18000	4800	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
4-Nitrophenol	ND		18000	6400	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Acenaphthene	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Acenaphthylene	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Acetophenone	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Anthracene	ND		9100	2300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Atrazine	ND		9100	3200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzaldehyde	ND		9100	7200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzo[a]anthracene	ND		9100	910	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzo[a]pyrene	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzo[b]fluoranthene	ND		9100	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzo[g,h,i]perylene	ND		9100	960	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Benzo[k]fluoranthene	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Biphenyl	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
bis (2-chloroisopropyl) ether	ND		9100	1800	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Bis(2-chloroethoxy)methane	ND		9100	1900	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Bis(2-chloroethyl)ether	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Bis(2-ethylhexyl) phthalate	ND		9100	3100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Butyl benzyl phthalate	ND		9100	1500	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Caprolactam	ND		9100	2700	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Carbazole	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Chrysene	ND		9100	2000	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Dibenz(a,h)anthracene	ND		9100	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Dibenzofuran	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Diethyl phthalate	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Dimethyl phthalate	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Di-n-butyl phthalate	ND		9100	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Di-n-octyl phthalate	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Fluoranthene	ND		9100	960	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Fluorene	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Hexachlorobenzene	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Hexachlorobutadiene	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Hexachlorocyclopentadiene	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Hexachloroethane	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Indeno[1,2,3-cd]pyrene	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Isophorone	ND		9100	1900	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Naphthalene	ND		9100	1200	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Nitrobenzene	ND		9100	1000	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
N-Nitrosodi-n-propylamine	ND		9100	1600	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
N-Nitrosodiphenylamine	ND		9100	7400	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Pentachlorophenol	ND		18000	9100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Phenanthrene	ND		9100	1300	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Phenol	ND		9100	1400	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50
Pyrene	ND		9100	1100	ug/Kg	☼	06/11/18 14:15	06/19/18 13:19	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Methylene Chloride	*17000*	*T J N*	*ug/Kg*	☼	*1.93*	*75-09-2*	*06/11/18 14:15*	*06/19/18 13:19*	*50*

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 13-14.2'
Date Collected: 06/01/18 11:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-2
Matrix: Solid
Percent Solids: 91.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Tentatively Identified Compound	Est. Result	Qualifier	Unit	D	RT	CAS No.	Prepared	Analyzed	Dil Fac
Decahydro-4,4,8,9,10-pentamethylnaphthalene	9600	T J N	ug/Kg	☼	9.10	80655-44-3	06/11/18 14:15	06/19/18 13:19	50
Unknown	11000	T J	ug/Kg	☼	9.67		06/11/18 14:15	06/19/18 13:19	50
Cyclopentene, 1,2-dimethyl-4-methylene-3-phenyl-	8700	T J	ug/Kg	☼	10.33		06/11/18 14:15	06/19/18 13:19	50
Azulene, 7-ethyl-1,4-dimethyl-	10000	T J N	ug/Kg	☼	10.58	529-05-5	06/11/18 14:15	06/19/18 13:19	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	166	X	54 - 120	06/11/18 14:15	06/19/18 13:19	50
2-Fluorobiphenyl	84		60 - 120	06/11/18 14:15	06/19/18 13:19	50
2-Fluorophenol (Surr)	58		52 - 120	06/11/18 14:15	06/19/18 13:19	50
Nitrobenzene-d5 (Surr)	64		53 - 120	06/11/18 14:15	06/19/18 13:19	50
Phenol-d5 (Surr)	59		54 - 120	06/11/18 14:15	06/19/18 13:19	50
p-Terphenyl-d14 (Surr)	131	X	65 - 121	06/11/18 14:15	06/19/18 13:19	50

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 0"-2"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-3
Matrix: Solid
Percent Solids: 94.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		8900	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,4,6-Trichlorophenol	ND		8900	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,4-Dichlorophenol	ND		8900	950	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,4-Dimethylphenol	ND		8900	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,4-Dinitrophenol	ND		87000	41000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,4-Dinitrotoluene	ND		8900	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2,6-Dinitrotoluene	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Chloronaphthalene	ND		8900	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Chlorophenol	ND		8900	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Methylnaphthalene	ND		8900	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Methylphenol	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Nitroaniline	ND		17000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
2-Nitrophenol	ND		8900	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
3,3'-Dichlorobenzidine	ND		17000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
3-Nitroaniline	ND		17000	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4,6-Dinitro-2-methylphenol	ND		17000	8900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Bromophenyl phenyl ether	ND		8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Chloro-3-methylphenol	ND		8900	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Chloroaniline	ND		8900	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Chlorophenyl phenyl ether	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Methylphenol	ND		17000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Nitroaniline	ND		17000	4700	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
4-Nitrophenol	ND		17000	6300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Acenaphthene	ND		8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Acenaphthylene	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Acetophenone	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Anthracene	ND		8900	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Atrazine	ND		8900	3100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzaldehyde	ND		8900	7100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzo[a]anthracene	ND		8900	890	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzo[a]pyrene	ND		8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzo[b]fluoranthene	ND		8900	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzo[g,h,i]perylene	ND		8900	950	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Benzo[k]fluoranthene	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Biphenyl	ND		8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
bis (2-chloroisopropyl) ether	ND		8900	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Bis(2-chloroethoxy)methane	ND		8900	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Bis(2-chloroethyl)ether	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Bis(2-ethylhexyl) phthalate	ND		8900	3100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Butyl benzyl phthalate	ND		8900	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Caprolactam	ND		8900	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Carbazole	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Chrysene	ND		8900	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Dibenz(a,h)anthracene	ND		8900	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Dibenzofuran	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Diethyl phthalate	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Dimethyl phthalate	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Di-n-butyl phthalate	ND		8900	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Di-n-octyl phthalate	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50

Client Sample ID: SS-01 0"-2"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-3
Matrix: Solid
Percent Solids: 94.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**3300**	**J**	8900	950	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Fluorene	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Hexachlorobenzene	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Hexachlorobutadiene	ND		8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Hexachlorocyclopentadiene	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Hexachloroethane	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Indeno[1,2,3-cd]pyrene	ND		8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Isophorone	ND		8900	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Naphthalene	ND		8900	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Nitrobenzene	ND		8900	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
N-Nitrosodi-n-propylamine	ND		8900	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
N-Nitrosodiphenylamine	ND		8900	7300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Pentachlorophenol	ND		17000	8900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Phenanthrene	**2500**	**J**	8900	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Phenol	ND		8900	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50
Pyrene	**3200**	**J**	8900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:05	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 19:05*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 19:05*	*50*
2-Fluorobiphenyl	*0*	*X*	*60 - 120*	*06/07/18 14:15*	*06/12/18 19:05*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 19:05*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 19:05*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 19:05*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 19:05*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5110**	**B F1**	10.3	4.5	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Antimony	ND	F1	15.4	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Arsenic	**4.8**		2.1	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Barium	**47.4**	**F1 F2**	0.51	0.11	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Beryllium	**0.28**		0.21	0.029	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Cadmium	**0.34**		0.21	0.031	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Calcium	**30600**	**B**	51.4	3.4	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Chromium	**11.6**		0.53	0.21	mg/Kg	☼	06/18/18 16:41	06/19/18 10:59	1
Cobalt	**6.1**		0.51	0.051	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Copper	**35.1**	**B**	1.0	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Iron	**11800**	**B**	10.3	3.6	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Lead	**84.2**		1.0	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Magnesium	**15500**		20.6	0.95	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Manganese	**327**	**B**	0.21	0.033	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Nickel	**11.7**	**B**	5.1	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Potassium	**1110**	**F1**	30.9	20.6	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Selenium	ND		4.1	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Silver	ND		0.62	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Sodium	**108**	**J**	144	13.4	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Thallium	ND		6.2	0.31	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 0"-2"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-3
Matrix: Solid
Percent Solids: 94.7

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	15.8		0.51	0.11	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1
Zinc	106		2.1	0.66	mg/Kg	☼	06/11/18 17:30	06/13/18 21:50	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.27		0.020	0.0081	mg/Kg	☼	06/21/18 16:35	06/21/18 17:49	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 2"-12"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-4
Matrix: Solid
Percent Solids: 94.9

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		89000	24000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,4,6-Trichlorophenol	ND		89000	18000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,4-Dichlorophenol	ND		89000	9400	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,4-Dimethylphenol	ND		89000	21000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,4-Dinitrophenol	ND		870000	410000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,4-Dinitrotoluene	ND		89000	18000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2,6-Dinitrotoluene	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Chloronaphthalene	ND		89000	15000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Chlorophenol	ND		89000	16000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Methylnaphthalene	ND		89000	18000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Methylphenol	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Nitroaniline	ND		170000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
2-Nitrophenol	ND		89000	25000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
3,3'-Dichlorobenzidine	ND		170000	100000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
3-Nitroaniline	ND		170000	25000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4,6-Dinitro-2-methylphenol	ND		170000	89000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Bromophenyl phenyl ether	ND		89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Chloro-3-methylphenol	ND		89000	22000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Chloroaniline	ND		89000	22000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Chlorophenyl phenyl ether	ND		89000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Methylphenol	ND		170000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Nitroaniline	ND		170000	47000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
4-Nitrophenol	ND		170000	62000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Acenaphthene	ND		89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Acenaphthylene	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Acetophenone	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Anthracene	ND		89000	22000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Atrazine	ND		89000	31000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzaldehyde	ND		89000	71000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzo[a]anthracene	ND		89000	8900	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzo[a]pyrene	**13000**	**J F2**	89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzo[b]fluoranthene	**16000**	**J F2**	89000	14000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzo[g,h,i]perylene	ND		89000	9400	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Benzo[k]fluoranthene	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Biphenyl	ND		89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
bis (2-chloroisopropyl) ether	ND		89000	18000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Bis(2-chloroethoxy)methane	ND		89000	19000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Bis(2-chloroethyl)ether	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Bis(2-ethylhexyl) phthalate	ND		89000	30000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Butyl benzyl phthalate	ND		89000	15000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Caprolactam	ND		89000	27000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Carbazole	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Chrysene	ND		89000	20000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Dibenz(a,h)anthracene	ND		89000	16000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Dibenzofuran	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Diethyl phthalate	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Dimethyl phthalate	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Di-n-butyl phthalate	ND		89000	15000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Di-n-octyl phthalate	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 2"-12"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-4
Matrix: Solid
Percent Solids: 94.9

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	ND	F2	89000	9400	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Fluorene	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Hexachlorobenzene	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Hexachlorobutadiene	ND		89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Hexachlorocyclopentadiene	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Hexachloroethane	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Indeno[1,2,3-cd]pyrene	ND		89000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Isophorone	ND		89000	19000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Naphthalene	ND		89000	12000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Nitrobenzene	ND		89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
N-Nitrosodi-n-propylamine	ND		89000	15000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
N-Nitrosodiphenylamine	ND		89000	72000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Pentachlorophenol	ND		170000	89000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Phenanthrene	ND		89000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Phenol	ND		89000	14000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50
Pyrene	ND	F2	89000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 18:37	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 18:37*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 18:37*	*50*
2-Fluorobiphenyl	*0*	*X*	*60 - 120*	*06/07/18 14:15*	*06/12/18 18:37*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 18:37*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 18:37*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 18:37*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 18:37*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5910**	**B**	10.5	4.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Antimony	ND		15.7	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Arsenic	**5.2**		2.1	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Barium	**56.8**		0.52	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Beryllium	**0.32**		0.21	0.029	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Cadmium	**0.41**		0.21	0.031	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Calcium	**31200**	**B**	52.5	3.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Chromium	**12.3**	**B**	0.52	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Cobalt	**8.5**		0.52	0.052	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Copper	**50.1**	**B**	1.0	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Iron	**13500**	**B**	10.5	3.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Lead	**104**		1.0	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Magnesium	**16200**		21.0	0.97	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Manganese	**378**	**B**	0.21	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Nickel	**13.4**	**B**	5.2	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Potassium	**1260**		31.5	21.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Selenium	ND		4.2	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Silver	ND		0.63	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Sodium	**102**	**J**	147	13.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Thallium	ND		6.3	0.31	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 2"-12"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-4
Matrix: Solid
Percent Solids: 94.9

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	17.1		0.52	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1
Zinc	110		2.1	0.67	mg/Kg	☼	06/11/18 17:30	06/13/18 22:09	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.33		0.022	0.0087	mg/Kg	☼	06/21/18 16:35	06/21/18 17:51	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 12"-24"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-5
Matrix: Solid
Percent Solids: 95.5

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		8800	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,4,6-Trichlorophenol	ND		8800	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,4-Dichlorophenol	ND		8800	930	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,4-Dimethylphenol	ND		8800	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,4-Dinitrophenol	ND		86000	40000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,4-Dinitrotoluene	ND		8800	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2,6-Dinitrotoluene	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Chloronaphthalene	ND		8800	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Chlorophenol	ND		8800	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Methylnaphthalene	ND		8800	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Methylphenol	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Nitroaniline	ND		17000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
2-Nitrophenol	ND		8800	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
3,3'-Dichlorobenzidine	ND		17000	10000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
3-Nitroaniline	ND		17000	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4,6-Dinitro-2-methylphenol	ND		17000	8800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Bromophenyl phenyl ether	ND		8800	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Chloro-3-methylphenol	ND		8800	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Chloroaniline	ND		8800	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Chlorophenyl phenyl ether	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Methylphenol	ND		17000	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Nitroaniline	ND		17000	4600	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
4-Nitrophenol	ND		17000	6100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Acenaphthene	ND		8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Acenaphthylene	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Acetophenone	ND		8800	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Anthracene	ND		8800	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Atrazine	ND		8800	3000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzaldehyde	ND		8800	7000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzo[a]anthracene	ND		8800	880	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzo[a]pyrene	**1900**	**J**	8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzo[b]fluoranthene	**3000**	**J**	8800	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzo[g,h,i]perylene	ND		8800	930	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Benzo[k]fluoranthene	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Biphenyl	ND		8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
bis (2-chloroisopropyl) ether	ND		8800	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Bis(2-chloroethoxy)methane	ND		8800	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Bis(2-chloroethyl)ether	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Bis(2-ethylhexyl) phthalate	ND		8800	3000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Butyl benzyl phthalate	ND		8800	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Caprolactam	ND		8800	2600	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Carbazole	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Chrysene	ND		8800	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Dibenz(a,h)anthracene	ND		8800	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Dibenzofuran	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Diethyl phthalate	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Dimethyl phthalate	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Di-n-butyl phthalate	ND		8800	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Di-n-octyl phthalate	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50

Client Sample ID: SS-01 12"-24"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-5
Matrix: Solid
Percent Solids: 95.5

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**3900**	**J**	8800	930	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Fluorene	ND		8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Hexachlorobenzene	ND		8800	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Hexachlorobutadiene	ND		8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Hexachlorocyclopentadiene	ND		8800	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Hexachloroethane	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Indeno[1,2,3-cd]pyrene	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Isophorone	ND		8800	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Naphthalene	ND		8800	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Nitrobenzene	ND		8800	980	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
N-Nitrosodi-n-propylamine	ND		8800	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
N-Nitrosodiphenylamine	ND		8800	7100	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Pentachlorophenol	ND		17000	8800	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Phenanthrene	**2600**	**J**	8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Phenol	ND		8800	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50
Pyrene	**3400**	**J**	8800	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 19:32	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 19:32*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 19:32*	*50*
2-Fluorobiphenyl	*0*	*X*	*60 - 120*	*06/07/18 14:15*	*06/12/18 19:32*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 19:32*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 19:32*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 19:32*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 19:32*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6170**	**B**	10.8	4.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Antimony	ND		16.1	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Arsenic	**5.0**		2.2	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Barium	**56.9**		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Beryllium	**0.34**		0.22	0.030	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Cadmium	**0.40**		0.22	0.032	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Calcium	**34300**	**B**	53.8	3.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Chromium	**13.2**	**B**	0.54	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Cobalt	**10.2**		0.54	0.054	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Copper	**51.7**	**B**	1.1	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Iron	**13100**	**B**	10.8	3.8	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Lead	**118**		1.1	0.26	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Magnesium	**18000**		21.5	1.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Manganese	**407**	**B**	0.22	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Nickel	**13.0**	**B**	5.4	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Potassium	**1360**		32.3	21.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Selenium	ND		4.3	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Silver	ND		0.65	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Sodium	**111**	**J**	151	14.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Thallium	ND		6.5	0.32	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-01 12"-24"
Date Collected: 06/01/18 10:00
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-5
Matrix: Solid
Percent Solids: 95.5

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	19.5		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1
Zinc	114		2.2	0.69	mg/Kg	☼	06/11/18 17:30	06/13/18 22:13	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.24		0.021	0.0085	mg/Kg	☼	06/21/18 16:35	06/21/18 17:52	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 0"-2"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-6
Matrix: Solid
Percent Solids: 90.5

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		9400	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,4,6-Trichlorophenol	ND		9400	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,4-Dichlorophenol	ND		9400	990	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,4-Dimethylphenol	ND		9400	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,4-Dinitrophenol	ND		92000	43000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,4-Dinitrotoluene	ND		9400	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2,6-Dinitrotoluene	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Chloronaphthalene	ND		9400	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Chlorophenol	ND		9400	1700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Methylnaphthalene	ND		9400	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Methylphenol	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Nitroaniline	ND		18000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
2-Nitrophenol	ND		9400	2600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
3,3'-Dichlorobenzidine	ND		18000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
3-Nitroaniline	ND		18000	2600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4,6-Dinitro-2-methylphenol	ND		18000	9400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Bromophenyl phenyl ether	ND		9400	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Chloro-3-methylphenol	ND		9400	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Chloroaniline	ND		9400	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Chlorophenyl phenyl ether	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Methylphenol	ND		18000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Nitroaniline	ND		18000	4900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
4-Nitrophenol	ND		18000	6600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Acenaphthene	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Acenaphthylene	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Acetophenone	ND		9400	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Anthracene	ND		9400	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Atrazine	ND		9400	3300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzaldehyde	ND		9400	7500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzo[a]anthracene	ND		9400	940	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzo[a]pyrene	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzo[b]fluoranthene	ND		9400	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzo[g,h,i]perylene	ND		9400	990	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Benzo[k]fluoranthene	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Biphenyl	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
bis (2-chloroisopropyl) ether	ND		9400	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Bis(2-chloroethoxy)methane	ND		9400	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Bis(2-chloroethyl)ether	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Bis(2-ethylhexyl) phthalate	ND		9400	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Butyl benzyl phthalate	ND		9400	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Caprolactam	ND		9400	2800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Carbazole	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Chrysene	ND		9400	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Dibenz(a,h)anthracene	ND		9400	1700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Dibenzofuran	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Diethyl phthalate	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Dimethyl phthalate	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Di-n-butyl phthalate	ND		9400	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Di-n-octyl phthalate	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50

Client Sample ID: SS-02 0"-2"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-6
Matrix: Solid
Percent Solids: 90.5

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**1100**	**J**	9400	990	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Fluorene	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Hexachlorobenzene	ND		9400	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Hexachlorobutadiene	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Hexachlorocyclopentadiene	ND		9400	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Hexachloroethane	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Indeno[1,2,3-cd]pyrene	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Isophorone	ND		9400	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Naphthalene	ND		9400	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Nitrobenzene	ND		9400	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
N-Nitrosodi-n-propylamine	ND		9400	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
N-Nitrosodiphenylamine	ND		9400	7600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Pentachlorophenol	ND		18000	9400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Phenanthrene	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Phenol	ND		9400	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50
Pyrene	ND		9400	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:00	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 20:00*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:00*	*50*
2-Fluorobiphenyl	*81*		*60 - 120*	*06/07/18 14:15*	*06/12/18 20:00*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 20:00*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 20:00*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:00*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 20:00*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5780**	**B**	10.8	4.8	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Antimony	ND		16.2	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Arsenic	**7.1**		2.2	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Barium	**52.1**		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Beryllium	**0.31**		0.22	0.030	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Cadmium	**0.30**		0.22	0.032	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Calcium	**21600**	**B**	54.2	3.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Chromium	**15.2**	**B**	0.54	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Cobalt	**5.7**		0.54	0.054	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Copper	**34.8**	**B**	1.1	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Iron	**14600**	**B**	10.8	3.8	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Lead	**85.9**		1.1	0.26	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Magnesium	**9390**		21.7	1.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Manganese	**358**	**B**	0.22	0.035	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Nickel	**14.5**	**B**	5.4	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Potassium	**1270**		32.5	21.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Selenium	ND		4.3	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Silver	**0.40**	**J**	0.65	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Sodium	**134**	**J**	152	14.1	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Thallium	ND		6.5	0.32	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 0"-2"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-6
Matrix: Solid
Percent Solids: 90.5

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	15.7		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1
Zinc	98.5		2.2	0.69	mg/Kg	☼	06/11/18 17:30	06/13/18 22:17	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.25		0.023	0.0092	mg/Kg	☼	06/21/18 16:35	06/21/18 17:59	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 2"-12"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-7
Matrix: Solid
Percent Solids: 93.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		9100	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,4,6-Trichlorophenol	ND		9100	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,4-Dichlorophenol	ND		9100	960	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,4-Dimethylphenol	ND		9100	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,4-Dinitrophenol	ND		89000	42000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,4-Dinitrotoluene	ND		9100	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2,6-Dinitrotoluene	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Chloronaphthalene	ND		9100	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Chlorophenol	ND		9100	1700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Methylnaphthalene	ND		9100	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Methylphenol	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Nitroaniline	ND		18000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
2-Nitrophenol	ND		9100	2600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
3,3'-Dichlorobenzidine	ND		18000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
3-Nitroaniline	ND		18000	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4,6-Dinitro-2-methylphenol	ND		18000	9100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Bromophenyl phenyl ether	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Chloro-3-methylphenol	ND		9100	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Chloroaniline	ND		9100	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Chlorophenyl phenyl ether	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Methylphenol	ND		18000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Nitroaniline	ND		18000	4800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
4-Nitrophenol	ND		18000	6400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Acenaphthene	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Acenaphthylene	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Acetophenone	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Anthracene	ND		9100	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Atrazine	ND		9100	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzaldehyde	ND		9100	7200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzo[a]anthracene	ND		9100	910	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzo[a]pyrene	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzo[b]fluoranthene	ND		9100	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzo[g,h,i]perylene	ND		9100	960	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Benzo[k]fluoranthene	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Biphenyl	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
bis (2-chloroisopropyl) ether	ND		9100	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Bis(2-chloroethoxy)methane	ND		9100	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Bis(2-chloroethyl)ether	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Bis(2-ethylhexyl) phthalate	ND		9100	3100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Butyl benzyl phthalate	ND		9100	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Caprolactam	ND		9100	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Carbazole	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Chrysene	ND		9100	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Dibenz(a,h)anthracene	ND		9100	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Dibenzofuran	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Diethyl phthalate	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Dimethyl phthalate	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Di-n-butyl phthalate	ND		9100	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Di-n-octyl phthalate	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50

Client Sample ID: SS-02 2"-12"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-7
Matrix: Solid
Percent Solids: 93.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**1300**	**J**	9100	960	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Fluorene	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Hexachlorobenzene	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Hexachlorobutadiene	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Hexachlorocyclopentadiene	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Hexachloroethane	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Indeno[1,2,3-cd]pyrene	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Isophorone	ND		9100	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Naphthalene	ND		9100	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Nitrobenzene	ND		9100	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
N-Nitrosodi-n-propylamine	ND		9100	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
N-Nitrosodiphenylamine	ND		9100	7400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Pentachlorophenol	ND		18000	9100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Phenanthrene	ND		9100	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Phenol	ND		9100	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50
Pyrene	ND		9100	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:27	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 20:27*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:27*	*50*
2-Fluorobiphenyl	*89*		*60 - 120*	*06/07/18 14:15*	*06/12/18 20:27*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 20:27*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 20:27*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:27*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 20:27*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5740**	**B**	10.2	4.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Antimony	ND		15.3	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Arsenic	**6.2**		2.0	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Barium	**56.6**		0.51	0.11	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Beryllium	**0.33**		0.20	0.029	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Cadmium	**0.36**		0.20	0.031	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Calcium	**25200**	**B**	51.1	3.4	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Chromium	**11.9**	**B**	0.51	0.20	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Cobalt	**5.7**		0.51	0.051	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Copper	**25.7**	**B**	1.0	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Iron	**13800**	**B**	10.2	3.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Lead	**126**		1.0	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Magnesium	**9730**		20.4	0.95	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Manganese	**405**	**B**	0.20	0.033	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Nickel	**13.4**	**B**	5.1	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Potassium	**1250**		30.7	20.4	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Selenium	ND		4.1	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Silver	ND		0.61	0.20	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Sodium	**91.3**	**J**	143	13.3	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Thallium	ND		6.1	0.31	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 2"-12"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-7
Matrix: Solid
Percent Solids: 93.4

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	16.2		0.51	0.11	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1
Zinc	75.3		2.0	0.65	mg/Kg	☼	06/11/18 17:30	06/13/18 22:32	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.29		0.021	0.0084	mg/Kg	☼	06/21/18 16:35	06/21/18 18:00	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 12"-24"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-8
Matrix: Solid
Percent Solids: 94.6

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		9000	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,4,6-Trichlorophenol	ND		9000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,4-Dichlorophenol	ND		9000	950	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,4-Dimethylphenol	ND		9000	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,4-Dinitrophenol	ND		88000	41000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,4-Dinitrotoluene	ND		9000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2,6-Dinitrotoluene	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Chloronaphthalene	ND		9000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Chlorophenol	ND		9000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Methylnaphthalene	ND		9000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Methylphenol	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Nitroaniline	ND		17000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
2-Nitrophenol	ND		9000	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
3,3'-Dichlorobenzidine	ND		17000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
3-Nitroaniline	ND		17000	2500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4,6-Dinitro-2-methylphenol	ND		17000	9000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Bromophenyl phenyl ether	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Chloro-3-methylphenol	ND		9000	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Chloroaniline	ND		9000	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Chlorophenyl phenyl ether	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Methylphenol	ND		17000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Nitroaniline	ND		17000	4700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
4-Nitrophenol	ND		17000	6300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Acenaphthene	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Acenaphthylene	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Acetophenone	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Anthracene	ND		9000	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Atrazine	ND		9000	3100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzaldehyde	ND		9000	7100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzo[a]anthracene	ND		9000	900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzo[a]pyrene	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzo[b]fluoranthene	ND		9000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzo[g,h,i]perylene	ND		9000	950	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Benzo[k]fluoranthene	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Biphenyl	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
bis (2-chloroisopropyl) ether	ND		9000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Bis(2-chloroethoxy)methane	ND		9000	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Bis(2-chloroethyl)ether	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Bis(2-ethylhexyl) phthalate	ND		9000	3100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Butyl benzyl phthalate	ND		9000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Caprolactam	ND		9000	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Carbazole	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Chrysene	ND		9000	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Dibenz(a,h)anthracene	ND		9000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Dibenzofuran	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Diethyl phthalate	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Dimethyl phthalate	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Di-n-butyl phthalate	ND		9000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Di-n-octyl phthalate	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 12"-24"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-8
Matrix: Solid
Percent Solids: 94.6

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	ND		9000	950	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Fluorene	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Hexachlorobenzene	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Hexachlorobutadiene	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Hexachlorocyclopentadiene	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Hexachloroethane	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Indeno[1,2,3-cd]pyrene	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Isophorone	ND		9000	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Naphthalene	ND		9000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Nitrobenzene	ND		9000	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
N-Nitrosodi-n-propylamine	ND		9000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
N-Nitrosodiphenylamine	ND		9000	7300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Pentachlorophenol	ND		17000	9000	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Phenanthrene	ND		9000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Phenol	ND		9000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50
Pyrene	ND		9000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 20:55	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:15*	*06/12/18 20:55*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:55*	*50*
2-Fluorobiphenyl	*70*		*60 - 120*	*06/07/18 14:15*	*06/12/18 20:55*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 20:55*	*50*
Nitrobenzene-d5 (Surr)	*85*		*53 - 120*	*06/07/18 14:15*	*06/12/18 20:55*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 20:55*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 20:55*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6190**	**B**	10.5	4.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Antimony	ND		15.8	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Arsenic	**7.6**		2.1	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Barium	**71.2**		0.53	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Beryllium	**0.35**		0.21	0.029	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Cadmium	**0.44**		0.21	0.032	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Calcium	**27700**	**B**	52.6	3.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Chromium	**13.3**	**B**	0.53	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Cobalt	**6.6**		0.53	0.053	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Copper	**32.1**	**B**	1.1	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Iron	**16400**	**B**	10.5	3.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Lead	**99.2**		1.1	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Magnesium	**13800**		21.0	0.97	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Manganese	**489**	**B**	0.21	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Nickel	**15.2**	**B**	5.3	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Potassium	**1340**		31.5	21.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Selenium	ND		4.2	0.42	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Silver	ND		0.63	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Sodium	**104**	**J**	147	13.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Thallium	ND		6.3	0.32	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-02 12"-24"
Date Collected: 06/01/18 11:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-8
Matrix: Solid
Percent Solids: 94.6

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	17.8		0.53	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1
Zinc	71.8		2.1	0.67	mg/Kg	☼	06/11/18 17:30	06/13/18 22:36	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.33		0.020	0.0081	mg/Kg	☼	06/21/18 16:35	06/21/18 18:06	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 0"-2"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-9
Matrix: Solid
Percent Solids: 94.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		1800	480	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,4,6-Trichlorophenol	ND		1800	360	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,4-Dichlorophenol	ND		1800	190	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,4-Dimethylphenol	ND		1800	430	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,4-Dinitrophenol	ND		17000	8200	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,4-Dinitrotoluene	ND		1800	370	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2,6-Dinitrotoluene	ND		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Chloronaphthalene	ND		1800	290	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Chlorophenol	ND		1800	320	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Methylnaphthalene	ND		1800	360	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Methylphenol	ND		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Nitroaniline	ND		3500	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
2-Nitrophenol	ND		1800	500	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
3,3'-Dichlorobenzidine	ND		3500	2100	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
3-Nitroaniline	ND		3500	490	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4,6-Dinitro-2-methylphenol	ND		3500	1800	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Bromophenyl phenyl ether	ND		1800	250	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Chloro-3-methylphenol	ND		1800	440	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Chloroaniline	ND		1800	440	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Chlorophenyl phenyl ether	ND		1800	220	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Methylphenol	ND		3500	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Nitroaniline	ND		3500	930	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
4-Nitrophenol	ND		3500	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Acenaphthene	**260**	**J**	1800	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Acenaphthylene	**230**	**J**	1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Acetophenone	ND		1800	240	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Anthracene	**440**	**J**	1800	440	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Atrazine	ND		1800	620	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzaldehyde	ND		1800	1400	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzo[a]anthracene	**2500**		1800	180	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzo[a]pyrene	**2400**		1800	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzo[b]fluoranthene	**3000**		1800	280	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzo[g,h,i]perylene	**1700**	**J**	1800	190	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Benzo[k]fluoranthene	ND		1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Biphenyl	ND		1800	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
bis (2-chloroisopropyl) ether	ND		1800	360	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Bis(2-chloroethoxy)methane	ND		1800	380	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Bis(2-chloroethyl)ether	ND		1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Bis(2-ethylhexyl) phthalate	ND		1800	610	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Butyl benzyl phthalate	ND		1800	290	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Caprolactam	ND		1800	530	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Carbazole	**290**	**J**	1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Chrysene	**2800**		1800	400	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Dibenz(a,h)anthracene	ND		1800	310	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Dibenzofuran	ND		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Diethyl phthalate	ND		1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Dimethyl phthalate	ND		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Di-n-butyl phthalate	ND		1800	300	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Di-n-octyl phthalate	ND		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 0"-2"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-9
Matrix: Solid
Percent Solids: 94.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**5300**		1800	190	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Fluorene	**230**	**J**	1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Hexachlorobenzene	ND		1800	240	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Hexachlorobutadiene	ND		1800	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Hexachlorocyclopentadiene	ND		1800	240	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Hexachloroethane	ND		1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Indeno[1,2,3-cd]pyrene	**1500**	**J**	1800	220	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Isophorone	ND		1800	380	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Naphthalene	ND		1800	230	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Nitrobenzene	ND		1800	200	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
N-Nitrosodi-n-propylamine	ND		1800	300	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
N-Nitrosodiphenylamine	ND		1800	1400	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Pentachlorophenol	ND		3500	1800	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Phenanthrene	**3100**		1800	260	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Phenol	ND		1800	270	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10
Pyrene	**4800**		1800	210	ug/Kg	☼	06/07/18 14:15	06/13/18 14:57	10

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*1600*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/13/18 14:57*	*10*
Hexadecane	*1700*	*T J N*	*ug/Kg*	☼	*15.05*	*544-76-3*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
Benzo[e]pyrene	*2100*	*T J N*	*ug/Kg*	☼	*15.44*	*192-97-2*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
Eicosane	*2700*	*T J N*	*ug/Kg*	☼	*15.81*	*112-95-8*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
Unknown	*1900*	*T J*	*ug/Kg*	☼	*16.13*		*06/07/18 14:15*	*06/13/18 14:57*	*10*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*97*		*54 - 120*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
2-Fluorobiphenyl	*76*		*60 - 120*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
2-Fluorophenol (Surr)	*51*	*X*	*52 - 120*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
Nitrobenzene-d5 (Surr)	*70*		*53 - 120*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
Phenol-d5 (Surr)	*55*		*54 - 120*	*06/07/18 14:15*	*06/13/18 14:57*	*10*
p-Terphenyl-d14 (Surr)	*96*		*65 - 121*	*06/07/18 14:15*	*06/13/18 14:57*	*10*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5620**	**B**	10.8	4.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Antimony	ND		16.2	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Arsenic	**7.0**		2.2	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Barium	**116**		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Beryllium	**0.61**		0.22	0.030	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Cadmium	**1.2**		0.22	0.032	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Calcium	**5220**	**B**	53.9	3.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Chromium	**27.5**	**B**	0.54	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Cobalt	**6.5**		0.54	0.054	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Copper	**48.9**	**B**	1.1	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Iron	**15500**	**B**	10.8	3.8	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Lead	**332**		1.1	0.26	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Magnesium	**1170**		21.5	1.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Manganese	**181**	**B**	0.22	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Nickel	**15.9**	**B**	5.4	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Potassium	**673**		32.3	21.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 0"-2"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-9
Matrix: Solid
Percent Solids: 94.8

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		4.3	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Silver	**0.58**	**J**	0.65	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Sodium	**81.5**	**J**	151	14.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Thallium	ND		6.5	0.32	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Vanadium	**19.2**		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1
Zinc	**217**		2.2	0.69	mg/Kg	☼	06/11/18 17:30	06/13/18 22:40	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.31**		0.022	0.0088	mg/Kg	☼	06/21/18 16:35	06/21/18 18:07	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 2"-12"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-10
Matrix: Solid
Percent Solids: 91.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		190	50	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,4,6-Trichlorophenol	ND		190	37	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,4-Dichlorophenol	ND		190	20	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,4-Dimethylphenol	ND		190	45	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,4-Dinitrophenol	ND		1800	860	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,4-Dinitrotoluene	ND		190	38	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2,6-Dinitrotoluene	ND		190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Chloronaphthalene	ND		190	31	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Chlorophenol	ND		190	34	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Methylnaphthalene	**130**	**J**	190	37	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Methylphenol	ND		190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Nitroaniline	ND		360	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
2-Nitrophenol	ND		190	52	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
3,3'-Dichlorobenzidine	ND		360	220	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
3-Nitroaniline	ND		360	51	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4,6-Dinitro-2-methylphenol	ND		360	190	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Bromophenyl phenyl ether	ND		190	26	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Chloro-3-methylphenol	ND		190	46	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Chloroaniline	ND		190	46	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Chlorophenyl phenyl ether	ND		190	23	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Methylphenol	ND		360	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Nitroaniline	ND		360	97	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
4-Nitrophenol	ND		360	130	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Acenaphthene	**38**	**J**	190	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Acenaphthylene	**52**	**J**	190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Acetophenone	ND		190	25	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Anthracene	**78**	**J**	190	46	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Atrazine	ND		190	64	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzaldehyde	ND		190	150	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzo[a]anthracene	**400**		190	19	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzo[a]pyrene	**410**		190	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzo[b]fluoranthene	**490**		190	30	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzo[g,h,i]perylene	**330**		190	20	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Benzo[k]fluoranthene	**260**		190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Biphenyl	ND		190	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
bis (2-chloroisopropyl) ether	ND		190	37	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Bis(2-chloroethoxy)methane	ND		190	39	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Bis(2-chloroethyl)ether	ND		190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Bis(2-ethylhexyl) phthalate	ND		190	63	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Butyl benzyl phthalate	ND		190	31	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Caprolactam	ND		190	56	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Carbazole	**56**	**J**	190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Chrysene	**470**		190	42	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Dibenz(a,h)anthracene	ND		190	33	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Dibenzofuran	**63**	**J**	190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Diethyl phthalate	ND		190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Dimethyl phthalate	ND		190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Di-n-butyl phthalate	ND		190	32	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Di-n-octyl phthalate	ND		190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1

Client Sample ID: SS-03 2"-12"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-10
Matrix: Solid
Percent Solids: 91.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**870**		190	20	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Fluorene	**47**	**J**	190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Hexachlorobenzene	ND		190	25	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Hexachlorobutadiene	ND		190	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Hexachlorocyclopentadiene	ND		190	25	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Hexachloroethane	ND		190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Indeno[1,2,3-cd]pyrene	**270**		190	23	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Isophorone	ND		190	39	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Naphthalene	**54**	**J**	190	24	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Nitrobenzene	ND		190	21	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
N-Nitrosodi-n-propylamine	ND		190	32	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
N-Nitrosodiphenylamine	ND		190	150	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Pentachlorophenol	ND		360	190	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Phenanthrene	**560**		190	27	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Phenol	ND		190	28	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1
Pyrene	**740**		190	22	ug/Kg	☼	06/07/18 14:15	06/12/18 21:50	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*1200*	*T J*	*ug/Kg*	☼	*4.53*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*230*	*T J*	*ug/Kg*	☼	*9.87*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*900*	*T J*	*ug/Kg*	☼	*10.53*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*370*	*T J*	*ug/Kg*	☼	*10.64*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Undecane, 2,6-dimethyl-	*700*	*T J N*	*ug/Kg*	☼	*11.14*	*17301-23-4*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*220*	*T J*	*ug/Kg*	☼	*11.41*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*510*	*T J*	*ug/Kg*	☼	*12.17*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Anthracene, 2-methyl-	*260*	*T J N*	*ug/Kg*	☼	*12.19*	*613-12-7*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Benzene, 1,1'-(2-cyclopropen-1-ylidene)bis-	*270*	*T J N*	*ug/Kg*	☼	*12.21*	*22825-21-4*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*290*	*T J*	*ug/Kg*	☼	*12.29*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*280*	*T J*	*ug/Kg*	☼	*12.32*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*320*	*T J*	*ug/Kg*	☼	*13.88*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
1,19-Eicosadiene	*340*	*T J N*	*ug/Kg*	☼	*14.88*	*14811-95-1*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*430*	*T J*	*ug/Kg*	☼	*15.05*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Cyclotetracosane	*380*	*T J N*	*ug/Kg*	☼	*15.09*	*297-03-0*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*400*	*T J*	*ug/Kg*	☼	*15.44*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*340*	*T J*	*ug/Kg*	☼	*15.60*		*06/07/18 14:15*	*06/12/18 21:50*	*1*
Nonadecane	*740*	*T J N*	*ug/Kg*	☼	*15.81*	*629-92-5*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Unknown	*380*	*T J*	*ug/Kg*	☼	*16.80*		*06/07/18 14:15*	*06/12/18 21:50*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*89*		*54 - 120*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
2-Fluorobiphenyl	*73*		*60 - 120*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
2-Fluorophenol (Surr)	*48*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Nitrobenzene-d5 (Surr)	*58*		*53 - 120*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
Phenol-d5 (Surr)	*58*		*54 - 120*	*06/07/18 14:15*	*06/12/18 21:50*	*1*
p-Terphenyl-d14 (Surr)	*98*		*65 - 121*	*06/07/18 14:15*	*06/12/18 21:50*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4240**	**B**	10.7	4.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 2"-12"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-10
Matrix: Solid
Percent Solids: 91.2

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		16.1	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Arsenic	10		2.1	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Barium	70.4		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Beryllium	0.63		0.21	0.030	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Cadmium	0.20	J	0.21	0.032	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Calcium	1900	B	53.6	3.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Chromium	16.4	B	0.54	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Cobalt	6.4		0.54	0.054	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Copper	38.6	B	1.1	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Iron	45500	B	10.7	3.8	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Lead	66.7		1.1	0.26	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Magnesium	432		21.5	0.99	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Manganese	81.1	B	0.21	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Nickel	17.0	B	5.4	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Potassium	1620		32.2	21.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Selenium	0.91	J	4.3	0.43	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Silver	ND		0.64	0.21	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Sodium	109	J	150	13.9	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Thallium	ND		6.4	0.32	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Vanadium	20.7		0.54	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1
Zinc	48.4		2.1	0.69	mg/Kg	☼	06/11/18 17:30	06/13/18 22:48	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.066		0.022	0.0090	mg/Kg	☼	06/21/18 16:35	06/21/18 18:08	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 12"-24"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-11
Matrix: Solid
Percent Solids: 87.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		970	260	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,4,6-Trichlorophenol	ND		970	190	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,4-Dichlorophenol	ND		970	100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,4-Dimethylphenol	ND		970	230	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,4-Dinitrophenol	ND		9500	4500	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,4-Dinitrotoluene	ND		970	200	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2,6-Dinitrotoluene	ND		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Chloronaphthalene	ND		970	160	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Chlorophenol	ND		970	180	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Methylnaphthalene	ND		970	190	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Methylphenol	ND		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Nitroaniline	ND		1900	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
2-Nitrophenol	ND		970	270	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
3,3'-Dichlorobenzidine	ND		1900	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
3-Nitroaniline	ND		1900	270	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4,6-Dinitro-2-methylphenol	ND		1900	970	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Bromophenyl phenyl ether	ND		970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Chloro-3-methylphenol	ND		970	240	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Chloroaniline	ND		970	240	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Chlorophenyl phenyl ether	ND		970	120	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Methylphenol	ND		1900	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Nitroaniline	ND		1900	510	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
4-Nitrophenol	ND		1900	680	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Acenaphthene	**420**	**J**	970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Acenaphthylene	**280**	**J**	970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Acetophenone	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Anthracene	**720**	**J**	970	240	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Atrazine	ND		970	340	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzaldehyde	ND		970	770	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzo[a]anthracene	**2200**		970	97	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzo[a]pyrene	**2100**		970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzo[b]fluoranthene	**2500**		970	150	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzo[g,h,i]perylene	**1600**		970	100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Benzo[k]fluoranthene	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Biphenyl	ND		970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
bis (2-chloroisopropyl) ether	ND		970	190	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Bis(2-chloroethoxy)methane	ND		970	210	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Bis(2-chloroethyl)ether	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Bis(2-ethylhexyl) phthalate	ND		970	330	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Butyl benzyl phthalate	ND		970	160	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Caprolactam	ND		970	290	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Carbazole	**360**	**J**	970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Chrysene	**2800**		970	220	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Dibenz(a,h)anthracene	ND		970	170	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Dibenzofuran	**220**	**J**	970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Diethyl phthalate	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Dimethyl phthalate	ND		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Di-n-butyl phthalate	ND		970	170	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Di-n-octyl phthalate	ND		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5

Client Sample ID: SS-03 12"-24"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-11
Matrix: Solid
Percent Solids: 87.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**5300**		970	100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Fluorene	**410**	**J**	970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Hexachlorobenzene	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Hexachlorobutadiene	ND		970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Hexachlorocyclopentadiene	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Hexachloroethane	ND		970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Indeno[1,2,3-cd]pyrene	**1300**		970	120	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Isophorone	ND		970	210	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Naphthalene	**180**	**J**	970	130	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Nitrobenzene	ND		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
N-Nitrosodi-n-propylamine	ND		970	170	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
N-Nitrosodiphenylamine	ND		970	790	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Pentachlorophenol	ND		1900	970	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Phenanthrene	**4400**		970	140	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Phenol	ND		970	150	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5
Pyrene	**5100**		970	110	ug/Kg	☼	06/07/18 14:15	06/12/18 22:17	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*3300*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:15*	*06/12/18 22:17*	*5*
Unknown	*1400*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/12/18 22:17*	*5*
Anthracene, 9-methyl-	*1200*	*T J N*	*ug/Kg*	☼	*12.22*	*779-02-2*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
Unknown	*1300*	*T J*	*ug/Kg*	☼	*12.30*		*06/07/18 14:15*	*06/12/18 22:17*	*5*
9,10-Anthracenedione	*920*	*T J N*	*ug/Kg*	☼	*12.47*	*84-65-1*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
11H-Benzo[b]fluorene	*830*	*T J N*	*ug/Kg*	☼	*13.32*	*243-17-4*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
Unknown	*850*	*T J*	*ug/Kg*	☼	*14.88*		*06/07/18 14:15*	*06/12/18 22:17*	*5*
Unknown	*1800*	*T J*	*ug/Kg*	☼	*15.44*		*06/07/18 14:15*	*06/12/18 22:17*	*5*
Unknown	*1300*	*T J*	*ug/Kg*	☼	*15.60*		*06/07/18 14:15*	*06/12/18 22:17*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*71*		*54 - 120*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
2-Fluorobiphenyl	*80*		*60 - 120*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
2-Fluorophenol (Surr)	*66*		*52 - 120*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
Nitrobenzene-d5 (Surr)	*86*		*53 - 120*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
Phenol-d5 (Surr)	*72*		*54 - 120*	*06/07/18 14:15*	*06/12/18 22:17*	*5*
p-Terphenyl-d14 (Surr)	*104*		*65 - 121*	*06/07/18 14:15*	*06/12/18 22:17*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6670**	**B**	11.2	4.9	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Antimony	ND		16.8	0.45	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Arsenic	**7.0**		2.2	0.45	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Barium	**84.4**		0.56	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Beryllium	**0.45**		0.22	0.031	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Cadmium	**0.21**	**J**	0.22	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Calcium	**10300**	**B**	56.0	3.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Chromium	**12.6**		0.59	0.24	mg/Kg	☼	06/18/18 16:41	06/19/18 11:02	1
Cobalt	**6.1**		0.56	0.056	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Copper	**38.4**	**B**	1.1	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Iron	**13700**	**B**	11.2	3.9	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Lead	**267**		1.1	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-03 12"-24"
Date Collected: 06/01/18 11:55
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-11
Matrix: Solid
Percent Solids: 87.1

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	4980		22.4	1.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Manganese	258	B	0.22	0.036	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Nickel	14.2	B	5.6	0.26	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Potassium	974		33.6	22.4	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Selenium	ND		4.5	0.45	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Silver	ND		0.67	0.22	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Sodium	106	J	157	14.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Thallium	ND		6.7	0.34	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Vanadium	18.1		0.56	0.12	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1
Zinc	128		2.2	0.72	mg/Kg	☼	06/11/18 17:30	06/13/18 22:55	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.50		0.023	0.0093	mg/Kg	☼	06/21/18 16:35	06/21/18 18:10	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 0"-2"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-12
Matrix: Solid
Percent Solids: 75.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		4500	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,4,6-Trichlorophenol	ND		4500	900	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,4-Dichlorophenol	ND		4500	480	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,4-Dimethylphenol	ND		4500	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,4-Dinitrophenol	ND		44000	21000	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,4-Dinitrotoluene	ND		4500	930	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2,6-Dinitrotoluene	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Chloronaphthalene	ND		4500	740	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Chlorophenol	ND		4500	820	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Methylnaphthalene	ND		4500	900	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Methylphenol	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Nitroaniline	ND		8800	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
2-Nitrophenol	ND		4500	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
3,3'-Dichlorobenzidine	ND		8800	5300	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
3-Nitroaniline	ND		8800	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4,6-Dinitro-2-methylphenol	ND		8800	4500	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Bromophenyl phenyl ether	ND		4500	640	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Chloro-3-methylphenol	ND		4500	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Chloroaniline	ND		4500	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Chlorophenyl phenyl ether	ND		4500	560	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Methylphenol	ND		8800	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Nitroaniline	ND		8800	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
4-Nitrophenol	ND		8800	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Acenaphthene	ND		4500	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Acenaphthylene	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Acetophenone	ND		4500	610	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Anthracene	ND		4500	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Atrazine	ND		4500	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzaldehyde	ND		4500	3600	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzo[a]anthracene	**2400**	**J**	4500	450	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzo[a]pyrene	**2300**	**J**	4500	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzo[b]fluoranthene	**3200**	**J**	4500	720	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzo[g,h,i]perylene	**1900**	**J**	4500	480	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Benzo[k]fluoranthene	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Biphenyl	ND		4500	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
bis (2-chloroisopropyl) ether	ND		4500	900	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Bis(2-chloroethoxy)methane	ND		4500	960	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Bis(2-chloroethyl)ether	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Bis(2-ethylhexyl) phthalate	ND		4500	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Butyl benzyl phthalate	ND		4500	740	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Caprolactam	ND		4500	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Carbazole	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Chrysene	**3000**	**J**	4500	1000	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Dibenz(a,h)anthracene	ND		4500	800	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Dibenzofuran	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Diethyl phthalate	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Dimethyl phthalate	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Di-n-butyl phthalate	ND		4500	770	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Di-n-octyl phthalate	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20

Client Sample ID: SS-04 0"-2"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-12
Matrix: Solid
Percent Solids: 75.1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**5600**		4500	480	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Fluorene	ND		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Hexachlorobenzene	ND		4500	610	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Hexachlorobutadiene	ND		4500	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Hexachlorocyclopentadiene	ND		4500	610	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Hexachloroethane	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Indeno[1,2,3-cd]pyrene	**1800**	**J**	4500	560	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Isophorone	ND		4500	960	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Naphthalene	ND		4500	580	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Nitrobenzene	ND		4500	510	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
N-Nitrosodi-n-propylamine	ND		4500	770	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
N-Nitrosodiphenylamine	ND		4500	3700	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Pentachlorophenol	ND		8800	4500	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Phenanthrene	**2400**	**J**	4500	660	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Phenol	ND		4500	690	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20
Pyrene	**4600**		4500	530	ug/Kg	☼	06/07/18 14:15	06/12/18 22:45	20

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*5200*	*T J*	*ug/Kg*	☼	*15.81*		*06/07/18 14:15*	*06/12/18 22:45*	*20*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 22:45*	*20*
2-Fluorobiphenyl	*75*		*60 - 120*	*06/07/18 14:15*	*06/12/18 22:45*	*20*
2-Fluorophenol (Surr)	*51*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 22:45*	*20*
Nitrobenzene-d5 (Surr)	*61*		*53 - 120*	*06/07/18 14:15*	*06/12/18 22:45*	*20*
Phenol-d5 (Surr)	*62*		*54 - 120*	*06/07/18 14:15*	*06/12/18 22:45*	*20*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 22:45*	*20*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4940**	**B**	13.5	6.0	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Antimony	ND		20.3	0.54	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Arsenic	**6.3**		2.7	0.54	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Barium	**117**		0.68	0.15	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Beryllium	**0.27**		0.27	0.038	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Cadmium	**1.0**		0.27	0.041	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Calcium	**20100**	**B**	67.7	4.5	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Chromium	**17.2**	**B**	0.68	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Cobalt	**4.3**		0.68	0.068	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Copper	**46.2**	**B**	1.4	0.28	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Iron	**12000**	**B**	13.5	4.7	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Lead	**398**		1.4	0.33	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Magnesium	**3970**		27.1	1.3	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Manganese	**320**	**B**	0.27	0.043	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Nickel	**11.1**	**B**	6.8	0.31	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Potassium	**1160**		40.6	27.1	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Selenium	ND		5.4	0.54	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Silver	**0.40**	**J**	0.81	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Sodium	**101**	**J**	190	17.6	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Thallium	ND		8.1	0.41	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 0"-2"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-12
Matrix: Solid
Percent Solids: 75.1

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	14.2		0.68	0.15	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1
Zinc	268		2.7	0.87	mg/Kg	☼	06/11/18 17:30	06/13/18 22:59	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.32		0.026	0.011	mg/Kg	☼	06/21/18 16:35	06/21/18 18:11	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 2"-12"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-13
Matrix: Solid
Percent Solids: 78.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		11000	2900	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,4,6-Trichlorophenol	ND		11000	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,4-Dichlorophenol	ND		11000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,4-Dimethylphenol	ND		11000	2600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,4-Dinitrophenol	ND		100000	49000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,4-Dinitrotoluene	ND		11000	2200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2,6-Dinitrotoluene	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Chloronaphthalene	ND		11000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Chlorophenol	ND		11000	2000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Methylnaphthalene	ND		11000	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Methylphenol	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Nitroaniline	ND		21000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
2-Nitrophenol	ND		11000	3000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
3,3'-Dichlorobenzidine	ND		21000	13000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
3-Nitroaniline	ND		21000	3000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4,6-Dinitro-2-methylphenol	ND		21000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Bromophenyl phenyl ether	ND		11000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Chloro-3-methylphenol	ND		11000	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Chloroaniline	ND		11000	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Chlorophenyl phenyl ether	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Methylphenol	ND		21000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Nitroaniline	ND		21000	5600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
4-Nitrophenol	ND		21000	7500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Acenaphthene	ND		11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Acenaphthylene	**1700**	**J**	11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Acetophenone	ND		11000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Anthracene	ND		11000	2700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Atrazine	ND		11000	3700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzaldehyde	ND		11000	8500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzo[a]anthracene	**8100**	**J**	11000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzo[a]pyrene	**7500**	**J**	11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzo[b]fluoranthene	**9900**	**J**	11000	1700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzo[g,h,i]perylene	**4900**	**J**	11000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Benzo[k]fluoranthene	ND		11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Biphenyl	ND		11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
bis (2-chloroisopropyl) ether	ND		11000	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Bis(2-chloroethoxy)methane	ND		11000	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Bis(2-chloroethyl)ether	ND		11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Bis(2-ethylhexyl) phthalate	ND		11000	3700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Butyl benzyl phthalate	ND		11000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Caprolactam	ND		11000	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Carbazole	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Chrysene	**7600**	**J**	11000	2400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Dibenz(a,h)anthracene	ND		11000	1900	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Dibenzofuran	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Diethyl phthalate	ND		11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Dimethyl phthalate	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Di-n-butyl phthalate	ND		11000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Di-n-octyl phthalate	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50

Client Sample ID: SS-04 2"-12"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-13
Matrix: Solid
Percent Solids: 78.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**15000**		11000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Fluorene	ND		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Hexachlorobenzene	ND		11000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Hexachlorobutadiene	ND		11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Hexachlorocyclopentadiene	ND		11000	1500	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Hexachloroethane	ND		11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Indeno[1,2,3-cd]pyrene	**4800**	**J**	11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Isophorone	ND		11000	2300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Naphthalene	ND		11000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Nitrobenzene	ND		11000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
N-Nitrosodi-n-propylamine	ND		11000	1800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
N-Nitrosodiphenylamine	ND		11000	8700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Pentachlorophenol	ND		21000	11000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Phenanthrene	**5200**	**J**	11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Phenol	ND		11000	1600	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50
Pyrene	**12000**		11000	1300	ug/Kg	☼	06/07/18 14:15	06/12/18 23:13	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*46000*	*T J*	*ug/Kg*	☼	*2.09*		*06/07/18 14:15*	*06/12/18 23:13*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 23:13*	*50*
2-Fluorobiphenyl	*69*		*60 - 120*	*06/07/18 14:15*	*06/12/18 23:13*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:15*	*06/12/18 23:13*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:15*	*06/12/18 23:13*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:15*	*06/12/18 23:13*	*50*
p-Terphenyl-d14 (Surr)	*84*		*65 - 121*	*06/07/18 14:15*	*06/12/18 23:13*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5520**	**B**	12.7	5.6	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Antimony	ND		19.1	0.51	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Arsenic	**7.9**		2.5	0.51	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Barium	**153**		0.64	0.14	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Beryllium	**0.33**		0.25	0.036	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Cadmium	**0.97**		0.25	0.038	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Calcium	**24700**	**B**	63.7	4.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Chromium	**15.5**	**B**	0.64	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Cobalt	**4.6**		0.64	0.064	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Copper	**63.2**	**B**	1.3	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Iron	**12700**	**B**	12.7	4.5	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Lead	**497**		1.3	0.31	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Magnesium	**4340**		25.5	1.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Manganese	**320**	**B**	0.25	0.041	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Nickel	**12.6**	**B**	6.4	0.29	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Potassium	**1490**		38.2	25.5	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Selenium	ND		5.1	0.51	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Silver	**0.54**	**J**	0.76	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Sodium	**123**	**J**	178	16.5	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Thallium	ND		7.6	0.38	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 2"-12"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-13
Matrix: Solid
Percent Solids: 78.4

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	14.8		0.64	0.14	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1
Zinc	314		2.5	0.81	mg/Kg	☼	06/11/18 17:30	06/13/18 23:18	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.41		0.026	0.011	mg/Kg	☼	06/21/18 16:35	06/21/18 18:12	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 12"-24"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-14
Matrix: Solid
Percent Solids: 84.6

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,4,6-Trichlorophenol	ND		4000	800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,4-Dichlorophenol	ND		4000	420	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,4-Dimethylphenol	ND		4000	960	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,4-Dinitrophenol	ND		39000	18000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,4-Dinitrotoluene	ND		4000	820	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2,6-Dinitrotoluene	ND		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Chloronaphthalene	ND		4000	650	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Chlorophenol	ND		4000	720	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Methylnaphthalene	ND		4000	800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Methylphenol	ND		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Nitroaniline	ND		7700	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
2-Nitrophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
3,3'-Dichlorobenzidine	ND		7700	4700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
3-Nitroaniline	ND		7700	1100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4,6-Dinitro-2-methylphenol	ND		7700	4000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Bromophenyl phenyl ether	ND		4000	560	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Chloro-3-methylphenol	ND		4000	980	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Chloroaniline	ND		4000	980	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Chlorophenyl phenyl ether	ND		4000	490	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Methylphenol	ND		7700	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Nitroaniline	ND		7700	2100	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
4-Nitrophenol	ND		7700	2800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Acenaphthene	ND		4000	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Acenaphthylene	**3200**	**J**	4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Acetophenone	ND		4000	540	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Anthracene	**4600**		4000	980	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Atrazine	ND		4000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzaldehyde	ND		4000	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzo[a]anthracene	**13000**		4000	400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzo[a]pyrene	**12000**		4000	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzo[b]fluoranthene	**14000**		4000	630	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzo[g,h,i]perylene	**9400**		4000	420	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Benzo[k]fluoranthene	**7000**		4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Biphenyl	ND		4000	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
bis (2-chloroisopropyl) ether	ND		4000	800	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Bis(2-chloroethoxy)methane	ND		4000	840	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Bis(2-chloroethyl)ether	ND		4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Bis(2-ethylhexyl) phthalate	ND		4000	1400	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Butyl benzyl phthalate	ND		4000	650	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Caprolactam	ND		4000	1200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Carbazole	**600**	**J**	4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Chrysene	**12000**		4000	890	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Dibenz(a,h)anthracene	ND		4000	700	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Dibenzofuran	ND		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Diethyl phthalate	ND		4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Dimethyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Di-n-butyl phthalate	ND		4000	680	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Di-n-octyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20

Client Sample ID: SS-04 12"-24"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-14
Matrix: Solid
Percent Solids: 84.6

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**31000**		4000	420	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Fluorene	**1000**	**J**	4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Hexachlorobenzene	ND		4000	540	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Hexachlorobutadiene	ND		4000	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Hexachlorocyclopentadiene	ND		4000	540	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Hexachloroethane	ND		4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Indeno[1,2,3-cd]pyrene	**8700**		4000	490	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Isophorone	ND		4000	840	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Naphthalene	ND		4000	510	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Nitrobenzene	ND		4000	440	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
N-Nitrosodi-n-propylamine	ND		4000	680	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
N-Nitrosodiphenylamine	ND		4000	3200	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Pentachlorophenol	ND		7700	4000	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Phenanthrene	**15000**		4000	580	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Phenol	ND		4000	610	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20
Pyrene	**26000**		4000	470	ug/Kg	☼	06/07/18 14:15	06/12/18 23:40	20

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*8400*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:15*	*06/12/18 23:40*	*20*
Anthracene, 2-methyl-	*3900*	*T J N*	*ug/Kg*	☼	*12.22*	*613-12-7*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
Unknown	*6600*	*T J*	*ug/Kg*	☼	*12.30*		*06/07/18 14:15*	*06/12/18 23:40*	*20*
Fluoranthene, 2-methyl-	*3700*	*T J N*	*ug/Kg*	☼	*13.32*	*33543-31-6*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
Unknown	*3200*	*T J*	*ug/Kg*	☼	*15.24*		*06/07/18 14:15*	*06/12/18 23:40*	*20*
Benzo[e]pyrene	*9200*	*T J N*	*ug/Kg*	☼	*15.44*	*192-97-2*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
Unknown	*3400*	*T J*	*ug/Kg*	☼	*17.69*		*06/07/18 14:15*	*06/12/18 23:40*	*20*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*87*		*54 - 120*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
2-Fluorobiphenyl	*89*		*60 - 120*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
2-Fluorophenol (Surr)	*72*		*52 - 120*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
Nitrobenzene-d5 (Surr)	*103*		*53 - 120*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
Phenol-d5 (Surr)	*83*		*54 - 120*	*06/07/18 14:15*	*06/12/18 23:40*	*20*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:15*	*06/12/18 23:40*	*20*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4780**	**B**	11.7	5.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Antimony	ND		17.6	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Arsenic	**6.3**		2.3	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Barium	**107**		0.59	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Beryllium	**0.30**		0.23	0.033	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Cadmium	**0.69**		0.23	0.035	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Calcium	**15800**	**B**	58.5	3.9	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Chromium	**17.6**	**B**	0.59	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Cobalt	**4.4**		0.59	0.059	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Copper	**71.5**	**B**	1.2	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Iron	**11100**	**B**	11.7	4.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Lead	**395**		1.2	0.28	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Magnesium	**3370**		23.4	1.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Manganese	**300**	**B**	0.23	0.037	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 12"-24"
Date Collected: 06/01/18 12:10
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-14
Matrix: Solid
Percent Solids: 84.6

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	13.6	B	5.9	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Potassium	1300		35.1	23.4	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Selenium	ND		4.7	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Silver	0.37	J	0.70	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Sodium	111	J	164	15.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Thallium	ND		7.0	0.35	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Vanadium	12.5		0.59	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1
Zinc	250		2.3	0.75	mg/Kg	☼	06/11/18 17:30	06/13/18 23:22	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.46		0.024	0.0098	mg/Kg	☼	06/21/18 16:35	06/21/18 18:14	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 0"-2"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-15
Matrix: Solid
Percent Solids: 83.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		1000	270	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,4,6-Trichlorophenol	ND		1000	200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,4-Dichlorophenol	ND		1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,4-Dimethylphenol	ND		1000	240	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,4-Dinitrophenol	ND		9800	4600	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,4-Dinitrotoluene	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2,6-Dinitrotoluene	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Chloronaphthalene	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Chlorophenol	ND		1000	180	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Methylnaphthalene	ND		1000	200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Methylphenol	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Nitroaniline	ND		2000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
2-Nitrophenol	ND		1000	280	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
3,3'-Dichlorobenzidine	ND		2000	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
3-Nitroaniline	ND		2000	280	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4,6-Dinitro-2-methylphenol	ND		2000	1000	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Bromophenyl phenyl ether	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Chloro-3-methylphenol	ND		1000	250	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Chloroaniline	ND		1000	250	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Chlorophenyl phenyl ether	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Methylphenol	ND		2000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Nitroaniline	ND		2000	530	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
4-Nitrophenol	ND		2000	700	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Acenaphthene	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Acenaphthylene	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Acetophenone	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Anthracene	ND		1000	250	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Atrazine	ND		1000	350	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzaldehyde	ND		1000	800	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzo[a]anthracene	**450**	**J**	1000	100	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzo[a]pyrene	**470**	**J**	1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzo[b]fluoranthene	**640**	**J**	1000	160	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzo[g,h,i]perylene	**400**	**J**	1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Benzo[k]fluoranthene	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Biphenyl	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
bis (2-chloroisopropyl) ether	ND		1000	200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Bis(2-chloroethoxy)methane	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Bis(2-chloroethyl)ether	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Bis(2-ethylhexyl) phthalate	ND		1000	340	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Butyl benzyl phthalate	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Caprolactam	ND		1000	300	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Carbazole	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Chrysene	**490**	**J**	1000	220	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Dibenz(a,h)anthracene	ND		1000	180	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Dibenzofuran	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Diethyl phthalate	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Dimethyl phthalate	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Di-n-butyl phthalate	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Di-n-octyl phthalate	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5

Client Sample ID: SS-05 0"-2"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-15
Matrix: Solid
Percent Solids: 83.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**950**	**J**	1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Fluorene	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Hexachlorobenzene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Hexachlorobutadiene	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Hexachlorocyclopentadiene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Hexachloroethane	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Indeno[1,2,3-cd]pyrene	**380**	**J**	1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Isophorone	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Naphthalene	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Nitrobenzene	ND		1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
N-Nitrosodi-n-propylamine	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
N-Nitrosodiphenylamine	ND		1000	820	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Pentachlorophenol	ND		2000	1000	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Phenanthrene	**480**	**J**	1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Phenol	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5
Pyrene	**820**	**J**	1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 00:08	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*4400*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:15*	*06/13/18 00:08*	*5*
Unknown	*1200*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/13/18 00:08*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*78*		*54 - 120*	*06/07/18 14:15*	*06/13/18 00:08*	*5*
2-Fluorobiphenyl	*85*		*60 - 120*	*06/07/18 14:15*	*06/13/18 00:08*	*5*
2-Fluorophenol (Surr)	*71*		*52 - 120*	*06/07/18 14:15*	*06/13/18 00:08*	*5*
Nitrobenzene-d5 (Surr)	*84*		*53 - 120*	*06/07/18 14:15*	*06/13/18 00:08*	*5*
Phenol-d5 (Surr)	*74*		*54 - 120*	*06/07/18 14:15*	*06/13/18 00:08*	*5*
p-Terphenyl-d14 (Surr)	*98*		*65 - 121*	*06/07/18 14:15*	*06/13/18 00:08*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7360**	**B**	11.7	5.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Antimony	ND		17.5	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Arsenic	**11.3**		2.3	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Barium	**60.4**		0.58	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Beryllium	**0.34**		0.23	0.033	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Cadmium	**0.43**		0.23	0.035	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Calcium	**2670**	**B**	58.4	3.9	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Chromium	**10.9**		0.59	0.24	mg/Kg	☼	06/18/18 16:41	06/19/18 11:06	1
Cobalt	**4.2**		0.58	0.058	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Copper	**72.3**	**B**	1.2	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Iron	**13500**	**B**	11.7	4.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Lead	**143**		1.2	0.28	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Magnesium	**1570**		23.4	1.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Manganese	**313**	**B**	0.23	0.037	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Nickel	**10.4**	**B**	5.8	0.27	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Potassium	**786**		35.0	23.4	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Selenium	ND		4.7	0.47	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Silver	ND		0.70	0.23	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Sodium	**51.2**	**J**	164	15.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 0"-2"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-15
Matrix: Solid
Percent Solids: 83.8

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		7.0	0.35	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Vanadium	17.1		0.58	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1
Zinc	168		2.3	0.75	mg/Kg	☼	06/11/18 17:30	06/13/18 23:26	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.68		0.023	0.0094	mg/Kg	☼	06/21/18 16:35	06/21/18 18:15	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 2"-12"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-16
Matrix: Solid
Percent Solids: 84.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		200	54	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,4,6-Trichlorophenol	ND		200	40	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,4-Dichlorophenol	ND		200	21	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,4-Dimethylphenol	ND		200	48	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,4-Dinitrophenol	ND		1900	920	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,4-Dinitrotoluene	ND		200	41	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2,6-Dinitrotoluene	ND		200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Chloronaphthalene	ND		200	33	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Chlorophenol	ND		200	36	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Methylnaphthalene	ND		200	40	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Methylphenol	ND		200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Nitroaniline	ND		390	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
2-Nitrophenol	ND		200	56	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
3,3'-Dichlorobenzidine	ND		390	230	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
3-Nitroaniline	ND		390	55	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4,6-Dinitro-2-methylphenol	ND		390	200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Bromophenyl phenyl ether	ND		200	28	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Chloro-3-methylphenol	ND		200	49	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Chloroaniline	ND		200	49	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Chlorophenyl phenyl ether	ND		200	25	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Methylphenol	ND		390	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Nitroaniline	ND		390	100	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
4-Nitrophenol	ND		390	140	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Acenaphthene	**66**	**J**	200	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Acenaphthylene	**27**	**J**	200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Acetophenone	ND		200	27	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Anthracene	**130**	**J**	200	49	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Atrazine	ND		200	69	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzaldehyde	ND		200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzo[a]anthracene	**560**		200	20	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzo[a]pyrene	**560**		200	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzo[b]fluoranthene	**650**		200	32	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzo[g,h,i]perylene	**500**		200	21	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Benzo[k]fluoranthene	**340**		200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Biphenyl	ND		200	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
bis (2-chloroisopropyl) ether	ND		200	40	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Bis(2-chloroethoxy)methane	ND		200	42	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Bis(2-chloroethyl)ether	ND		200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Bis(2-ethylhexyl) phthalate	ND		200	68	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Butyl benzyl phthalate	ND		200	33	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Caprolactam	ND		200	60	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Carbazole	**66**	**J**	200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Chrysene	**610**		200	45	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Dibenz(a,h)anthracene	ND		200	35	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Dibenzofuran	**37**	**J**	200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Diethyl phthalate	ND		200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Dimethyl phthalate	ND		200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Di-n-butyl phthalate	ND		200	34	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Di-n-octyl phthalate	ND		200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 2"-12"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-16
Matrix: Solid
Percent Solids: 84.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**1200**		200	21	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Fluorene	**53**	**J**	200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Hexachlorobenzene	ND		200	27	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Hexachlorobutadiene	ND		200	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Hexachlorocyclopentadiene	ND		200	27	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Hexachloroethane	ND		200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Indeno[1,2,3-cd]pyrene	**390**		200	25	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Isophorone	ND		200	42	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Naphthalene	ND		200	26	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Nitrobenzene	ND		200	22	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
N-Nitrosodi-n-propylamine	ND		200	34	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
N-Nitrosodiphenylamine	ND		200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Pentachlorophenol	ND		390	200	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Phenanthrene	**620**		200	29	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Phenol	ND		200	31	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1
Pyrene	**1000**		200	23	ug/Kg	☼	06/07/18 14:15	06/13/18 00:35	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*3000*	*T J*	*ug/Kg*	☼	*2.03*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*1200*	*T J*	*ug/Kg*	☼	*4.53*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
1,4-Naphthalenedione, 5-hydroxy-	*240*	*T J N*	*ug/Kg*	☼	*10.32*	*481-39-0*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*200*	*T J*	*ug/Kg*	☼	*12.30*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Benzo[b]naphtho[2,3-d]thiophene	*190*	*T J N*	*ug/Kg*	☼	*13.88*	*243-46-9*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*210*	*T J*	*ug/Kg*	☼	*14.45*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Pentadecanal-	*550*	*T J N*	*ug/Kg*	☼	*14.88*	*2765-11-9*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Heptadecane	*200*	*T J N*	*ug/Kg*	☼	*15.05*	*629-78-7*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
1-Pentadecanethiol	*450*	*T J N*	*ug/Kg*	☼	*15.08*	*25276-70-4*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*460*	*T J*	*ug/Kg*	☼	*15.44*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*410*	*T J*	*ug/Kg*	☼	*15.60*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Heneicosane	*410*	*T J N*	*ug/Kg*	☼	*15.81*	*629-94-7*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*290*	*T J*	*ug/Kg*	☼	*16.36*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*250*	*T J*	*ug/Kg*	☼	*16.55*		*06/07/18 14:15*	*06/13/18 00:35*	*1*
Unknown	*300*	*T J*	*ug/Kg*	☼	*16.80*		*06/07/18 14:15*	*06/13/18 00:35*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*93*		*54 - 120*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
2-Fluorobiphenyl	*100*		*60 - 120*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
2-Fluorophenol (Surr)	*78*		*52 - 120*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Nitrobenzene-d5 (Surr)	*107*		*53 - 120*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
Phenol-d5 (Surr)	*86*		*54 - 120*	*06/07/18 14:15*	*06/13/18 00:35*	*1*
p-Terphenyl-d14 (Surr)	*105*		*65 - 121*	*06/07/18 14:15*	*06/13/18 00:35*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7190**	**B**	12.0	5.3	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Antimony	ND		18.0	0.48	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Arsenic	**21.5**		2.4	0.48	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Barium	**63.8**		0.60	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Beryllium	**0.33**		0.24	0.034	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Cadmium	**0.38**		0.24	0.036	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 2"-12"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-16
Matrix: Solid
Percent Solids: 84.4

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	1950	B	60.0	4.0	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Chromium	13.2	B	0.60	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Cobalt	19.1		0.60	0.060	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Copper	220	B	1.2	0.25	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Iron	53100	B	12.0	4.2	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Lead	132		1.2	0.29	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Magnesium	1230		24.0	1.1	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Manganese	404	B	0.24	0.038	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Nickel	14.9	B	6.0	0.28	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Potassium	692		36.0	24.0	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Selenium	ND		4.8	0.48	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Silver	ND		0.72	0.24	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Sodium	51.9	J	168	15.6	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Thallium	ND		7.2	0.36	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Vanadium	20.8		0.60	0.13	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1
Zinc	133		2.4	0.77	mg/Kg	☼	06/11/18 17:30	06/13/18 23:30	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.79		0.023	0.0095	mg/Kg	☼	06/21/18 16:35	06/21/18 18:17	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 12"-24"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-17
Matrix: Solid
Percent Solids: 81.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		210	56	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,4,6-Trichlorophenol	ND		210	42	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,4-Dichlorophenol	ND		210	22	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,4-Dimethylphenol	ND		210	50	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,4-Dinitrophenol	ND		2000	960	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,4-Dinitrotoluene	ND		210	43	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2,6-Dinitrotoluene	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Chloronaphthalene	ND		210	34	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Chlorophenol	ND		210	38	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Methylnaphthalene	ND		210	42	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Methylphenol	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Nitroaniline	ND		400	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
2-Nitrophenol	ND		210	59	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
3,3'-Dichlorobenzidine	ND		400	240	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
3-Nitroaniline	ND		400	58	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4,6-Dinitro-2-methylphenol	ND		400	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Bromophenyl phenyl ether	ND		210	29	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Chloro-3-methylphenol	ND		210	51	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Chloroaniline	ND		210	51	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Chlorophenyl phenyl ether	ND		210	26	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Methylphenol	ND		400	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Nitroaniline	ND		400	110	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
4-Nitrophenol	ND		400	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Acenaphthene	ND		210	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Acenaphthylene	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Acetophenone	ND		210	28	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Anthracene	ND		210	51	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Atrazine	ND		210	72	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzaldehyde	ND		210	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzo[a]anthracene	**180**	**J**	210	21	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzo[a]pyrene	**160**	**J**	210	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzo[b]fluoranthene	**200**	**J**	210	33	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzo[g,h,i]perylene	**130**	**J**	210	22	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Benzo[k]fluoranthene	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Biphenyl	ND		210	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
bis (2-chloroisopropyl) ether	ND		210	42	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Bis(2-chloroethoxy)methane	ND		210	44	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Bis(2-chloroethyl)ether	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Bis(2-ethylhexyl) phthalate	ND		210	71	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Butyl benzyl phthalate	ND		210	34	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Caprolactam	ND		210	62	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Carbazole	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Chrysene	**170**	**J**	210	47	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Dibenz(a,h)anthracene	ND		210	37	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Dibenzofuran	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Diethyl phthalate	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Dimethyl phthalate	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Di-n-butyl phthalate	ND		210	35	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Di-n-octyl phthalate	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1

Client Sample ID: SS-05 12"-24"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-17
Matrix: Solid
Percent Solids: 81.4

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**350**		210	22	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Fluorene	ND		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Hexachlorobenzene	ND		210	28	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Hexachlorobutadiene	ND		210	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Hexachlorocyclopentadiene	ND		210	28	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Hexachloroethane	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Indeno[1,2,3-cd]pyrene	**120**	**J**	210	26	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Isophorone	ND		210	44	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Naphthalene	ND		210	27	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Nitrobenzene	ND		210	23	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
N-Nitrosodi-n-propylamine	ND		210	35	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
N-Nitrosodiphenylamine	ND		210	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Pentachlorophenol	ND		400	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Phenanthrene	**220**		210	31	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Phenol	ND		210	32	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1
Pyrene	**330**		210	24	ug/Kg	☼	06/07/18 14:15	06/13/18 01:03	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*4200*	*T J*	*ug/Kg*	☼	*2.03*		*06/07/18 14:15*	*06/13/18 01:03*	*1*
Unknown	*1200*	*T J*	*ug/Kg*	☼	*4.53*		*06/07/18 14:15*	*06/13/18 01:03*	*1*
Unknown	*240*	*T J*	*ug/Kg*	☼	*10.32*		*06/07/18 14:15*	*06/13/18 01:03*	*1*
Unknown	*220*	*T J*	*ug/Kg*	☼	*13.88*		*06/07/18 14:15*	*06/13/18 01:03*	*1*
13-Tertadecen-1-ol acetate	*310*	*T J N*	*ug/Kg*	☼	*14.45*	*1000130-79-8*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
Unknown	*170*	*T J*	*ug/Kg*	☼	*14.88*		*06/07/18 14:15*	*06/13/18 01:03*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*92*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
2-Fluorobiphenyl	*92*		*60 - 120*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
2-Fluorophenol (Surr)	*77*		*52 - 120*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
Nitrobenzene-d5 (Surr)	*97*		*53 - 120*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
Phenol-d5 (Surr)	*78*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:03*	*1*
p-Terphenyl-d14 (Surr)	*106*		*65 - 121*	*06/07/18 14:15*	*06/13/18 01:03*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8930**		12.2	5.4	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Antimony	**1.5**	**J**	18.3	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Arsenic	**12.7**		2.4	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Barium	**64.4**		0.61	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Beryllium	**0.40**		0.24	0.034	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Cadmium	**0.30**	**B**	0.24	0.037	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Calcium	**2030**	**B**	61.0	4.0	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Chromium	**15.2**		0.62	0.25	mg/Kg	☼	06/13/18 17:32	06/14/18 17:05	1
Cobalt	**4.1**		0.61	0.061	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Copper	**29.3**	**B**	1.2	0.26	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Iron	**12900**	**B**	12.2	4.3	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Lead	**104**		1.2	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Magnesium	**1390**		24.4	1.1	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Manganese	**331**		0.24	0.039	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-05 12"-24"
Date Collected: 06/01/18 12:20
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-17
Matrix: Solid
Percent Solids: 81.4

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	8.2	B	6.1	0.28	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Potassium	793		36.6	24.4	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Selenium	ND		4.9	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Silver	ND		0.73	0.24	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Sodium	68.7	J	171	15.9	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Thallium	ND		7.3	0.37	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Vanadium	19.8		0.61	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1
Zinc	116		2.4	0.78	mg/Kg	☼	06/08/18 18:16	06/11/18 15:17	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.52		0.023	0.0095	mg/Kg	☼	06/21/18 16:35	06/21/18 18:18	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 0"-2"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-18
Matrix: Solid
Percent Solids: 68.9

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		1200	330	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,4,6-Trichlorophenol	ND		1200	240	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,4-Dichlorophenol	ND		1200	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,4-Dimethylphenol	ND		1200	290	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,4-Dinitrophenol	ND		12000	5600	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,4-Dinitrotoluene	ND		1200	250	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2,6-Dinitrotoluene	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Chloronaphthalene	ND		1200	200	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Chlorophenol	ND		1200	220	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Methylnaphthalene	ND		1200	240	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Methylphenol	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Nitroaniline	ND		2300	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
2-Nitrophenol	ND		1200	340	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
3,3'-Dichlorobenzidine	ND		2300	1400	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
3-Nitroaniline	ND		2300	330	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4,6-Dinitro-2-methylphenol	ND		2300	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Bromophenyl phenyl ether	ND		1200	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Chloro-3-methylphenol	ND		1200	300	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Chloroaniline	ND		1200	300	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Chlorophenyl phenyl ether	ND		1200	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Methylphenol	ND		2300	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Nitroaniline	ND		2300	630	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
4-Nitrophenol	ND		2300	840	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Acenaphthene	ND		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Acenaphthylene	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Acetophenone	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Anthracene	**370**	**J**	1200	300	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Atrazine	ND		1200	420	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzaldehyde	ND		1200	960	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzo[a]anthracene	**1400**		1200	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzo[a]pyrene	**1500**		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzo[b]fluoranthene	**1700**		1200	190	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzo[g,h,i]perylene	**1200**		1200	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Benzo[k]fluoranthene	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Biphenyl	ND		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
bis (2-chloroisopropyl) ether	ND		1200	240	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Bis(2-chloroethoxy)methane	ND		1200	260	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Bis(2-chloroethyl)ether	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Bis(2-ethylhexyl) phthalate	ND		1200	410	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Butyl benzyl phthalate	ND		1200	200	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Caprolactam	ND		1200	360	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Carbazole	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Chrysene	**1500**		1200	270	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Dibenz(a,h)anthracene	ND		1200	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Dibenzofuran	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Diethyl phthalate	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Dimethyl phthalate	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Di-n-butyl phthalate	ND		1200	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Di-n-octyl phthalate	ND		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 0"-2"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-18
Matrix: Solid
Percent Solids: 68.9

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	3400		1200	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Fluorene	150	J	1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Hexachlorobenzene	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Hexachlorobutadiene	ND		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Hexachlorocyclopentadiene	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Hexachloroethane	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Indeno[1,2,3-cd]pyrene	950	J	1200	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Isophorone	ND		1200	260	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Naphthalene	ND		1200	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Nitrobenzene	ND		1200	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
N-Nitrosodi-n-propylamine	ND		1200	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
N-Nitrosodiphenylamine	ND		1200	980	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Pentachlorophenol	ND		2300	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Phenanthrene	1600		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Phenol	ND		1200	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5
Pyrene	2800		1200	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:30	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*2400*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:15*	*06/13/18 01:30*	*5*
Unknown	*1200*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/13/18 01:30*	*5*
1,4-Naphthalenedione, 5-hydroxy-	*2300*	*T J N*	*ug/Kg*	☼	*10.32*	*481-39-0*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
Benzo[e]pyrene	*1200*	*T J N*	*ug/Kg*	☼	*15.44*	*192-97-2*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
Unknown	*1100*	*T J*	*ug/Kg*	☼	*17.75*		*06/07/18 14:15*	*06/13/18 01:30*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*79*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
2-Fluorobiphenyl	*77*		*60 - 120*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
2-Fluorophenol (Surr)	*65*		*52 - 120*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
Nitrobenzene-d5 (Surr)	*86*		*53 - 120*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
Phenol-d5 (Surr)	*76*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:30*	*5*
p-Terphenyl-d14 (Surr)	*86*		*65 - 121*	*06/07/18 14:15*	*06/13/18 01:30*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8260	F1	14.3	6.3	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Antimony	1.4	J F1	21.5	0.57	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Arsenic	8.1		2.9	0.57	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Barium	85.5		0.72	0.16	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Beryllium	0.39		0.29	0.040	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Cadmium	0.84	B	0.29	0.043	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Calcium	4280	B F1	71.6	4.7	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Chromium	12.8		0.73	0.29	mg/Kg	☼	06/13/18 17:32	06/14/18 17:09	1
Cobalt	4.5		0.72	0.072	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Copper	29.2	B	1.4	0.30	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Iron	13200	B	14.3	5.0	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Lead	232		1.4	0.34	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Magnesium	1580		28.6	1.3	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Manganese	355		0.29	0.046	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Nickel	11.5	B	7.2	0.33	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Potassium	1090	F1	42.9	28.6	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 0"-2"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-18
Matrix: Solid
Percent Solids: 68.9

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		5.7	0.57	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Silver	**0.42**	**J**	0.86	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Sodium	**81.8**	**J**	200	18.6	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Thallium	ND		8.6	0.43	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Vanadium	**20.0**		0.72	0.16	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1
Zinc	**267**		2.9	0.92	mg/Kg	☼	06/08/18 18:16	06/11/18 15:21	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.41**		0.029	0.012	mg/Kg	☼	06/21/18 16:35	06/21/18 18:23	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 2"-12"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-19
Matrix: Solid
Percent Solids: 80.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		1000	280	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,4,6-Trichlorophenol	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,4-Dichlorophenol	ND		1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,4-Dimethylphenol	ND		1000	250	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,4-Dinitrophenol	ND		10000	4800	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,4-Dinitrotoluene	ND		1000	220	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2,6-Dinitrotoluene	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Chloronaphthalene	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Chlorophenol	ND		1000	190	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Methylnaphthalene	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Methylphenol	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Nitroaniline	ND		2000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
2-Nitrophenol	ND		1000	300	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
3,3'-Dichlorobenzidine	ND		2000	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
3-Nitroaniline	ND		2000	290	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4,6-Dinitro-2-methylphenol	ND		2000	1000	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Bromophenyl phenyl ether	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Chloro-3-methylphenol	ND		1000	260	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Chloroaniline	ND		1000	260	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Chlorophenyl phenyl ether	ND		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Methylphenol	ND		2000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Nitroaniline	ND		2000	550	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
4-Nitrophenol	ND		2000	730	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Acenaphthene	**190**	**J**	1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Acenaphthylene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Acetophenone	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Anthracene	**390**	**J**	1000	260	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Atrazine	ND		1000	360	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzaldehyde	ND		1000	830	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzo[a]anthracene	**1500**		1000	100	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzo[a]pyrene	**1600**		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzo[b]fluoranthene	**2100**		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzo[g,h,i]perylene	**1400**		1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Benzo[k]fluoranthene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Biphenyl	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
bis (2-chloroisopropyl) ether	ND		1000	210	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Bis(2-chloroethoxy)methane	ND		1000	220	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Bis(2-chloroethyl)ether	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Bis(2-ethylhexyl) phthalate	ND		1000	360	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Butyl benzyl phthalate	ND		1000	170	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Caprolactam	ND		1000	310	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Carbazole	**130**	**J**	1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Chrysene	**1600**		1000	230	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Dibenz(a,h)anthracene	ND		1000	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Dibenzofuran	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Diethyl phthalate	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Dimethyl phthalate	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Di-n-butyl phthalate	ND		1000	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Di-n-octyl phthalate	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5

Client Sample ID: SS-06 2"-12"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-19
Matrix: Solid
Percent Solids: 80.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	3400		1000	110	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Fluorene	160	J	1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Hexachlorobenzene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Hexachlorobutadiene	ND		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Hexachlorocyclopentadiene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Hexachloroethane	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Indeno[1,2,3-cd]pyrene	1100		1000	130	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Isophorone	ND		1000	220	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Naphthalene	ND		1000	140	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Nitrobenzene	ND		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
N-Nitrosodi-n-propylamine	ND		1000	180	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
N-Nitrosodiphenylamine	ND		1000	850	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Pentachlorophenol	ND		2000	1000	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Phenanthrene	1800		1000	150	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Phenol	ND		1000	160	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5
Pyrene	3200		1000	120	ug/Kg	☼	06/07/18 14:15	06/13/18 01:58	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*5700*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:15*	*06/13/18 01:58*	*5*
Unknown	*1600*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/13/18 01:58*	*5*
Unknown	*1300*	*T J*	*ug/Kg*	☼	*15.44*		*06/07/18 14:15*	*06/13/18 01:58*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*91*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:58*	*5*
2-Fluorobiphenyl	*84*		*60 - 120*	*06/07/18 14:15*	*06/13/18 01:58*	*5*
2-Fluorophenol (Surr)	*71*		*52 - 120*	*06/07/18 14:15*	*06/13/18 01:58*	*5*
Nitrobenzene-d5 (Surr)	*96*		*53 - 120*	*06/07/18 14:15*	*06/13/18 01:58*	*5*
Phenol-d5 (Surr)	*83*		*54 - 120*	*06/07/18 14:15*	*06/13/18 01:58*	*5*
p-Terphenyl-d14 (Surr)	*101*		*65 - 121*	*06/07/18 14:15*	*06/13/18 01:58*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7050		11.9	5.2	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Antimony	2.3	J	17.9	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Arsenic	8.5		2.4	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Barium	75.2		0.60	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Beryllium	0.36		0.24	0.033	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Cadmium	0.80	B	0.24	0.036	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Calcium	3060	B	59.6	3.9	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Chromium	11.8		0.63	0.25	mg/Kg	☼	06/13/18 17:32	06/14/18 17:37	1
Cobalt	4.0		0.60	0.060	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Copper	44.4	B	1.2	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Iron	12900	B	11.9	4.2	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Lead	2010		1.2	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Magnesium	1330		23.8	1.1	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Manganese	308		0.24	0.038	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Nickel	9.2	B	6.0	0.27	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Potassium	863		35.8	23.8	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Selenium	ND		4.8	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Silver	0.40	J	0.72	0.24	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 2"-12"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-19
Matrix: Solid
Percent Solids: 80.7

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	57.3	J	167	15.5	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Thallium	ND		7.2	0.36	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Vanadium	17.3		0.60	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1
Zinc	248		2.4	0.76	mg/Kg	☼	06/08/18 18:16	06/11/18 15:50	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.47		0.024	0.0097	mg/Kg	☼	06/21/18 16:35	06/21/18 18:24	1

Client Sample ID: SS-06 12"-24"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-20
Matrix: Solid
Percent Solids: 78.0

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		1100	290	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,4,6-Trichlorophenol	ND		1100	210	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,4-Dichlorophenol	ND		1100	110	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,4-Dimethylphenol	ND		1100	260	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,4-Dinitrophenol	ND		10000	4900	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,4-Dinitrotoluene	ND		1100	220	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2,6-Dinitrotoluene	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Chloronaphthalene	ND		1100	170	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Chlorophenol	ND		1100	190	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Methylnaphthalene	ND		1100	210	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Methylphenol	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Nitroaniline	ND		2100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
2-Nitrophenol	ND		1100	300	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
3,3'-Dichlorobenzidine	ND		2100	1200	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
3-Nitroaniline	ND		2100	290	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4,6-Dinitro-2-methylphenol	ND		2100	1100	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Bromophenyl phenyl ether	ND		1100	150	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Chloro-3-methylphenol	ND		1100	260	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Chloroaniline	ND		1100	260	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Chlorophenyl phenyl ether	ND		1100	130	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Methylphenol	ND		2100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Nitroaniline	ND		2100	550	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
4-Nitrophenol	ND		2100	740	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Acenaphthene	ND		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Acenaphthylene	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Acetophenone	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Anthracene	**330**	**J**	1100	260	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Atrazine	ND		1100	370	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzaldehyde	ND		1100	840	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzo[a]anthracene	**1100**		1100	110	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzo[a]pyrene	**1200**		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzo[b]fluoranthene	**1100**		1100	170	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzo[g,h,i]perylene	**890**	**J**	1100	110	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Benzo[k]fluoranthene	**890**	**J**	1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Biphenyl	ND		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
bis (2-chloroisopropyl) ether	ND		1100	210	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Bis(2-chloroethoxy)methane	ND		1100	220	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Bis(2-chloroethyl)ether	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Bis(2-ethylhexyl) phthalate	ND		1100	360	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Butyl benzyl phthalate	ND		1100	170	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Caprolactam	ND		1100	320	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Carbazole	**130**	**J**	1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Chrysene	**1100**		1100	240	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Dibenz(a,h)anthracene	**240**	**J**	1100	190	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Dibenzofuran	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Diethyl phthalate	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Dimethyl phthalate	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Di-n-butyl phthalate	ND		1100	180	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Di-n-octyl phthalate	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5

Client Sample ID: SS-06 12"-24"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-20
Matrix: Solid
Percent Solids: 78.0

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**2800**		1100	110	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Fluorene	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Hexachlorobenzene	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Hexachlorobutadiene	ND		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Hexachlorocyclopentadiene	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Hexachloroethane	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Indeno[1,2,3-cd]pyrene	**820**	**J**	1100	130	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Isophorone	ND		1100	220	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Naphthalene	ND		1100	140	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Nitrobenzene	ND		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
N-Nitrosodi-n-propylamine	ND		1100	180	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
N-Nitrosodiphenylamine	ND		1100	860	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Pentachlorophenol	ND		2100	1100	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Phenanthrene	**1500**		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Phenol	ND		1100	160	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5
Pyrene	**2400**		1100	120	ug/Kg	☼	06/07/18 14:15	06/13/18 02:25	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*1400*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:15*	*06/13/18 02:25*	*5*
Unknown	*1000*	*T J*	*ug/Kg*	☼	*15.44*		*06/07/18 14:15*	*06/13/18 02:25*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*94*		*54 - 120*	*06/07/18 14:15*	*06/13/18 02:25*	*5*
2-Fluorobiphenyl	*79*		*60 - 120*	*06/07/18 14:15*	*06/13/18 02:25*	*5*
2-Fluorophenol (Surr)	*68*		*52 - 120*	*06/07/18 14:15*	*06/13/18 02:25*	*5*
Nitrobenzene-d5 (Surr)	*77*		*53 - 120*	*06/07/18 14:15*	*06/13/18 02:25*	*5*
Phenol-d5 (Surr)	*71*		*54 - 120*	*06/07/18 14:15*	*06/13/18 02:25*	*5*
p-Terphenyl-d14 (Surr)	*103*		*65 - 121*	*06/07/18 14:15*	*06/13/18 02:25*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7250**		12.7	5.6	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Antimony	**0.94**	**J**	19.0	0.51	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Arsenic	**8.7**		2.5	0.51	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Barium	**76.9**		0.63	0.14	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Beryllium	**0.37**		0.25	0.036	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Cadmium	**0.74**	**B**	0.25	0.038	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Calcium	**3320**	**B**	63.5	4.2	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Chromium	**11.5**		0.64	0.26	mg/Kg	☼	06/13/18 17:32	06/14/18 17:41	1
Cobalt	**4.1**		0.63	0.063	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Copper	**26.3**	**B**	1.3	0.27	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Iron	**11600**	**B**	12.7	4.4	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Lead	**200**		1.3	0.30	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Magnesium	**1370**		25.4	1.2	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Manganese	**328**		0.25	0.041	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Nickel	**9.0**	**B**	6.3	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Potassium	**847**		38.1	25.4	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Selenium	**0.52**	**J**	5.1	0.51	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Silver	**0.29**	**J**	0.76	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Sodium	**64.6**	**J**	178	16.5	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-06 12"-24"
Date Collected: 06/01/18 12:25
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-20
Matrix: Solid
Percent Solids: 78.0

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		7.6	0.38	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Vanadium	17.2		0.63	0.14	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1
Zinc	222		2.5	0.81	mg/Kg	☼	06/08/18 18:16	06/11/18 15:53	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.42		0.024	0.0098	mg/Kg	☼	06/21/18 16:35	06/21/18 18:26	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 0"-2"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-21
Matrix: Solid
Percent Solids: 83.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,4,6-Trichlorophenol	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,4-Dichlorophenol	ND	F2	4000	430	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,4-Dimethylphenol	ND		4000	970	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,4-Dinitrophenol	ND		39000	19000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,4-Dinitrotoluene	ND	F1	4000	830	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2,6-Dinitrotoluene	ND	F1	4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Chloronaphthalene	ND		4000	660	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Chlorophenol	ND		4000	730	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Methylnaphthalene	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Methylphenol	ND	F2	4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Nitroaniline	ND	F1	7800	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
2-Nitrophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
3,3'-Dichlorobenzidine	ND		7800	4700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
3-Nitroaniline	ND		7800	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4,6-Dinitro-2-methylphenol	ND		7800	4000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Bromophenyl phenyl ether	ND	F2	4000	570	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Chloro-3-methylphenol	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Chloroaniline	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Chlorophenyl phenyl ether	ND		4000	500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Methylphenol	ND		7800	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Nitroaniline	ND		7800	2100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
4-Nitrophenol	ND		7800	2800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Acenaphthene	ND		4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Acenaphthylene	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Acetophenone	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Anthracene	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Atrazine	ND		4000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzaldehyde	ND	F1	4000	3200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzo[a]anthracene	**1800**	**J**	4000	400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzo[a]pyrene	**2100**	**J**	4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzo[b]fluoranthene	**2900**	**J F2 F1**	4000	640	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzo[g,h,i]perylene	**1700**	**J**	4000	430	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Benzo[k]fluoranthene	**910**	**J**	4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Biphenyl	ND		4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
bis (2-chloroisopropyl) ether	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Bis(2-chloroethoxy)methane	ND		4000	850	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Bis(2-chloroethyl)ether	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Bis(2-ethylhexyl) phthalate	ND		4000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Butyl benzyl phthalate	ND	F2	4000	660	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Caprolactam	ND	F2	4000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Carbazole	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Chrysene	**2100**	**J F1**	4000	900	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Dibenz(a,h)anthracene	ND		4000	710	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Dibenzofuran	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Diethyl phthalate	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Dimethyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Di-n-butyl phthalate	ND		4000	680	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Di-n-octyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20

Client Sample ID: SS-07 0"-2"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-21
Matrix: Solid
Percent Solids: 83.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**3400**	**J**	4000	430	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Fluorene	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Hexachlorobenzene	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Hexachlorobutadiene	ND	F1	4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Hexachlorocyclopentadiene	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Hexachloroethane	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Indeno[1,2,3-cd]pyrene	**1200**	**J**	4000	500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Isophorone	ND		4000	850	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Naphthalene	ND	F2	4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Nitrobenzene	ND		4000	450	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
N-Nitrosodi-n-propylamine	ND		4000	680	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
N-Nitrosodiphenylamine	ND		4000	3300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Pentachlorophenol	ND		7800	4000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Phenanthrene	**1700**	**J**	4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Phenol	ND		4000	610	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20
Pyrene	**3500**	**J**	4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 17:15	20

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:08*	*06/13/18 17:15*	*20*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*82*		*54 - 120*	*06/07/18 14:08*	*06/13/18 17:15*	*20*
2-Fluorobiphenyl	*91*		*60 - 120*	*06/07/18 14:08*	*06/13/18 17:15*	*20*
2-Fluorophenol (Surr)	*65*		*52 - 120*	*06/07/18 14:08*	*06/13/18 17:15*	*20*
Nitrobenzene-d5 (Surr)	*84*		*53 - 120*	*06/07/18 14:08*	*06/13/18 17:15*	*20*
Phenol-d5 (Surr)	*58*		*54 - 120*	*06/07/18 14:08*	*06/13/18 17:15*	*20*
p-Terphenyl-d14 (Surr)	*99*		*65 - 121*	*06/07/18 14:08*	*06/13/18 17:15*	*20*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7720**		12.3	5.4	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Antimony	**1.0**	**J**	18.4	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Arsenic	**5.3**		2.5	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Barium	**84.7**		0.61	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Beryllium	**0.34**		0.25	0.034	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Cadmium	**1.1**	**B**	0.25	0.037	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Calcium	**23500**	**B**	61.3	4.0	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Chromium	**15.2**		0.58	0.23	mg/Kg	☼	06/13/18 17:32	06/14/18 17:45	1
Cobalt	**5.7**		0.61	0.061	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Copper	**40.1**	**B**	1.2	0.26	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Iron	**15100**	**B**	12.3	4.3	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Lead	**202**		1.2	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Magnesium	**3920**		24.5	1.1	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Manganese	**366**		0.25	0.039	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Nickel	**14.0**	**B**	6.1	0.28	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Potassium	**1650**		36.8	24.5	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Selenium	ND		4.9	0.49	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Silver	**0.48**	**J**	0.74	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Sodium	**233**		172	15.9	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Thallium	ND		7.4	0.37	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 0"-2"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-21
Matrix: Solid
Percent Solids: 83.8

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	21.5		0.61	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1
Zinc	424		2.5	0.78	mg/Kg	☼	06/08/18 18:16	06/11/18 15:57	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.35		0.025	0.010	mg/Kg	☼	06/21/18 16:35	06/21/18 18:27	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 2"-12"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-22
Matrix: Solid
Percent Solids: 83.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		10000	2700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,4,6-Trichlorophenol	ND		10000	2000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,4-Dichlorophenol	ND		10000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,4-Dimethylphenol	ND		10000	2400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,4-Dinitrophenol	ND		99000	47000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,4-Dinitrotoluene	ND		10000	2100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2,6-Dinitrotoluene	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Chloronaphthalene	ND		10000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Chlorophenol	ND		10000	1800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Methylnaphthalene	ND		10000	2000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Methylphenol	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Nitroaniline	ND		20000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
2-Nitrophenol	ND		10000	2900	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
3,3'-Dichlorobenzidine	ND		20000	12000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
3-Nitroaniline	ND		20000	2800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4,6-Dinitro-2-methylphenol	ND		20000	10000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Bromophenyl phenyl ether	ND		10000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Chloro-3-methylphenol	ND		10000	2500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Chloroaniline	ND		10000	2500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Chlorophenyl phenyl ether	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Methylphenol	ND		20000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Nitroaniline	ND		20000	5300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
4-Nitrophenol	ND		20000	7100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Acenaphthene	ND		10000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Acenaphthylene	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Acetophenone	ND		10000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Anthracene	ND		10000	2500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Atrazine	ND		10000	3500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzaldehyde	ND		10000	8100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzo[a]anthracene	**7700**	**J**	10000	1000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzo[a]pyrene	**7300**	**J**	10000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzo[b]fluoranthene	**8700**	**J**	10000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzo[g,h,i]perylene	**5100**	**J**	10000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Benzo[k]fluoranthene	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Biphenyl	ND		10000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
bis (2-chloroisopropyl) ether	ND		10000	2000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Bis(2-chloroethoxy)methane	ND		10000	2100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Bis(2-chloroethyl)ether	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Bis(2-ethylhexyl) phthalate	ND		10000	3500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Butyl benzyl phthalate	ND		10000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Caprolactam	ND		10000	3000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Carbazole	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Chrysene	**7500**	**J**	10000	2300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Dibenz(a,h)anthracene	ND		10000	1800	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Dibenzofuran	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Diethyl phthalate	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Dimethyl phthalate	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Di-n-butyl phthalate	ND		10000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Di-n-octyl phthalate	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50

Client Sample ID: SS-07 2"-12"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-22
Matrix: Solid
Percent Solids: 83.2

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**15000**		10000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Fluorene	ND		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Hexachlorobenzene	ND		10000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Hexachlorobutadiene	ND		10000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Hexachlorocyclopentadiene	ND		10000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Hexachloroethane	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Indeno[1,2,3-cd]pyrene	**4500**	**J**	10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Isophorone	ND		10000	2100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Naphthalene	ND		10000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Nitrobenzene	ND		10000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
N-Nitrosodi-n-propylamine	ND		10000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
N-Nitrosodiphenylamine	ND		10000	8200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Pentachlorophenol	ND		20000	10000	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Phenanthrene	**7600**	**J**	10000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Phenol	ND		10000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50
Pyrene	**15000**		10000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 17:43	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:08*	*06/13/18 17:43*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:08*	*06/13/18 17:43*	*50*
2-Fluorobiphenyl	*96*		*60 - 120*	*06/07/18 14:08*	*06/13/18 17:43*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:08*	*06/13/18 17:43*	*50*
Nitrobenzene-d5 (Surr)	*105*		*53 - 120*	*06/07/18 14:08*	*06/13/18 17:43*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:08*	*06/13/18 17:43*	*50*
p-Terphenyl-d14 (Surr)	*101*		*65 - 121*	*06/07/18 14:08*	*06/13/18 17:43*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6880**		12.0	5.3	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Antimony	**1.2**	**J**	18.0	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Arsenic	**6.4**		2.4	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Barium	**74.0**		0.60	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Beryllium	**0.32**		0.24	0.034	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Cadmium	**0.69**	**B**	0.24	0.036	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Calcium	**17600**	**B**	60.1	4.0	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Chromium	**12.2**		0.60	0.24	mg/Kg	☼	06/13/18 17:32	06/14/18 17:48	1
Cobalt	**4.9**		0.60	0.060	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Copper	**50.0**	**B**	1.2	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Iron	**13900**	**B**	12.0	4.2	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Lead	**219**		1.2	0.29	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Magnesium	**3600**		24.0	1.1	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Manganese	**671**		0.24	0.038	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Nickel	**12.8**	**B**	6.0	0.28	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Potassium	**1290**		36.1	24.0	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Selenium	ND		4.8	0.48	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Silver	**0.38**	**J**	0.72	0.24	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Sodium	**122**	**J**	168	15.6	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Thallium	ND		7.2	0.36	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 2"-12"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-22
Matrix: Solid
Percent Solids: 83.2

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	17.5		0.60	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1
Zinc	239		2.4	0.77	mg/Kg	☼	06/08/18 18:16	06/11/18 16:01	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.37		0.024	0.0097	mg/Kg	☼	06/21/18 16:35	06/21/18 18:29	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 12"-24"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-23
Matrix: Solid
Percent Solids: 84.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,4,6-Trichlorophenol	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,4-Dichlorophenol	ND		4000	420	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,4-Dimethylphenol	ND		4000	960	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,4-Dinitrophenol	ND		39000	18000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,4-Dinitrotoluene	ND		4000	820	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2,6-Dinitrotoluene	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Chloronaphthalene	ND		4000	660	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Chlorophenol	ND		4000	730	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Methylnaphthalene	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Methylphenol	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Nitroaniline	ND		7700	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
2-Nitrophenol	ND		4000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
3,3'-Dichlorobenzidine	ND		7700	4700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
3-Nitroaniline	ND		7700	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4,6-Dinitro-2-methylphenol	ND		7700	4000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Bromophenyl phenyl ether	ND		4000	560	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Chloro-3-methylphenol	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Chloroaniline	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Chlorophenyl phenyl ether	ND		4000	490	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Methylphenol	ND		7700	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Nitroaniline	ND		7700	2100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
4-Nitrophenol	ND		7700	2800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Acenaphthene	ND		4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Acenaphthylene	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Acetophenone	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Anthracene	ND		4000	990	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Atrazine	ND		4000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzaldehyde	ND		4000	3200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzo[a]anthracene	**2000**	**J**	4000	400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzo[a]pyrene	**2000**	**J**	4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzo[b]fluoranthene	**2700**	**J**	4000	630	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzo[g,h,i]perylene	**1600**	**J**	4000	420	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Benzo[k]fluoranthene	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Biphenyl	ND		4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
bis (2-chloroisopropyl) ether	ND		4000	800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Bis(2-chloroethoxy)methane	ND		4000	840	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Bis(2-chloroethyl)ether	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Bis(2-ethylhexyl) phthalate	ND		4000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Butyl benzyl phthalate	ND		4000	660	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Caprolactam	ND		4000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Carbazole	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Chrysene	**2200**	**J**	4000	890	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Dibenz(a,h)anthracene	ND		4000	700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Dibenzofuran	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Diethyl phthalate	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Dimethyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Di-n-butyl phthalate	ND		4000	680	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Di-n-octyl phthalate	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20

Client Sample ID: SS-07 12"-24"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-23
Matrix: Solid
Percent Solids: 84.7

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**4600**		4000	420	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Fluorene	ND		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Hexachlorobenzene	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Hexachlorobutadiene	ND		4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Hexachlorocyclopentadiene	ND		4000	540	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Hexachloroethane	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Indeno[1,2,3-cd]pyrene	**1100**	**J**	4000	490	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Isophorone	ND		4000	840	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Naphthalene	ND		4000	520	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Nitrobenzene	ND		4000	450	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
N-Nitrosodi-n-propylamine	ND		4000	680	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
N-Nitrosodiphenylamine	ND		4000	3200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Pentachlorophenol	ND		7700	4000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Phenanthrene	**3300**	**J**	4000	590	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Phenol	ND		4000	610	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20
Pyrene	**4600**		4000	470	ug/Kg	☼	06/07/18 14:08	06/13/18 18:12	20

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:08*	*06/13/18 18:12*	*20*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*111*		*54 - 120*	*06/07/18 14:08*	*06/13/18 18:12*	*20*
2-Fluorobiphenyl	*102*		*60 - 120*	*06/07/18 14:08*	*06/13/18 18:12*	*20*
2-Fluorophenol (Surr)	*77*		*52 - 120*	*06/07/18 14:08*	*06/13/18 18:12*	*20*
Nitrobenzene-d5 (Surr)	*125*	*X*	*53 - 120*	*06/07/18 14:08*	*06/13/18 18:12*	*20*
Phenol-d5 (Surr)	*69*		*54 - 120*	*06/07/18 14:08*	*06/13/18 18:12*	*20*
p-Terphenyl-d14 (Surr)	*128*	*X*	*65 - 121*	*06/07/18 14:08*	*06/13/18 18:12*	*20*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8080**		11.4	5.0	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Antimony	**0.85**	**J**	17.1	0.46	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Arsenic	**5.8**		2.3	0.46	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Barium	**49.9**		0.57	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Beryllium	**0.35**		0.23	0.032	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Cadmium	**0.33**	**B**	0.23	0.034	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Calcium	**17600**	**B**	57.1	3.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Chromium	**40.2**	**B**	0.57	0.23	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Cobalt	**4.9**		0.57	0.057	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Copper	**18.0**	**B**	1.1	0.24	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Iron	**13700**	**B**	11.4	4.0	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Lead	**175**		1.1	0.27	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Magnesium	**6010**		22.8	1.1	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Manganese	**303**		0.23	0.037	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Nickel	**17.7**	**B**	5.7	0.26	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Potassium	**1380**		34.2	22.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Selenium	ND		4.6	0.46	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Silver	ND		0.68	0.23	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Sodium	**87.1**	**J**	160	14.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Thallium	ND		6.8	0.34	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 12"-24"
Date Collected: 06/01/18 12:35
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-23
Matrix: Solid
Percent Solids: 84.7

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	18.4		0.57	0.13	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1
Zinc	114		2.3	0.73	mg/Kg	☼	06/08/18 18:16	06/11/18 16:04	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.20	B	0.024	0.0096	mg/Kg	☼	06/21/18 16:35	06/21/18 18:33	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 0"-2"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-24
Matrix: Solid
Percent Solids: 77.0

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		11000	3000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,4,6-Trichlorophenol	ND		11000	2200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,4-Dichlorophenol	ND		11000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,4-Dimethylphenol	ND		11000	2600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,4-Dinitrophenol	ND		110000	50000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,4-Dinitrotoluene	ND		11000	2200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2,6-Dinitrotoluene	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Chloronaphthalene	ND		11000	1800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Chlorophenol	ND		11000	2000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Methylnaphthalene	ND		11000	2200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Methylphenol	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Nitroaniline	ND		21000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
2-Nitrophenol	ND		11000	3100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
3,3'-Dichlorobenzidine	ND		21000	13000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
3-Nitroaniline	ND		21000	3000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4,6-Dinitro-2-methylphenol	ND		21000	11000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Bromophenyl phenyl ether	ND		11000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Chloro-3-methylphenol	ND		11000	2700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Chloroaniline	ND		11000	2700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Chlorophenyl phenyl ether	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Methylphenol	ND		21000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Nitroaniline	ND		21000	5700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
4-Nitrophenol	ND		21000	7600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Acenaphthene	ND		11000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Acenaphthylene	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Acetophenone	ND		11000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Anthracene	ND		11000	2700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Atrazine	ND		11000	3800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzaldehyde	ND		11000	8700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzo[a]anthracene	**4800**	**J**	11000	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzo[a]pyrene	**3500**	**J**	11000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzo[b]fluoranthene	**4900**	**J**	11000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzo[g,h,i]perylene	**2500**	**J**	11000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Benzo[k]fluoranthene	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Biphenyl	ND		11000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
bis (2-chloroisopropyl) ether	ND		11000	2200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Bis(2-chloroethoxy)methane	ND		11000	2300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Bis(2-chloroethyl)ether	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Bis(2-ethylhexyl) phthalate	ND		11000	3700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Butyl benzyl phthalate	ND		11000	1800	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Caprolactam	ND		11000	3300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Carbazole	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Chrysene	**3500**	**J**	11000	2400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Dibenz(a,h)anthracene	ND		11000	1900	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Dibenzofuran	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Diethyl phthalate	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Dimethyl phthalate	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Di-n-butyl phthalate	ND		11000	1900	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Di-n-octyl phthalate	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50

Client Sample ID: SS-08 0"-2"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-24
Matrix: Solid
Percent Solids: 77.0

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**9400**	**J**	11000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Fluorene	ND		11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Hexachlorobenzene	ND		11000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Hexachlorobutadiene	ND		11000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Hexachlorocyclopentadiene	ND		11000	1500	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Hexachloroethane	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Indeno[1,2,3-cd]pyrene	**1900**	**J**	11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Isophorone	ND		11000	2300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Naphthalene	ND		11000	1400	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Nitrobenzene	ND		11000	1200	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
N-Nitrosodi-n-propylamine	ND		11000	1900	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
N-Nitrosodiphenylamine	ND		11000	8900	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Pentachlorophenol	ND		21000	11000	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Phenanthrene	**6800**	**J**	11000	1600	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Phenol	ND		11000	1700	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50
Pyrene	**8200**	**J**	11000	1300	ug/Kg	☼	06/07/18 14:08	06/13/18 18:40	50

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*	☼			*06/07/18 14:08*	*06/13/18 18:40*	*50*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:08*	*06/13/18 18:40*	*50*
2-Fluorobiphenyl	*94*		*60 - 120*	*06/07/18 14:08*	*06/13/18 18:40*	*50*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*	*06/07/18 14:08*	*06/13/18 18:40*	*50*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*	*06/07/18 14:08*	*06/13/18 18:40*	*50*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*	*06/07/18 14:08*	*06/13/18 18:40*	*50*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*	*06/07/18 14:08*	*06/13/18 18:40*	*50*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7040**		13.1	5.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Antimony	**1.1**	**J**	19.7	0.53	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Arsenic	**14.8**		2.6	0.53	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Barium	**77.2**		0.66	0.14	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Beryllium	**0.37**		0.26	0.037	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Cadmium	**0.78**	**B**	0.26	0.039	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Calcium	**22800**	**B**	65.7	4.3	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Chromium	**16.0**		0.66	0.26	mg/Kg	☼	06/13/18 17:32	06/14/18 17:52	1
Cobalt	**5.4**		0.66	0.066	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Copper	**34.0**	**B**	1.3	0.28	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Iron	**13200**	**B**	13.1	4.6	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Lead	**265**		1.3	0.32	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Magnesium	**7530**		26.3	1.2	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Manganese	**338**		0.26	0.042	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Nickel	**13.0**	**B**	6.6	0.30	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Potassium	**1600**		39.4	26.3	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Selenium	ND		5.3	0.53	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Silver	**0.60**	**J**	0.79	0.26	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Sodium	**119**	**J**	184	17.1	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Thallium	ND		7.9	0.39	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 0"-2"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-24
Matrix: Solid
Percent Solids: 77.0

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	18.5		0.66	0.14	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1
Zinc	221		2.6	0.84	mg/Kg	☼	06/08/18 18:16	06/11/18 16:08	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.31	F1 B	0.026	0.011	mg/Kg	☼	06/21/18 16:35	06/21/18 18:35	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 2"-12"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-25
Matrix: Solid
Percent Solids: 93.3

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		910	250	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,4,6-Trichlorophenol	ND		910	180	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,4-Dichlorophenol	ND		910	96	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,4-Dimethylphenol	ND		910	220	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,4-Dinitrophenol	ND		8900	4200	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,4-Dinitrotoluene	ND		910	190	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2,6-Dinitrotoluene	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Chloronaphthalene	ND		910	150	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Chlorophenol	ND		910	170	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Methylnaphthalene	ND		910	180	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Methylphenol	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Nitroaniline	ND		1800	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
2-Nitrophenol	ND		910	260	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
3,3'-Dichlorobenzidine	ND		1800	1100	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
3-Nitroaniline	ND		1800	250	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4,6-Dinitro-2-methylphenol	ND		1800	910	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Bromophenyl phenyl ether	ND		910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Chloro-3-methylphenol	ND		910	230	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Chloroaniline	ND		910	230	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Chlorophenyl phenyl ether	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Methylphenol	ND		1800	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Nitroaniline	ND		1800	480	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
4-Nitrophenol	ND		1800	640	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Acenaphthene	ND		910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Acenaphthylene	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Acetophenone	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Anthracene	ND		910	230	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Atrazine	ND		910	320	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzaldehyde	ND		910	720	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzo[a]anthracene	ND		910	91	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzo[a]pyrene	**400**	**J**	910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzo[b]fluoranthene	**530**	**J**	910	140	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzo[g,h,i]perylene	**290**	**J**	910	96	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Benzo[k]fluoranthene	**150**	**J**	910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Biphenyl	ND		910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
bis (2-chloroisopropyl) ether	ND		910	180	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Bis(2-chloroethoxy)methane	ND		910	190	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Bis(2-chloroethyl)ether	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Bis(2-ethylhexyl) phthalate	ND		910	310	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Butyl benzyl phthalate	ND		910	150	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Caprolactam	ND		910	270	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Carbazole	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Chrysene	**360**	**J**	910	200	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Dibenz(a,h)anthracene	ND		910	160	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Dibenzofuran	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Diethyl phthalate	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Dimethyl phthalate	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Di-n-butyl phthalate	ND		910	160	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Di-n-octyl phthalate	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5

Client Sample ID: SS-08 2"-12"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-25
Matrix: Solid
Percent Solids: 93.3

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**580**	**J**	910	96	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Fluorene	ND		910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Hexachlorobenzene	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Hexachlorobutadiene	ND		910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Hexachlorocyclopentadiene	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Hexachloroethane	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Indeno[1,2,3-cd]pyrene	**260**	**J**	910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Isophorone	ND		910	190	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Naphthalene	ND		910	120	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Nitrobenzene	ND		910	100	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
N-Nitrosodi-n-propylamine	ND		910	160	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
N-Nitrosodiphenylamine	ND		910	740	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Pentachlorophenol	ND		1800	910	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Phenanthrene	**230**	**J**	910	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Phenol	ND		910	140	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5
Pyrene	**510**	**J**	910	110	ug/Kg	☼	06/07/18 14:08	06/13/18 19:08	5

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*800*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:08*	*06/13/18 19:08*	*5*
Unknown	*760*	*T J*	*ug/Kg*	☼	*14.88*		*06/07/18 14:08*	*06/13/18 19:08*	*5*
Unknown	*830*	*T J*	*ug/Kg*	☼	*15.05*		*06/07/18 14:08*	*06/13/18 19:08*	*5*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*89*		*54 - 120*	*06/07/18 14:08*	*06/13/18 19:08*	*5*
2-Fluorobiphenyl	*74*		*60 - 120*	*06/07/18 14:08*	*06/13/18 19:08*	*5*
2-Fluorophenol (Surr)	*55*		*52 - 120*	*06/07/18 14:08*	*06/13/18 19:08*	*5*
Nitrobenzene-d5 (Surr)	*75*		*53 - 120*	*06/07/18 14:08*	*06/13/18 19:08*	*5*
Phenol-d5 (Surr)	*64*		*54 - 120*	*06/07/18 14:08*	*06/13/18 19:08*	*5*
p-Terphenyl-d14 (Surr)	*111*		*65 - 121*	*06/07/18 14:08*	*06/13/18 19:08*	*5*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6530**		10.6	4.7	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Antimony	**1.1**	**J**	15.9	0.42	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Arsenic	**21.6**		2.1	0.42	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Barium	**48.5**		0.53	0.12	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Beryllium	**0.32**		0.21	0.030	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Cadmium	**0.34**	**B**	0.21	0.032	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Calcium	**23700**	**B**	53.0	3.5	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Chromium	**32.6**	**B**	0.53	0.21	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Cobalt	**5.1**		0.53	0.053	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Copper	**28.9**	**B**	1.1	0.22	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Iron	**12500**	**B**	10.6	3.7	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Lead	**141**		1.1	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Magnesium	**7630**		21.2	0.98	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Manganese	**300**		0.21	0.034	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Nickel	**22.1**	**B**	5.3	0.24	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Potassium	**1360**		31.8	21.2	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Selenium	ND		4.2	0.42	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Silver	ND		0.64	0.21	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 2"-12"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-25
Matrix: Solid
Percent Solids: 93.3

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	89.9	J	148	13.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Thallium	ND		6.4	0.32	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Vanadium	16.8		0.53	0.12	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1
Zinc	98.8		2.1	0.68	mg/Kg	☼	06/08/18 18:16	06/11/18 16:12	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.16	B	0.020	0.0082	mg/Kg	☼	06/21/18 16:35	06/21/18 18:44	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 12"-24"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-26
Matrix: Solid
Percent Solids: 88.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		190	52	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,4,6-Trichlorophenol	ND		190	38	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,4-Dichlorophenol	ND		190	20	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,4-Dimethylphenol	ND		190	46	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,4-Dinitrophenol	ND		1900	880	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,4-Dinitrotoluene	ND		190	39	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2,6-Dinitrotoluene	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Chloronaphthalene	ND		190	31	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Chlorophenol	ND		190	35	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Methylnaphthalene	ND		190	38	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Methylphenol	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Nitroaniline	ND		370	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
2-Nitrophenol	ND		190	54	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
3,3'-Dichlorobenzidine	ND		370	220	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
3-Nitroaniline	ND		370	53	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4,6-Dinitro-2-methylphenol	ND		370	190	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Bromophenyl phenyl ether	ND		190	27	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Chloro-3-methylphenol	ND		190	47	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Chloroaniline	ND		190	47	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Chlorophenyl phenyl ether	ND		190	24	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Methylphenol	ND		370	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Nitroaniline	ND		370	100	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
4-Nitrophenol	ND		370	130	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Acenaphthene	ND		190	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Acenaphthylene	ND		190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Acetophenone	ND		190	26	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Anthracene	ND		190	47	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Atrazine	ND		190	66	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzaldehyde	ND		190	150	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzo[a]anthracene	**290**		190	19	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzo[a]pyrene	**340**		190	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzo[b]fluoranthene	**430**		190	30	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzo[g,h,i]perylene	**300**		190	20	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Benzo[k]fluoranthene	**140**	**J**	190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Biphenyl	ND		190	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
bis (2-chloroisopropyl) ether	ND		190	38	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Bis(2-chloroethoxy)methane	ND		190	40	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Bis(2-chloroethyl)ether	ND		190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Bis(2-ethylhexyl) phthalate	ND		190	65	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Butyl benzyl phthalate	ND		190	31	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Caprolactam	ND		190	57	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Carbazole	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Chrysene	**320**		190	43	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Dibenz(a,h)anthracene	ND		190	34	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Dibenzofuran	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Diethyl phthalate	ND		190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Dimethyl phthalate	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Di-n-butyl phthalate	ND		190	33	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Di-n-octyl phthalate	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 12"-24"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-26
Matrix: Solid
Percent Solids: 88.8

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**460**		190	20	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Fluorene	ND		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Hexachlorobenzene	ND		190	26	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Hexachlorobutadiene	ND		190	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Hexachlorocyclopentadiene	ND		190	26	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Hexachloroethane	ND		190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Indeno[1,2,3-cd]pyrene	**220**		190	24	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Isophorone	ND		190	40	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Naphthalene	ND		190	25	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Nitrobenzene	ND		190	21	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
N-Nitrosodi-n-propylamine	ND		190	33	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
N-Nitrosodiphenylamine	ND		190	150	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Pentachlorophenol	ND		370	190	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Phenanthrene	**190**		190	28	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Phenol	ND		190	29	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1
Pyrene	**450**		190	22	ug/Kg	☼	06/07/18 14:08	06/13/18 19:37	1

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Unknown	*1400*	*T J*	*ug/Kg*	☼	*2.04*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Methylene Chloride	*6300*	*T J N*	*ug/Kg*	☼	*2.17*	*75-09-2*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*760*	*T J*	*ug/Kg*	☼	*4.54*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
n-Hexadecanoic acid	*160*	*T J N*	*ug/Kg*	☼	*12.17*	*57-10-3*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*340*	*T J*	*ug/Kg*	☼	*12.39*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*190*	*T J*	*ug/Kg*	☼	*13.88*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*390*	*T J*	*ug/Kg*	☼	*14.45*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*350*	*T J*	*ug/Kg*	☼	*14.88*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Octadecane	*470*	*T J N*	*ug/Kg*	☼	*15.05*	*593-45-3*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
E-15-Heptadecenal	*410*	*T J N*	*ug/Kg*	☼	*15.08*	*1000130-97-9*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Benzo[j]fluoranthene	*270*	*T J N*	*ug/Kg*	☼	*15.44*	*205-82-3*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*290*	*T J*	*ug/Kg*	☼	*15.60*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Octadecane	*280*	*T J N*	*ug/Kg*	☼	*15.81*	*593-45-3*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*230*	*T J*	*ug/Kg*	☼	*16.13*		*06/07/18 14:08*	*06/13/18 19:37*	*1*
Unknown	*220*	*T J*	*ug/Kg*	☼	*16.55*		*06/07/18 14:08*	*06/13/18 19:37*	*1*

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*95*		*54 - 120*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
2-Fluorobiphenyl	*80*		*60 - 120*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
2-Fluorophenol (Surr)	*52*		*52 - 120*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Nitrobenzene-d5 (Surr)	*76*		*53 - 120*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
Phenol-d5 (Surr)	*65*		*54 - 120*	*06/07/18 14:08*	*06/13/18 19:37*	*1*
p-Terphenyl-d14 (Surr)	*107*		*65 - 121*	*06/07/18 14:08*	*06/13/18 19:37*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5060**		10.9	4.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Antimony	**0.65**	**J**	16.3	0.44	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Arsenic	**13.8**		2.2	0.44	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Barium	**42.1**		0.54	0.12	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Beryllium	**0.26**		0.22	0.031	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 12"-24"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-26
Matrix: Solid
Percent Solids: 88.8

Method: 6010C - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.21	J B	0.22	0.033	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Calcium	44600	B	54.5	3.6	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Chromium	9.8		0.56	0.22	mg/Kg	☼	06/13/18 17:32	06/14/18 17:56	1
Cobalt	3.7		0.54	0.054	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Copper	12.9	B	1.1	0.23	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Iron	10000	B	10.9	3.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Lead	72.5		1.1	0.26	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Magnesium	8500		21.8	1.0	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Manganese	388		0.22	0.035	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Nickel	8.6	B	5.4	0.25	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Potassium	1230		32.7	21.8	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Selenium	ND		4.4	0.44	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Silver	ND		0.65	0.22	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Sodium	145	J	153	14.2	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Thallium	ND		6.5	0.33	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Vanadium	14.9		0.54	0.12	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1
Zinc	58.1		2.2	0.70	mg/Kg	☼	06/08/18 18:16	06/11/18 16:15	1

Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.11	B	0.022	0.0087	mg/Kg	☼	06/21/18 16:35	06/21/18 18:46	1

Surrogate Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(64-126)	(72-126)	(60-140)	(71-125)
480-136903-1	SB-03 11'-12'	101	77	103	107
480-136903-2	SB-03 13-14.2'	98	75	100	104
LCS 480-418340/1-A	Lab Control Sample	98	98	100	97
MB 480-418340/2-A	Method Blank	99	93	99	96

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHd14
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(65-121)
480-136903-1	SB-03 11'-12'	178 X	92	69	72	63	141 X
480-136903-2	SB-03 13-14.2'	166 X	84	58	64	59	131 X
480-136903-3	SS-01 0"-2"	0 X	0 X	0 X	0 X	0 X	0 X
480-136903-4	SS-01 2"-12"	0 X	0 X	0 X	0 X	0 X	0 X
480-136903-4 MS	SS-01 2"-12"	0 X	0 X	0 X	0 X	0 X	0 X
480-136903-4 MSD	SS-01 2"-12"	0 X	0 X	0 X	0 X	0 X	0 X
480-136903-5	SS-01 12"-24"	0 X	0 X	0 X	0 X	0 X	0 X
480-136903-6	SS-02 0"-2"	0 X	81	0 X	0 X	0 X	0 X
480-136903-7	SS-02 2"-12"	0 X	89	0 X	0 X	0 X	0 X
480-136903-8	SS-02 12"-24"	0 X	70	0 X	85	0 X	0 X
480-136903-9	SS-03 0"-2"	97	76	51 X	70	55	96
480-136903-10	SS-03 2"-12"	89	73	48 X	58	58	98
480-136903-11	SS-03 12"-24"	71	80	66	86	72	104
480-136903-12	SS-04 0"-2"	0 X	75	51 X	61	62	0 X
480-136903-13	SS-04 2"-12"	0 X	69	0 X	0 X	0 X	84
480-136903-14	SS-04 12"-24"	87	89	72	103	83	0 X
480-136903-15	SS-05 0"-2"	78	85	71	84	74	98
480-136903-16	SS-05 2"-12"	93	100	78	107	86	105
480-136903-17	SS-05 12"-24"	92	92	77	97	78	106
480-136903-18	SS-06 0"-2"	79	77	65	86	76	86
480-136903-19	SS-06 2"-12"	91	84	71	96	83	101
480-136903-20	SS-06 12"-24"	94	79	68	77	71	103
480-136903-21	SS-07 0"-2"	82	91	65	84	58	99
480-136903-21 MS	SS-07 0"-2"	90	89	70	92	65	102
480-136903-21 MSD	SS-07 0"-2"	102	75	57	99	67	97
480-136903-22	SS-07 2"-12"	0 X	96	0 X	105	0 X	101
480-136903-23	SS-07 12"-24"	111	102	77	125 X	69	128 X
480-136903-24	SS-08 0"-2"	0 X	94	0 X	0 X	0 X	0 X
480-136903-25	SS-08 2"-12"	89	74	55	75	64	111
480-136903-26	SS-08 12"-24"	95	80	52	76	65	107
LCS 480-418456/2-A	Lab Control Sample	101	85	70	86	76	121
LCS 480-418467/2-A	Lab Control Sample	91	86	65	87	69	117

Surrogate Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
		TBP	FBP	2FP	NBZ	PHL	TPHd14		
Lab Sample ID	Client Sample ID	(54-120)	(60-120)	(52-120)	(53-120)	(54-120)	(65-121)		
LCS 480-418982/2-A	Lab Control Sample	99	92	83	84	88	114		
MB 480-418456/1-A	Method Blank	82	90	71	95	83	121		
MB 480-418467/1-A	Method Blank	88	77	69	84	74	110		
MB 480-418982/1-A	Method Blank	86	102	93	95	97	132 X		

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHd14 = p-Terphenyl-d14 (Surr)

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-418340/2-A
Matrix: Solid
Analysis Batch: 418345

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418340

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.36	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.81	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		5.0	1.1	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,1,2-Trichloroethane	ND		5.0	0.65	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,1-Dichloroethane	ND		5.0	0.61	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,1-Dichloroethene	ND		5.0	0.61	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2,4-Trichlorobenzene	ND		5.0	0.30	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2,4-Trimethylbenzene	ND		5.0	0.96	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2-Dibromo-3-Chloropropane	ND		5.0	2.5	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2-Dibromoethane	ND		5.0	0.64	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2-Dichlorobenzene	ND		5.0	0.39	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2-Dichloroethane	ND		5.0	0.25	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,2-Dichloropropane	ND		5.0	2.5	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,3,5-Trimethylbenzene	ND		5.0	0.32	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,3-Dichlorobenzene	ND		5.0	0.26	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
1,4-Dichlorobenzene	ND		5.0	0.70	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
2-Butanone (MEK)	ND		25	1.8	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
2-Hexanone	ND		25	2.5	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
4-Isopropyltoluene	ND		5.0	0.40	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
4-Methyl-2-pentanone (MIBK)	ND		25	1.6	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Acetone	ND		25	4.2	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Benzene	ND		5.0	0.25	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Bromodichloromethane	ND		5.0	0.67	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Bromoform	ND		5.0	2.5	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Bromomethane	ND		5.0	0.45	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Carbon disulfide	ND		5.0	2.5	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Carbon tetrachloride	ND		5.0	0.48	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Chlorobenzene	ND		5.0	0.66	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Chloroethane	ND		5.0	1.1	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Chloroform	ND		5.0	0.31	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Chloromethane	ND		5.0	0.30	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
cis-1,2-Dichloroethene	ND		5.0	0.64	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
cis-1,3-Dichloropropene	ND		5.0	0.72	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Cyclohexane	ND		5.0	0.70	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Dibromochloromethane	ND		5.0	0.64	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Dichlorodifluoromethane	ND		5.0	0.41	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Ethylbenzene	ND		5.0	0.35	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Isopropylbenzene	ND		5.0	0.75	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
m,p-Xylene	ND		10	0.84	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Methyl acetate	ND		25	3.0	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Methyl tert-butyl ether	ND		5.0	0.49	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Methylcyclohexane	ND		5.0	0.76	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Methylene Chloride	ND		5.0	2.3	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Naphthalene	ND		5.0	0.67	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
n-Butylbenzene	ND		5.0	0.44	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
N-Propylbenzene	ND		5.0	0.40	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
o-Xylene	ND		5.0	0.65	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
sec-Butylbenzene	ND		5.0	0.44	ug/Kg		06/07/18 08:42	06/07/18 12:01	1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 480-418340/2-A
Matrix: Solid
Analysis Batch: 418345

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418340

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Styrene	ND		5.0	0.25	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
tert-Butylbenzene	ND		5.0	0.52	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Tetrachloroethene	ND		5.0	0.67	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Toluene	ND		5.0	0.38	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
trans-1,2-Dichloroethene	ND		5.0	0.52	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
trans-1,3-Dichloropropene	ND		5.0	2.2	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Trichloroethene	ND		5.0	1.1	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Trichlorofluoromethane	ND		5.0	0.47	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Vinyl chloride	ND		5.0	0.61	ug/Kg		06/07/18 08:42	06/07/18 12:01	1
Xylenes, Total	ND		10	0.84	ug/Kg		06/07/18 08:42	06/07/18 12:01	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*06/07/18 08:42*	*06/07/18 12:01*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*64 - 126*	*06/07/18 08:42*	*06/07/18 12:01*	*1*
4-Bromofluorobenzene (Surr)	*93*		*72 - 126*	*06/07/18 08:42*	*06/07/18 12:01*	*1*
Dibromofluoromethane (Surr)	*99*		*60 - 140*	*06/07/18 08:42*	*06/07/18 12:01*	*1*
Toluene-d8 (Surr)	*96*		*71 - 125*	*06/07/18 08:42*	*06/07/18 12:01*	*1*

Lab Sample ID: LCS 480-418340/1-A
Matrix: Solid
Analysis Batch: 418345

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	50.0	43.5		ug/Kg		87	77 - 121
1,1,2,2-Tetrachloroethane	50.0	49.9		ug/Kg		100	80 - 120
1,1,2-Trichloro-1,2,2-trifluoroethane	50.0	46.4		ug/Kg		93	60 - 140
1,1,2-Trichloroethane	50.0	48.5		ug/Kg		97	78 - 122
1,1-Dichloroethane	50.0	47.2		ug/Kg		94	73 - 126
1,1-Dichloroethene	50.0	46.1		ug/Kg		92	59 - 125
1,2,4-Trichlorobenzene	50.0	43.3		ug/Kg		87	64 - 120
1,2,4-Trimethylbenzene	50.0	44.8		ug/Kg		90	74 - 120
1,2-Dibromo-3-Chloropropane	50.0	47.0		ug/Kg		94	63 - 124
1,2-Dibromoethane	50.0	49.0		ug/Kg		98	78 - 120
1,2-Dichlorobenzene	50.0	44.9		ug/Kg		90	75 - 120
1,2-Dichloroethane	50.0	46.9		ug/Kg		94	77 - 122
1,2-Dichloropropane	50.0	47.6		ug/Kg		95	75 - 124
1,3,5-Trimethylbenzene	50.0	45.1		ug/Kg		90	74 - 120
1,3-Dichlorobenzene	50.0	45.4		ug/Kg		91	74 - 120
1,4-Dichlorobenzene	50.0	45.0		ug/Kg		90	73 - 120
2-Butanone (MEK)	250	286		ug/Kg		114	70 - 134
2-Hexanone	250	267		ug/Kg		107	59 - 130
4-Isopropyltoluene	50.0	44.9		ug/Kg		90	74 - 120
4-Methyl-2-pentanone (MIBK)	250	256		ug/Kg		102	65 - 133
Acetone	250	279		ug/Kg		112	61 - 137
Benzene	50.0	47.7		ug/Kg		95	79 - 127

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 480-418340/1-A
Matrix: Solid
Analysis Batch: 418345

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418340

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromodichloromethane	50.0	48.2		ug/Kg		96	80 - 122
Bromoform	50.0	47.7		ug/Kg		95	68 - 126
Bromomethane	50.0	50.9		ug/Kg		102	37 - 149
Carbon disulfide	50.0	43.9		ug/Kg		88	64 - 131
Carbon tetrachloride	50.0	41.9		ug/Kg		84	75 - 135
Chlorobenzene	50.0	45.9		ug/Kg		92	76 - 124
Chloroethane	50.0	48.6		ug/Kg		97	69 - 135
Chloroform	50.0	46.6		ug/Kg		93	80 - 120
Chloromethane	50.0	48.1		ug/Kg		96	63 - 127
cis-1,2-Dichloroethene	50.0	47.2		ug/Kg		94	81 - 120
cis-1,3-Dichloropropene	50.0	47.6		ug/Kg		95	80 - 120
Cyclohexane	50.0	44.3		ug/Kg		89	65 - 120
Dibromochloromethane	50.0	47.4		ug/Kg		95	76 - 125
Dichlorodifluoromethane	50.0	45.9		ug/Kg		92	57 - 142
Ethylbenzene	50.0	45.5		ug/Kg		91	80 - 120
Isopropylbenzene	50.0	44.8		ug/Kg		90	72 - 120
m,p-Xylene	50.0	45.0		ug/Kg		90	70 - 130
Methyl acetate	100	109		ug/Kg		109	55 - 136
Methyl tert-butyl ether	50.0	47.7		ug/Kg		95	63 - 125
Methylcyclohexane	50.0	44.8		ug/Kg		90	60 - 140
Methylene Chloride	50.0	51.7		ug/Kg		103	61 - 127
Naphthalene	50.0	47.3		ug/Kg		95	38 - 137
n-Butylbenzene	50.0	44.7		ug/Kg		89	70 - 120
N-Propylbenzene	50.0	45.6		ug/Kg		91	70 - 130
o-Xylene	50.0	45.1		ug/Kg		90	70 - 130
sec-Butylbenzene	50.0	45.1		ug/Kg		90	74 - 120
Styrene	50.0	46.1		ug/Kg		92	80 - 120
tert-Butylbenzene	50.0	43.7		ug/Kg		87	73 - 120
Tetrachloroethene	50.0	43.6		ug/Kg		87	74 - 122
Toluene	50.0	45.1		ug/Kg		90	74 - 128
trans-1,2-Dichloroethene	50.0	46.7		ug/Kg		93	78 - 126
trans-1,3-Dichloropropene	50.0	46.4		ug/Kg		93	73 - 123
Trichloroethene	50.0	46.3		ug/Kg		93	77 - 129
Trichlorofluoromethane	50.0	50.0		ug/Kg		100	65 - 146
Vinyl chloride	50.0	48.6		ug/Kg		97	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*64 - 126*
4-Bromofluorobenzene (Surr)	*98*		*72 - 126*
Dibromofluoromethane (Surr)	*100*		*60 - 140*
Toluene-d8 (Surr)	*97*		*71 - 125*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-418456/1-A
Matrix: Solid
Analysis Batch: 419623

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418456

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		170	46	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,4,6-Trichlorophenol	ND		170	34	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,4-Dichlorophenol	ND		170	18	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,4-Dimethylphenol	ND		170	41	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,4-Dinitrophenol	ND		1700	780	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,4-Dinitrotoluene	ND		170	35	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2,6-Dinitrotoluene	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Chloronaphthalene	ND		170	28	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Chlorophenol	ND		170	31	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Methylnaphthalene	ND		170	34	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Methylphenol	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Nitroaniline	ND		330	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
2-Nitrophenol	ND		170	48	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
3,3'-Dichlorobenzidine	ND		330	200	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
3-Nitroaniline	ND		330	47	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4,6-Dinitro-2-methylphenol	ND		330	170	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Bromophenyl phenyl ether	ND		170	24	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Chloro-3-methylphenol	ND		170	42	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Chloroaniline	ND		170	42	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Chlorophenyl phenyl ether	ND		170	21	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Methylphenol	ND		330	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Nitroaniline	ND		330	89	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
4-Nitrophenol	ND		330	120	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Acenaphthene	ND		170	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Acenaphthylene	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Acetophenone	ND		170	23	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Anthracene	ND		170	42	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Atrazine	ND		170	59	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzaldehyde	ND		170	130	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzo[a]anthracene	ND		170	17	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzo[a]pyrene	ND		170	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzo[b]fluoranthene	ND		170	27	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzo[g,h,i]perylene	ND		170	18	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Benzo[k]fluoranthene	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Biphenyl	ND		170	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
bis (2-chloroisopropyl) ether	ND		170	34	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Bis(2-chloroethoxy)methane	ND		170	36	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Bis(2-chloroethyl)ether	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Bis(2-ethylhexyl) phthalate	ND		170	58	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Butyl benzyl phthalate	ND		170	28	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Caprolactam	ND		170	51	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Carbazole	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Chrysene	ND		170	38	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Dibenz(a,h)anthracene	ND		170	30	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Dibenzofuran	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Diethyl phthalate	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Dimethyl phthalate	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Di-n-butyl phthalate	ND		170	29	ug/Kg		06/07/18 14:08	06/14/18 16:53	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-418456/1-A
Matrix: Solid
Analysis Batch: 419623

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418456

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Di-n-octyl phthalate	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Fluoranthene	ND		170	18	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Fluorene	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Hexachlorobenzene	ND		170	23	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Hexachlorobutadiene	ND		170	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Hexachlorocyclopentadiene	ND		170	23	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Hexachloroethane	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Indeno[1,2,3-cd]pyrene	ND		170	21	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Isophorone	ND		170	36	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Naphthalene	ND		170	22	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Nitrobenzene	ND		170	19	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
N-Nitrosodi-n-propylamine	ND		170	29	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
N-Nitrosodiphenylamine	ND		170	140	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Pentachlorophenol	ND		330	170	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Phenanthrene	ND		170	25	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Phenol	ND		170	26	ug/Kg		06/07/18 14:08	06/14/18 16:53	1
Pyrene	ND		170	20	ug/Kg		06/07/18 14:08	06/14/18 16:53	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*06/07/18 14:08*	*06/14/18 16:53*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*82*		*54 - 120*	*06/07/18 14:08*	*06/14/18 16:53*	*1*
2-Fluorobiphenyl	*90*		*60 - 120*	*06/07/18 14:08*	*06/14/18 16:53*	*1*
2-Fluorophenol (Surr)	*71*		*52 - 120*	*06/07/18 14:08*	*06/14/18 16:53*	*1*
Nitrobenzene-d5 (Surr)	*95*		*53 - 120*	*06/07/18 14:08*	*06/14/18 16:53*	*1*
Phenol-d5 (Surr)	*83*		*54 - 120*	*06/07/18 14:08*	*06/14/18 16:53*	*1*
p-Terphenyl-d14 (Surr)	*121*		*65 - 121*	*06/07/18 14:08*	*06/14/18 16:53*	*1*

Lab Sample ID: LCS 480-418456/2-A
Matrix: Solid
Analysis Batch: 419623

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-Trichlorophenol	1660	1550		ug/Kg		94	59 - 126
2,4,6-Trichlorophenol	1660	1510		ug/Kg		91	59 - 123
2,4-Dichlorophenol	1660	1470		ug/Kg		89	61 - 120
2,4-Dimethylphenol	1660	1460		ug/Kg		88	59 - 120
2,4-Dinitrophenol	3310	2930		ug/Kg		89	41 - 146
2,4-Dinitrotoluene	1660	1650		ug/Kg		100	63 - 120
2,6-Dinitrotoluene	1660	1690		ug/Kg		102	66 - 120
2-Chloronaphthalene	1660	1260		ug/Kg		76	57 - 120
2-Chlorophenol	1660	1200		ug/Kg		72	53 - 120
2-Methylnaphthalene	1660	1550		ug/Kg		94	59 - 120
2-Methylphenol	1660	1280		ug/Kg		77	54 - 120
2-Nitroaniline	1660	1770		ug/Kg		107	61 - 120
2-Nitrophenol	1660	1370		ug/Kg		83	56 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-418456/2-A
Matrix: Solid
Analysis Batch: 419623

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
3,3'-Dichlorobenzidine	3310	2900		ug/Kg		87	54 - 120
3-Nitroaniline	1660	1320		ug/Kg		80	48 - 120
4,6-Dinitro-2-methylphenol	3310	3270		ug/Kg		99	49 - 122
4-Bromophenyl phenyl ether	1660	1670		ug/Kg		101	58 - 120
4-Chloro-3-methylphenol	1660	1570		ug/Kg		95	61 - 120
4-Chloroaniline	1660	1170		ug/Kg		70	38 - 120
4-Chlorophenyl phenyl ether	1660	1640		ug/Kg		99	63 - 124
4-Methylphenol	1660	1340		ug/Kg		81	55 - 120
4-Nitroaniline	1660	1470		ug/Kg		89	56 - 120
4-Nitrophenol	3310	4150		ug/Kg		126	43 - 147
Acenaphthene	1660	1500		ug/Kg		91	62 - 120
Acenaphthylene	1660	1310		ug/Kg		79	58 - 121
Acetophenone	1660	1340		ug/Kg		81	54 - 120
Anthracene	1660	1490		ug/Kg		90	62 - 120
Atrazine	3310	3950		ug/Kg		119	60 - 127
Benzaldehyde	3310	1370		ug/Kg		41	10 - 150
Benzo[a]anthracene	1660	1680		ug/Kg		102	65 - 120
Benzo[a]pyrene	1660	1640		ug/Kg		99	64 - 120
Benzo[b]fluoranthene	1660	1780		ug/Kg		107	64 - 120
Benzo[g,h,i]perylene	1660	1490		ug/Kg		90	45 - 145
Benzo[k]fluoranthene	1660	1650		ug/Kg		100	65 - 120
Biphenyl	1660	1410		ug/Kg		85	59 - 120
bis (2-chloroisopropyl) ether	1660	1560		ug/Kg		94	44 - 120
Bis(2-chloroethoxy)methane	1660	1250		ug/Kg		76	55 - 120
Bis(2-chloroethyl)ether	1660	1160		ug/Kg		70	45 - 120
Bis(2-ethylhexyl) phthalate	1660	1620		ug/Kg		98	61 - 133
Butyl benzyl phthalate	1660	1580		ug/Kg		95	61 - 129
Caprolactam	3310	3070		ug/Kg		93	47 - 120
Carbazole	1660	1470		ug/Kg		89	65 - 120
Chrysene	1660	1670		ug/Kg		101	64 - 120
Dibenz(a,h)anthracene	1660	1540		ug/Kg		93	54 - 132
Dibenzofuran	1660	1490		ug/Kg		90	63 - 120
Diethyl phthalate	1660	1640		ug/Kg		99	66 - 120
Dimethyl phthalate	1660	1540		ug/Kg		93	65 - 124
Di-n-butyl phthalate	1660	1560		ug/Kg		94	58 - 130
Di-n-octyl phthalate	1660	1540		ug/Kg		93	57 - 133
Fluoranthene	1660	1630		ug/Kg		98	62 - 120
Fluorene	1660	1500		ug/Kg		91	63 - 120
Hexachlorobenzene	1660	1630		ug/Kg		98	60 - 120
Hexachlorobutadiene	1660	1710		ug/Kg		103	45 - 120
Hexachlorocyclopentadiene	1660	1480		ug/Kg		89	47 - 120
Hexachloroethane	1660	1150		ug/Kg		69	41 - 120
Indeno[1,2,3-cd]pyrene	1660	1540		ug/Kg		93	56 - 134
Isophorone	1660	1500		ug/Kg		91	56 - 120
Naphthalene	1660	1270		ug/Kg		77	55 - 120
Nitrobenzene	1660	1420		ug/Kg		86	54 - 120
N-Nitrosodi-n-propylamine	1660	1380		ug/Kg		83	52 - 120
N-Nitrosodiphenylamine	1660	1480		ug/Kg		89	51 - 128

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-418456/2-A
Matrix: Solid
Analysis Batch: 419623

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	3310	3120		ug/Kg		94	51 - 120
Phenanthrene	1660	1420		ug/Kg		86	60 - 120
Phenol	1660	1190		ug/Kg		72	53 - 120
Pyrene	1660	1780		ug/Kg		107	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*101*		*54 - 120*
2-Fluorobiphenyl	*85*		*60 - 120*
2-Fluorophenol (Surr)	*70*		*52 - 120*
Nitrobenzene-d5 (Surr)	*86*		*53 - 120*
Phenol-d5 (Surr)	*76*		*54 - 120*
p-Terphenyl-d14 (Surr)	*121*		*65 - 121*

Lab Sample ID: 480-136903-21 MS
Matrix: Solid
Analysis Batch: 419382

Client Sample ID: SS-07 0"-2"
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-Trichlorophenol	ND		1980	1540	J	ug/Kg	☼	78	46 - 120
2,4,6-Trichlorophenol	ND		1980	2170	J	ug/Kg	☼	110	41 - 123
2,4-Dichlorophenol	ND	F2	1980	1470	J	ug/Kg	☼	74	45 - 120
2,4-Dimethylphenol	ND		1980	1600	J	ug/Kg	☼	81	52 - 120
2,4-Dinitrophenol	ND		3960	ND		ug/Kg	☼	NC	41 - 146
2,4-Dinitrotoluene	ND	F1	1980	ND	F1	ug/Kg	☼	0	63 - 125
2,6-Dinitrotoluene	ND	F1	1980	2580	J F1	ug/Kg	☼	130	66 - 120
2-Chloronaphthalene	ND		1980	1550	J	ug/Kg	☼	78	57 - 120
2-Chlorophenol	ND		1980	1300	J	ug/Kg	☼	66	43 - 120
2-Methylnaphthalene	ND		1980	1730	J	ug/Kg	☼	87	55 - 120
2-Methylphenol	ND	F2	1980	1690	J	ug/Kg	☼	86	48 - 120
2-Nitroaniline	ND	F1	1980	2550	J F1	ug/Kg	☼	129	61 - 120
2-Nitrophenol	ND		1980	1940	J	ug/Kg	☼	98	37 - 120
3,3'-Dichlorobenzidine	ND		3960	ND		ug/Kg	☼	NC	37 - 126
3-Nitroaniline	ND		1980	1690	J	ug/Kg	☼	86	48 - 120
4,6-Dinitro-2-methylphenol	ND		3960	5070	J	ug/Kg	☼	NC	23 - 149
4-Bromophenyl phenyl ether	ND	F2	1980	1930	J	ug/Kg	☼	98	58 - 120
4-Chloro-3-methylphenol	ND		1980	1370	J	ug/Kg	☼	69	49 - 125
4-Chloroaniline	ND		1980	1130	J	ug/Kg	☼	57	38 - 120
4-Chlorophenyl phenyl ether	ND		1980	2130	J	ug/Kg	☼	108	63 - 124
4-Methylphenol	ND		1980	1570	J	ug/Kg	☼	79	50 - 120
4-Nitroaniline	ND		1980	ND		ug/Kg	☼	NC	47 - 120
4-Nitrophenol	ND		3960	4260	J	ug/Kg	☼	108	31 - 147
Acenaphthene	ND		1980	1930	J	ug/Kg	☼	98	60 - 120
Acenaphthylene	ND		1980	1610	J	ug/Kg	☼	81	58 - 121
Acetophenone	ND		1980	1330	J	ug/Kg	☼	67	47 - 120
Anthracene	ND		1980	2000	J	ug/Kg	☼	101	62 - 120
Atrazine	ND		3960	4480		ug/Kg	☼	113	60 - 150
Benzaldehyde	ND	F1	3960	ND	F1	ug/Kg	☼	0	10 - 150
Benzo[a]anthracene	1800	J	1980	3840	J	ug/Kg	☼	101	65 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-21 MS
Matrix: Solid
Analysis Batch: 419382

Client Sample ID: SS-07 0"-2"
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzo[a]pyrene	2100	J	1980	3500	J	ug/Kg	☼	70	64 - 120
Benzo[b]fluoranthene	2900	J F2 F1	1980	4120	F1	ug/Kg	☼	62	64 - 120
Benzo[g,h,i]perylene	1700	J	1980	3400	J	ug/Kg	☼	85	45 - 145
Benzo[k]fluoranthene	910	J	1980	3060	J	ug/Kg	☼	108	65 - 120
Biphenyl	ND		1980	1600	J	ug/Kg	☼	81	58 - 120
bis (2-chloroisopropyl) ether	ND		1980	1680	J	ug/Kg	☼	85	31 - 120
Bis(2-chloroethoxy)methane	ND		1980	1470	J	ug/Kg	☼	74	52 - 120
Bis(2-chloroethyl)ether	ND		1980	1300	J	ug/Kg	☼	65	45 - 120
Bis(2-ethylhexyl) phthalate	ND		1980	2330	J	ug/Kg	☼	118	61 - 133
Butyl benzyl phthalate	ND	F2	1980	1910	J	ug/Kg	☼	96	61 - 120
Caprolactam	ND	F2	3960	2870	J	ug/Kg	☼	73	37 - 133
Carbazole	ND		1980	1790	J	ug/Kg	☼	90	59 - 120
Chrysene	2100	J F1	1980	3610	J	ug/Kg	☼	74	64 - 120
Dibenz(a,h)anthracene	ND		1980	2340	J	ug/Kg	☼	118	54 - 132
Dibenzofuran	ND		1980	1750	J	ug/Kg	☼	88	62 - 120
Diethyl phthalate	ND		1980	1890	J	ug/Kg	☼	96	66 - 120
Dimethyl phthalate	ND		1980	1730	J	ug/Kg	☼	87	65 - 124
Di-n-butyl phthalate	ND		1980	1660	J	ug/Kg	☼	84	58 - 130
Di-n-octyl phthalate	ND		1980	2170	J	ug/Kg	☼	110	57 - 133
Fluoranthene	3400	J	1980	5160		ug/Kg	☼	91	62 - 120
Fluorene	ND		1980	1830	J	ug/Kg	☼	93	63 - 120
Hexachlorobenzene	ND		1980	1780	J	ug/Kg	☼	90	60 - 120
Hexachlorobutadiene	ND	F1	1980	2450	J F1	ug/Kg	☼	124	45 - 120
Hexachlorocyclopentadiene	ND		1980	1180	J	ug/Kg	☼	59	31 - 120
Hexachloroethane	ND		1980	1570	J	ug/Kg	☼	79	21 - 120
Indeno[1,2,3-cd]pyrene	1200	J	1980	2940	J	ug/Kg	☼	85	56 - 134
Isophorone	ND		1980	1520	J	ug/Kg	☼	77	56 - 120
Naphthalene	ND	F2	1980	1700	J	ug/Kg	☼	86	46 - 120
Nitrobenzene	ND		1980	1500	J	ug/Kg	☼	76	49 - 120
N-Nitrosodi-n-propylamine	ND		1980	1460	J	ug/Kg	☼	74	46 - 120
N-Nitrosodiphenylamine	ND		1980	ND		ug/Kg	☼	NC	20 - 128
Pentachlorophenol	ND		3960	4160	J	ug/Kg	☼	NC	25 - 136
Phenanthrene	1700	J	1980	3240	J	ug/Kg	☼	78	60 - 122
Phenol	ND		1980	1420	J	ug/Kg	☼	72	50 - 120
Pyrene	3500	J	1980	4920		ug/Kg	☼	73	61 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*90*		*54 - 120*
2-Fluorobiphenyl	*89*		*60 - 120*
2-Fluorophenol (Surr)	*70*		*52 - 120*
Nitrobenzene-d5 (Surr)	*92*		*53 - 120*
Phenol-d5 (Surr)	*65*		*54 - 120*
p-Terphenyl-d14 (Surr)	*102*		*65 - 121*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-21 MSD
Matrix: Solid
Analysis Batch: 419382

Client Sample ID: SS-07 0"-2"
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,5-Trichlorophenol	ND		1980	1660	J	ug/Kg	☼	84	46 - 120	8	18
2,4,6-Trichlorophenol	ND		1980	1990	J	ug/Kg	☼	100	41 - 123	9	19
2,4-Dichlorophenol	ND	F2	1980	1790	J F2	ug/Kg	☼	90	45 - 120	20	19
2,4-Dimethylphenol	ND		1980	1440	J	ug/Kg	☼	72	52 - 120	11	42
2,4-Dinitrophenol	ND		3970	ND		ug/Kg	☼	NC	41 - 146	NC	22
2,4-Dinitrotoluene	ND	F1	1980	2570	J F1	ug/Kg	☼	130	63 - 125	NC	20
2,6-Dinitrotoluene	ND	F1	1980	2580	J F1	ug/Kg	☼	130	66 - 120	0	15
2-Chloronaphthalene	ND		1980	1570	J	ug/Kg	☼	79	57 - 120	1	21
2-Chlorophenol	ND		1980	1470	J	ug/Kg	☼	74	43 - 120	12	25
2-Methylnaphthalene	ND		1980	1760	J	ug/Kg	☼	89	55 - 120	2	21
2-Methylphenol	ND	F2	1980	1110	J F2	ug/Kg	☼	56	48 - 120	41	27
2-Nitroaniline	ND	F1	1980	2360	J	ug/Kg	☼	119	61 - 120	8	15
2-Nitrophenol	ND		1980	2110	J	ug/Kg	☼	106	37 - 120	8	18
3,3'-Dichlorobenzidine	ND		3970	ND		ug/Kg	☼	NC	37 - 126	NC	25
3-Nitroaniline	ND		1980	1570	J	ug/Kg	☼	79	48 - 120	8	19
4,6-Dinitro-2-methylphenol	ND		3970	4620	J	ug/Kg	☼	NC	23 - 149	9	15
4-Bromophenyl phenyl ether	ND	F2	1980	1520	J F2	ug/Kg	☼	77	58 - 120	24	15
4-Chloro-3-methylphenol	ND		1980	1640	J	ug/Kg	☼	83	49 - 125	18	27
4-Chloroaniline	ND		1980	1270	J	ug/Kg	☼	64	38 - 120	11	22
4-Chlorophenyl phenyl ether	ND		1980	1830	J	ug/Kg	☼	92	63 - 124	15	16
4-Methylphenol	ND		1980	1580	J	ug/Kg	☼	80	50 - 120	1	24
4-Nitroaniline	ND		1980	2220	J	ug/Kg	☼	NC	47 - 120	NC	24
4-Nitrophenol	ND		3970	4840	J	ug/Kg	☼	122	31 - 147	13	25
Acenaphthene	ND		1980	1950	J	ug/Kg	☼	99	60 - 120	1	35
Acenaphthylene	ND		1980	1760	J	ug/Kg	☼	89	58 - 121	9	18
Acetophenone	ND		1980	1390	J	ug/Kg	☼	70	47 - 120	4	20
Anthracene	ND		1980	1950	J	ug/Kg	☼	98	62 - 120	3	15
Atrazine	ND		3970	4950		ug/Kg	☼	125	60 - 150	10	20
Benzaldehyde	ND	F1	3970	ND	F1	ug/Kg	☼	0	10 - 150	NC	20
Benzo[a]anthracene	1800	J	1980	3680	J	ug/Kg	☼	93	65 - 120	4	15
Benzo[a]pyrene	2100	J	1980	3600	J	ug/Kg	☼	74	64 - 120	3	15
Benzo[b]fluoranthene	2900	J F2 F1	1980	3250	J F2 F1	ug/Kg	☼	19	64 - 120	23	15
Benzo[g,h,i]perylene	1700	J	1980	3290	J	ug/Kg	☼	79	45 - 145	3	15
Benzo[k]fluoranthene	910	J	1980	3010	J	ug/Kg	☼	106	65 - 120	2	22
Biphenyl	ND		1980	1780	J	ug/Kg	☼	90	58 - 120	11	20
bis (2-chloroisopropyl) ether	ND		1980	1580	J	ug/Kg	☼	80	31 - 120	7	24
Bis(2-chloroethoxy)methane	ND		1980	1360	J	ug/Kg	☼	68	52 - 120	8	17
Bis(2-chloroethyl)ether	ND		1980	1260	J	ug/Kg	☼	63	45 - 120	3	21
Bis(2-ethylhexyl) phthalate	ND		1980	2560	J	ug/Kg	☼	129	61 - 133	9	15
Butyl benzyl phthalate	ND	F2	1980	2280	J F2	ug/Kg	☼	115	61 - 120	18	16
Caprolactam	ND	F2	3970	3980	J F2	ug/Kg	☼	100	37 - 133	32	20
Carbazole	ND		1980	1670	J	ug/Kg	☼	84	59 - 120	7	20
Chrysene	2100	J F1	1980	3270	J F1	ug/Kg	☼	57	64 - 120	10	15
Dibenz(a,h)anthracene	ND		1980	2320	J	ug/Kg	☼	117	54 - 132	1	15
Dibenzofuran	ND		1980	1530	J	ug/Kg	☼	77	62 - 120	13	15
Diethyl phthalate	ND		1980	1750	J	ug/Kg	☼	88	66 - 120	8	15
Dimethyl phthalate	ND		1980	1570	J	ug/Kg	☼	79	65 - 124	10	15
Di-n-butyl phthalate	ND		1980	1580	J	ug/Kg	☼	80	58 - 130	5	15

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-21 MSD
Matrix: Solid
Analysis Batch: 419382

Client Sample ID: SS-07 0"-2"
Prep Type: Total/NA
Prep Batch: 418456

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Di-n-octyl phthalate	ND		1980	2150	J	ug/Kg	☼	108	57 - 133	1	16
Fluoranthene	3400	J	1980	5100		ug/Kg	☼	88	62 - 120	1	15
Fluorene	ND		1980	1770	J	ug/Kg	☼	89	63 - 120	3	15
Hexachlorobenzene	ND		1980	1690	J	ug/Kg	☼	85	60 - 120	5	15
Hexachlorobutadiene	ND	F1	1980	2180	J	ug/Kg	☼	110	45 - 120	12	44
Hexachlorocyclopentadiene	ND		1980	1000	J	ug/Kg	☼	51	31 - 120	16	49
Hexachloroethane	ND		1980	1350	J	ug/Kg	☼	68	21 - 120	15	46
Indeno[1,2,3-cd]pyrene	1200	J	1980	3020	J	ug/Kg	☼	89	56 - 134	3	15
Isophorone	ND		1980	1710	J	ug/Kg	☼	86	56 - 120	12	17
Naphthalene	ND	F2	1980	1240	J F2	ug/Kg	☼	62	46 - 120	31	29
Nitrobenzene	ND		1980	1530	J	ug/Kg	☼	77	49 - 120	2	24
N-Nitrosodi-n-propylamine	ND		1980	1630	J	ug/Kg	☼	82	46 - 120	11	31
N-Nitrosodiphenylamine	ND		1980	ND		ug/Kg	☼	NC	20 - 128	NC	15
Pentachlorophenol	ND		3970	ND		ug/Kg	☼	NC	25 - 136	NC	35
Phenanthrene	1700	J	1980	3250	J	ug/Kg	☼	78	60 - 122	0	15
Phenol	ND		1980	1230	J	ug/Kg	☼	62	50 - 120	14	35
Pyrene	3500	J	1980	4800		ug/Kg	☼	66	61 - 133	2	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*102*		*54 - 120*
2-Fluorobiphenyl	*75*		*60 - 120*
2-Fluorophenol (Surr)	*57*		*52 - 120*
Nitrobenzene-d5 (Surr)	*99*		*53 - 120*
Phenol-d5 (Surr)	*67*		*54 - 120*
p-Terphenyl-d14 (Surr)	*97*		*65 - 121*

Lab Sample ID: MB 480-418467/1-A
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418467

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		170	45	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,4,6-Trichlorophenol	ND		170	33	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,4-Dichlorophenol	ND		170	18	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,4-Dimethylphenol	ND		170	40	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,4-Dinitrophenol	ND		1600	770	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,4-Dinitrotoluene	ND		170	34	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2,6-Dinitrotoluene	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Chloronaphthalene	ND		170	28	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Chlorophenol	ND		170	30	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Methylnaphthalene	ND		170	33	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Methylphenol	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Nitroaniline	ND		320	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
2-Nitrophenol	ND		170	47	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
3,3'-Dichlorobenzidine	ND		320	200	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
3-Nitroaniline	ND		320	46	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4,6-Dinitro-2-methylphenol	ND		320	170	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Bromophenyl phenyl ether	ND		170	24	ug/Kg		06/07/18 14:15	06/12/18 16:47	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-418467/1-A
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418467

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Chloro-3-methylphenol	ND		170	41	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Chloroaniline	ND		170	41	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Chlorophenyl phenyl ether	ND		170	21	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Methylphenol	ND		320	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Nitroaniline	ND		320	88	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
4-Nitrophenol	ND		320	120	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Acenaphthene	ND		170	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Acenaphthylene	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Acetophenone	ND		170	23	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Anthracene	ND		170	41	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Atrazine	ND		170	58	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzaldehyde	ND		170	130	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzo[a]anthracene	ND		170	17	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzo[a]pyrene	ND		170	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzo[b]fluoranthene	ND		170	27	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzo[g,h,i]perylene	ND		170	18	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Benzo[k]fluoranthene	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Biphenyl	ND		170	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
bis (2-chloroisopropyl) ether	ND		170	33	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Bis(2-chloroethoxy)methane	ND		170	35	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Bis(2-chloroethyl)ether	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Bis(2-ethylhexyl) phthalate	ND		170	57	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Butyl benzyl phthalate	ND		170	28	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Caprolactam	ND		170	50	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Carbazole	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Chrysene	ND		170	37	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Dibenz(a,h)anthracene	ND		170	30	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Dibenzofuran	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Diethyl phthalate	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Dimethyl phthalate	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Di-n-butyl phthalate	ND		170	29	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Di-n-octyl phthalate	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Fluoranthene	ND		170	18	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Fluorene	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Hexachlorobenzene	ND		170	23	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Hexachlorobutadiene	ND		170	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Hexachlorocyclopentadiene	ND		170	23	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Hexachloroethane	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Indeno[1,2,3-cd]pyrene	ND		170	21	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Isophorone	ND		170	35	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Naphthalene	ND		170	22	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Nitrobenzene	ND		170	19	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
N-Nitrosodi-n-propylamine	ND		170	29	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
N-Nitrosodiphenylamine	ND		170	140	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Pentachlorophenol	ND		320	170	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Phenanthrene	ND		170	25	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Phenol	ND		170	26	ug/Kg		06/07/18 14:15	06/12/18 16:47	1
Pyrene	ND		170	20	ug/Kg		06/07/18 14:15	06/12/18 16:47	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-418467/1-A
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418467

Tentatively Identified Compound	MB Est. Result	MB Qualifier	Unit	D	RT	CAS No.	Prepared	Analyzed	Dil Fac
Unknown	4040	T J	ug/Kg		2.04		06/07/18 14:15	06/12/18 16:47	1
Unknown	901	T J	ug/Kg		4.54		06/07/18 14:15	06/12/18 16:47	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	88		54 - 120	06/07/18 14:15	06/12/18 16:47	1
2-Fluorobiphenyl	77		60 - 120	06/07/18 14:15	06/12/18 16:47	1
2-Fluorophenol (Surr)	69		52 - 120	06/07/18 14:15	06/12/18 16:47	1
Nitrobenzene-d5 (Surr)	84		53 - 120	06/07/18 14:15	06/12/18 16:47	1
Phenol-d5 (Surr)	74		54 - 120	06/07/18 14:15	06/12/18 16:47	1
p-Terphenyl-d14 (Surr)	110		65 - 121	06/07/18 14:15	06/12/18 16:47	1

Lab Sample ID: LCS 480-418467/2-A
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-Trichlorophenol	1670	1500		ug/Kg		90	59 - 126
2,4,6-Trichlorophenol	1670	1510		ug/Kg		90	59 - 123
2,4-Dichlorophenol	1670	1470		ug/Kg		88	61 - 120
2,4-Dimethylphenol	1670	1470		ug/Kg		88	59 - 120
2,4-Dinitrophenol	3330	2330		ug/Kg		70	41 - 146
2,4-Dinitrotoluene	1670	1610		ug/Kg		97	63 - 120
2,6-Dinitrotoluene	1670	1540		ug/Kg		93	66 - 120
2-Chloronaphthalene	1670	1320		ug/Kg		79	57 - 120
2-Chlorophenol	1670	1140		ug/Kg		68	53 - 120
2-Methylnaphthalene	1670	1540		ug/Kg		92	59 - 120
2-Methylphenol	1670	1180		ug/Kg		71	54 - 120
2-Nitroaniline	1670	1570		ug/Kg		94	61 - 120
2-Nitrophenol	1670	1330		ug/Kg		80	56 - 120
3,3'-Dichlorobenzidine	3330	2780		ug/Kg		83	54 - 120
3-Nitroaniline	1670	1340		ug/Kg		80	48 - 120
4,6-Dinitro-2-methylphenol	3330	2900		ug/Kg		87	49 - 122
4-Bromophenyl phenyl ether	1670	1520		ug/Kg		91	58 - 120
4-Chloro-3-methylphenol	1670	1460		ug/Kg		88	61 - 120
4-Chloroaniline	1670	1090		ug/Kg		66	38 - 120
4-Chlorophenyl phenyl ether	1670	1610		ug/Kg		97	63 - 124
4-Methylphenol	1670	1220		ug/Kg		73	55 - 120
4-Nitroaniline	1670	1260		ug/Kg		76	56 - 120
4-Nitrophenol	3330	3590		ug/Kg		108	43 - 147
Acenaphthene	1670	1520		ug/Kg		91	62 - 120
Acenaphthylene	1670	1280		ug/Kg		77	58 - 121
Acetophenone	1670	1230		ug/Kg		74	54 - 120
Anthracene	1670	1400		ug/Kg		84	62 - 120
Atrazine	3330	3540		ug/Kg		106	60 - 127
Benzaldehyde	3330	1200		ug/Kg		36	10 - 150
Benzo[a]anthracene	1670	1590		ug/Kg		95	65 - 120
Benzo[a]pyrene	1670	1530		ug/Kg		92	64 - 120

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-418467/2-A
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzo[b]fluoranthene	1670	1640		ug/Kg		99	64 - 120
Benzo[g,h,i]perylene	1670	1520		ug/Kg		91	45 - 145
Benzo[k]fluoranthene	1670	1520		ug/Kg		91	65 - 120
Biphenyl	1670	1440		ug/Kg		86	59 - 120
bis (2-chloroisopropyl) ether	1670	1350		ug/Kg		81	44 - 120
Bis(2-chloroethoxy)methane	1670	1330		ug/Kg		80	55 - 120
Bis(2-chloroethyl)ether	1670	1160		ug/Kg		70	45 - 120
Bis(2-ethylhexyl) phthalate	1670	1560		ug/Kg		93	61 - 133
Butyl benzyl phthalate	1670	1510		ug/Kg		91	61 - 129
Caprolactam	3330	2760		ug/Kg		83	47 - 120
Carbazole	1670	1350		ug/Kg		81	65 - 120
Chrysene	1670	1560		ug/Kg		93	64 - 120
Dibenz(a,h)anthracene	1670	1540		ug/Kg		93	54 - 132
Dibenzofuran	1670	1440		ug/Kg		86	63 - 120
Diethyl phthalate	1670	1490		ug/Kg		89	66 - 120
Dimethyl phthalate	1670	1400		ug/Kg		84	65 - 124
Di-n-butyl phthalate	1670	1390		ug/Kg		83	58 - 130
Di-n-octyl phthalate	1670	1470		ug/Kg		88	57 - 133
Fluoranthene	1670	1450		ug/Kg		87	62 - 120
Fluorene	1670	1460		ug/Kg		88	63 - 120
Hexachlorobenzene	1670	1540		ug/Kg		92	60 - 120
Hexachlorobutadiene	1670	1670		ug/Kg		100	45 - 120
Hexachlorocyclopentadiene	1670	1650		ug/Kg		99	47 - 120
Hexachloroethane	1670	1150		ug/Kg		69	41 - 120
Indeno[1,2,3-cd]pyrene	1670	1520		ug/Kg		91	56 - 134
Isophorone	1670	1460		ug/Kg		88	56 - 120
Naphthalene	1670	1330		ug/Kg		80	55 - 120
Nitrobenzene	1670	1500		ug/Kg		90	54 - 120
N-Nitrosodi-n-propylamine	1670	1240		ug/Kg		75	52 - 120
N-Nitrosodiphenylamine	1670	1410		ug/Kg		84	51 - 128
Pentachlorophenol	3330	2920		ug/Kg		87	51 - 120
Phenanthrene	1670	1380		ug/Kg		83	60 - 120
Phenol	1670	1100		ug/Kg		66	53 - 120
Pyrene	1670	1740		ug/Kg		105	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*91*		*54 - 120*
2-Fluorobiphenyl	*86*		*60 - 120*
2-Fluorophenol (Surr)	*65*		*52 - 120*
Nitrobenzene-d5 (Surr)	*87*		*53 - 120*
Phenol-d5 (Surr)	*69*		*54 - 120*
p-Terphenyl-d14 (Surr)	*117*		*65 - 121*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-4 MS
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: SS-01 2"-12"
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-Trichlorophenol	ND		1720	ND		ug/Kg	☼	NC	46 - 120
2,4,6-Trichlorophenol	ND		1720	ND		ug/Kg	☼	NC	41 - 123
2,4-Dichlorophenol	ND		1720	ND		ug/Kg	☼	NC	45 - 120
2,4-Dimethylphenol	ND		1720	ND		ug/Kg	☼	NC	52 - 120
2,4-Dinitrophenol	ND		3430	ND		ug/Kg	☼	NC	41 - 146
2,4-Dinitrotoluene	ND		1720	ND		ug/Kg	☼	NC	63 - 125
2,6-Dinitrotoluene	ND		1720	ND		ug/Kg	☼	NC	66 - 120
2-Chloronaphthalene	ND		1720	ND		ug/Kg	☼	NC	57 - 120
2-Chlorophenol	ND		1720	ND		ug/Kg	☼	NC	43 - 120
2-Methylnaphthalene	ND		1720	ND		ug/Kg	☼	NC	55 - 120
2-Methylphenol	ND		1720	ND		ug/Kg	☼	NC	48 - 120
2-Nitroaniline	ND		1720	ND		ug/Kg	☼	NC	61 - 120
2-Nitrophenol	ND		1720	ND		ug/Kg	☼	NC	37 - 120
3,3'-Dichlorobenzidine	ND		3430	ND		ug/Kg	☼	NC	37 - 126
3-Nitroaniline	ND		1720	ND		ug/Kg	☼	NC	48 - 120
4,6-Dinitro-2-methylphenol	ND		3430	ND		ug/Kg	☼	NC	23 - 149
4-Bromophenyl phenyl ether	ND		1720	ND		ug/Kg	☼	NC	58 - 120
4-Chloro-3-methylphenol	ND		1720	ND		ug/Kg	☼	NC	49 - 125
4-Chloroaniline	ND		1720	ND		ug/Kg	☼	NC	38 - 120
4-Chlorophenyl phenyl ether	ND		1720	ND		ug/Kg	☼	NC	63 - 124
4-Methylphenol	ND		1720	ND		ug/Kg	☼	NC	50 - 120
4-Nitroaniline	ND		1720	ND		ug/Kg	☼	NC	47 - 120
4-Nitrophenol	ND		3430	ND		ug/Kg	☼	NC	31 - 147
Acenaphthene	ND		1720	ND		ug/Kg	☼	NC	60 - 120
Acenaphthylene	ND		1720	ND		ug/Kg	☼	NC	58 - 121
Acetophenone	ND		1720	ND		ug/Kg	☼	NC	47 - 120
Anthracene	ND		1720	ND		ug/Kg	☼	NC	62 - 120
Atrazine	ND		3430	ND		ug/Kg	☼	NC	60 - 150
Benzaldehyde	ND		3430	ND		ug/Kg	☼	NC	10 - 150
Benzo[a]anthracene	ND		1720	ND		ug/Kg	☼	NC	65 - 120
Benzo[a]pyrene	13000	J F2	1720	16100	J	ug/Kg	☼	NC	64 - 120
Benzo[b]fluoranthene	16000	J F2	1720	17900	J 4	ug/Kg	☼	101	64 - 120
Benzo[g,h,i]perylene	ND		1720	10600	J	ug/Kg	☼	NC	45 - 145
Benzo[k]fluoranthene	ND		1720	8940	J	ug/Kg	☼	NC	65 - 120
Biphenyl	ND		1720	ND		ug/Kg	☼	NC	58 - 120
bis (2-chloroisopropyl) ether	ND		1720	ND		ug/Kg	☼	NC	31 - 120
Bis(2-chloroethoxy)methane	ND		1720	ND		ug/Kg	☼	NC	52 - 120
Bis(2-chloroethyl)ether	ND		1720	ND		ug/Kg	☼	NC	45 - 120
Bis(2-ethylhexyl) phthalate	ND		1720	ND		ug/Kg	☼	NC	61 - 133
Butyl benzyl phthalate	ND		1720	ND		ug/Kg	☼	NC	61 - 120
Caprolactam	ND		3430	ND		ug/Kg	☼	NC	37 - 133
Carbazole	ND		1720	ND		ug/Kg	☼	NC	59 - 120
Chrysene	ND		1720	13600	J	ug/Kg	☼	NC	64 - 120
Dibenz(a,h)anthracene	ND		1720	ND		ug/Kg	☼	NC	54 - 132
Dibenzofuran	ND		1720	ND		ug/Kg	☼	NC	62 - 120
Diethyl phthalate	ND		1720	ND		ug/Kg	☼	NC	66 - 120
Dimethyl phthalate	ND		1720	ND		ug/Kg	☼	NC	65 - 124
Di-n-butyl phthalate	ND		1720	ND		ug/Kg	☼	NC	58 - 130

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-4 MS
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: SS-01 2"-12"
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Di-n-octyl phthalate	ND		1720	ND		ug/Kg	☼	NC	57 - 133
Fluoranthene	ND	F2	1720	16500	J	ug/Kg	☼	NC	62 - 120
Fluorene	ND		1720	ND		ug/Kg	☼	NC	63 - 120
Hexachlorobenzene	ND		1720	ND		ug/Kg	☼	NC	60 - 120
Hexachlorobutadiene	ND		1720	ND		ug/Kg	☼	NC	45 - 120
Hexachlorocyclopentadiene	ND		1720	ND		ug/Kg	☼	NC	31 - 120
Hexachloroethane	ND		1720	ND		ug/Kg	☼	NC	21 - 120
Indeno[1,2,3-cd]pyrene	ND		1720	9790	J	ug/Kg	☼	NC	56 - 134
Isophorone	ND		1720	ND		ug/Kg	☼	NC	56 - 120
Naphthalene	ND		1720	ND		ug/Kg	☼	NC	46 - 120
Nitrobenzene	ND		1720	ND		ug/Kg	☼	NC	49 - 120
N-Nitrosodi-n-propylamine	ND		1720	ND		ug/Kg	☼	NC	46 - 120
N-Nitrosodiphenylamine	ND		1720	ND		ug/Kg	☼	NC	20 - 128
Pentachlorophenol	ND		3430	ND		ug/Kg	☼	NC	25 - 136
Phenanthrene	ND		1720	10200	J	ug/Kg	☼	NC	60 - 122
Phenol	ND		1720	ND		ug/Kg	☼	NC	50 - 120
Pyrene	ND	F2	1720	17600	J	ug/Kg	☼	NC	61 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*
2-Fluorobiphenyl	*0*	*X*	*60 - 120*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*

Lab Sample ID: 480-136903-4 MSD
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: SS-01 2"-12"
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,5-Trichlorophenol	ND		1750	ND		ug/Kg	☼	NC	46 - 120	NC	18
2,4,6-Trichlorophenol	ND		1750	ND		ug/Kg	☼	NC	41 - 123	NC	19
2,4-Dichlorophenol	ND		1750	ND		ug/Kg	☼	NC	45 - 120	NC	19
2,4-Dimethylphenol	ND		1750	ND		ug/Kg	☼	NC	52 - 120	NC	42
2,4-Dinitrophenol	ND		3500	ND		ug/Kg	☼	NC	41 - 146	NC	22
2,4-Dinitrotoluene	ND		1750	ND		ug/Kg	☼	NC	63 - 125	NC	20
2,6-Dinitrotoluene	ND		1750	ND		ug/Kg	☼	NC	66 - 120	NC	15
2-Chloronaphthalene	ND		1750	ND		ug/Kg	☼	NC	57 - 120	NC	21
2-Chlorophenol	ND		1750	ND		ug/Kg	☼	NC	43 - 120	NC	25
2-Methylnaphthalene	ND		1750	ND		ug/Kg	☼	NC	55 - 120	NC	21
2-Methylphenol	ND		1750	ND		ug/Kg	☼	NC	48 - 120	NC	27
2-Nitroaniline	ND		1750	ND		ug/Kg	☼	NC	61 - 120	NC	15
2-Nitrophenol	ND		1750	ND		ug/Kg	☼	NC	37 - 120	NC	18
3,3'-Dichlorobenzidine	ND		3500	ND		ug/Kg	☼	NC	37 - 126	NC	25
3-Nitroaniline	ND		1750	ND		ug/Kg	☼	NC	48 - 120	NC	19
4,6-Dinitro-2-methylphenol	ND		3500	ND		ug/Kg	☼	NC	23 - 149	NC	15
4-Bromophenyl phenyl ether	ND		1750	ND		ug/Kg	☼	NC	58 - 120	NC	15

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-4 MSD
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: SS-01 2"-12"
Prep Type: Total/NA
Prep Batch: 418467

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4-Chloro-3-methylphenol	ND		1750	ND		ug/Kg	☼	NC	49 - 125	NC	27
4-Chloroaniline	ND		1750	ND		ug/Kg	☼	NC	38 - 120	NC	22
4-Chlorophenyl phenyl ether	ND		1750	ND		ug/Kg	☼	NC	63 - 124	NC	16
4-Methylphenol	ND		1750	ND		ug/Kg	☼	NC	50 - 120	NC	24
4-Nitroaniline	ND		1750	ND		ug/Kg	☼	NC	47 - 120	NC	24
4-Nitrophenol	ND		3500	ND		ug/Kg	☼	NC	31 - 147	NC	25
Acenaphthene	ND		1750	ND		ug/Kg	☼	NC	60 - 120	NC	35
Acenaphthylene	ND		1750	ND		ug/Kg	☼	NC	58 - 121	NC	18
Acetophenone	ND		1750	ND		ug/Kg	☼	NC	47 - 120	NC	20
Anthracene	ND		1750	ND		ug/Kg	☼	NC	62 - 120	NC	15
Atrazine	ND		3500	ND		ug/Kg	☼	NC	60 - 150	NC	20
Benzaldehyde	ND		3500	ND		ug/Kg	☼	NC	10 - 150	NC	20
Benzo[a]anthracene	ND		1750	ND		ug/Kg	☼	NC	65 - 120	NC	15
Benzo[a]pyrene	13000	J F2	1750	7710	J F2	ug/Kg	☼	NC	64 - 120	71	15
Benzo[b]fluoranthene	16000	J F2	1750	9390	J 4 F2	ug/Kg	☼	-385	64 - 120	62	15
Benzo[g,h,i]perylene	ND		1750	ND		ug/Kg	☼	NC	45 - 145	NC	15
Benzo[k]fluoranthene	ND		1750	ND		ug/Kg	☼	NC	65 - 120	NC	22
Biphenyl	ND		1750	ND		ug/Kg	☼	NC	58 - 120	NC	20
bis (2-chloroisopropyl) ether	ND		1750	ND		ug/Kg	☼	NC	31 - 120	NC	24
Bis(2-chloroethoxy)methane	ND		1750	ND		ug/Kg	☼	NC	52 - 120	NC	17
Bis(2-chloroethyl)ether	ND		1750	ND		ug/Kg	☼	NC	45 - 120	NC	21
Bis(2-ethylhexyl) phthalate	ND		1750	ND		ug/Kg	☼	NC	61 - 133	NC	15
Butyl benzyl phthalate	ND		1750	ND		ug/Kg	☼	NC	61 - 120	NC	16
Caprolactam	ND		3500	ND		ug/Kg	☼	NC	37 - 133	NC	20
Carbazole	ND		1750	ND		ug/Kg	☼	NC	59 - 120	NC	20
Chrysene	ND		1750	ND		ug/Kg	☼	NC	64 - 120	NC	15
Dibenz(a,h)anthracene	ND		1750	ND		ug/Kg	☼	NC	54 - 132	NC	15
Dibenzofuran	ND		1750	ND		ug/Kg	☼	NC	62 - 120	NC	15
Diethyl phthalate	ND		1750	ND		ug/Kg	☼	NC	66 - 120	NC	15
Dimethyl phthalate	ND		1750	ND		ug/Kg	☼	NC	65 - 124	NC	15
Di-n-butyl phthalate	ND		1750	ND		ug/Kg	☼	NC	58 - 130	NC	15
Di-n-octyl phthalate	ND		1750	ND		ug/Kg	☼	NC	57 - 133	NC	16
Fluoranthene	ND	F2	1750	7130	J F2	ug/Kg	☼	NC	62 - 120	79	15
Fluorene	ND		1750	ND		ug/Kg	☼	NC	63 - 120	NC	15
Hexachlorobenzene	ND		1750	ND		ug/Kg	☼	NC	60 - 120	NC	15
Hexachlorobutadiene	ND		1750	ND		ug/Kg	☼	NC	45 - 120	NC	44
Hexachlorocyclopentadiene	ND		1750	ND		ug/Kg	☼	NC	31 - 120	NC	49
Hexachloroethane	ND		1750	ND		ug/Kg	☼	NC	21 - 120	NC	46
Indeno[1,2,3-cd]pyrene	ND		1750	ND		ug/Kg	☼	NC	56 - 134	NC	15
Isophorone	ND		1750	ND		ug/Kg	☼	NC	56 - 120	NC	17
Naphthalene	ND		1750	ND		ug/Kg	☼	NC	46 - 120	NC	29
Nitrobenzene	ND		1750	ND		ug/Kg	☼	NC	49 - 120	NC	24
N-Nitrosodi-n-propylamine	ND		1750	ND		ug/Kg	☼	NC	46 - 120	NC	31
N-Nitrosodiphenylamine	ND		1750	ND		ug/Kg	☼	NC	20 - 128	NC	15
Pentachlorophenol	ND		3500	ND		ug/Kg	☼	NC	25 - 136	NC	35
Phenanthrene	ND		1750	ND		ug/Kg	☼	NC	60 - 122	NC	15
Phenol	ND		1750	ND		ug/Kg	☼	NC	50 - 120	NC	35
Pyrene	ND	F2	1750	7570	J F2	ug/Kg	☼	NC	61 - 133	79	35

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 480-136903-4 MSD
Matrix: Solid
Analysis Batch: 419187

Client Sample ID: SS-01 2"-12"
Prep Type: Total/NA
Prep Batch: 418467

Surrogate	MSD %Recovery	MSD Qualifier	Limits
2,4,6-Tribromophenol (Surr)	*0*	*X*	*54 - 120*
2-Fluorobiphenyl	*0*	*X*	*60 - 120*
2-Fluorophenol (Surr)	*0*	*X*	*52 - 120*
Nitrobenzene-d5 (Surr)	*0*	*X*	*53 - 120*
Phenol-d5 (Surr)	*0*	*X*	*54 - 120*
p-Terphenyl-d14 (Surr)	*0*	*X*	*65 - 121*

Lab Sample ID: MB 480-418982/1-A
Matrix: Solid
Analysis Batch: 419893

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418982

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		170	46	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,4,6-Trichlorophenol	ND		170	34	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,4-Dichlorophenol	ND		170	18	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,4-Dimethylphenol	ND		170	41	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,4-Dinitrophenol	ND		1600	780	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,4-Dinitrotoluene	ND		170	35	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2,6-Dinitrotoluene	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Chloronaphthalene	ND		170	28	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Chlorophenol	ND		170	31	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Methylnaphthalene	ND		170	34	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Methylphenol	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Nitroaniline	ND		330	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
2-Nitrophenol	ND		170	48	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
3,3'-Dichlorobenzidine	ND		330	200	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
3-Nitroaniline	ND		330	47	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4,6-Dinitro-2-methylphenol	ND		330	170	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Bromophenyl phenyl ether	ND		170	24	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Chloro-3-methylphenol	ND		170	42	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Chloroaniline	ND		170	42	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Chlorophenyl phenyl ether	ND		170	21	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Methylphenol	ND		330	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Nitroaniline	ND		330	88	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
4-Nitrophenol	ND		330	120	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Acenaphthene	ND		170	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Acenaphthylene	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Acetophenone	ND		170	23	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Anthracene	ND		170	42	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Atrazine	ND		170	58	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzaldehyde	ND		170	130	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzo[a]anthracene	ND		170	17	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzo[a]pyrene	ND		170	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzo[b]fluoranthene	ND		170	27	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzo[g,h,i]perylene	ND		170	18	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Benzo[k]fluoranthene	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Biphenyl	ND		170	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
bis (2-chloroisopropyl) ether	ND		170	34	ug/Kg		06/11/18 14:15	06/15/18 22:02	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-418982/1-A
Matrix: Solid
Analysis Batch: 419893

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418982

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-chloroethoxy)methane	ND		170	36	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Bis(2-chloroethyl)ether	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Bis(2-ethylhexyl) phthalate	ND		170	57	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Butyl benzyl phthalate	ND		170	28	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Caprolactam	ND		170	51	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Carbazole	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Chrysene	ND		170	38	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Dibenz(a,h)anthracene	ND		170	30	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Dibenzofuran	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Diethyl phthalate	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Dimethyl phthalate	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Di-n-butyl phthalate	ND		170	29	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Di-n-octyl phthalate	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Fluoranthene	ND		170	18	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Fluorene	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Hexachlorobenzene	ND		170	23	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Hexachlorobutadiene	ND		170	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Hexachlorocyclopentadiene	ND		170	23	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Hexachloroethane	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Indeno[1,2,3-cd]pyrene	ND		170	21	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Isophorone	ND		170	36	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Naphthalene	ND		170	22	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Nitrobenzene	ND		170	19	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
N-Nitrosodi-n-propylamine	ND		170	29	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
N-Nitrosodiphenylamine	ND		170	140	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Pentachlorophenol	ND		330	170	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Phenanthrene	ND		170	25	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Phenol	ND		170	26	ug/Kg		06/11/18 14:15	06/15/18 22:02	1
Pyrene	ND		170	20	ug/Kg		06/11/18 14:15	06/15/18 22:02	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Tentatively Identified Compound	*None*		*ug/Kg*				*06/11/18 14:15*	*06/15/18 22:02*	*1*

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*86*		*54 - 120*	*06/11/18 14:15*	*06/15/18 22:02*	*1*
2-Fluorobiphenyl	*102*		*60 - 120*	*06/11/18 14:15*	*06/15/18 22:02*	*1*
2-Fluorophenol (Surr)	*93*		*52 - 120*	*06/11/18 14:15*	*06/15/18 22:02*	*1*
Nitrobenzene-d5 (Surr)	*95*		*53 - 120*	*06/11/18 14:15*	*06/15/18 22:02*	*1*
Phenol-d5 (Surr)	*97*		*54 - 120*	*06/11/18 14:15*	*06/15/18 22:02*	*1*
p-Terphenyl-d14 (Surr)	*132*	*X*	*65 - 121*	*06/11/18 14:15*	*06/15/18 22:02*	*1*

Lab Sample ID: LCS 480-418982/2-A
Matrix: Solid
Analysis Batch: 419893

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418982

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-Trichlorophenol	1660	1530		ug/Kg		92	59 - 126

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-418982/2-A
Matrix: Solid
Analysis Batch: 419893

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418982

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,6-Trichlorophenol	1660	1550		ug/Kg		93	59 - 123
2,4-Dichlorophenol	1660	1440		ug/Kg		86	61 - 120
2,4-Dimethylphenol	1660	1440		ug/Kg		87	59 - 120
2,4-Dinitrophenol	3330	2740		ug/Kg		82	41 - 146
2,4-Dinitrotoluene	1660	1610		ug/Kg		97	63 - 120
2,6-Dinitrotoluene	1660	1590		ug/Kg		95	66 - 120
2-Chloronaphthalene	1660	1510		ug/Kg		91	57 - 120
2-Chlorophenol	1660	1330		ug/Kg		80	53 - 120
2-Methylnaphthalene	1660	1410		ug/Kg		85	59 - 120
2-Methylphenol	1660	1410		ug/Kg		85	54 - 120
2-Nitroaniline	1660	1610		ug/Kg		97	61 - 120
2-Nitrophenol	1660	1380		ug/Kg		83	56 - 120
3,3'-Dichlorobenzidine	3330	2890		ug/Kg		87	54 - 120
3-Nitroaniline	1660	1400		ug/Kg		84	48 - 120
4,6-Dinitro-2-methylphenol	3330	3130		ug/Kg		94	49 - 122
4-Bromophenyl phenyl ether	1660	1670		ug/Kg		101	58 - 120
4-Chloro-3-methylphenol	1660	1540		ug/Kg		92	61 - 120
4-Chloroaniline	1660	1250		ug/Kg		75	38 - 120
4-Chlorophenyl phenyl ether	1660	1580		ug/Kg		95	63 - 124
4-Methylphenol	1660	1380		ug/Kg		83	55 - 120
4-Nitroaniline	1660	1530		ug/Kg		92	56 - 120
4-Nitrophenol	3330	3250		ug/Kg		98	43 - 147
Acenaphthene	1660	1550		ug/Kg		93	62 - 120
Acenaphthylene	1660	1530		ug/Kg		92	58 - 121
Acetophenone	1660	1380		ug/Kg		83	54 - 120
Anthracene	1660	1700		ug/Kg		102	62 - 120
Atrazine	3330	3380		ug/Kg		102	60 - 127
Benzaldehyde	3330	1100		ug/Kg		33	10 - 150
Benzo[a]anthracene	1660	1620		ug/Kg		97	65 - 120
Benzo[a]pyrene	1660	1690		ug/Kg		102	64 - 120
Benzo[b]fluoranthene	1660	1580		ug/Kg		95	64 - 120
Benzo[g,h,i]perylene	1660	1660		ug/Kg		100	45 - 145
Benzo[k]fluoranthene	1660	1730		ug/Kg		104	65 - 120
Biphenyl	1660	1530		ug/Kg		92	59 - 120
bis (2-chloroisopropyl) ether	1660	1260		ug/Kg		76	44 - 120
Bis(2-chloroethoxy)methane	1660	1400		ug/Kg		84	55 - 120
Bis(2-chloroethyl)ether	1660	1340		ug/Kg		81	45 - 120
Bis(2-ethylhexyl) phthalate	1660	1630		ug/Kg		98	61 - 133
Butyl benzyl phthalate	1660	1680		ug/Kg		101	61 - 129
Caprolactam	3330	3040		ug/Kg		92	47 - 120
Carbazole	1660	1660		ug/Kg		100	65 - 120
Chrysene	1660	1700		ug/Kg		102	64 - 120
Dibenz(a,h)anthracene	1660	1640		ug/Kg		98	54 - 132
Dibenzofuran	1660	1580		ug/Kg		95	63 - 120
Diethyl phthalate	1660	1590		ug/Kg		96	66 - 120
Dimethyl phthalate	1660	1650		ug/Kg		99	65 - 124
Di-n-butyl phthalate	1660	1650		ug/Kg		99	58 - 130
Di-n-octyl phthalate	1660	1610		ug/Kg		97	57 - 133

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-418982/2-A
Matrix: Solid
Analysis Batch: 419893

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418982

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoranthene	1660	1660		ug/Kg		100	62 - 120
Fluorene	1660	1600		ug/Kg		96	63 - 120
Hexachlorobenzene	1660	1630		ug/Kg		98	60 - 120
Hexachlorobutadiene	1660	1370		ug/Kg		82	45 - 120
Hexachlorocyclopentadiene	1660	1310		ug/Kg		79	47 - 120
Hexachloroethane	1660	1240		ug/Kg		74	41 - 120
Indeno[1,2,3-cd]pyrene	1660	1630		ug/Kg		98	56 - 134
Isophorone	1660	1460		ug/Kg		88	56 - 120
Naphthalene	1660	1400		ug/Kg		84	55 - 120
Nitrobenzene	1660	1360		ug/Kg		82	54 - 120
N-Nitrosodi-n-propylamine	1660	1380		ug/Kg		83	52 - 120
N-Nitrosodiphenylamine	1660	1690		ug/Kg		101	51 - 128
Pentachlorophenol	3330	3110		ug/Kg		94	51 - 120
Phenanthrene	1660	1650		ug/Kg		99	60 - 120
Phenol	1660	1400		ug/Kg		84	53 - 120
Pyrene	1660	1730		ug/Kg		104	61 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*99*		*54 - 120*
2-Fluorobiphenyl	*92*		*60 - 120*
2-Fluorophenol (Surr)	*83*		*52 - 120*
Nitrobenzene-d5 (Surr)	*84*		*53 - 120*
Phenol-d5 (Surr)	*88*		*54 - 120*
p-Terphenyl-d14 (Surr)	*114*		*65 - 121*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-418721/1-A
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418721

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		9.9	4.4	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Antimony	ND		14.8	0.40	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Arsenic	ND		2.0	0.40	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Barium	ND		0.49	0.11	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Beryllium	ND		0.20	0.028	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Cadmium	0.0366	J	0.20	0.030	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Calcium	3.33	J	49.4	3.3	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Chromium	2.06		0.49	0.20	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Cobalt	ND		0.49	0.049	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Copper	0.932	J	0.99	0.21	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Iron	13.86		9.9	3.5	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Lead	ND		0.99	0.24	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Magnesium	ND		19.8	0.92	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Manganese	ND		0.20	0.032	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Nickel	0.783	J	4.9	0.23	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Potassium	ND		29.7	19.8	mg/Kg		06/08/18 18:16	06/11/18 15:10	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: MB 480-418721/1-A
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418721

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		4.0	0.40	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Silver	ND		0.59	0.20	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Sodium	ND		138	12.9	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Thallium	ND		5.9	0.30	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Vanadium	ND		0.49	0.11	mg/Kg		06/08/18 18:16	06/11/18 15:10	1
Zinc	ND		2.0	0.63	mg/Kg		06/08/18 18:16	06/11/18 15:10	1

Lab Sample ID: LCSSRM 480-418721/2-A
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418721

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	10100	7525		mg/Kg		74.5	30.4 - 125.7
Antimony	184	75.57		mg/Kg		41.1	10.0 - 137.5
Arsenic	178	133.6		mg/Kg		75.1	65.7 - 120.8
Barium	228	174.8		mg/Kg		76.6	68.4 - 118.4
Beryllium	61.3	48.24		mg/Kg		78.7	69.3 - 120.1
Cadmium	143	105.3		mg/Kg		73.6	65.9 - 114.0
Calcium	5190	3918		mg/Kg		75.5	65.9 - 115.8
Chromium	107	84.83		mg/Kg		79.3	65.9 - 123.4
Cobalt	71.4	63.85		mg/Kg		89.4	71.3 - 120.4
Copper	116	92.10		mg/Kg		79.4	70.6 - 119.0
Iron	15000	13040		mg/Kg		87.0	33.0 - 155.3
Lead	210	185.4		mg/Kg		88.3	71.9 - 121.0
Magnesium	2570	1984		mg/Kg		77.2	55.3 - 123.0
Manganese	383	309.2		mg/Kg		80.7	73.1 - 120.1
Nickel	95.4	81.76		mg/Kg		85.7	65.6 - 117.4
Potassium	2420	1901		mg/Kg		78.6	47.9 - 116.9
Selenium	130	93.47		mg/Kg		71.9	59.2 - 120.0
Silver	91.2	70.59		mg/Kg		77.4	64.0 - 126.1
Sodium	690	517.0		mg/Kg		74.9	49.0 - 131.0
Thallium	156	133.8		mg/Kg		85.8	61.9 - 119.9
Vanadium	104	83.15		mg/Kg		80.0	61.4 - 126.0

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCSSRM 480-418721/2-A
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418721

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Zinc	254	193.0		mg/Kg		76.0	66.9 - 122.4

Lab Sample ID: 480-136903-18 MS
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: SS-06 0"-2"
Prep Type: Total/NA
Prep Batch: 418721

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	8260	F1	2790	13940	F1	mg/Kg	☼	203	75 - 125
Antimony	1.4	J F1	55.9	40.17	F1	mg/Kg	☼	69	75 - 125
Arsenic	8.1		55.9	57.26		mg/Kg	☼	88	75 - 125
Barium	85.5		55.9	142.4		mg/Kg	☼	102	75 - 125
Beryllium	0.39		55.9	50.64		mg/Kg	☼	90	75 - 125
Cadmium	0.84	B	55.9	51.01		mg/Kg	☼	90	75 - 125
Calcium	4280	B F1	2790	7946	F1	mg/Kg	☼	131	75 - 125
Chromium	17.0	B	55.9	65.48		mg/Kg	☼	87	75 - 125
Cobalt	4.5		55.9	58.51		mg/Kg	☼	97	75 - 125
Copper	29.2	B	55.9	78.41		mg/Kg	☼	88	75 - 125
Iron	13200	B	2790	15400	4	mg/Kg	☼	80	75 - 125
Lead	232		55.9	300.4	4	mg/Kg	☼	122	75 - 125
Magnesium	1580		2790	4513		mg/Kg	☼	105	75 - 125
Manganese	355		55.9	409.6	4	mg/Kg	☼	98	75 - 125
Nickel	11.5	B	55.9	66.41		mg/Kg	☼	98	75 - 125
Potassium	1090	F1	2800	4561		mg/Kg	☼	124	75 - 125
Selenium	ND		55.9	48.24		mg/Kg	☼	86	75 - 125
Silver	0.42	J	14.0	13.32		mg/Kg	☼	92	75 - 125
Sodium	81.8	J	2800	2675		mg/Kg	☼	93	75 - 125
Thallium	ND		55.9	54.90		mg/Kg	☼	98	75 - 125
Vanadium	20.0		55.9	76.34		mg/Kg	☼	101	75 - 125
Zinc	267		55.9	311.7	4	mg/Kg	☼	80	75 - 125

Lab Sample ID: 480-136903-18 MSD
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: SS-06 0"-2"
Prep Type: Total/NA
Prep Batch: 418721

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	8260	F1	2800	14970	F1	mg/Kg	☼	240	75 - 125	7	20
Antimony	1.4	J F1	56.0	39.13	F1	mg/Kg	☼	67	75 - 125	3	20
Arsenic	8.1		56.0	58.11		mg/Kg	☼	89	75 - 125	1	20
Barium	85.5		56.0	152.6		mg/Kg	☼	120	75 - 125	7	20
Beryllium	0.39		56.0	51.15		mg/Kg	☼	91	75 - 125	1	20
Cadmium	0.84	B	56.0	50.90		mg/Kg	☼	89	75 - 125	0	20
Calcium	4280	B F1	2800	7345		mg/Kg	☼	109	75 - 125	8	20
Chromium	17.0	B	56.0	65.90		mg/Kg	☼	87	75 - 125	1	20
Cobalt	4.5		56.0	59.01		mg/Kg	☼	97	75 - 125	1	20
Copper	29.2	B	56.0	79.31		mg/Kg	☼	89	75 - 125	1	20
Iron	13200	B	2800	16080	4	mg/Kg	☼	104	75 - 125	4	20
Lead	232		56.0	297.4	4	mg/Kg	☼	116	75 - 125	1	20
Magnesium	1580		2800	4590		mg/Kg	☼	107	75 - 125	2	20

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 480-136903-18 MSD
Matrix: Solid
Analysis Batch: 419098

Client Sample ID: SS-06 0"-2"
Prep Type: Total/NA
Prep Batch: 418721

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese	355		56.0	398.9	4	mg/Kg	☼	79	75 - 125	3	20
Nickel	11.5	B	56.0	67.15		mg/Kg	☼	99	75 - 125	1	20
Potassium	1090	F1	2800	4841	F1	mg/Kg	☼	134	75 - 125	6	20
Selenium	ND		56.0	47.98		mg/Kg	☼	86	75 - 125	1	20
Silver	0.42	J	14.0	13.39		mg/Kg	☼	93	75 - 125	1	20
Sodium	81.8	J	2810	2705		mg/Kg	☼	93	75 - 125	1	20
Thallium	ND		56.0	55.25		mg/Kg	☼	99	75 - 125	1	20
Vanadium	20.0		56.0	77.14		mg/Kg	☼	102	75 - 125	1	20
Zinc	267		56.0	309.7	4	mg/Kg	☼	76	75 - 125	1	20

Lab Sample ID: MB 480-418724/1-A
Matrix: Solid
Analysis Batch: 419817

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418724

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5.08	J	9.9	4.4	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Antimony	ND		14.9	0.40	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Arsenic	ND		2.0	0.40	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Barium	ND		0.50	0.11	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Beryllium	ND		0.20	0.028	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Cadmium	ND		0.20	0.030	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Calcium	3.72	J	49.6	3.3	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Chromium	1.01		0.50	0.20	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Cobalt	ND		0.50	0.050	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Copper	1.38		0.99	0.21	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Iron	9.94		9.9	3.5	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Lead	ND		0.99	0.24	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Magnesium	ND		19.8	0.92	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Manganese	0.222		0.20	0.032	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Nickel	0.343	J	5.0	0.23	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Potassium	ND		29.7	19.8	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Selenium	ND		4.0	0.40	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Silver	ND		0.59	0.20	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Sodium	ND		139	12.9	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Thallium	ND		5.9	0.30	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Vanadium	ND		0.50	0.11	mg/Kg		06/11/18 17:30	06/14/18 10:45	1
Zinc	ND		2.0	0.63	mg/Kg		06/11/18 17:30	06/14/18 10:45	1

Lab Sample ID: LCSSRM 480-418724/2-A
Matrix: Solid
Analysis Batch: 419542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418724

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	10100	6970		mg/Kg		69.0	30.4 - 125.7
Antimony	184	57.77		mg/Kg		31.4	10.0 - 137.5
Arsenic	178	133.3		mg/Kg		74.9	65.7 - 120.8

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCSSRM 480-418724/2-A
Matrix: Solid
Analysis Batch: 419542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418724

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	228	177.7		mg/Kg		77.9	68.4 - 118.4
Beryllium	61.3	46.75		mg/Kg		76.3	69.3 - 120.1
Cadmium	143	106.9		mg/Kg		74.7	65.9 - 114.0
Calcium	5190	3825		mg/Kg		73.7	65.9 - 115.8
Chromium	107	82.87		mg/Kg		77.5	65.9 - 123.4
Cobalt	71.4	64.86		mg/Kg		90.8	71.3 - 120.4
Copper	116	89.22		mg/Kg		76.9	70.6 - 119.0
Iron	15000	11880		mg/Kg		79.2	33.0 - 155.3
Lead	210	182.2		mg/Kg		86.7	71.9 - 121.0
Magnesium	2570	1869		mg/Kg		72.7	55.3 - 123.0
Manganese	383	331.7		mg/Kg		86.6	73.1 - 120.1
Nickel	95.4	82.40		mg/Kg		86.4	65.6 - 117.4
Potassium	2420	1791		mg/Kg		74.0	47.9 - 116.9
Selenium	130	93.28		mg/Kg		71.8	59.2 - 120.0
Silver	91.2	66.10		mg/Kg		72.5	64.0 - 126.1
Sodium	690	524.6		mg/Kg		76.0	49.0 - 131.0
Thallium	156	133.7		mg/Kg		85.7	61.9 - 119.9
Vanadium	104	78.60		mg/Kg		75.6	61.4 - 126.0
Zinc	254	191.8		mg/Kg		75.5	66.9 - 122.4

Lab Sample ID: 480-136903-3 MS
Matrix: Solid
Analysis Batch: 419542

Client Sample ID: SS-01 0"-2"
Prep Type: Total/NA
Prep Batch: 418724

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5110	B F1	2130	12070	F1	mg/Kg	☼	326	75 - 125
Antimony	ND	F1	42.6	23.21	F1	mg/Kg	☼	54	75 - 125
Arsenic	4.8		42.6	42.33		mg/Kg	☼	88	75 - 125
Barium	47.4	F1 F2	42.6	136.4	F1	mg/Kg	☼	209	75 - 125
Beryllium	0.28		42.6	37.03		mg/Kg	☼	86	75 - 125
Cadmium	0.34		42.6	37.79		mg/Kg	☼	88	75 - 125
Calcium	30600	B	2130	39500	4	mg/Kg	☼	418	75 - 125
Cobalt	6.1		42.6	47.64		mg/Kg	☼	97	75 - 125
Copper	35.1	B	42.6	73.46		mg/Kg	☼	90	75 - 125

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 480-136903-3 MS — **Client Sample ID: SS-01 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419542 — **Prep Batch: 418724**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	11800	B	2130	14560	4	mg/Kg	☼	128	75 - 125
Lead	84.2		42.6	129.8		mg/Kg	☼	107	75 - 125
Magnesium	15500		2130	22940	4	mg/Kg	☼	350	75 - 125
Manganese	327	B	42.6	394.6	4	mg/Kg	☼	157	75 - 125
Nickel	11.7	B	42.6	57.03		mg/Kg	☼	106	75 - 125
Potassium	1110	F1	2130	5264	F1	mg/Kg	☼	195	75 - 125
Selenium	ND		42.6	35.51		mg/Kg	☼	83	75 - 125
Silver	ND		10.7	9.97		mg/Kg	☼	93	75 - 125
Sodium	108	J	2140	2092		mg/Kg	☼	93	75 - 125
Thallium	ND		42.6	41.97		mg/Kg	☼	98	75 - 125
Vanadium	15.8		42.6	60.92		mg/Kg	☼	106	75 - 125
Zinc	106		42.6	149.9		mg/Kg	☼	103	75 - 125

Lab Sample ID: 480-136903-3 MSD — **Client Sample ID: SS-01 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419542 — **Prep Batch: 418724**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5110	B F1	2100	11560	F1	mg/Kg	☼	307	75 - 125	4	20
Antimony	ND	F1	42.1	23.67	F1	mg/Kg	☼	56	75 - 125	2	20
Arsenic	4.8		42.1	41.87		mg/Kg	☼	88	75 - 125	1	20
Barium	47.4	F1 F2	42.1	96.51	F2	mg/Kg	☼	117	75 - 125	34	20
Beryllium	0.28		42.1	36.01		mg/Kg	☼	85	75 - 125	3	20
Cadmium	0.34		42.1	36.93		mg/Kg	☼	87	75 - 125	2	20
Calcium	30600	B	2100	37720	4	mg/Kg	☼	339	75 - 125	5	20
Cobalt	6.1		42.1	45.38		mg/Kg	☼	93	75 - 125	5	20
Copper	35.1	B	42.1	82.80		mg/Kg	☼	114	75 - 125	12	20
Iron	11800	B	2100	13460	4	mg/Kg	☼	77	75 - 125	8	20
Lead	84.2		42.1	128.6		mg/Kg	☼	106	75 - 125	1	20
Magnesium	15500		2100	21660	4	mg/Kg	☼	294	75 - 125	6	20
Manganese	327	B	42.1	353.3	4	mg/Kg	☼	62	75 - 125	11	20
Nickel	11.7	B	42.1	54.91		mg/Kg	☼	103	75 - 125	4	20
Potassium	1110	F1	2100	4882	F1	mg/Kg	☼	179	75 - 125	8	20
Selenium	ND		42.1	34.67		mg/Kg	☼	82	75 - 125	2	20
Silver	ND		10.5	9.58		mg/Kg	☼	91	75 - 125	4	20
Sodium	108	J	2110	2003		mg/Kg	☼	90	75 - 125	4	20
Thallium	ND		42.1	40.13		mg/Kg	☼	95	75 - 125	4	20
Vanadium	15.8		42.1	61.27		mg/Kg	☼	108	75 - 125	1	20
Zinc	106		42.1	149.1		mg/Kg	☼	103	75 - 125	1	20

Lab Sample ID: MB 480-419412/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419810 — **Prep Batch: 419412**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.50	0.20	mg/Kg		06/13/18 17:32	06/14/18 16:47	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCSSRM 480-419412/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419810 — **Prep Batch: 419412**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	107	91.59		mg/Kg		85.6	65.9 - 123.4

Lab Sample ID: 480-136903-18 MS — **Client Sample ID: SS-06 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419810 — **Prep Batch: 419412**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	12.8		58.2	66.80		mg/Kg	☼	93	75 - 125

Lab Sample ID: 480-136903-18 MSD — **Client Sample ID: SS-06 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 419810 — **Prep Batch: 419412**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	12.8		57.8	70.83		mg/Kg	☼	100	75 - 125	6	20

Lab Sample ID: MB 480-420227/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420445 — **Prep Batch: 420227**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.48	0.19	mg/Kg		06/18/18 16:41	06/19/18 10:51	1

Lab Sample ID: LCSSRM 480-420227/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420445 — **Prep Batch: 420227**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	107	84.61		mg/Kg		79.1	65.9 - 123.4

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 480-420874/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420874**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.019	0.0078	mg/Kg		06/21/18 16:35	06/21/18 17:46	1

Lab Sample ID: LCSSRM 480-420874/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420874**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	13.3	12.92		mg/Kg		97.2	51.2 - 148.1

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: 480-136903-5 MS — **Client Sample ID: SS-01 12"-24"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420874**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.24		0.349	0.591		mg/Kg	☼	99	80 - 120

Lab Sample ID: 480-136903-5 MSD — **Client Sample ID: SS-01 12"-24"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420874**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.24		0.337	0.582		mg/Kg	☼	100	80 - 120	2	20

Lab Sample ID: MB 480-420875/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420875**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00952	J	0.019	0.0078	mg/Kg		06/21/18 16:35	06/21/18 18:30	1

Lab Sample ID: LCSSRM 480-420875/2-A ^10 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420875**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	13.3	13.28		mg/Kg		99.9	51.2 - 148.1

Lab Sample ID: 480-136903-24 MS — **Client Sample ID: SS-08 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420875**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.31	F1 B	0.428	0.719		mg/Kg	☼	95	80 - 120

Lab Sample ID: 480-136903-24 MSD — **Client Sample ID: SS-08 0"-2"**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 420968 — **Prep Batch: 420875**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.31	F1 B	0.425	0.634	F1	mg/Kg	☼	75	80 - 120	13	20

GC/MS VOA

Prep Batch: 418340

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-1	SB-03 11'-12'	Total/NA	Solid	5035A_L	
480-136903-2	SB-03 13-14.2'	Total/NA	Solid	5035A_L	
MB 480-418340/2-A	Method Blank	Total/NA	Solid	5035A_L	
LCS 480-418340/1-A	Lab Control Sample	Total/NA	Solid	5035A_L	

Analysis Batch: 418345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-1	SB-03 11'-12'	Total/NA	Solid	8260C	418340
480-136903-2	SB-03 13-14.2'	Total/NA	Solid	8260C	418340
MB 480-418340/2-A	Method Blank	Total/NA	Solid	8260C	418340
LCS 480-418340/1-A	Lab Control Sample	Total/NA	Solid	8260C	418340

GC/MS Semi VOA

Prep Batch: 418456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-21	SS-07 0"-2"	Total/NA	Solid	3550C	
480-136903-22	SS-07 2"-12"	Total/NA	Solid	3550C	
480-136903-23	SS-07 12"-24"	Total/NA	Solid	3550C	
480-136903-24	SS-08 0"-2"	Total/NA	Solid	3550C	
480-136903-25	SS-08 2"-12"	Total/NA	Solid	3550C	
480-136903-26	SS-08 12"-24"	Total/NA	Solid	3550C	
MB 480-418456/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-418456/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-136903-21 MS	SS-07 0"-2"	Total/NA	Solid	3550C	
480-136903-21 MSD	SS-07 0"-2"	Total/NA	Solid	3550C	

Prep Batch: 418467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	3550C	
480-136903-4	SS-01 2"-12"	Total/NA	Solid	3550C	
480-136903-5	SS-01 12"-24"	Total/NA	Solid	3550C	
480-136903-6	SS-02 0"-2"	Total/NA	Solid	3550C	
480-136903-7	SS-02 2"-12"	Total/NA	Solid	3550C	
480-136903-8	SS-02 12"-24"	Total/NA	Solid	3550C	
480-136903-9	SS-03 0"-2"	Total/NA	Solid	3550C	
480-136903-10	SS-03 2"-12"	Total/NA	Solid	3550C	
480-136903-11	SS-03 12"-24"	Total/NA	Solid	3550C	
480-136903-12	SS-04 0"-2"	Total/NA	Solid	3550C	
480-136903-13	SS-04 2"-12"	Total/NA	Solid	3550C	
480-136903-14	SS-04 12"-24"	Total/NA	Solid	3550C	
480-136903-15	SS-05 0"-2"	Total/NA	Solid	3550C	
480-136903-16	SS-05 2"-12"	Total/NA	Solid	3550C	
480-136903-17	SS-05 12"-24"	Total/NA	Solid	3550C	
480-136903-18	SS-06 0"-2"	Total/NA	Solid	3550C	
480-136903-19	SS-06 2"-12"	Total/NA	Solid	3550C	
480-136903-20	SS-06 12"-24"	Total/NA	Solid	3550C	
MB 480-418467/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-418467/2-A	Lab Control Sample	Total/NA	Solid	3550C	
480-136903-4 MS	SS-01 2"-12"	Total/NA	Solid	3550C	

GC/MS Semi VOA (Continued)

Prep Batch: 418467 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-4 MSD	SS-01 2"-12"	Total/NA	Solid	3550C	

Prep Batch: 418982

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-1	SB-03 11'-12'	Total/NA	Solid	3550C	
480-136903-2	SB-03 13-14.2'	Total/NA	Solid	3550C	
MB 480-418982/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 480-418982/2-A	Lab Control Sample	Total/NA	Solid	3550C	

Analysis Batch: 419187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	8270D	418467
480-136903-4	SS-01 2"-12"	Total/NA	Solid	8270D	418467
480-136903-5	SS-01 12"-24"	Total/NA	Solid	8270D	418467
480-136903-6	SS-02 0"-2"	Total/NA	Solid	8270D	418467
480-136903-7	SS-02 2"-12"	Total/NA	Solid	8270D	418467
480-136903-8	SS-02 12"-24"	Total/NA	Solid	8270D	418467
480-136903-10	SS-03 2"-12"	Total/NA	Solid	8270D	418467
480-136903-11	SS-03 12"-24"	Total/NA	Solid	8270D	418467
480-136903-12	SS-04 0"-2"	Total/NA	Solid	8270D	418467
480-136903-13	SS-04 2"-12"	Total/NA	Solid	8270D	418467
480-136903-14	SS-04 12"-24"	Total/NA	Solid	8270D	418467
480-136903-15	SS-05 0"-2"	Total/NA	Solid	8270D	418467
480-136903-16	SS-05 2"-12"	Total/NA	Solid	8270D	418467
480-136903-17	SS-05 12"-24"	Total/NA	Solid	8270D	418467
480-136903-18	SS-06 0"-2"	Total/NA	Solid	8270D	418467
480-136903-19	SS-06 2"-12"	Total/NA	Solid	8270D	418467
480-136903-20	SS-06 12"-24"	Total/NA	Solid	8270D	418467
MB 480-418467/1-A	Method Blank	Total/NA	Solid	8270D	418467
LCS 480-418467/2-A	Lab Control Sample	Total/NA	Solid	8270D	418467
480-136903-4 MS	SS-01 2"-12"	Total/NA	Solid	8270D	418467
480-136903-4 MSD	SS-01 2"-12"	Total/NA	Solid	8270D	418467

Analysis Batch: 419382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-9	SS-03 0"-2"	Total/NA	Solid	8270D	418467
480-136903-21	SS-07 0"-2"	Total/NA	Solid	8270D	418456
480-136903-22	SS-07 2"-12"	Total/NA	Solid	8270D	418456
480-136903-23	SS-07 12"-24"	Total/NA	Solid	8270D	418456
480-136903-24	SS-08 0"-2"	Total/NA	Solid	8270D	418456
480-136903-25	SS-08 2"-12"	Total/NA	Solid	8270D	418456
480-136903-26	SS-08 12"-24"	Total/NA	Solid	8270D	418456
480-136903-21 MS	SS-07 0"-2"	Total/NA	Solid	8270D	418456
480-136903-21 MSD	SS-07 0"-2"	Total/NA	Solid	8270D	418456

Analysis Batch: 419623

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-418456/1-A	Method Blank	Total/NA	Solid	8270D	418456
LCS 480-418456/2-A	Lab Control Sample	Total/NA	Solid	8270D	418456

GC/MS Semi VOA (Continued)

Analysis Batch: 419893

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-418982/1-A	Method Blank	Total/NA	Solid	8270D	418982
LCS 480-418982/2-A	Lab Control Sample	Total/NA	Solid	8270D	418982

Analysis Batch: 420374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-1	SB-03 11'-12'	Total/NA	Solid	8270D	418982
480-136903-2	SB-03 13-14.2'	Total/NA	Solid	8270D	418982

Metals

Prep Batch: 418721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-17	SS-05 12"-24"	Total/NA	Solid	3050B	
480-136903-18	SS-06 0"-2"	Total/NA	Solid	3050B	
480-136903-19	SS-06 2"-12"	Total/NA	Solid	3050B	
480-136903-20	SS-06 12"-24"	Total/NA	Solid	3050B	
480-136903-21	SS-07 0"-2"	Total/NA	Solid	3050B	
480-136903-22	SS-07 2"-12"	Total/NA	Solid	3050B	
480-136903-23	SS-07 12"-24"	Total/NA	Solid	3050B	
480-136903-24	SS-08 0"-2"	Total/NA	Solid	3050B	
480-136903-25	SS-08 2"-12"	Total/NA	Solid	3050B	
480-136903-26	SS-08 12"-24"	Total/NA	Solid	3050B	
MB 480-418721/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-418721/2-A	Lab Control Sample	Total/NA	Solid	3050B	
480-136903-18 MS	SS-06 0"-2"	Total/NA	Solid	3050B	
480-136903-18 MSD	SS-06 0"-2"	Total/NA	Solid	3050B	

Prep Batch: 418724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	3050B	
480-136903-4	SS-01 2"-12"	Total/NA	Solid	3050B	
480-136903-5	SS-01 12"-24"	Total/NA	Solid	3050B	
480-136903-6	SS-02 0"-2"	Total/NA	Solid	3050B	
480-136903-7	SS-02 2"-12"	Total/NA	Solid	3050B	
480-136903-8	SS-02 12"-24"	Total/NA	Solid	3050B	
480-136903-9	SS-03 0"-2"	Total/NA	Solid	3050B	
480-136903-10	SS-03 2"-12"	Total/NA	Solid	3050B	
480-136903-11	SS-03 12"-24"	Total/NA	Solid	3050B	
480-136903-12	SS-04 0"-2"	Total/NA	Solid	3050B	
480-136903-13	SS-04 2"-12"	Total/NA	Solid	3050B	
480-136903-14	SS-04 12"-24"	Total/NA	Solid	3050B	
480-136903-15	SS-05 0"-2"	Total/NA	Solid	3050B	
480-136903-16	SS-05 2"-12"	Total/NA	Solid	3050B	
MB 480-418724/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-418724/2-A	Lab Control Sample	Total/NA	Solid	3050B	
480-136903-3 MS	SS-01 0"-2"	Total/NA	Solid	3050B	
480-136903-3 MSD	SS-01 0"-2"	Total/NA	Solid	3050B	

Metals (Continued)

Analysis Batch: 419098

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-17	SS-05 12"-24"	Total/NA	Solid	6010C	418721
480-136903-18	SS-06 0"-2"	Total/NA	Solid	6010C	418721
480-136903-19	SS-06 2"-12"	Total/NA	Solid	6010C	418721
480-136903-20	SS-06 12"-24"	Total/NA	Solid	6010C	418721
480-136903-21	SS-07 0"-2"	Total/NA	Solid	6010C	418721
480-136903-22	SS-07 2"-12"	Total/NA	Solid	6010C	418721
480-136903-23	SS-07 12"-24"	Total/NA	Solid	6010C	418721
480-136903-24	SS-08 0"-2"	Total/NA	Solid	6010C	418721
480-136903-25	SS-08 2"-12"	Total/NA	Solid	6010C	418721
480-136903-26	SS-08 12"-24"	Total/NA	Solid	6010C	418721
MB 480-418721/1-A	Method Blank	Total/NA	Solid	6010C	418721
LCSSRM 480-418721/2-A	Lab Control Sample	Total/NA	Solid	6010C	418721
480-136903-18 MS	SS-06 0"-2"	Total/NA	Solid	6010C	418721
480-136903-18 MSD	SS-06 0"-2"	Total/NA	Solid	6010C	418721

Prep Batch: 419412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-17	SS-05 12"-24"	Total/NA	Solid	3050B	
480-136903-18	SS-06 0"-2"	Total/NA	Solid	3050B	
480-136903-19	SS-06 2"-12"	Total/NA	Solid	3050B	
480-136903-20	SS-06 12"-24"	Total/NA	Solid	3050B	
480-136903-21	SS-07 0"-2"	Total/NA	Solid	3050B	
480-136903-22	SS-07 2"-12"	Total/NA	Solid	3050B	
480-136903-24	SS-08 0"-2"	Total/NA	Solid	3050B	
480-136903-26	SS-08 12"-24"	Total/NA	Solid	3050B	
MB 480-419412/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-419412/2-A	Lab Control Sample	Total/NA	Solid	3050B	
480-136903-18 MS	SS-06 0"-2"	Total/NA	Solid	3050B	
480-136903-18 MSD	SS-06 0"-2"	Total/NA	Solid	3050B	

Analysis Batch: 419542

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	6010C	418724
480-136903-4	SS-01 2"-12"	Total/NA	Solid	6010C	418724
480-136903-5	SS-01 12"-24"	Total/NA	Solid	6010C	418724
480-136903-6	SS-02 0"-2"	Total/NA	Solid	6010C	418724
480-136903-7	SS-02 2"-12"	Total/NA	Solid	6010C	418724
480-136903-8	SS-02 12"-24"	Total/NA	Solid	6010C	418724
480-136903-9	SS-03 0"-2"	Total/NA	Solid	6010C	418724
480-136903-10	SS-03 2"-12"	Total/NA	Solid	6010C	418724
480-136903-11	SS-03 12"-24"	Total/NA	Solid	6010C	418724
480-136903-12	SS-04 0"-2"	Total/NA	Solid	6010C	418724
480-136903-13	SS-04 2"-12"	Total/NA	Solid	6010C	418724
480-136903-14	SS-04 12"-24"	Total/NA	Solid	6010C	418724
480-136903-15	SS-05 0"-2"	Total/NA	Solid	6010C	418724
480-136903-16	SS-05 2"-12"	Total/NA	Solid	6010C	418724
LCSSRM 480-418724/2-A	Lab Control Sample	Total/NA	Solid	6010C	418724
480-136903-3 MS	SS-01 0"-2"	Total/NA	Solid	6010C	418724
480-136903-3 MSD	SS-01 0"-2"	Total/NA	Solid	6010C	418724

Metals (Continued)

Analysis Batch: 419810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-17	SS-05 12"-24"	Total/NA	Solid	6010C	419412
480-136903-18	SS-06 0"-2"	Total/NA	Solid	6010C	419412
480-136903-19	SS-06 2"-12"	Total/NA	Solid	6010C	419412
480-136903-20	SS-06 12"-24"	Total/NA	Solid	6010C	419412
480-136903-21	SS-07 0"-2"	Total/NA	Solid	6010C	419412
480-136903-22	SS-07 2"-12"	Total/NA	Solid	6010C	419412
480-136903-24	SS-08 0"-2"	Total/NA	Solid	6010C	419412
480-136903-26	SS-08 12"-24"	Total/NA	Solid	6010C	419412
MB 480-419412/1-A	Method Blank	Total/NA	Solid	6010C	419412
LCSSRM 480-419412/2-A	Lab Control Sample	Total/NA	Solid	6010C	419412
480-136903-18 MS	SS-06 0"-2"	Total/NA	Solid	6010C	419412
480-136903-18 MSD	SS-06 0"-2"	Total/NA	Solid	6010C	419412

Analysis Batch: 419817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-418724/1-A	Method Blank	Total/NA	Solid	6010C	418724

Prep Batch: 420227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	3050B	
480-136903-11	SS-03 12"-24"	Total/NA	Solid	3050B	
480-136903-15	SS-05 0"-2"	Total/NA	Solid	3050B	
MB 480-420227/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-420227/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 420445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	6010C	420227
480-136903-11	SS-03 12"-24"	Total/NA	Solid	6010C	420227
480-136903-15	SS-05 0"-2"	Total/NA	Solid	6010C	420227
MB 480-420227/1-A	Method Blank	Total/NA	Solid	6010C	420227
LCSSRM 480-420227/2-A	Lab Control Sample	Total/NA	Solid	6010C	420227

Prep Batch: 420874

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	7471B	
480-136903-4	SS-01 2"-12"	Total/NA	Solid	7471B	
480-136903-5	SS-01 12"-24"	Total/NA	Solid	7471B	
480-136903-6	SS-02 0"-2"	Total/NA	Solid	7471B	
480-136903-7	SS-02 2"-12"	Total/NA	Solid	7471B	
480-136903-8	SS-02 12"-24"	Total/NA	Solid	7471B	
480-136903-9	SS-03 0"-2"	Total/NA	Solid	7471B	
480-136903-10	SS-03 2"-12"	Total/NA	Solid	7471B	
480-136903-11	SS-03 12"-24"	Total/NA	Solid	7471B	
480-136903-12	SS-04 0"-2"	Total/NA	Solid	7471B	
480-136903-13	SS-04 2"-12"	Total/NA	Solid	7471B	
480-136903-14	SS-04 12"-24"	Total/NA	Solid	7471B	
480-136903-15	SS-05 0"-2"	Total/NA	Solid	7471B	
480-136903-16	SS-05 2"-12"	Total/NA	Solid	7471B	
480-136903-17	SS-05 12"-24"	Total/NA	Solid	7471B	
480-136903-18	SS-06 0"-2"	Total/NA	Solid	7471B	

Metals (Continued)

Prep Batch: 420874 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-19	SS-06 2"-12"	Total/NA	Solid	7471B	
480-136903-20	SS-06 12"-24"	Total/NA	Solid	7471B	
480-136903-21	SS-07 0"-2"	Total/NA	Solid	7471B	
480-136903-22	SS-07 2"-12"	Total/NA	Solid	7471B	
MB 480-420874/1-A	Method Blank	Total/NA	Solid	7471B	
LCSSRM 480-420874/2-A ^10	Lab Control Sample	Total/NA	Solid	7471B	
480-136903-5 MS	SS-01 12"-24"	Total/NA	Solid	7471B	
480-136903-5 MSD	SS-01 12"-24"	Total/NA	Solid	7471B	

Prep Batch: 420875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-23	SS-07 12"-24"	Total/NA	Solid	7471B	
480-136903-24	SS-08 0"-2"	Total/NA	Solid	7471B	
480-136903-25	SS-08 2"-12"	Total/NA	Solid	7471B	
480-136903-26	SS-08 12"-24"	Total/NA	Solid	7471B	
MB 480-420875/1-A	Method Blank	Total/NA	Solid	7471B	
LCSSRM 480-420875/2-A ^10	Lab Control Sample	Total/NA	Solid	7471B	
480-136903-24 MS	SS-08 0"-2"	Total/NA	Solid	7471B	
480-136903-24 MSD	SS-08 0"-2"	Total/NA	Solid	7471B	

Analysis Batch: 420968

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-3	SS-01 0"-2"	Total/NA	Solid	7471B	420874
480-136903-4	SS-01 2"-12"	Total/NA	Solid	7471B	420874
480-136903-5	SS-01 12"-24"	Total/NA	Solid	7471B	420874
480-136903-6	SS-02 0"-2"	Total/NA	Solid	7471B	420874
480-136903-7	SS-02 2"-12"	Total/NA	Solid	7471B	420874
480-136903-8	SS-02 12"-24"	Total/NA	Solid	7471B	420874
480-136903-9	SS-03 0"-2"	Total/NA	Solid	7471B	420874
480-136903-10	SS-03 2"-12"	Total/NA	Solid	7471B	420874
480-136903-11	SS-03 12"-24"	Total/NA	Solid	7471B	420874
480-136903-12	SS-04 0"-2"	Total/NA	Solid	7471B	420874
480-136903-13	SS-04 2"-12"	Total/NA	Solid	7471B	420874
480-136903-14	SS-04 12"-24"	Total/NA	Solid	7471B	420874
480-136903-15	SS-05 0"-2"	Total/NA	Solid	7471B	420874
480-136903-16	SS-05 2"-12"	Total/NA	Solid	7471B	420874
480-136903-17	SS-05 12"-24"	Total/NA	Solid	7471B	420874
480-136903-18	SS-06 0"-2"	Total/NA	Solid	7471B	420874
480-136903-19	SS-06 2"-12"	Total/NA	Solid	7471B	420874
480-136903-20	SS-06 12"-24"	Total/NA	Solid	7471B	420874
480-136903-21	SS-07 0"-2"	Total/NA	Solid	7471B	420874
480-136903-22	SS-07 2"-12"	Total/NA	Solid	7471B	420874
480-136903-23	SS-07 12"-24"	Total/NA	Solid	7471B	420875
480-136903-24	SS-08 0"-2"	Total/NA	Solid	7471B	420875
480-136903-25	SS-08 2"-12"	Total/NA	Solid	7471B	420875
480-136903-26	SS-08 12"-24"	Total/NA	Solid	7471B	420875
MB 480-420874/1-A	Method Blank	Total/NA	Solid	7471B	420874
MB 480-420875/1-A	Method Blank	Total/NA	Solid	7471B	420875
LCSSRM 480-420874/2-A ^10	Lab Control Sample	Total/NA	Solid	7471B	420874
LCSSRM 480-420875/2-A ^10	Lab Control Sample	Total/NA	Solid	7471B	420875
480-136903-5 MS	SS-01 12"-24"	Total/NA	Solid	7471B	420874

Metals (Continued)

Analysis Batch: 420968 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-5 MSD	SS-01 12"-24"	Total/NA	Solid	7471B	420874
480-136903-24 MS	SS-08 0"-2"	Total/NA	Solid	7471B	420875
480-136903-24 MSD	SS-08 0"-2"	Total/NA	Solid	7471B	420875

General Chemistry

Analysis Batch: 418089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-136903-1	SB-03 11'-12'	Total/NA	Solid	Moisture	
480-136903-2	SB-03 13-14.2'	Total/NA	Solid	Moisture	
480-136903-3	SS-01 0"-2"	Total/NA	Solid	Moisture	
480-136903-4	SS-01 2"-12"	Total/NA	Solid	Moisture	
480-136903-5	SS-01 12"-24"	Total/NA	Solid	Moisture	
480-136903-6	SS-02 0"-2"	Total/NA	Solid	Moisture	
480-136903-7	SS-02 2"-12"	Total/NA	Solid	Moisture	
480-136903-8	SS-02 12"-24"	Total/NA	Solid	Moisture	
480-136903-9	SS-03 0"-2"	Total/NA	Solid	Moisture	
480-136903-10	SS-03 2"-12"	Total/NA	Solid	Moisture	
480-136903-11	SS-03 12"-24"	Total/NA	Solid	Moisture	
480-136903-12	SS-04 0"-2"	Total/NA	Solid	Moisture	
480-136903-13	SS-04 2"-12"	Total/NA	Solid	Moisture	
480-136903-14	SS-04 12"-24"	Total/NA	Solid	Moisture	
480-136903-15	SS-05 0"-2"	Total/NA	Solid	Moisture	
480-136903-16	SS-05 2"-12"	Total/NA	Solid	Moisture	
480-136903-17	SS-05 12"-24"	Total/NA	Solid	Moisture	
480-136903-18	SS-06 0"-2"	Total/NA	Solid	Moisture	
480-136903-19	SS-06 2"-12"	Total/NA	Solid	Moisture	
480-136903-20	SS-06 12"-24"	Total/NA	Solid	Moisture	
480-136903-21	SS-07 0"-2"	Total/NA	Solid	Moisture	
480-136903-22	SS-07 2"-12"	Total/NA	Solid	Moisture	
480-136903-23	SS-07 12"-24"	Total/NA	Solid	Moisture	
480-136903-24	SS-08 0"-2"	Total/NA	Solid	Moisture	
480-136903-25	SS-08 2"-12"	Total/NA	Solid	Moisture	
480-136903-26	SS-08 12"-24"	Total/NA	Solid	Moisture	

Lab Chronicle

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SB-03 11'-12'
Lab Sample ID: 480-136903-1
Date Collected: 06/01/18 10:45
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SB-03 11'-12'
Lab Sample ID: 480-136903-1
Date Collected: 06/01/18 10:45
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 79.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			418340	06/07/18 08:42	CDC	TAL BUF
Total/NA	Analysis	8260C		1	418345	06/07/18 12:39	CDC	TAL BUF
Total/NA	Prep	3550C			418982	06/11/18 14:15	CAM	TAL BUF
Total/NA	Analysis	8270D		50	420374	06/19/18 12:54	RJS	TAL BUF

Client Sample ID: SB-03 13-14.2'
Lab Sample ID: 480-136903-2
Date Collected: 06/01/18 11:10
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SB-03 13-14.2'
Lab Sample ID: 480-136903-2
Date Collected: 06/01/18 11:10
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 91.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035A_L			418340	06/07/18 08:42	CDC	TAL BUF
Total/NA	Analysis	8260C		1	418345	06/07/18 13:05	CDC	TAL BUF
Total/NA	Prep	3550C			418982	06/11/18 14:15	CAM	TAL BUF
Total/NA	Analysis	8270D		50	420374	06/19/18 13:19	RJS	TAL BUF

Client Sample ID: SS-01 0"-2"
Lab Sample ID: 480-136903-3
Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-01 0"-2"
Lab Sample ID: 480-136903-3
Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 94.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF

Client Sample ID: SS-01 0"-2"

Lab Sample ID: 480-136903-3

Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 94.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8270D		50	419187	06/12/18 19:05	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 21:50	AMH	TAL BUF
Total/NA	Prep	3050B			420227	06/18/18 16:41	KMP	TAL BUF
Total/NA	Analysis	6010C		1	420445	06/19/18 10:59	LMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 17:49	BMB	TAL BUF

Client Sample ID: SS-01 2"-12"

Lab Sample ID: 480-136903-4

Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-01 2"-12"

Lab Sample ID: 480-136903-4

Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 94.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 18:37	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:09	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 17:51	BMB	TAL BUF

Client Sample ID: SS-01 12"-24"

Lab Sample ID: 480-136903-5

Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-01 12"-24"

Lab Sample ID: 480-136903-5

Date Collected: 06/01/18 10:00
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 95.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 19:32	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:13	AMH	TAL BUF

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 17:52	BMB	TAL BUF

Client Sample ID: SS-02 0"-2" — **Lab Sample ID: 480-136903-6**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-02 0"-2" — **Lab Sample ID: 480-136903-6**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 90.5**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 20:00	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:17	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 17:59	BMB	TAL BUF

Client Sample ID: SS-02 2"-12" — **Lab Sample ID: 480-136903-7**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-02 2"-12" — **Lab Sample ID: 480-136903-7**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 93.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 20:27	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:32	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:00	BMB	TAL BUF

Client Sample ID: SS-02 12"-24" — **Lab Sample ID: 480-136903-8**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-02 12"-24" — **Lab Sample ID: 480-136903-8**
Date Collected: 06/01/18 11:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 94.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 20:55	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:36	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:06	BMB	TAL BUF

Client Sample ID: SS-03 0"-2" — **Lab Sample ID: 480-136903-9**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-03 0"-2" — **Lab Sample ID: 480-136903-9**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 94.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		10	419382	06/13/18 14:57	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:40	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:07	BMB	TAL BUF

Client Sample ID: SS-03 2"-12" — **Lab Sample ID: 480-136903-10**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-03 2"-12" — **Lab Sample ID: 480-136903-10**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 91.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		1	419187	06/12/18 21:50	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:48	AMH	TAL BUF

Client Sample ID: SS-03 2"-12" — **Lab Sample ID: 480-136903-10**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 91.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:08	BMB	TAL BUF

Client Sample ID: SS-03 12"-24" — **Lab Sample ID: 480-136903-11**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-03 12"-24" — **Lab Sample ID: 480-136903-11**
Date Collected: 06/01/18 11:55 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 87.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419187	06/12/18 22:17	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:55	AMH	TAL BUF
Total/NA	Prep	3050B			420227	06/18/18 16:41	KMP	TAL BUF
Total/NA	Analysis	6010C		1	420445	06/19/18 11:02	LMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:10	BMB	TAL BUF

Client Sample ID: SS-04 0"-2" — **Lab Sample ID: 480-136903-12**
Date Collected: 06/01/18 12:10 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-04 0"-2" — **Lab Sample ID: 480-136903-12**
Date Collected: 06/01/18 12:10 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 75.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		20	419187	06/12/18 22:45	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 22:59	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:11	BMB	TAL BUF

Lab Chronicle

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-04 2"-12"

Lab Sample ID: 480-136903-13
Date Collected: 06/01/18 12:10
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-04 2"-12"

Lab Sample ID: 480-136903-13
Date Collected: 06/01/18 12:10
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 78.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419187	06/12/18 23:13	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 23:18	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:12	BMB	TAL BUF

Client Sample ID: SS-04 12"-24"

Lab Sample ID: 480-136903-14
Date Collected: 06/01/18 12:10
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-04 12"-24"

Lab Sample ID: 480-136903-14
Date Collected: 06/01/18 12:10
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 84.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		20	419187	06/12/18 23:40	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 23:22	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:14	BMB	TAL BUF

Client Sample ID: SS-05 0"-2"

Lab Sample ID: 480-136903-15
Date Collected: 06/01/18 12:20
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-05 0"-2" — **Lab Sample ID: 480-136903-15**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 83.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419187	06/13/18 00:08	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 23:26	AMH	TAL BUF
Total/NA	Prep	3050B			420227	06/18/18 16:41	KMP	TAL BUF
Total/NA	Analysis	6010C		1	420445	06/19/18 11:06	LMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:15	BMB	TAL BUF

Client Sample ID: SS-05 2"-12" — **Lab Sample ID: 480-136903-16**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-05 2"-12" — **Lab Sample ID: 480-136903-16**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 84.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		1	419187	06/13/18 00:35	PJQ	TAL BUF
Total/NA	Prep	3050B			418724	06/11/18 17:30	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419542	06/13/18 23:30	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:17	BMB	TAL BUF

Client Sample ID: SS-05 12"-24" — **Lab Sample ID: 480-136903-17**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-05 12"-24" — **Lab Sample ID: 480-136903-17**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 81.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		1	419187	06/13/18 01:03	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF

Client Sample ID: SS-05 12"-24" — **Lab Sample ID: 480-136903-17**
Date Collected: 06/01/18 12:20 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 81.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010C		1	419098	06/11/18 15:17	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:05	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:18	BMB	TAL BUF

Client Sample ID: SS-06 0"-2" — **Lab Sample ID: 480-136903-18**
Date Collected: 06/01/18 12:25 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-06 0"-2" — **Lab Sample ID: 480-136903-18**
Date Collected: 06/01/18 12:25 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 68.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419187	06/13/18 01:30	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 15:21	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:09	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:23	BMB	TAL BUF

Client Sample ID: SS-06 2"-12" — **Lab Sample ID: 480-136903-19**
Date Collected: 06/01/18 12:25 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-06 2"-12" — **Lab Sample ID: 480-136903-19**
Date Collected: 06/01/18 12:25 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 80.7**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419187	06/13/18 01:58	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 15:50	AMH	TAL BUF

Lab Chronicle

Client: New York State D.E.C. TestAmerica Job ID: 480-136903-1
Project/Site: Former Vacuum Oil #0370583 PIN 07888

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:37	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:24	BMB	TAL BUF

Client Sample ID: SS-06 12"-24" **Lab Sample ID: 480-136903-20**
Date Collected: 06/01/18 12:25 **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-06 12"-24" **Lab Sample ID: 480-136903-20**
Date Collected: 06/01/18 12:25 **Matrix: Solid**
Date Received: 06/05/18 10:15 **Percent Solids: 78.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418467	06/07/18 14:15	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419187	06/13/18 02:25	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 15:53	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:41	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:26	BMB	TAL BUF

Client Sample ID: SS-07 0"-2" **Lab Sample ID: 480-136903-21**
Date Collected: 06/01/18 12:35 **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-07 0"-2" **Lab Sample ID: 480-136903-21**
Date Collected: 06/01/18 12:35 **Matrix: Solid**
Date Received: 06/05/18 10:15 **Percent Solids: 83.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		20	419382	06/13/18 17:15	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 15:57	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:45	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:27	BMB	TAL BUF

Lab Chronicle

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-07 2"-12"

Lab Sample ID: 480-136903-22

Date Collected: 06/01/18 12:35
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-07 2"-12"

Lab Sample ID: 480-136903-22

Date Collected: 06/01/18 12:35
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 83.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419382	06/13/18 17:43	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 16:01	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:48	AMH	TAL BUF
Total/NA	Prep	7471B			420874	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:29	BMB	TAL BUF

Client Sample ID: SS-07 12"-24"

Lab Sample ID: 480-136903-23

Date Collected: 06/01/18 12:35
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-07 12"-24"

Lab Sample ID: 480-136903-23

Date Collected: 06/01/18 12:35
Matrix: Solid
Date Received: 06/05/18 10:15
Percent Solids: 84.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		20	419382	06/13/18 18:12	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 16:04	AMH	TAL BUF
Total/NA	Prep	7471B			420875	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:33	BMB	TAL BUF

Client Sample ID: SS-08 0"-2"

Lab Sample ID: 480-136903-24

Date Collected: 06/01/18 12:40
Matrix: Solid
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-08 0"-2" — **Lab Sample ID: 480-136903-24**
Date Collected: 06/01/18 12:40 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 77.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		50	419382	06/13/18 18:40	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 16:08	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:52	AMH	TAL BUF
Total/NA	Prep	7471B			420875	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:35	BMB	TAL BUF

Client Sample ID: SS-08 2"-12" — **Lab Sample ID: 480-136903-25**
Date Collected: 06/01/18 12:40 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-08 2"-12" — **Lab Sample ID: 480-136903-25**
Date Collected: 06/01/18 12:40 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 93.3**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		5	419382	06/13/18 19:08	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419098	06/11/18 16:12	AMH	TAL BUF
Total/NA	Prep	7471B			420875	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:44	BMB	TAL BUF

Client Sample ID: SS-08 12"-24" — **Lab Sample ID: 480-136903-26**
Date Collected: 06/01/18 12:40 — **Matrix: Solid**
Date Received: 06/05/18 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	418089	06/06/18 05:15	CSW	TAL BUF

Client Sample ID: SS-08 12"-24" — **Lab Sample ID: 480-136903-26**
Date Collected: 06/01/18 12:40 — **Matrix: Solid**
Date Received: 06/05/18 10:15 — **Percent Solids: 88.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			418456	06/07/18 14:08	SGD	TAL BUF
Total/NA	Analysis	8270D		1	419382	06/13/18 19:37	PJQ	TAL BUF
Total/NA	Prep	3050B			418721	06/08/18 18:16	KMP	TAL BUF

Lab Chronicle

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Client Sample ID: SS-08 12"-24"
Date Collected: 06/01/18 12:40
Date Received: 06/05/18 10:15

Lab Sample ID: 480-136903-26
Matrix: Solid
Percent Solids: 88.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010C		1	419098	06/11/18 16:15	AMH	TAL BUF
Total/NA	Prep	3050B			419412	06/13/18 17:32	KMP	TAL BUF
Total/NA	Analysis	6010C		1	419810	06/14/18 17:56	AMH	TAL BUF
Total/NA	Prep	7471B			420875	06/21/18 16:35	BMB	TAL BUF
Total/NA	Analysis	7471B		1	420968	06/21/18 18:46	BMB	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New York	NELAP	2	10026	03-31-18 *

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL BUF
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL BUF
6010C	Metals (ICP)	SW846	TAL BUF
7471B	Mercury (CVAA)	SW846	TAL BUF
Moisture	Percent Moisture	EPA	TAL BUF
3050B	Preparation, Metals	SW846	TAL BUF
3550C	Ultrasonic Extraction	SW846	TAL BUF
5035A_L	Closed System Purge and Trap	SW846	TAL BUF
7471B	Preparation, Mercury	SW846	TAL BUF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: New York State D.E.C.
Project/Site: Former Vacuum Oil #0370583 PIN 07888

TestAmerica Job ID: 480-136903-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-136903-1	SB-03 11'-12'	Solid	06/01/18 10:45	06/05/18 10:15
480-136903-2	SB-03 13-14.2'	Solid	06/01/18 11:10	06/05/18 10:15
480-136903-3	SS-01 0"-2"	Solid	06/01/18 10:00	06/05/18 10:15
480-136903-4	SS-01 2"-12"	Solid	06/01/18 10:00	06/05/18 10:15
480-136903-5	SS-01 12"-24"	Solid	06/01/18 10:00	06/05/18 10:15
480-136903-6	SS-02 0"-2"	Solid	06/01/18 11:20	06/05/18 10:15
480-136903-7	SS-02 2"-12"	Solid	06/01/18 11:20	06/05/18 10:15
480-136903-8	SS-02 12"-24"	Solid	06/01/18 11:20	06/05/18 10:15
480-136903-9	SS-03 0"-2"	Solid	06/01/18 11:55	06/05/18 10:15
480-136903-10	SS-03 2"-12"	Solid	06/01/18 11:55	06/05/18 10:15
480-136903-11	SS-03 12"-24"	Solid	06/01/18 11:55	06/05/18 10:15
480-136903-12	SS-04 0"-2"	Solid	06/01/18 12:10	06/05/18 10:15
480-136903-13	SS-04 2"-12"	Solid	06/01/18 12:10	06/05/18 10:15
480-136903-14	SS-04 12"-24"	Solid	06/01/18 12:10	06/05/18 10:15
480-136903-15	SS-05 0"-2"	Solid	06/01/18 12:20	06/05/18 10:15
480-136903-16	SS-05 2"-12"	Solid	06/01/18 12:20	06/05/18 10:15
480-136903-17	SS-05 12"-24"	Solid	06/01/18 12:20	06/05/18 10:15
480-136903-18	SS-06 0"-2"	Solid	06/01/18 12:25	06/05/18 10:15
480-136903-19	SS-06 2"-12"	Solid	06/01/18 12:25	06/05/18 10:15
480-136903-20	SS-06 12"-24"	Solid	06/01/18 12:25	06/05/18 10:15
480-136903-21	SS-07 0"-2"	Solid	06/01/18 12:35	06/05/18 10:15
480-136903-22	SS-07 2"-12"	Solid	06/01/18 12:35	06/05/18 10:15
480-136903-23	SS-07 12"-24"	Solid	06/01/18 12:35	06/05/18 10:15
480-136903-24	SS-08 0"-2"	Solid	06/01/18 12:40	06/05/18 10:15
480-136903-25	SS-08 2"-12"	Solid	06/01/18 12:40	06/05/18 10:15
480-136903-26	SS-08 12"-24"	Solid	06/01/18 12:40	06/05/18 10:15

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	NYSDEC Project Manager: Frank Sowers	Site Contact: Steven Rife	Date: 6/4/2018	COC No:
LaBella Associates, D.P.C. on behalf of NYSDEC	Tel/Fax: 585-755-9244	Lab Contact: Orlette Johnson	Carrier: FedEx	1 of 3 COCs
300 State Street	Analysis Turnaround Time			Sampler: Steven Rife
Rochester, New York 14614	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(585) 454-6110	TAT if different from Below _____			Walk-in Client:
	☒ 2 weeks			Lab Sampling:
Project Name: Former Vacuum Oil Sampling June 2018	☐ 1 week			Job / SDG:
Labella PO: 2161937 PH 022	☐ 2 days			
NYSDEC CallOut ID: 134788	☐ 1 day			480-136903 COC

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	CP-51 + TCL VOCs + TICs	CP-51 + TCL SVOCs + TICs	TAL Metals
SB-03 11'-12'	6/1/18	1045	G	SS	1			X	X	
SB-03 13-14.2'	6/1/18	1110	G	SS	1			X	X	
SS-01 0"-2"	6/1/18	1000	G	SS	1				X	X
SS-01 2"-12"	6/1/18	1000	G	SS	1				X	X
SS-01 12"-24"	6/1/18	1000	G	SS	1				X	X
SS-02 0"-2"	6/1/18	1120	G	SS	1				X	X
SS-02 2"-12"	6/1/18	1120	G	SS	1				X	X
SS-02 12"-24"	6/1/18	1120	G	SS	1				X	X
SS-03 0"-2"	6/1/18	1155	G	SS	1				X	X
SS-03 2"-12"	6/1/18	1155	G	SS	1				X	X
SS-03 12"-24"	6/1/18	1155	G	SS	1				X	X
SS-04 0"-2"	6/1/18	1210	G	SS	1				X	X

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
ASP CAT A RPT

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: #1 3.5 Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
S.Rife Steven Rife	LaBella	2030	FedEx	FedEx	6/4/18 2030
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
			[illegible]	TAB	6/5/18 1015
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	NYSDEC Project Manager: Frank Sowers	Site Contact: Steven Rife	Date: 6/4/2018	COC No:
LaBella Associates, D.P.C. on behalf of NYSDEC	Tel/Fax: 585-755-9244	Lab Contact: Orlette Johnson	Carrier: FedEx	2 of 3 COCs
300 State Street	Analysis Turnaround Time			Sampler: Steven Rife
Rochester, New York 14614	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(585) 454-6110	TAT if different from Below _____			Walk-in Client:
	☒ 2 weeks			Lab Sampling:
Project Name: Former Vacuum Oil Sampling June 2018	☐ 1 week			
Labella PO: 2161937 PH 022	☐ 2 days			Job / SDG No.:
NYSDEC CallOut ID: 134788	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	CP-51 + TCL VOCs + TICs	CP-51 + TCL SVOCs + TICs	TAL Metals	Sample Specific Notes:
SS-04 2"-12"	6/1/18	1210	G	SS	1				X	X	
SS-04 12"-24"	6/1/18	1210	G	SS	1				X	X	
SS-05 0"-2"	6/1/18	1220	G	SS	1				X	X	
SS-05 2"-12"	6/1/18	1220	G	SS	1				X	X	
SS-05 12"-24"	6/1/18	1220	G	SS	1				X	X	
SS-06 0"-2"	6/1/18	1225	G	SS	1				X	X	
SS-06 2"-12"	6/1/18	1225	G	SS	1				X	X	
SS-06 12"-24"	6/1/18	1225	G	SS	1				X	X	
SS-07 0"-2"	6/1/18	1235	G	SS	1				X	X	
SS-07 2"-12"	6/1/18	1235	G	SS	1				X	X	
SS-07 12"-24"	6/1/18	1235	G	SS	1				X	X	
SS-08 0"-2"	6/1/18	1240	G	SS	1				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

ASP CAT A. RPT

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: #1 3.5	Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
S. Rife Steven Rife	LaBella	2030	FedEx	FedEx	6/4/18 2030
Relinquished by:	Company:	Date/Time:	Received by: Orlette	Company: TAB	Date/Time: 6/5/18 1015
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	NYSDEC Project Manager: Frank Sowers	Site Contact: Steven Rife	Date: 6/4/2018	COC No:
LaBella Associates, D.P.C. on behalf of NYSDEC	Tel/Fax: 585-755-9244	Lab Contact: Orlette Johnson	Carrier: FedEx	3 of 3 COCs
300 State Street	Analysis Turnaround Time			Sampler: Steven Rife
Rochester, New York 14614	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(585) 454-6110	TAT if different from Below _____			Walk-in Client:
	☒ 2 weeks			Lab Sampling:
Project Name: Former Vacuum Oil Sampling June 2018	☐ 1 week			
Labella PO: 2161937 PH 022	☐ 2 days			Job / SDG No.:
NYSDEC CallOut ID: 134788	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	CP-51 + TCL VOCs + TICs	CP-51 + TCL SVOCs + TICs	TAL Metals	Sample Specific Notes:
SS-08 2"-12"	6/1/18	1240	G	SS	1				X	X	
SS-08 12"-24"	6/1/18	1240	G	SS	1				X	X	
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						
	6/1/18		G	SS	1						

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ASP CAT A. RPT

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: #1 3.5	Corr'd: _____	Therm ID No.: _____

Relinquished by: S. Rife	Company: LaBella	Date/Time: 2030	Received by: FedEx	Company: FedEx	Date/Time: 6/4/2018 2030
Relinquished by:	Company:	Date/Time:	Received by:	Company: TAB	Date/Time: 6/5/18 1015
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.11, dated 1/24/2017

Login Sample Receipt Checklist

Client: New York State D.E.C.

Job Number: 480-136903-1

Login Number: 136903

List Source: TestAmerica Buffalo

List Number: 1

Creator: Kolb, Chris M

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	LABELLA
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

APPENDIX B

Roux Standard Operating Procedures (SOPs)

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures and standards for record keeping and maintenance, for all field activities conducted by Roux Associates, Inc. (Roux Associates).

Strict quality assurance/quality control (QA/QC) is necessary to properly and accurately document and preserve all project-related information. Quality assurance is implemented to corroborate that quality control procedures are followed. Quality control provides a means to monitor investigation activities (e.g., sampling and laboratory performance) as a check on the quality of the data.

Valid data and information are integral to all aspects of Roux Associates' field activities. These aspects include, but are not necessarily limited to, activities that involve: drilling; sediment, sludge, and soil sampling (lithologic, and soil-quality and analysis); well construction and development; aquifer testing and analysis; water-quality sampling and analysis (surface water and ground water); free-product sampling and analysis; air-quality sampling and analysis; geophysical testing; demolition activities; waste removal operations; engineering installations; etc. The data will be confirmed by QA/QC methods established and set forth in the work plan/scope of work. Without checks on the field and analytical procedures, the potential exists for contradictory results, and associated incomplete or incorrect results from the interpretation of potentially questionable data.

Documentation will be entered in the field notebook and must be transcribed with extreme care, in a clear and concise manner, as the information recorded will become part of the permanent legal record. Because field notes are the legal record of site activities, they must be taken in a standard and consistent manner. If abbreviations are used, then they must first be spelled out for clarity (i.e., to avoid ambiguity and misunderstanding). All entries must be dated and initialed, and the time (military time) of the entry included. Field notebooks and forms must be assigned to an individual project and properly identified (i.e., client name, project number, location and name of site, individual recording information, dates, times, etc.). Change of possession of field notebooks or forms must be documented with the date and time, and initialed by both individuals. Following each day's entries, the field notebook or form must be photocopied in the event that the original documentation is lost or stolen. All field notebooks must have the company name and address legibly printed in indelible ink along with the message "If found, then please forward to Roux Associates, Inc. at the above address - REWARD OFFERED."

Information must be recorded while onsite because it may be difficult to recall details at a later date. Furthermore, information must be documented immediately as it provides unbiased information which will be used for writing the report when the field activities are completed. Project-related documentation is an irreplaceable, important record for

other individuals who may become involved in the project, and provides the project manager with a complete history of project-related activities. Written information must be accompanied by maps, sketches, and photographs where appropriate, especially if these supplemental sources of information assist in the documentation process. A new page must be used in the field notebook for each new day's entries (i.e., unused portions of a previous page must have an "X" placed through it). The end of the day's records must be initialed and dated.

As part of record keeping and QA/QC activities, state and federal regulatory agencies should be contacted to check if special or different protocols are required and/or if particular or unconventional methods are required for the given field activity. Thus, the record keeping and QA/QC activities implemented by Roux Associates are based on technically sound standard practices and incorporate Roux Associates own, extensive experience in conducting hydrogeologic field activities.

2.0 MATERIALS

In order to track investigation activities, specific materials are required. These materials include the following:

a. A bound, waterproof field notebook.

b. Appropriate Roux Associates' forms (e.g., daily log, geologic log, monitoring well construction log, well sampling data form, location sketch, chain of custody, telephone conversation record, meeting notes, etc.).

c. Appropriate labels (e.g., sample, Roux Associates' Custody Seal, etc.)

d. Work plan/scope of work.

e. Health and safety plan (HASP).

f. Appropriate Roux Associates' SOPs.

g. Black pens, and indelible markers.

h. Camera and film.

3.0 DOCUMENTATION

3.1 Before the Roux Associates personnel leave the field, they must ensure that their field notes include comprehensive descriptions of the hydrogeologic conditions, and all investigation-related activities and results (onsite and offsite). This will safeguard against the inability to reconstruct and comprehend all aspects of the field investigation after its completion, and will serve to facilitate the writing of an accurate report. Properly documented information provides the QA/QC tracking (back-up) required for all Roux Associates' projects. General types of

information that must be recorded (where pertinent to the investigation being conducted) include, but may not necessarily be limited to, the following:

a. List of Roux Associates personnel on site.

b. Name, date, and time of arrival on site by Roux Associates personnel, including temporary departures from, and returns to, the site during the work day.

c. Client and project number.

d. Name and location of study area.

e. Date and time of arrival on site by non-Roux Associates personnel (names and affiliation) and equipment (e.g., subcontractors and facility personnel, and drilling equipment, respectively, etc.), including temporary departures from, and returns to, the site during the work day, and departure at the end of the work day.

f. List of non-Roux Associates personnel on site.

g. Weather conditions at the beginning of the day as well as any changes in weather that occur during the working day.

h. Health and safety procedures including level of protection, monitoring of vital signs, frequency of air monitoring, and any change (i.e., downgrade or upgrade) in the level of protection for Roux Associates and other on-site personnel (e.g., subcontractors, facility personnel, etc.).

i. Health and safety procedures not in compliance with the HASP (for all on-site personnel).

j. Site reconnaissance information (e.g., topographic features, geologic features, surface-water bodies, seeps, areas of apparent contamination, facility/plant structures, etc.).

k. Air monitoring results (i.e., photoionization detector [PID], etc. measurements).

l. Task designation and work progress.

m. Work-related and site-related discussions with subcontractors, regulatory agency personnel, plant personnel, the general public, and Roux Associates personnel.

n. Delays, unusual situations, problems and accidents.

o. Field work not conducted in accordance with the work plan/scope of work, and rationale and justification for any change(s) in field procedures including discussions with personnel regarding the change(s) and who authorized the change(s).

p. QA/QC procedures not conducted in accordance with the QA/QC procedures established in the work plan/scope of work and rationale and justification for any change(s) in QA/QC procedures including discussions with personnel regarding the change(s) and who authorized the change(s).

q. Equipment and instrument problems.

r. Decontamination and calibration procedures.

s. Activities in and around the site and work area by any and all on-site personnel which may impact field activities.

t. Sketches, maps, and/or photographs (with dates and times) of the site, structures, equipment, etc. that would facilitate explanations of site conditions.

u. Contamination evidenced as a result of work-related activities (e.g., visible contaminants [sheen] in drilling fluids or on drilling equipment; sheen on, or staining of, sediments; color of, or separate [nonaqueous] phase on, water from borehole or well; vapors or odors emanating from a borehole or well; etc.); make all observations as objectively as possible (e.g., grey-blue, oil-like sheen; black and orange, rust-like stain; fuel-like odor; etc.) and avoid using nontechnical or negative-sounding terms (e.g., slimy, goopy, foul-smelling).

v. Date and time of final departure from the site of all personnel at the end of the work day.

3.2 In addition to the general types of information that must be recorded (as presented in Section 3.1), task-specific information must also be properly documented. Task-specific information which is required is provided in each respective task-oriented SOP, and the documentation procedures outlined in each SOP must be followed.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for sample handling which will allow consistent and accurate results. Valid chemistry data are integral to investigations that characterize media-quality conditions. Thus, this SOP is designed to ensure that once samples are collected, they are preserved, packed and delivered in a manner which will maintain sample integrity to as great an extent as possible. The procedures outlined are applicable to most sampling events and any required modifications must be clearly described in the work plan.

2.0 CONSIDERATIONS

Sample containers, sampling equipment decontamination, quality assurance/quality control (QA/QC), sample preservation, and sample handling are all components of this SOP.

2.1 Sample Containers

Prior to collection of a sample, considerations must be given to the type of container that will be used to store and transport the sample. The type and number of containers selected is usually based on factors such as sample matrix, potential contaminants to be encountered, analytical methods requested, and the laboratory's internal quality assurance requirements. In most cases, the overriding considerations will be the analytical methodology, or the state or federal regulatory requirements because these regulations generally encompass the other factors. The sample container selected is usually based on some combination of the following criteria:

a. Reactivity of Container Material with Sample

Choosing the proper composition of sample containers will help to ensure that the chemical and physical integrity of the sample is maintained. For sampling potentially hazardous material, glass is the recommended container type because it is chemically inert to most substances. Plastic containers are not recommended for most hazardous wastes because the potential exists for contaminants to adsorb to the surface of the plastic or for the plasticizer to leach into the sample.

In some instances, however, the sample characteristics or analytes of interest may dictate that plastic containers be used instead of glass. Because some metals species will adhere to the sides of the glass containers in an aqueous matrix, plastic bottles (e.g., nalgene) must be used for samples collected for metals analysis. A separate, plastic container should accompany glass containers if metals analysis is to be performed along with other analyses. Likewise, other sample

characteristics may dictate that glass cannot be used. For example, in the case of a strong alkali waste or hydrofluoric solution, plastic containers may be more suitable because glass containers may be etched by these compounds and create adsorptive sites on the container's surface.

b. Volume of the Container

The volume of sample to be collected will be dictated by the analysis being performed and the sample matrix. The laboratory must supply bottles of sufficient volume to perform the required analysis. In most cases, the methodology dictates the volume of sample material required to complete the analysis. However, individual laboratories may provide larger volume containers for various analytes to ensure sufficient quantities for duplicates or other QC checks.

To facilitate transfer of the sample from the sampler into the container and to minimize spillage and sample disturbance, wide-mouth containers are recommended. Aqueous volatile organic samples must be placed into 40-milliliter (ml) glass vials with polytetrafluoroethylene (PTFE) (e.g., TeflonTM) septums. Non-aqueous volatile organic samples should be collected in the same type of vials or in 4-ounce (oz) wide-mouth jars provided by the laboratory. These jars should have PTFE-lined screw caps.

c. Color of Container

Whenever possible, amber glass containers should be used to prevent photodegradation of the sample, except when samples are being collected for metals analysis. If amber containers are not available, then containers holding samples should be protected from light (i.e., place in cooler with ice immediately after filling).

d. Container Closures

Container closures must screw on and off the containers and form a leak-proof seal. Container caps must not be removed until the container is ready to be filled with the sample, and the container cap must be replaced (securely) immediately after filling it. Closures should be constructed of a material which is inert with respect to the sampled material, such as PTFE (e.g., TeflonTM). Alternately, the closure may be separated from the sample by a closure liner that is inert to the sample material such as PTFE sheeting. If soil or sediment samples are being collected, the threads of the container must be wiped clean with a dedicated paper towel or cloth so the cap can be threaded properly.

e. Decontamination of Sample Containers

Sample containers must be laboratory cleaned by the laboratory performing the analysis. The cleaning procedure is dictated by the specific analysis to be performed on the sample. Sample containers must be carefully examined to ensure that all containers appear clean. Do not mistake the preservative as unwanted residue. The bottles should not be field cleaned. If there is any question regarding the integrity of the bottle, then the laboratory must be contacted immediately and the bottle(s) replaced.

f. Sample Bottle Storage and Transport

No matter where the sample bottles are, whether at the laboratory waiting to be packed for shipment or in the field waiting to be filled with sample, care must be taken to avoid contamination. Sample shuttles or coolers, and sample bottles must be stored and transported in clean environments. Sample bottles and clean sampling equipment must never be stored near solvents, gasoline, or other equipment that is a potential source of cross-contamination. When under chain of custody, sample bottles must be secured in locked vehicles, and custody sealed in shuttles or in the presence of authorized personnel. Information which documents that proper storage and transport procedures have been followed must be included in the field notebook and on appropriate field forms.

2.2 Decontamination of Sampling Equipment

Proper decontamination of all re-usable sampling equipment is critical for all sampling episodes. The SOP for Decontamination of Field Equipment and SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for decontamination of various types of equipment.

2.3 Quality Assurance/Quality Control Samples

QA/QC samples are intended to provide control over the proper collection and tracking of environmental measurements, and subsequent review, interpretation and validation of generated analytical data. The SOPs for Collection of Quality Control Samples, for Evaluation and Validation of Data, and for Field Record Keeping and Quality Assurance/Quality Control must be referred to for detailed guidance regarding these respective procedures. SOPs for method-specific or instrument-specific tasks must also be referred to for guidance for QA/QC procedures.

2.4 Sample Preservation Requirements

Certain analytical methodologies for specific analytes require chemical additives in order to stabilize and maintain sample integrity. Generally, this is accomplished under the following two scenarios:

a. Sample bottles are preserved at the laboratory prior to shipment into the field.

b. Preservatives are added in the field immediately after the samples are collected.

Many laboratories provide pre-preserved bottles as a matter of convenience and to help ensure that samples will be preserved immediately upon collection. A problem associated with this method arises if not enough sample could be collected, resulting in too much preservative in the sample. More commonly encountered problems with this method include the possibility of insufficient preservative provided to achieve the desired pH level or the need for additional preservation due to chemical reactions caused by the addition of sample liquids to pre-preserved bottles. The use of pre-preserved bottles is acceptable; however, field sampling teams must always be prepared to add additional preservatives to samples if the aforementioned situations occur. Furthermore, care must be exercised not to overfill sample bottles containing preservatives to prevent the sample and preservative from spilling and therefore diluting the preservative (i.e., not having enough preservative for the volume of sample).

When samples are preserved after collection, special care must be taken. The transportation and handling of concentrated acids in the field requires additional preparation and adherence to appropriate preservation procedures. All preservation acids used in the field should be trace-metal or higher-grade.

2.5 Sample Handling

After the proper sample bottles have been received under chain-of-custody, properly decontaminated equipment has been used to collect the sample, and appropriate preservatives have been added to maintain sample integrity, the final step for the field personnel is checking the sample bottles prior to proper packing and delivery of the samples to the laboratory.

All samples should be organized and the labels checked for accuracy. The caps should be checked for tightness and any 40-ml volatile organic compound (VOC) bottles must be checked for bubbles. Each sample bottle must be placed in an individual "zip-lock" bag to protect the label, and placed on ice. The bottles must be carefully packed to prevent breakage during transport. When several bottles have been collected for an individual sample, they should not be placed adjacent to each other in the cooler to prevent possible breakage of all bottles for a given sample. If there are any samples which are known or suspected to be highly contaminated, these should be placed in an individual cooler under separate chain-of-custody to prevent possible cross contamination. Sufficient ice (wet or blue packs) should be placed in the cooler to maintain the temperature at 4 degrees Celsius (°C) until delivery at the laboratory. Consult the work plan to determine if a particular ice is specified as the preservation for transportation (e.g., the United States Environmental Protection Agency does not like the use of blue packs because they claim that the samples will not hold at 4°C). If additional

coolers are required, then they should be purchased. The chain-of-custody form should be properly completed, placed in a "zip-lock" bag, and placed in the cooler. One copy must be maintained for the project files. The cooler should be sealed with packing tape and a custody seal. The custody seal number should be noted in the field book. Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time. If overnight mail is utilized, then the shipping bill must be maintained for the files and the laboratory must be called the following day to confirm receipt.

3.0 EQUIPMENT AND MATERIALS

3.1 General equipment and materials may include, but not necessarily be limited to, the following:

a. Sample bottles of proper size and type with labels.

b. Cooler with ice (wet or blue pack).

c. Field notebook, appropriate field form(s), chain-of-custody form(s), custody seals.

d. Black pen and indelible marker.

e. Packing tape, "bubble wrap", and "zip-lock" bags.

f. Overnight (express) mail forms and laboratory address.

g. Health and safety plan (HASP).

h. Work plan/scope of work.

i. Pertinent SOPs for specified tasks and their respective equipment and materials.

3.2 Preservatives for specific samples/analytes as specified by the laboratory. Preservatives must be stored in secure, spillproof glass containers with their content, concentration, and date of preparation and expiration clearly labeled.

3.3 Miscellaneous equipment and materials including, but not necessarily limited to, the following:

a. Graduated pipettes.

b. Pipette bulbs.

c. Litmus paper.

d. Glass stirring rods.

e. Protective goggles.

f. Disposable gloves.

g. Lab apron.

h. First aid kit.

i. Portable eye wash station.

j. Water supply for immediate flushing of spillage, if appropriate.

k. Shovel and container for immediate containerization of spillage-impacted soils, if appropriate.

4.0 PROCEDURE

4.1 Examine all bottles and verify that they are clean and of the proper type, number, and volume for the sampling to be conducted.

4.2 Label bottles carefully and clearly with project name and number, site location, sample identification, date, time, and the sampler's initials using an indelible marker.

4.3 Collect samples in the proper manner (refer to specific sampling SOPs).

4.4 Conduct preservation activities as required after each sample has been collected. Field preservation must be done immediately and must not be done later than 30 minutes after sample collection.

4.5 Conduct QC sampling, as required.

4.6 Seal each container carefully and place in an individual "zip lock" bag.

4.7 Organize and carefully pack all samples in the cooler immediately after collection (e.g., bubble wrap). Insulate samples so that breakage will not occur.

4.8 Complete and place the chain-of-custody form in the cooler after all samples have been collected. Maintain one copy for the project file. If the cooler is to be transferred several times prior to shipment or delivery to the laboratory, it may be easier to tape the chain-of-custody to the exterior of the sealed cooler. When exceptionally hazardous samples are known or suspected to be present, this should be identified on the chain-of-custody as a courtesy to the laboratory personnel.

4.9 Add additional ice as necessary to ensure that it will last until receipt by the laboratory.

4.10 Seal the cooler with packing tape and a custody seal. Record the number of the custody seal in the field notebook and on the field form. If there are any

exceptionally hazardous samples, then shipping regulations should be examined to ensure that the sample containers and coolers are in compliance and properly labeled.

4.11 Samples collected from Monday through Friday will be delivered to the laboratory within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if certain analytes require a shorter delivery time.

4.12 Maintain the shipping bill for the project files if overnight mail is utilized and call the laboratory the following day to confirm receipt.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for laboratory analysis. This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, grab samples from stockpiled soils, surface samples, test pit samples, etc.

2.0 CONSIDERATIONS

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact or suspected source areas. Soil samples can be collected at the surface, shallow subsurface, or at depth. When samples are collected at depth the water content should be noted, since generally "soil sampling" is restricted to the unsaturated zone. Equipment selection will be determined by the depth of the sample to be collected. A thorough description of the sampling locations and proposed methods of sample collection should be included in the work plan.

Commonly, surface sampling refers to the collection of samples at a 0 to 6 inch depth interval. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan. Collection of surface soil samples is most efficiently accomplished with the use of a stainless steel trowel or scoop. For samples at greater depths a decontaminated bucket auger or power auger may be needed to advance the hole to the point of sample collection. Another clean bucket auger should then be used to collect the sample. To collect samples at depths of greater than approximately six feet the use of a drill rig and split spoon samples will usually be necessary. In some situations, sample locations are accessed with the use of a backhoe.

3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines soil sampling requirements.

b. Field notebook, field form(s), maps, chain-of-custody forms, and custody seals.

c. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents, aluminum foil, plastic sheeting, etc.).

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable sampling gloves.

g. Laboratory-supplied sample containers with labels.

h. Cooler with blue or wet ice.

i. Plastic sheeting.

j. Black pen and indelible marker.

k. Zip-lock bags and packing material.

l. Tape measure.

m. Paper towels or clean rags.

n. Masking and packing tape.

o. Overnight (express) mail forms.

4.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner.

5.0 PROCEDURE

5.1 Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned according to the decontamination SOP. If samples are to be collected at depth, then the boring must be advanced with thoroughly cleaned equipment to the desired sampling horizon and a different thoroughly cleaned sampler must be used to collect the sample.

5.2 Using disposable gloves and a pre-cleaned, stainless steel spatula or spoon, extract the soil sample from the sampler, measure the recovery, and separate the wash from the true sample. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

5.3 Place the sample in a laboratory-supplied, pre-cleaned sample container. This should be done as quickly as possible and this is especially important when sampling for volatile organic compounds (VOCs). Samples to be analyzed for VOCs must be collected prior to other constituents.

5.4 The sample container will be labeled with appropriate information such as, client name, site location, sample identification (location, depth, etc.), date and time of collection, and sampler’s initials.

5.5 Using the remaining portion of soil from the sampler, log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, layering, grain size, etc.).

5.6 If soil samples are to be composited in the field, then equal portions from selected locations will be placed on a clean plastic sheet and homogenized. Alternately, several samples may be submitted to the laboratory for compositing by weight. The method used is dependent upon regulatory requirements. Specific compositing procedures shall be approved by the appropriate regulatory agency and described in the work plan. Samples to be analyzed for VOCs will not be composited unless required by a regulatory agency.

5.7 After the sample has been collected, labeled, and logged in detail, it is placed in a zip-lock bag and stored in a cooler at 4°C.

5.8 A chain-of-custody form is completed for all samples collected. One copy is retained and two are sent with the samples in a zip-lock bag to the laboratory. A custody seal is placed on the cooler prior to shipment.

5.9 Samples collected from Monday to Friday are to be delivered to the laboratory within 24 hours of collection. If Saturday delivery is unavailable, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if any analytes require a shorter delivery time.

5.10 The field notebook and appropriate forms should include, but not be limited to the following: client name, site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, etc. A site map should be prepared with exact measurements to each sample location in case follow-up sampling is necessary.

5.11 All reusable sampling equipment must be thoroughly cleaned in accordance with the decontamination SOP. Following the final decontamination (after all samples are collected) the sampling equipment is wrapped in aluminum foil. Discard any gloves, foil, plastic, etc. in an appropriate manner that is consistent with site conditions.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for screening soil samples for volatile organic vapors using a portable photoionization detector (PID). This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, and grab samples from stockpiled soils.

2.0 CONSIDERATIONS

The primary objective of photoionization screening of soil samples is to obtain a qualitative understanding of the distribution of volatile organic compounds (VOCs) in soil. The proper design of an organic vapor screening program requires an understanding of site hydrogeology, potential source areas, and potential constituents of concern. Sample locations and frequency must be fully defined in the work plan. The work plan should outline the type of lamp to be utilized in the PID based on the ionization potentials and response factors of the constituents of concern. The work plan must also clearly describe the heating or equilibration procedures to be employed if they differ from those described in this SOP. Regardless of the specific equilibration procedure employed, it is imperative that each sample be treated identically to allow the photoionization results from different locations to be compared. Observations such as water, clay, and organic content should be noted to facilitate interpretation of the data. Every effort should be made to collect a representative portion of soil from the sampling device.

3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines photoionization screening requirements.

b. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents [e.g., acetone, nitric acid, hexane, etc.], aluminum foil, plastic sheeting, etc.).

c. Field notebook, field form(s), maps, chain-of-custody forms.

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable plastic spoons.

g. Plastic sheeting.

h. Aluminum foil.

i. Mason jars or driller's jars.

j. Water bath (hot plate, extension cord, water tray, thermometer).

k. Photoionization detector with charging unit.

l. Calibration gases with regulator.

m. Indelible marker.

n. Masking tape.

o. Disposable sampling gloves.

4.0 DECONTAMINATION

Where possible, thoroughly pre-cleaned and wrapped sampling equipment must be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and sample jars will be changed after each use and discarded in an appropriate manner. If only photoionization results are to be obtained, then split-spoon samples and hand augers may be cleaned with a soap and water wash and potable water rinse or steam cleaning, and a final distilled water rinse. However, if samples are to be collected concurrently for laboratory analytical results, then all reusable sampling equipment must be thoroughly decontaminated according to the SOP for decontamination of field equipment.

5.0 CALIBRATION

The PID must be calibrated according to the manufacturer's specifications at a minimum frequency of once per day prior to collecting photoionization readings. In addition, periodic checks (e.g., every 2 hours or every ten samples) with the standard gas will be conducted to confirm that the calibration has not drifted. The time, date, and calibration procedure must be clearly documented in the field notebook and the calibration log. If at any time the photoionization results appear erratic or inconsistent with field observations, then the unit must be recalibrated. If calibration is difficult to achieve, then the unit's lamp should be checked for dirt or moisture and cleaned, as necessary. During humid or wet conditions, the unit should be calibrated on a more frequent basis as determined by field personnel.

6.0 PROCEDURE

6.1 Extract the soil sample from the sampler, quickly measure the recovery, and separate the wash from the true sample by using a dedicated, stainless steel spatula. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

6.2 Place the sample in a pre-cleaned glass jar (as quickly as possible to avoid loss of VOCs) filling the jar half full. Place an aluminum foil seal between the glass and metal cap and screw tight.

6.3 Label jars with the boring number, depth of sample, date of collection and blow counts. In addition, the field personnel will ensure the following: samples are taken at appropriate depths; unrepresentative portions of the sample are discarded properly; that the sampler is decontaminated properly between use; and the driller uses proper methods during sample collection and does not use oil or grease on tools entering the borehole.

6.4 Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, and layering).

6.5 After the sample has been collected, heat the sample under controlled conditions in a water bath for a 2 minute period.

6.6 Ensure that the PID has been calibrated and that the calibration information is documented in the field book. Pierce the aluminum foil seal with the probe from the PID and measure the relative concentration of VOCs in the headspace of the soil sample. The initial (peak) reading must be recorded.

6.7 Record the PID reading in the field notebook, on an appropriate field form, and on the base map, if appropriate.

6.8 Place any material not representative of the interval sampled in a pile with the other cuttings from the borehole.

6.9 If only photoionization results are to be obtained, then reusable sampling devices may be cleaned with a soap and water wash and a potable water rinse. The sampler will then be rinsed with distilled water, assembled and placed on plastic sheeting for reuse. A more rigorous decontamination procedure is required when samples are also being collected for laboratory analysis. Refer to the SOP for collection of soil samples for laboratory analysis for additional information.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for decontamination of all field equipment potentially exposed to contamination during drilling, and soil and water sampling. The objective of decontamination is to ensure that all drilling, and soil-sampling and water-sampling equipment is decontaminated (free of potential contaminants): 1) prior to being brought onsite to avoid the introduction of potential contaminants to the site; 2) between drilling and sampling events/activities onsite to eliminate the potential for cross-contamination between boreholes and/or wells; and 3) prior to the removal of equipment from the site to prevent the transportation of potentially contaminated equipment offsite.

In considering decontamination procedures, state and federal regulatory agency requirements must be considered because of potential variability between state and federal requirements and because of variability in the requirements of individual states. Decontamination procedures must be in compliance with state and/or federal protocols in order that regulatory agency(ies) scrutiny of the procedures and data collected do not result in non acceptance (invalidation) of the work undertaken and data collected.

2.0 PROCEDURE FOR DRILLING EQUIPMENT

The following is a minimum decontamination procedure for drilling equipment. Drilling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

2.1 The rig and all associated equipment should be properly decontaminated by the contractor before arriving at the test site.

2.2 The augers, drilling casings, rods, samplers, tools, rig, and any piece of equipment that can come in contact (directly or indirectly) with the soil, will be steam cleaned onsite prior to set up for drilling to ensure proper decontamination.

2.3 The same steam cleaning procedures will be followed between boreholes (at a fixed on-site location[s], if appropriate) and before leaving the site at the end of the study.

2.4 All on-site steam cleaning (decontamination) activities will be monitored and documented by a member(s) of the staff of Roux Associates, Inc.

2.5 If drilling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat drilling equipment, then special decontamination procedures may have to be utilized before steam cleaning (e.g., hexane scrub and wash).

2.6 Containment of decontamination fluids may be necessary (e.g., rinseate from steam cleaning) or will be required (e.g., hexane), and disposal must be in accordance with state and/or federal procedures.

3.0 PROCEDURE FOR SOIL-SAMPLING EQUIPMENT

The following is a minimum decontamination procedure for soil-sampling equipment (e.g., split spoons, stainless-steel spatulas). Soil-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

3.1 Wear disposable gloves while cleaning equipment to avoid cross-contamination and change gloves as needed.

3.2 Steam clean the sampler or rinse with potable water. If soil-sampling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat sampling equipment, then special decontamination procedures may have to be utilized before steam cleaning and washing in detergent solution (e.g., hexane scrub and wash).

3.3 Prepare a non-phosphate, laboratory-grade detergent solution and distilled or potable water in a clean bucket.

3.4 Disassemble the sampler, as necessary and immerse all parts and other sampling equipment in the solution.

3.5 Scrub all equipment in the bucket with a brush to remove any adhering particles.

3.6 Rinse all equipment with copious amounts of potable water followed by distilled or deionized water.

3.7 Place clean equipment on a clean plastic sheet (e.g., polyethylene)

3.8 Reassemble the cleaned sampler, as necessary.

3.9 Transfer the sampler to the driller (or helper) making sure that this individual is also wearing clean gloves, or wrap the equipment with a suitable material (e.g., plastic bag, aluminum foil.

As part of the decontamination procedure for soil-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

4.0 PROCEDURE FOR WATER-SAMPLING EQUIPMENT

The following is a decontamination procedure for water-sampling equipment (e.g., bailers, pumps). Water-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

4.1 Decontamination procedures for bailers follow:

a. Wear disposable gloves while cleaning bailer to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a bucket.

c. Disassemble bailer (if applicable) and discard cord in an appropriate manner, and scrub each part of the bailer with a brush and solution.

d. Rinse with potable water and reassemble bailer.

e. Rinse with copious amounts of distilled or deionized water.

f. Air dry.

g. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

h. Rinse bailer at least three times with distilled or deionized water before use.

4.2 Decontamination procedures for pumps follow:

a. Wear disposable gloves while cleaning pump to avoid cross-contamination and change gloves as needed.

b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a clean bucket, clean garbage can, or clean 55-gallon drum.

c. Flush the pump and discharge hose (if not disposable) with the detergent solution, and discard disposable tubing and/or cord in an appropriate manner.

d. Flush the pump and discharge hose (if not disposable) with potable water.

e. Place the pump on clear plastic sheeting.

f. Wipe any pump-related equipment (e.g., electrical lines, cables, discharge hose) that entered the well with a clean cloth and detergent solution, and rinse or wipe with a clean cloth and potable water.

g. Air dry.

h. Wrap equipment with a suitable material (e.g., clean plastic bag).

As part of the decontamination procedure for water-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures, and to establish the guidelines for drilling (soil borings, wells, or piezometers) and formation sampling activities in unconsolidated formations. There are several drilling techniques available which include hollow-stem auger, cable tool, hydraulic rotary, cased-hole rotary, and air rotary. Formation (sediment/soil) sample collection include disturbed (drill cuttings), intact (split-spoon), and undisturbed (Shelby-tube or Denison-core). Borehole abandonment (closure) procedures will also be addressed in this SOP.

The objective of drilling is to collect accurate subsurface information and to prepare a borehole for potential completion as a well or piezometer. Consequently, the lithologic data is the all important, most essential information that can be collected. The lithologic data characterizes subsurface conditions, describes hydrogeologic coefficients qualitatively and/or quantitatively, and identifies optimum locations for screen zones if wells are constructed.

Data can be obtained through the physical examination and testing of formation samples, as well as knowledge regarding ground-water levels. Thus, drill fluid mix, fluid loss, rate of drilling, lengths of split-spoon and Shelby-tube/Denison-core recovery, etc. must be monitored by the on-site hydrogeologist or geologist.

2.0 DRILLING TECHNIQUE-SELECTION

Verify that the drilling technique is the one specified in the investigation work plan, and that the drilling equipment mobilized by the driller is in good condition and proper working order. Do not permit the driller to use a drilling rig that appears to be substandard, in disrepair, etc., and/or is questionable as to whether or not the rig has the capabilities to accomplish the goals of the drilling program. The drilling rig must be capable of:

a. Penetration of all anticipated subsurface materials and formations at a desired rate, and construction of a borehole of desired diameter (for the anticipated well, if applicable, including the placement of a gravel or sand pack through a tremie pipe and necessary formation sealing material such as bentonite or cement).

b. Identification of lithology for development of a geologic log of all unconsolidated formations and materials penetrated, including physical characteristics and visual description of color, grain sizes, sorting and mineralogy.

c. Collection of samples of aquifer fluids during the drilling process and prior to well construction, while at the same time minimizing potential for cross-contamination. The method used should prevent cross-contamination between surface soils and ground water or between different hydrogeologic units.

d. Collection of intact and/or undisturbed soil samples from the center line or sidewall of the borehole. This objective requires the drilling to be halted while soil samples are taken from the bottom or side of the incomplete borehole.

e. Completion of the borehole into a well (monitoring or observation) or piezometer during the initial construction process (i.e., constructing a well or piezometer as the borehole is drilled, or constructing a well or piezometer in the borehole immediately after the drilling tools are removed).

f. Implementation of borehole geophysical logging (when applicable and possible) to enable more accurate vertical and horizontal extrapolation of borehole data to the lithology of the hydrogeologic system.

g. Completion of a well or piezometer, if applicable, in the borehole following a time lapse for interpretation of geologic or geophysical data from the borehole.

3.0 DRILLING TECHNIQUE - DESCRIPTION

3.1 Hollow-Stem Auger - This drilling method is rapid and extremely effective in most cohesive sediments but less so in loose sandy material. Penetration may be up to 150 feet below land surface (bls) depending on the size of the rig, drilling conditions, and the diameter of the auger flight; however, depths up to 250 feet bls have been achieved under compatible conditions. A major advantage of this technique is that normally no fluids are introduced into the formation. If the auger flights can be removed and the integrity of the borehole maintained, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If the auger flights must remain in the borehole, then only radiation geophysical logs can be run. Casing, screen, and sampling devices can then be lowered through the hollow stem by removing the removable plug at the bottom of the auger flights, and gravel packing and cementing can be accomplished within the hollow stem. However, this can be difficult especially below the water table. Auger flight outside diameters (OD) range from 5 inches (in.) to 12 in. The diameter of a well that can be constructed inside the hollow stem is limited, however, to about 4 in.

3.2 Cable Tool (Percussion) - This drilling method is slow because the borehole is advanced by lifting and dropping a heavy string of drilling tools. Cuttings accumulate in the drill casing and are removed by a sand bailer. A steel casing is driven in as the hole is deepened. Cable-tool rigs can be used in unconsolidated sediment and bedrock to depths of hundreds or thousands of feet and often

employ telescoping techniques for drilling deep boreholes. Electrical geophysical logs cannot be run through the steel cased borehole, but radiation logs (e.g., gamma, neutron, etc.) can be run. Well casing and screen can be installed within the cased hole after which the outer casing is pulled back (removed). Because the boring is cased as it is being drilled, cross-contamination between various depths is practically eliminated. The method provides an excellent means to collect good, representative formation samples.

3.3 Hydraulic Rotary - This drilling method uses a rotating bit to drill (advance) the borehole. Drill cuttings are removed using a recirculating drilling fluid (mud or water). Although setting up the drilling equipment is slow, the drilling process is reasonably fast. In the mud-rotary method, drilling mud forms a cake on the borehole wall which prevents excessive loss of fluid to the formation being drilled. The hydrostatic pressure combined with the weight and density of the mud slurry keeps the hole open. This allows the drill rods to be removed from the borehole and geophysical logs (electric and radiation) to be run in the open borehole.

In reverse hydraulic rotary drilling, the drilling fluid moves downward through annular space and then upward inside the drill pipe. If the drilling fluid does not contain mud, then sufficient water flow is required as make-up water because the borehole wall is not sealed; therefore, significant water loss can occur to the formation being drilled. The borehole is held open by hydrostatic pressure only. A serious obstacle to this drilling method occurs when the static water level is less than 15 feet below land surface because of insufficient hydrostatic head difference between the borehole and the water table. However, the problems of excessive water loss and shallow depths to water may be overcome by using mud as the drilling fluid.

In mud-rotary drilling, the drilling fluid (mud) moves downward through the drill pipe and then upward through the annular space. Therefore, the borehole is held open by hydrostatic pressure and the mud cake lining the wall of the borehole. The mud-rotary method can be used to construct moderate to deep wells in unconsolidated (and consolidated material), while the reverse rotary technique can be used to construct moderate to deep wells in unconsolidated materials. The principal disadvantage may be the difficulty in removing mud cake from the formation at the screened zone. Extensive well development may be required to remove the mud cake.

3.4 Cased-Hole Rotary - Several new rotary drilling techniques have been developed in which a steel casing is advanced with an air-rotary or mud-rotary drill. This technique is highly desirable for use in exploratory drilling at monitoring sites because water and soil samples may be collected under conditions which preclude contamination from shallower depths. Furthermore, this technique is extremely

effective in boulder or cavernous zones which would inhibit or preclude drilling using other techniques. Drilling results are comparable to cable-tool drilling but with greatly enhanced speeds. In all the cased-hole techniques, the main benefit is that the only portion of the borehole which is open, is at the bottom of the drill casing; thus, no soil or water from shallower depths can move down and impact the depth drilled and/or sampled. Electrical geophysical logs cannot be run through the steel-cased borehole, however, radiation logs (e.g., gamma, neutron, etc.) can be run.

Presently, there are three cased-hole rotary techniques which include:

a. The drill-thru casing hammer technique in which the casing is advanced by percussion with a casing hammer or vibratory driver similar to the method used in a borehole drilled by the air-rotary method. The casing hammer can also pull out the casing (air drilling only).

b. The Odex™ Drilling System (European system) which "pulls" the casing using a fixture attached to an air-hammer type drill bit (air drilling only).

c. The Barber™ Drilling System in which drilling is done with a top-head drive and a rotary table that spins casing into the ground. Casing can be fitted with a carbide "shoe" to cut boulders and an air hammer can be used above the bit. Air or mud rotary can be used to lift cuttings.

Two potential problems may be encountered using the cased-hole rotary technique which include: 1) "sand heave" when drilling stops (which can be quickly drilled or bailed out) and 2) possible aeration of water in the cased borehole if volatiles are being tested (which can be overcome by pumping or bailing the standing water out before sampling). The minimum drill casing diameter is 6 inches and depth is limited to approximately 450 feet.

3.5 Air Rotary - This drilling method uses a rotating bit to drill, and high-velocity compressed air to remove cuttings from the borehole. A pneumatic down-hole hammer is often used to add percussion to the rotary drilling action. This drilling method is very fast and, although it is most suitable for penetrating hard bedrock, it can be used in unconsolidated formations. The borehole may be cased or uncased depending on geologic conditions. If an open borehole is drilled, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If a cased borehole is drilled, then only radiation geophysical logs can be run.

Four potential problems may be encountered when using the air-rotary technique:

a. When a prolific aquifer is tapped, the compressed air may not be able to lift the water to the surface.

b. Aeration of water in the borehole (and finished well) immediately prior to sampling can interfere with a number of inorganic and organic water-quality parameters.

c. Low yield water entry zones may not be identified because the air pressure prevents water from entering the borehole. Care should be taken to prevent overdrilling of the borehole.

d. Air rotary drilling can induce the migration of volatile organics to the surface or adjacent structures causing potential aesthetic or health and safety concerns.

If the air-rotary technique is used then the following special procedures will be implemented:

a. The type of air compressor and lubricating oil will be documented on an appropriate field form and in the field notebook and a 1-pint sample of the oil will be retained for characterization in the event organic compounds are detected in a well sample.

b. An air line oil filter will be required and changed per manufacturer's recommendations during operation with documentation of this maintenance on an appropriate field form and in the field notebook. More frequent oil filter changes will be made if oil is visibly detected in the filtered air.

c. The use of any additive will be prohibited, except approved water (e.g., potable water) for dust control and cuttings removal.

4.0 DECONTAMINATION

Drilling equipment decontamination procedures are outlined in the field equipment decontamination SOP. Proper decontamination in accordance with regulatory guidelines must be clearly documented in the field notebook.

5.0 PROCEDURE FOR DRILLING

5.1 Document all drilling-related activities (e.g., starting, stopping, footage, problems, decontamination, etc.) on the daily log form and in the field notebook. Record dates and times of activities, and names of Roux Associates personnel providing oversight.

5.2 Monitor and record drill fluid mix, speed of rotation, pressure on the drill fluid, rate of drilling, and length of drill rods or casing in the borehole.

5.3 Confirm that the drill rods and core barrel are straight, or discontinue drilling.

5.4 Pay particular attention to the advancement of the boring because differences in the rate of drilling may be indicative of differences in subsurface geologic conditions (e.g., sand and gravel versus clay).

5.5 Maintain a continuous dialogue with the driller to track and keep informed of all drilling activities (e.g., the speed of the drill and drilling pressure, difficult and easy drilling conditions, etc.).

5.6 Collect formation samples as described below in Section 6.0. Sample jars must be labeled appropriately (e.g., project number and name, site location, boring number, date, sample interval, blow counts, and initials of Roux Associates personnel collecting sample).

5.7 Record geologic information in the geologic log form and in the field notebook.

5.8 Handle and ship split-spoon sample jars carefully to avoid breakage and handle and ship tubes or cores carefully to prevent disturbance.

6.0 PROCEDURE FOR FORMATION SAMPLING

6.1 Intact formation sampling will be implemented using split-spoon samplers (which are driven), Shelby-tube samplers (which are pushed), or Denison-core samplers (which are rotated) depending on the drilling technique employed. Formation samples will be retained in suitable size (e.g., 1-pint or 0.5-pint) jars for physical descriptions and potential physical and chemical analysis. The appropriately labeled jars and tubes will be stored in a safe place to avoid breakage, agitation, and freezing. Intact formation samples will be collected as described in the work plan at specified intervals (e.g., at 5-foot increments below land surface) and at each major change in subsurface materials. Hydrogeologic information will be recorded on a geologic log form and in the field notebook. Detailed descriptions of the type(s) of intact sample(s) collected, sampling intervals and conditions, and objective(s) of the sample collection will be provided in the work plan.

6.2 Disturbed formation samples (drill cuttings) will be examined continuously throughout the entire depth of the borehole. If applicable to the study and/or stated in the work plan, borehole cuttings will be collected from the circulating auger flights which lift cuttings to land surface (hollow-stem auger technique), from the sand bailer (cable-tool technique), from the recirculating drilling fluid (mudflume) which transports cuttings to land surface (mud-rotary and related techniques), or from the compressed air used to carry cuttings to land surface (air-rotary and related techniques). Formation samples will be retained in appropriate size (e.g., 1-pint or 0.5-pint), properly labeled jars and stored in a safe place to

avoid breakage, agitation, and freezing. Hydrogeologic data will be recorded on a geologic log form and in the field notebook.

6.3 The soil cores from the wells drilled at the site are used for lithologic identification. The first 18 inches of soil for each borehole will be collected intact using a split-spoon sample, Shelby-tube sampler, or Denison-core sampler. Split-spoon samples may be collected continuously from boreholes for cluster wells; single well and/or piezometer boreholes may be split-spooned throughout drilling or at specified intervals or changes in lithology. The conditions for sampling will be specified in the work plan.

6.4 Before collecting and retaining soil and/or sediments collected with the split-spoon sampler, the top several inches will be removed from the sampler and discarded to eliminate any sediment that may have caved into the bottom of the borehole.

6.5 Sediment sampling equipment such as split-spoon samplers, spatulas, etc. (but not including Shelby-tube or Denison-core samplers, which area not re-usable) will be decontaminated by steam cleaning and/or a non-phosphate, laboratory-grade and distilled/deionized wash followed by a distilled/deionized water rinse. (Refer to the SOP for Decontamination of Field Equipment for a detailed description of minimum and special decontamination procedures.) Decontamination of sediment sampling equipment will take place prior to the collection of the first sample and following the collection of each subsequent sample.

7.0 BOREHOLE ABANDONMENT OR CLOSURE

7.1 Upon the completion of the investigation, a determination will be made as whether to maintain the borehole (for a well or piezometer) or to close it (i.e., abandon and seal it). If the client and Roux Associates agree to abandon the borehole, then the state will be notified and a request will be presented for borehole abandonment. Upon state approval to seal the borehole, appropriate state borehole abandonment forms will be completed, if required. Following state approval, the abandonment of any borehole (or boring) will be in accordance with local, state and/or Federal regulations.

7.2 For each abandoned borehole, the procedure will be documented on an appropriate field form or in the study notebook. Documentation may include, where appropriate, the following:

a. Borehole designation.

b. Location with respect to the replacement borehole, if replaced (e.g., 30 ft north and 40 ft west of Borehole B-1). A location sketch should be prepared.

c. Open depth prior to grouting and any other relevant circumstances (e.g., formation collapse).

d. Drill casing left in the borehole by depth, size, and composition.

e. A copy of the geologic log.

f. A revised diagram of the abandoned borehole using a supplemental geologic log form.

g. Additional items left in hole by depth, description, and composition (e.g., lost tools, bailers, etc.).

h. A description and daily quantities of grout used to compensate for settlement.

i. The date of grouting.

j. The level of water or mud prior to grouting and the date and time measured.

k. Any other state or local well abandonment reporting requirements.

END OF PROCEDURE

APPENDIX C

Health and Safety Plan (HASP)

HEALTH & SAFETY PLAN

Former Vacuum Oil Refinery
Rochester, New York

February 12, 2021

0172.0180M012.107.RCV

Environmental Consulting
& Management
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rouxinc.com

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SITE-SPECIFIC EMERGENCY INFORMATION

Emergency Phone Numbers

Most emergency services can be obtained by calling **911**. Where 911 service is not available, use the telephone numbers provided in the below table. The following is a master emergency phone list for use by the project management personnel. A more condensed version of the emergency numbers listed below will be posted throughout project work areas. Emergencies encountered on the site will be responded to by a combination of off-site emergency services and site personnel.

Emergency Contact Information			
Site Personnel			
Title	Contact		Telephone
Project Principal	Ian Reed		781-569-4030 617-875-9394 (Cell)
Project Manager (PM)	Jim Dick		781-569-4000 617-596-8841 (Cell)
Site Health and Safety Officer (SHSO)	Grace van der Ven		781-569-4043 315-877-5946 (Cell)
Site Supervisor	Grace van der Ven		781-569-4043 315-877-5946 (Cell)
Office Health and Safety Manager (OHSM)	Anthony Marsocci		781-569-4034 585-721-1196 (Cell)
Office Manager	Nancy Nevins, P.G., LSP		781-569-4053 617-549-5351 (Cell)
Corporate Health and Safety Director (CHSD)	Brian Hobbs, CIH, CSP		631-630-2419 631-807-0193 (Cell)
Client Emergency Contact	Elizabeth Zinkevicz		207-363-8345
Outside Assistance			
Agency	Contact	Telephone	Address/Location
Ambulance/EMS	Rural Metro	585-777-7777	811 West Ave, Rochester, NY 14611
Police	Rochester Police Department	585-428-6720	185 Exchange Blvd, Rochester, NY 14614
Fire	Rochester Fire Department	585-428-6739	1261 South Ave, Rochester, NY 14620
AllOne Health	Evelyn Toledano	800-350-4511	Phone Only
Hospital	Strong Memorial Hospital	585-275-2100	601 Elmwood Avenue, Rochester, NY 14642
Occupational Medical Care Management	Work Fit Medical	585-426-4990	1160 Chili Ave, Suite 200, Rochester, NY 14624

The nearest hospital to the Site is the Strong Memorial Hospital located at 601 Elmwood Avenue in Rochester, New York. The telephone number for the hospital is (585) 275-2100. Directions from the Site to the hospital are located below.

Head **southwest** on **Exchange St.** toward **Flint St.**;

Turn **right** at **Flint St.**;

Turn **left** at **Plymouth Ave. S/S Plymouth Ave./RT-383**;

Continue to follow RT-383;

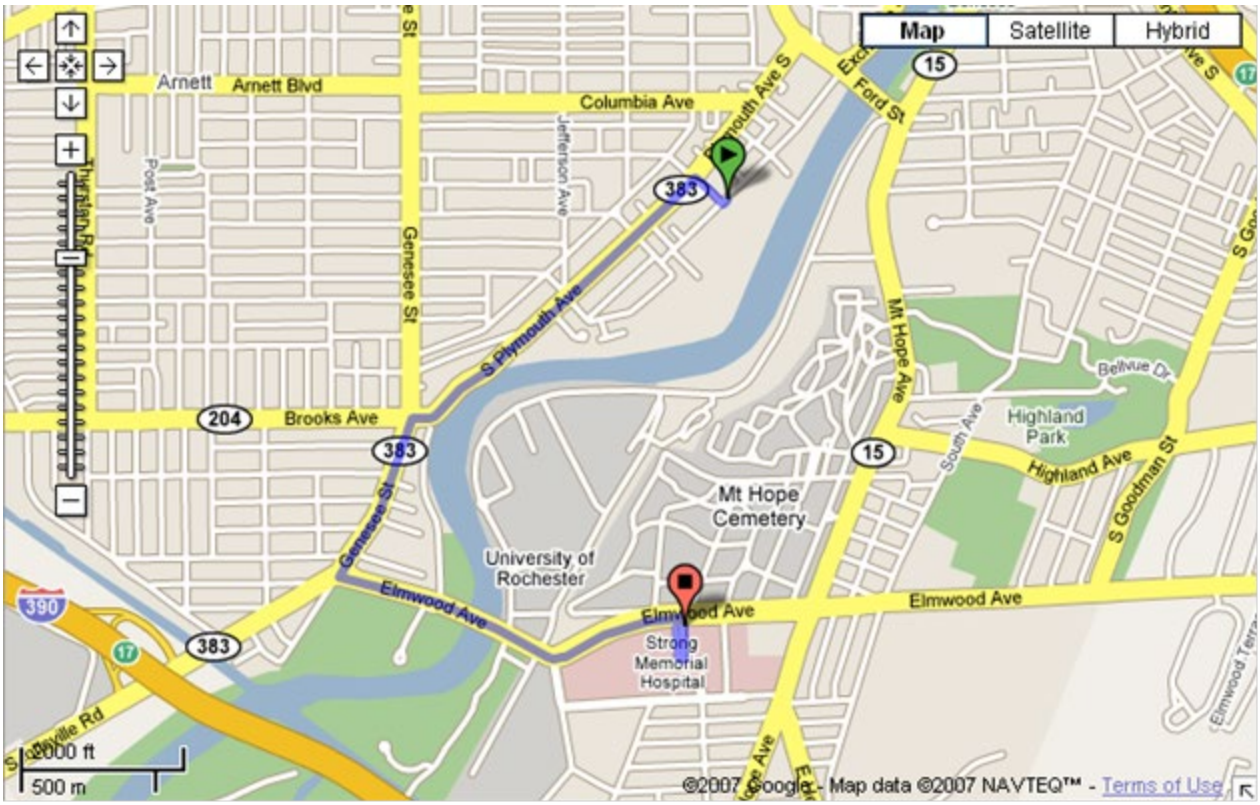
Turn **left** at **Genesee St./RT-383**;

Turn **left** at **Elmwood Ave.**;

Arrive at Strong Memorial Hospital.

The approximate driving time from the Site to the hospital is 7 minutes (2.4 miles).

A map depicting the above-described route is provided below.



The nearest urgent care facility to the Site is Work Fit Medical located at 1160 Chili Ave, Suite 200 in Rochester, New York. The telephone number for the facility is (585) 426-4990. Directions from the Site to the facility are located below.

Head **northwest** on **Flint St** toward **Exchange St**;

Turn **left** at the **2nd cross street** onto **S Plymouth Ave**;

Continue **straight** onto **Brooks Ave**;

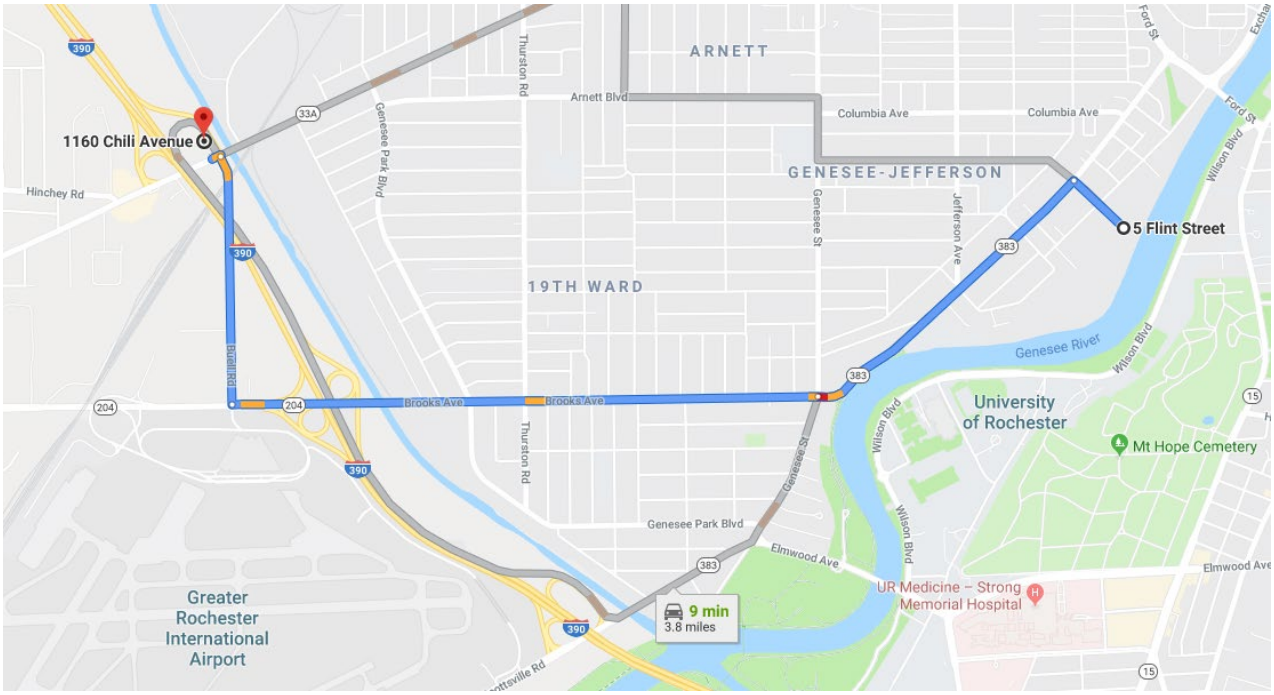
Turn **right** onto **Buell Rd**;

Turn **left** onto **NY-33A W**;

Work Fit Medical will be on the right.

The approximate driving time from the Site to the facility is 9 minutes (3.2 miles).

A map depicting the above-described route is provided below:



1.0 INTRODUCTION

This Site-specific Health and Safety Plan (HASP) has been prepared by Roux Associates, Inc. and Roux Environmental Engineering and Geology D.P.C. (collectively referred to as "Roux") for use during the sampling and investigation activities being performed by Roux at the former Vacuum Oil Refinery located in Rochester, New York ("the Site") (see **Figure 1**). These activities fall within the scope of operations covered by the Occupational Safety and Health Administration (OSHA) standards promulgated at 29 CFR 1910.120 and 29 CFR 1926.65, both commonly referred to as the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard. In accordance with the HAZWOPER Standard, this Site-specific HASP was prepared to address the safety and health hazards associated with the sampling, construction, and remediation activities being performed at the Site by Roux and to provide requirements and procedures for the protection of Roux employees, subcontractor personnel, government oversight personnel, Site personnel, and the general public. It also addresses client- and Site-specific requirements for health and safety.

OSHA mandates workers have a right to a safe and healthful workplace. **Appendix A** provides the OSHA Worker Safe and Healthful Workplace Rights Poster that outlines basic rights of workers. Compliance with this HASP is required for all Roux personnel and subcontractors contracted directly by Roux. Assistance in implementing this HASP can be obtained from the Roux Corporate Health and Safety Director (CHSD). The contents of this HASP may undergo revision based upon additional information made available. Any changes proposed to this HASP must be reviewed and approved by the CHSD or his designee and the ExxonMobil Project Manager (ExxonMobil PM), as listed in Section 1.1.

All Site operations are under the direction of ExxonMobil, and any operations or activities covered under this HASP shall also be subject to and compliant with any additional ExxonMobil procedures and protocols. Specifically, routine operations or activities performed at the Site that commonly require adherence to ExxonMobil procedures and protocols include, but are not limited to, confined space entry, hot work, excavation, working at heights, critical lifts, and drilling activities. Additionally, ExxonMobil has specific requirements regarding the use of personal protective equipment/ clothing (PPE). These requirements are incorporated into Section 6.2 of this HASP and, at a minimum, include the use of a hard hat, eye protection, American Society for Testing and Materials (ASTM) F2413-11-rated safety-toed boots (including task-specific requirements), high-visibility or reflective clothing (including task-specific or Department of Transportation required – as applicable), American National Standards Institute (ANSI) Level-2 cut--resistant gloves, and ANSI Z87.1-rated safety glasses. Special PPE (e.g., hearing protection, life vest, fall protection, etc.) may be required during various tasks and should be utilized as necessary or as required by OSHA, the SOPs, or by ExxonMobil procedures and protocols. Prior to initiating a task, all risks associated with the task should be evaluated to determine the appropriate procedures that need to be followed and PPE that is necessary.

Implementation of this HASP is the joint responsibility of the Project Manager (PM), the Site Health and Safety Officer (SHSO), and all field staff, with assistance from the Project Principal (PP), Office Health and Safety Manager (OHSM), and Corporate Health and Safety Director (CHSD). The PM is Jim Dick. The site Supervisor (SS) and Site Health and Safety Officer (SHSO) for this project is Grace van der Ven.

This HASP will be introduced to, reviewed, and signed off on by all Roux personnel through a formal training session prior to commencing work. A copy of the HASP will be kept at the Site at all times. The Roux SHSO or PM will be responsible for posting any changes, amendments, memos, etc. to the HASP. Any revisions to this HASP will be signed by appropriate personnel, which can include Roux's PP, CHSD, and SS. Any changes will be announced to all workers at the next safety meeting.

1.1 Roles and Responsibilities

Overall Roles and Responsibilities (R&Rs) of Roux personnel are provided in Roux's Policies and Procedures Manual. Only those R&Rs specific to HASP requirements are listed below.

Project Manager (PP) – Integrity Critical Position

The PP is responsible for defining the overall project objectives (field and office-related activities), determining chain-of-command, evaluating program outcome, and serving as final technical review of deliverables.

Project Manager (PM) – Integrity Critical Position

The PM has responsibility and authority to direct all work operations. The PM coordinates safety and health functions with the SHSO, has the authority to oversee and monitor the performance of the SHSO, and bears ultimate responsibility for the proper implementation of this HASP. The specific duties of the PM are:

- preparing and coordinating the Site work plan;
- providing the SS with work assignments and overseeing their performance; Coordinating safety and health efforts with the SHSO;
- ensuring effective emergency response through coordination with the Emergency Response Coordinator (ERC); and
- serving as primary Site liaison with public agencies and officials and Site contractors.

Site Health and Safety Officer (SHSO) – Integrity Critical Position

The SHSO has full responsibility and authority to develop and implement this HASP and to verify compliance. The SHSO reports to the Project Manager. The SHSO is on Site or readily accessible to the Site during all work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SHSO include:

- managing the safety and health functions on this Site;
- serving as the Site's point of contact for safety and health matters;
- ensuring Site monitoring, worker training, and effective selection and use of PPE;
    - ensures all personnel working onsite are qualified according to applicable United States Environmental Protection Agency (USEPA), OSHA, state, and local requirements
- assessing Site conditions for unsafe acts and conditions and providing corrective action; and
    - The determination of hazardous airborne concentrations will be made by the Site Supervisor or subcontractor Foreman, in consultation with the CHSD.
    - The SHSO has stop-work authorization that he or she will execute upon determination of an imminent safety hazard, emergency, or other potentially dangerous situation, such as detrimental weather conditions.
        - Authorization to proceed with work will be issued by the SHSO or CHSD in consultation with the PP after such action.
- assisting the preparation and review of this HASP;
- maintaining effective safety and health records as described in this HASP; and
- coordinating with the SS and others as necessary for safety and health efforts.

Office Health and Safety Manager (OSHM) – Integrity Critical Position

The Massachusetts Office Health and Safety Manager (OHSM) is responsible for providing support, as needed, to the Project and serves as back-up to the SHSO. The OHSM assures that field personnel assigned to the project receive a health and safety orientation and are provided with the necessary personal protective equipment and clothing. The OHSM may periodically perform field audits and safety evaluations, participate in field assessments and prepare information to be used for safety communications.

Corporate Health and Safety Director – Integrity Critical Position

The CHSD is responsible for assuring the appropriate monitoring and safety equipment and other resources necessary to perform Site activities safely are addressed in the HASP. The CHSD provides consultation to the Site personnel on all questions related to health and safety.

Site Supervisor

The SS's primary goal is Zero Environmental Health and Safety (EHS) Incidents. The SS is responsible for making certain that personnel receive and are aware of the provisions of this HASP, are instructed in the work practices necessary to ensure safety and are familiar with planned procedures for dealing with emergencies. The SS assures that personnel are aware of the potential hazards associated with Site operations and correcting any work practices or conditions that may result in injury or exposure to hazardous substances. The SS assures all field personnel comply with hazardous waste worker health and safety training and medical surveillance requirements of 29 CFR 1910.120 and all other applicable regulations.

The SS is responsible for field operations and reports to the PM. The SS ensures the implementation of the HASP requirements and procedures in the field. The specific responsibilities of the SS include:

- executing the work plan and schedule as detailed by the PM;
- coordination with the SHSO on safety and health; and
- ensuring Site work compliance with the requirements of this HASP.

Employees

All Roux employees are responsible for reading and following all provisions of the Corporate Health and Safety Manual, including this HASP. Employees report to the SS at the project Site. Each employee is also responsible for the following:

- taking all reasonable precautions to prevent injury to themselves and to their fellow employees;
- wearing all appropriate PPE as outlined within this HASP;
- attending all safety meetings;
- inspecting tools and equipment prior to use, and taking any defective tools or equipment out of service;
- appropriately documenting field events as they occur within a logbook or equivalent;
- properly operating machinery and/or equipment only if trained to do so;
- stopping work operations if unsafe conditions exist;
- identifying and mitigating hazards when observed;
- reporting all incidents and near misses to the Roux SHSO and SS immediately; and
- knowing where emergency equipment is located (e.g. first aid kit, fire extinguisher).

Subcontractors and Visitors

Subcontractors and visitors are responsible for complying with the same health and safety requirements. It is the responsibility of all to make sure subcontractors and visitors comply and uphold the HASP. Subcontractors and visitors have the following additional responsibilities:

- designating a qualified safety representative for the project that can make the necessary changes in work practices, as necessary;
- attending all safety meetings while participating in Roux Site work activities;
- reporting all incidents and near misses to Roux SHSO and SS immediately;
- conducting initial and periodic equipment inspections in accordance with manufacturer and regulatory guidelines; and
- providing copies of all Safety Data Sheets (SDS) listed in **Appendix B** to Roux SHSO for materials brought to the Site.

2.0 BACKGROUND

The following Site description and history summarizes information provided in the June 13, 2005 Historic and Current Site Conditions Report, prepared by AMEC on behalf of ExxonMobil, and submitted to the New York State Department of Environmental Conservation (NYSDEC).

Relevant background information is provided below, including a general description of the Site; a brief review of the Site's history with respect to hazardous material use, handling, and/or storage; and a review of known and potential releases of hazardous substances at the Site.

2.1 Site Description

The Site is located in the southern section of the City of Rochester, Monroe County, New York, just west of the Genesee River (**Figure 1**). The Site is located in an area currently used for commercial/industrial, residential and recreational uses. The Site encompasses various parcels of land, the majority of which were historically used for industrial activities including the facility operations.

Currently, the majority of the Site contains dense vegetative cover and is overgrown primarily with trees, bushes and grasses/weeds. According to AMEC, this area of vegetative cover is primarily early to mid-stage woods characterized by a mix of deciduous species that vary based on the areas of the Site such as wetland or "slighter higher moist woods." A bicycle/walking path with areas of maintained grass, constructed by the City of Rochester, traverses the southern and eastern perimeter of the Site along the Genesee River. A concrete bulkhead borders the Genesee River along the east/southeast Site boundary. According to historic information reviewed by Roux, the bulkhead has been in place since the facility was in operation. A large three-story building which was likely part of the facility operations is currently located on Site at the terminus of Flint Street. Lastly, a junkyard exists on a portion of the Site on Flint Street. This junkyard contains numerous junk vehicles, piles of tires and scrap parts.

2.2 Site History

The Vacuum Oil Company operated an oil refinery at portions of the Site from approximately 1866 to around the early 1890s (**Figure 2**). From the early 1890s until its closure in 1935, it operated as a blending facility. The facility consisted of several process and storage buildings and structures, tank farms, pipelines and rail lines. The processing and refining operations reportedly included processing crude oil transported to the Site in wooden barrels from the "Bradford Field" located in Pennsylvania in 1869. The crude oil was processed and used in the preparation of kerosene, naphtha and other finished lubricant products. Later, and subsequent to 1890, the facility began processing raw lubricant stocks which were finished, barreled/canned and shipped off Site. Significant products including lubricating oils, paraffin, neutral oils, spindle oils, naphtha, and marine engine oils were blended and distributed for sale. Barrels and tin cans were manufactured at the Site to provide containers for shipping and sale of the finished product. In 1916, the facility (sometimes referred to in the Historic and Current Site Conditions Report as "the Rochester Works") occupied 15 acres and maintained a large number of filters and other equipment for finishing lubricating oil stocks, a large compounding facility, and a barrel and can factory. The facility was demolished in the 1930s. Remnants of the facility exist at the Site including building foundations and slabs.

In addition to the above, two former railroad lines ran through the Site: 1) the Pennsylvania Railroad located approximately 100 feet northwest from the Genesee River and 2) the Erie Railroad located approximately 200 to 400 feet northwest from the Genesee River.

2.3 Known and Potential Releases of Hazardous Substances at the Site

According to the Historic and Current Site Conditions Report, AMEC conducted field surveys of the Site in November and December 2004. During these field surveys, AMEC identified existing Site structures and features including concrete retaining walls and structure remnants, retaining (former canal) walls, drums, manhole covers and piping (including historic sewer and lines), machinery parts and industrial debris, a piece of molten plastic, slag material mounds, rubble and tire piles, fire hydrants, former railroad structures and structures identified as resembling floor pits. According to information included in the Site Investigation Report – Former Vacuum Oil Company, Site #828089P, dated March 2001 and prepared by NYSDEC, in September 1992, NYSDEC removed approximately 400 to 500 tons of petroleum sludge located in the area of former sludge pits (formerly a "railyard area at the southeastern portion of the Vacuum Oil facility near what is currently the Genesee River bike trail"). The petroleum sludge was discovered during construction of the bike path (trail) and upon testing, the sludge was found to be non-hazardous.

The Historic Site Conditions Report identified several previous investigations that have been completed at the Site. These previous investigations included: 1) two investigations by the NYSDEC (one in 1999 and the other in 2000) and 2) an investigation by the City of Rochester in 1989. Additional information regarding these previous investigations is provided in the Historic Site Conditions Report.

Investigation results and materials storage records indicate that benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), and other petroleum-related constituents are present at the Site including polyaromatic hydrocarbons (PAHs) and metals. The toxicological, physical, and chemical properties of these potential contaminants are presented in **Table 1**.

3.0 SCOPE OF WORK

Site activities planned at this time and covered by this HASP include Site walkover and field activities oversight. Field activities include but may not be not limited to overseeing soil boring advancement, soil logging and sampling, global positioning system (GPS) surveying, and remediation (i.e., excavation). Following hand clearing procedures using hand-held tools/equipment, soil borings are proposed to be advanced using direct push truck and/or track mounted Geoprobe™. It is anticipated that each soil boring location will be advanced to approximately 8 ft bgs. Excavation of contaminated soil to the greatest extent feasible will be conducted using a truck and/or track mounted excavator. The excavation depth is not anticipated to extend beyond 8 ft bgs. Site activities not covered by this HASP will be included as an addendum. The proposed subsurface investigation and remediation locations are shown on **Figure 3**.

If there are any changes with the scope a revision of the HASP will be required to address any new hazards.

4.0 SITE CONTROL

This Site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the Site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the Site, and to deter vandalism and theft.

4.1 Site Map

A map of this Site, showing Site boundaries, designated work zones, and points of entry and exit is provided in **Figure 3**.

4.2 Site Access

Access to the Site is restricted to reduce the potential for exposure to its safety and health hazards. During hours of Site operation, Site entry and exit is authorized only at the points identified in **Figure 3**. Entry and exit at these points are controlled by orange snow fencing. The Site areas are composed of industrial operations and communal paths/parks without physical restrictions. Property owners are notified prior to Site access. When the Site is not operating, access to the Site will be restricted via temporary barriers (i.e. snow fencing).

4.3 Buddy System

Select field activities conducted in contaminated, hazardous, and remote areas of the Site may require the use of the buddy system. Prior to commencing with field tasks in a potentially hazardous area, the need for using the buddy system should be evaluated. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:

- Remaining in close visual contact with partner,
- Providing partner with assistance as needed or requested,
- Observing partner for signs of heat stress or other difficulties,
- Periodically checking the integrity of partner's PPE, and
- Notifying the SHSO or other Site personnel if emergency assistance is needed.

4.4 Site Communications

The following communication equipment is used to support on-site communication: cell phones and visual hand signals

Telephones are utilized for communication with emergency support services/facilities. Roux personnel will be equipped with a mobile telephone. The use of cell phones or other mobile communications devices (including but not limited to “smart” phones) while operating vehicles/ equipment/ tools or while working within defined work area exclusion zones is prohibited.

Hand signals will be used according to the following:

Hand Signals

SIGNAL	MEANING
Hand gripping throat	Out of air, can't breathe
Grip partner's wrist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	I'm alright, okay
Thumbs down	No, negative

A current list of emergency contact numbers is posted in the following locations:

Rochester Police Department	(585) 428-6720
Rochester Fire Department	(585) 428-6739
Emergency Response	911
Ambulance	(585) 777-7777
Strong Memorial Hospital	(585) 275-2100

4.5 Site Work Zones

This Site is divided into three (3) major zones, described below. These zones are characterized by the presence or absence of biological, chemical, or physical hazards and the activities performed within them. Zone boundaries will be clearly marked at all times and the flow of personnel among the zones is controlled. The Site will be monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings will also be adjusted, and workers are immediately notified of the change.

The establishment of work zones is developed to ensure: personnel are properly protected against the potential hazards in the area where they are working; work activities and potential contamination are limited to the specific areas; and personnel can be easily located and evacuated in an emergency. Only the people who are authorized to work and who have a need to be in the zone will be allowed in the designated zone.

The establishment of work zones and the levels of protection required within the zones will be determined on a case by case basis. The SHSO, Roux PM, and the ExxonMobil PM will determine the need for work zones, and based upon Site-specific knowledge and data, determine the levels of protection within the established zones.

Basic emergency and first aid equipment will be available at the Site, work vehicle, Support Zone (SZ), and/or the Contamination Reduction Zone (CRZ) as appropriate. This may include HASP-specified communications, first aid kit, emergency eyewash or emergency shower or drench system, fire extinguisher, and other safety-related equipment. Other safety equipment will be located at the Site of specific operations (e.g., drilling) as appropriate. Traffic cones and barricades will be used when work is required in roadways and high traffic areas, as per ExxonMobil E&PS Minimum Safety Expectations Traffic Control (**Appendix C**).

Field personnel will be notified of the locations of emergency and first aid equipment prior to commencing with field activities. The following sections provide general specifications for the three work zones.

4.5.1 Exclusion Zone

The area(s) that contain, or are suspected to contain, hazardous materials or activities will be considered the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are also considered to be part of the EZ. This zone will be delineated by orange high visibility fencing or temporary chain-link fencing. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SHSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy (co-worker)
- Required minimum level PPE
- Medical Authorization
- Training certification
- Requirement to be in the zone

During excavation, drilling, and sampling activities, the EZ is defined as the excavation and a minimum 10-foot radius around the excavation boundary or drilling or sampling locations. For the purposes of this project, the EZ will be delineated once the work sites have been determined.

4.5.2 Contamination Reduction Zone

A CRZ is established between the EZ and the SZ. The CRZ contains the Contamination Reduction Corridor (CRC) and is designed to reduce the probability that the uncontaminated clean areas will become contaminated or affected by other Site hazards. It is the area where decontamination of personnel and equipment takes place and serves to limit the physical transfer of hazardous substances into clean areas. The CRZ is to be used for general Site entry and egress including access for heavy equipment for investigation activities. The CRZ will also contain safety and emergency equipment (Section 6.2.3). Personnel are not allowed in the CRZ without:

- A buddy (co-worker)
- Appropriate PPE
- Medical authorization
- Training certification
- Requirement to be in the zone

4.5.3 Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ will be available for field team parking, communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. The support facility will be located up-wind of Site operations, if possible, and may be used as a potential evacuation point. No potentially contaminated personnel or materials are allowed in this zone except appropriately packaged/decontaminated and labeled samples and drummed wastes.

5.0 JOB HAZARD EVALUATION

Roux's work at the Site is expected to entail a variety of physical, chemical, and biological hazards, all of which must be sufficiently managed to allow the work to be performed safely. Some of the hazards are Site-specific, i.e., they are associated with the nature, physical characteristics, and/or routine operation of the Site itself, while others are activity-specific, i.e., they are associated with (or arise from) the particular activity being performed. The various hazards can be grouped into the following categories:

Caught/Crushed – the potential to become caught in, under, between, or by an object or parts of an object, such as equipment with parts that open and close or move up and down ("pinch points") or equipment that rotates, and the accompanying potential to have body parts cut, mangled, or crushed thereby.

Contact – the potential to be struck by or against moving or stationary objects that can cause physical injury, such as heavy machinery, overhead piping, moving vehicles, falling objects, and equipment (including tools and hand-held equipment) or infrastructure with the ability to cut or impale.

Energy Sources – the potential for bodily harm associated with energy sources, most notably electricity, but also including latent energy sources such as compressed air and equipment under tension (which when released could cause injurious contact or a fall).

Ergonomics – the potential for musculoskeletal injury associated with lifting/carrying, pushing/pulling, bending, reaching, and other physical activity attributable to poor body position/mechanics, repetitive motion, and/or vibration. See **Appendix Y** for more information.

Exposure – the potential for injury/illness due to physical, chemical, or biological exposures in the work environment, including but not limited to temperature extremes, solar radiation, and noise (physical), chemical splashes and hazardous atmospheres (chemical), and animal/insect bites and poisonous plants (biological).

Falls – the potential to slip or trip and thus fall or drop a load, resulting in bodily injury to oneself or others

The foregoing is intended to provide Roux employees with a general awareness of the hazards involved with Site work. A more detailed review of the potential hazards associated with each specific activity planned for the Site (or ongoing activity, as the case may be) is provided in the activity-specific Job Loss Analysis (JLA) forms in **Appendix D**. As can be seen in the JLA forms, the hazards are identified by category per the above, and specific measures designed to mitigate/manage those hazards are also identified. In preparing the JLA forms, all categories of hazards were considered, and all anticipated potential hazards were identified to the extent possible based on the experience of the personnel preparing and reviewing the JLA forms. However, there is always the possibility for an unanticipated hazard to arise, potentially as condition change over the course of the workday. Roux personnel must maintain a continual awareness of potential hazards in the work zone, regardless of whether the hazard is identified in the JLA form. Particular attention should be paid to hazards associated with exposure to hazardous substances (see **Table 1** for a listing of the hazardous substances most likely to be encountered in environmental media at the Site) and to Site personnel being located "in the line of fire" with respect to moving equipment, pinch points, and latent energy, e.g., being located or having body parts located within the swing radius of an excavator, between two sections of pipe being connected, below a piece of suspended equipment, or adjacent to a compressed air line.

5.1 Hazard Communication and Overall Site Information Program

The information in the JLAs and safety data sheets is made available to all employees and subcontractors who could be affected by it prior to the time they begin their work activities. Modifications to JLAs are communicated during routine pre-work briefings.

The information in the JLAs and SDSs (**Appendix D and B respectively**) is made available to all employees and subcontractors who could be affected by an exposure to the hazards covered in them prior to the time they begin their work activities. Modifications to JLAs are communicated during routine pre-work briefings, and periodically updated as needed in the HASP. SDSs will be maintained by the SHSO/SS for new chemicals brought on-site as needed.

The ExxonMobil OIMS Manual also requires implementation of the E&PS Hazard Communication Program for Hazardous Chemicals and Substances, which describes how the Site complies with the necessity to ensure that hazardous materials are reviewed for hazards prior to use, for communicating those hazards to potentially affected workers, and for implementing applicable precautions and controls to facilitate worker safety. This is accomplished at the Site by:

1. Identifying hazardous materials and chemicals used at the Site during work processes and compiling associated Material Safety Data Sheets (MSDSs) and SDSs (international Globally Harmonized System). Binders with hard-copies of MSDS / SDS will be located onsite and will be available for review by project personnel. **Appendix B.1.** provides the contents of the binder that is maintained onsite.
2. Implementing labeling requirements for hazardous materials containers that provide identification of the substance and applicable hazard warnings.
3. Performing annual reviews of the Site's chemical and hazardous substance inventory, as consistent with the E&PS Hazard Communication Program.
4. Implementing chemical and hazardous substance reviews that utilize OIMS guidance for subjecting each to the formal Approval Process. **Appendix B.2.a)** provides the Approval Process Instructions for Chemical Requestors and Approvers, **Appendix B.2.b)** provides Instructions for Completing the Chemical and Hazardous Substance Review Form, and **Appendix B.2.c)** provides the Chemical and Hazardous Substance Review Form template.

Completed Chemical and Hazardous Substance Review Forms, including those requiring ExxonMobil Industrial Hygienist Approval, are maintained in the Site database. SDS/ MSDS where Consumer Product Exemption Determination Forms have been completed are also maintained in the database.

5.2 Hazard Assessment

This section defines the hazards that may be present at the Site. Loss Prevention Self Assessments (LPSAs) will be performed before and during each task and as conditions in the field change. Before the start of work each day a tailgate health and safety meeting (safety briefing) will be held by the SS/SHSO, Roux PM or designee, and a record of the meeting will be completed and filed with the project files maintained onsite. Additionally, applicable JLAs will be reviewed, prior to the start of fieldwork tasks in accordance with the associated ExxonMobil JLA Protocol. A blank JLA form is included in **Appendix D**. All existing JLAs can be acquired from the SHSO and are found in **Appendix D**.

It should be noted that site workers and managers should attempt to consistently identify, assess, and control personnel exposure to potential health risks. ExxonMobil Environmental Services Company (EMES), now ExxonMobil Environmental and Property Solutions Company (E&PS), has developed Global Health Practices (GHP) to help identify occupational health risks by types of operation and provide control practices to address

risks. These practices are available to ensure implementation of proper preventive and protective measures. When personnel are exposed to the potential health risks described in the GHPs, control practices to address the risks should be followed. This HASP addresses general practices for exposure to chemical, physical, and biological agents, and provides activity specific control practices (e.g., waste handling, welding, etc.), PPE requirements, and care management practices for hazard mitigation. If activities or hazards are encountered which are not addressed by mitigative procedures outlined in the HASP, the SHSO and PP should be notified to help develop acceptable approaches.

5.2.1 COVID-19 Hazards

There is also potential for transmission and/or exposure to SARS-CoV-2, the virus that causes COVID-19. Prior to beginning work, on-Site protocols shall be established by the project team, including subcontractors, in accordance with federal, state, county, city, and/or other guidance, as applicable and consistent with **Appendix E**. Government guidance/orders generally consist of implementation of the following protocols/procedures (or some variation thereof):

- Self-monitoring for symptoms;
- Fitness check for work each day;
- Limiting businesses to “essential” operations;
- Social distancing (generally 6 feet);
- Cloth face masks/ coverings;
- Hand washing/ disinfectant use;
- Care/ awareness of surroundings (public spaces, equipment, hotel rooms, rental cars); and
- Additional guidance on minimizing potential exposure to SARS-CoV-2, including a JLA, are included in **Appendix E**.

5.2.2 Chemical Hazards

Investigation results and materials storage records indicate that BTEX, TPH, PCBs, PAHs, metals and other petroleum-related constituents are present at the Site. The toxicological, physical, and chemical properties of these potential contaminants are presented in **Table 1**. This table includes ExxonMobil Occupational Exposure Limits (OELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®), National Institute of Occupational Safety & Health (NIOSH) Recommended Exposure Limits (RELs), and OSHA Permissible Exposure Limits (PELs) that will establish the level of protection. Permissible Exposure Limits (PELs) are located on each product’s SDS. When evaluating exposure limits ExxonMobil OELs govern unless a lower TLV® or PEL has been established. For chemicals without an OEL, the most conservative value shall be considered. The potential for encountering these hazards exists during intrusive activities such as excavation/earth moving activities, or when exposed to untreated, recovered groundwater.

Due to the high-frequency of heavy equipment use during site operations, the effect of carbon monoxide (CO) generation in breathing spaces can potentially be hazardous to Site personnel. As such, an assessment of health hazards associated with CO, routes of exposure, symptoms of exposure, effects on human physiology, air concentration Action Levels and corresponding measures to mitigate exposure, and CO have been included in the toxicological **Table 1**.

5.2.3 Physical Hazards

A variety of physical hazards may be present during Site activities. These hazards are like those associated with any operating facility. These physical hazards may include motor vehicles, heavy equipment operation, and hazardous working surfaces. A hard hat, safety glasses, long-sleeved clothing with high visibility or reflective vest (task and conditions dependent), Level 2 cut-resistant gloves, steel- or composite-toed safety boots including task-specific requirements as consistent with ASTM F2413-11, must be worn always while working at the site. Workers must also be aware of electrical hazards, such as overhead power lines, while performing their assigned tasks. These hazards are not unique and are generally familiar to most field personnel. Additional task-specific requirements may be covered during safety briefings and while reviewing JLAs that pertain to the specifics of the Work Permit that is issued for that day. A Work Permit template for specific work activities is included as **Appendix F**.

5.2.4 Flammability/Explosive Hazards

A variety of highly flammable/explosive materials may be potentially stored at the Site. Prior to performing activities near potentially flammable/explosive materials (i.e., within storage areas), all applicable sections of this HASP and any ExxonMobil procedures specific to these areas need to be thoroughly understood and adhered to. All field personnel and visitors will be required to wear fire-retardant coveralls while working in and around flammable/explosive areas. Any questions or concerns should be directed to the SHSO, Roux PM, or the ExxonMobil PM.

5.2.5 Heat Stress

The National Weather Service records average minimum/maximum temperatures of 25 to 85 degrees Fahrenheit during the year in Western New York. Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment in hot weather environments.

Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water, and salts are lost by the body resulting in painful muscle cramps. The signs and symptoms of heat stress are as follows:

- Severe muscle cramps, usually in the legs and abdomen;
- Exhaustion, often to the point of collapse; and
- Dizziness or periods of faintness.

First aid treatment includes, but is not limited to, shade, rest, and fluid replacement. Typically, the individual should recover within one-half hour while being monitored constantly. If the individual has not improved substantially within 30 minutes and the body temperature has not decreased, the individual should be transported to a hospital for medical attention.

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat while working or exercising. The circulatory system of the individual fails as blood collects near the skin to rid the body of excess heat through transference. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Skin appears pale;
- Fatigue and weakness;

- Dizziness; and/or
- Elevated body temperature.

First aid treatment includes, but is not limited to, cooling the victim, elevating the feet, and replacing fluids. If the individual is not substantially improved within 30 minutes and the body temperature has not decreased, the individual should be transported to the hospital for medical attention. Documentation showing AllOne Health Occupational Care Management contact information, depicting the locations of and routing to the local Occupational Health Urgent Care Center and local hospital are included at the beginning of this HASP.

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a **MEDICAL EMERGENCY** requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot red skin;
- Body temperature approaching or above 105 degrees F;
- Confusion, altered mental state, slurred speech;
- Seizures;
- Large (dilated) pupils; and
- Loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility. Heat stress is a significant hazard if any type of protective equipment (semi-permeable or impermeable) that prevents evaporative cooling is worn in hot weather environments.

5.2.6 Cold Stress

The National Weather Service records average minimum/maximum temperatures of 25 to 85 degrees Fahrenheit during the year in Western New York. Cold stress is a danger at low temperatures and when the wind chill factor is low. Prevention of cold-related illnesses is a function of whole-body protection. Adequate insulated clothing must be used when the air temperature is below 60°F. A work/rest regimen will be initiated when ambient temperatures and protective clothing cause a stressful situation. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. The signs and symptoms of cold stress include the following:

- Severe shivering;
- Abnormal behavior;
- Slowing;
- Weakness;
- Stumbling or repeated falling;
- Inability to walk;
- Collapse; and/or
- Unconsciousness.

First aid requires removing the victim from the cold environment and seeking medical attention immediately. Also, prevent further body heat loss by covering the victim lightly with blankets. Do not cover the victim's face. If the victim is still conscious, administer hot drinks and encourage activity such as walking, wrapped in a blanket.

5.2.7 Noise

Noise is associated with the operation of heavy equipment, power tools, pumps, and generators. Noise is also a potential hazard when working near operating equipment such as drill rigs. High noise operations will be evaluated by the SHSO. Ear plugs are required in areas with noise exposure more than 85 dBA. Double hearing protection (ear plugs and earmuffs) are required in areas where the noise exposure is more than 95 dBA. In the few cases where noise levels exceed 105 dBA, or exposure times are exceeded, additional controls may be needed. Personnel with 8-hour time weighted average (TWA) exposures exceeding 85 dBA must be included in a hearing conservation program according to the regulations as specified in 29 CFR 1910.95. Noise exposure will be controlled by hearing protection as described above or by maintaining set-backs from high-noise equipment as warranted.

The installation of noise containment/dampening enclosures around high-noise-level equipment based upon a noise survey may be necessary if it is determined that it is permissible for personnel to enter the area without hearing protection. Entry into the high-noise-level equipment enclosures requires hearing protection at levels described above. If work is being completed with the high-noise-level equipment enclosure doors open, then all personnel must use hearing protection. Personnel handling heavy equipment and using power tools that produce noise levels exceeding those described above are also required to wear the appropriate level of hearing protection.

5.2.8 General Safety Hazards

- Heavy equipment and motor vehicle traffic. Workers shall wear high visibility clothing or fluorescent vests in high traffic areas and utilize 42" high traffic cones, barricades, and rigid fencing as consistent with ExxonMobil Minimum Safety Expectations (MSE) for Working Near Moving Equipment (**Appendix G**) and Traffic Control (**Appendix C**) to protect workers and work areas, as necessary.
- Slip, trip, fall hazards associated with uneven terrain, obstacles, and slippery or icy surfaces. General housekeeping will be performed to reduce and/or eliminate slip, trip, and fall hazards.
- Sharp edges, broken glass, exposed nails, rusty metal (wear gloves with a minimal ANSI 105-2000 cut resistant level II).
- Pinch points.
- Overhead hazards (wear hard hats, as required).
- Flying objects and airborne particulate hazards. Wear safety glasses, goggles, spoggles, or face shields, when appropriate.

5.2.9 Electrical Hazards

Portable pumps, generators, and other power tools require proper grounding and/or a ground fault circuit interrupter (GFCI) before operation. Personnel should never attempt to move equipment while in operation. Overhead and underground utilities will also be marked out and avoided as consistent with ExxonMobil's Subsurface Clearance Procedure (**Appendix H**) when drilling, earthmoving, or lifting are conducted additionally, ExxonMobil E&PS MSE for Electrical Safe Work Practices (**Appendix I**) shall be adhered to. Control of hazardous energy (lock out / tag out) is addressed in Section 11.3.

5.2.10 Biological Hazards

Biological hazards include the possibility of animal bites by potentially rabid stray or wild animals, ticks or other insect bites, and bee and wasp stings. Ticks may carry Lyme disease and/or Rocky Mountain spotted fever. Personnel shall examine themselves for ticks. Insecticides containing DEET may be an effective tick repellent but should be used with caution to avoid contaminating samples. Personnel allergic to bee and/or wasp stings shall provide medicine and antidotes to treat allergic reactions, as prescribed by their personal physicians.

Some insects and animals are more active at certain times – for example, some mosquitoes are most active between dusk and dawn. Ticks may be active at any time of day. Some places are more likely to have higher activity too – mosquitoes generally live in brush and trees, and near stagnant water. Ticks prefer areas with tall grass, brush, and trees. Some areas have mosquitoes that carry viruses (e.g., West Nile virus or Eastern Equine Encephalitis).

Other biological hazards include poison ivy, poison oak, and poison sumac. If exposed to these plants, personnel will wash skin thoroughly with soap and water. Additional information regarding biological hazards can be found within the Roux Biological Hazard Awareness Management Program found in **Appendix J**.

6.0 Training and Recordkeeping Requirements

6.1 Training

6.1.1 Basic Training

At a minimum, Site personnel who will perform work in areas where there exists the potential for toxic exposure will be health and safety-trained prior to performing work onsite per OSHA 29 CFR 1910.120(e) and 29 CFR 1926.65(e). More specifically, all Roux, subcontractor, and other personnel engaged in sampling and remedial activities at the Site and who are exposed or potentially exposed to hazardous substances, health hazards, or safety hazards must have received at a minimum the 40 hour initial HAZWOPER training consistent with the requirements of 29CFR 1910.120(e)(3)(i) training and a minimum of 3 days actual field experience under the direct supervision of a trained experienced supervisor, plus 8 hours of refresher training on an annual basis. Depending on tasks performed, less training may be permitted. Evidence of such training must be maintained at the Site or saved digitally in the project folder. Furthermore, all onsite management and supervisory personnel directly responsible for or who supervise the employees engaged in Site remedial operations, must have received additional specialized training at the time of job assignment on topics including, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques, plus 8 hours of refresher training on an annual basis.

Roux personnel training records are maintained in a corporate database with records available upon request from either the OHSM/SHSO/CHSD or Human Resources Department. Additional training records will be maintained by the SHSO on Site and as described in Section 6.2.

6.1.2 Loss Prevention System Training

All personnel who perform work on site, including subcontractors, must complete ExxonMobil's Loss Prevention System (LPS®) training and maintain their identification card always. The LPS® Training Program, which uses risk-assessment and behavior-based tools to reduce losses with the goal that "Nobody Gets Hurt", was enhanced during winter 2017, and includes a tiered approach to training based on the amount of time that workers are anticipated to conduct onsite operations. LPS® Training Levels consist of Basic, Standard, and Manager/Supervisor Training. Manager/Supervisor Training also includes Factors, Root Causes and Solutions Training. Guidance to determine who takes which LPS® Training Level, which is specialized for different types of personnel based on anticipated length of service and task risk levels, is provided in **Appendix K**. The SM and/or SHSO is responsible for coordinating the LPS® course.

6.1.3 Life Saving Actions

It is the expectation that all personnel who perform work onsite be aware of and acknowledges the consequences for non-compliance with the Life Saving Actions outlined by the ExxonMobil E&PS organization in December 2017.

The E&PS Life Saving Actions are:

1. Prevent Falls & Dropped Objects – Use fall protection; secure tools and materials
2. Protect from Moving Equipment/ Vehicles: Establish and control red zones and/or traffic
3. Restrict Access to Suspended Loads: Establish and control crush and drop zones
4. Dig with Caution: Locate underground hazards, prevent collapse
5. Isolate Energized Systems: Lock out, tag out, confirm zero energy state
6. Prevent Hot Work Explosions/Fires: Remove flammable materials; gas test
7. Establish/ Maintain Safe Confined Space: Test and monitor atmosphere
8. Respect Critical Safety Devices: Follow defeat procedures

Any personnel who knowingly violates the Life Saving Actions will be subject to disciplinary action in accordance with ExxonMobil E&PS Life Saving Actions Process Overview and may no longer be allowed to work at the Site following a review of the incident by the project management team.

6.1.4 Site-Specific Training

Training will be provided by the SS/SHSO that specifically addresses the activities, procedures, monitoring, and equipment to be utilized by Site personnel and visitors. The training will include Site and facility layout, hazards, emergency services at the Site, and will detail all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their activity. Site-specific training will be documented and kept as part of the project records.

6.1.5 Site-Supervisor Program Training

A Site Supervisor Program (SSP) training required by ExxonMobil has been provided to Roux staff with the goal of furnishing basic technical, safety, regulatory, and procedural knowledge for utilization during task implementation and Subcontractor oversight / management tasks. SSP training topics include:

- Construction, Installation, and Heavy Equipment Operations;
- Electrical Safety and Lock-Out / Tag-Out Procedures;
- Hot Work Procedures and Hot Work Permits;
- Critical Lift Procedures and Critical Lift Permits;
- General Remediation Systems Operation and Maintenance;
- Effective Tailgate Meetings;
- Drilling and Subsurface Structures Identification Procedures;
- Intervention and Coaching Soft Skills;
- Risk Tolerance;
- Traffic Control Guidelines and Procedures;
- Confined Spaces and Confined Space Permits;
- Fall Prevention / Protection, Working at Heights, and Permits;
- Operations on Product Piping;
- Gas Testing Requirements and Maintenance; and
- Heavy Equipment Exclusion Zones.

SSP training will continue on an on-going basis to ensure staff is provided sufficient levels of training to competently conduct tasks and/or oversee Subcontractors. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for activities with which they are associated. Workers will be responsible for answering a brief quiz at the end of each topic presentation and submit it to the SHSO for review and potential feedback. Site-specific training attendance shall be documented and kept as part of the project records.

6.1.6 Short Service Employees

This policy and procedure is an effort to ensure that Roux and Subcontractor short-service employees (SSEs) are identified, appropriately supervised, trained, and managed to prevent incidents such as personal injury, injury to others, environmental damage, or property damage. All Site workers with less than six (6) months continuous service in the same job type or less than six (6) months continuous service with his/her current employer are SSEs. Additionally, for ExxonMobil, workers who have less than six (6) months of ExxonMobil worksite experience or who have not worked on an ExxonMobil worksite in the last two (2) years are considered SSEs. The Roux Short Service Employee Management Program is provided in **Appendix L**. Adherence to this program is a requirement for all employees and subcontractors that conduct work at the Site.

6.1.7 Safety Briefings

Project personnel will be given briefings by the SHSO, the Roux PM, and/or the ExxonMobil PM on an as-needed basis to further assist them in conducting their activities safely. Safety briefings will be provided when new operations are to be conducted, change in work practices must be implemented due to new information made available, and before work begins at each work area. After the safety briefing, all personnel performing work at the Site will be required to review and sign the HASP.

6.2 Recordkeeping Requirements

All recordkeeping requirements mandated by OSHA (29 CFR 1910.120) will be strictly followed. Specifically, all Roux personnel training records, medical fit for duty papers, and respirator fit test forms will be required before work can begin and maintained during the length of the project. These records along with injury/incident reports, medical examination records and exposure monitoring records will become a permanent part of the project records. Emergency medical records for all Roux personnel will reside with the Human Resource Manager (HR) in case of any accidents or overt exposure. Each subcontractor will maintain the above-mentioned records for their own employees.

6.3 Corporate Recordable Injury/ Illness

A work-related injury or illness is defined as Corporate Recordable if it involves one or more of the following: death, day(s) away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, and/or a significant diagnosed injury or illness that has occurred based on a work function.

A reportable Lost Time Incident (LTI) is a result in which at least one lost day occurs after the day of the incident based on the individual's being unable to work at his/her normal work location (even if a weekend, holiday or vacation day). An LTI can also be determined by a Physician or Licensed Health Care Professional (PLHCP) that states an individual is unable to work at the normal location on the next calendar day.

A Restricted Work Incident (RWI) is a result in which an individual's work activities have been restricted because he or she is unable to perform one or more of the routine functions (work activities regularly performed at least once per week) of his/her job. It can also result from the inability to work a full workday that he or she would otherwise have been scheduled to work on any calendar day after the day of the injury or illness. It should be noted that any work restrictions recommended by a PLHCP are recordable even if the employee does not follow the restrictions.

A Medical Treatment Incident (MTI) results when a PLHCP has rendered a significant diagnosed injury or illness that does not fall into the LTI or RWI categories even if no medical treatment was received (e.g., work-related cases of cancer, chronic irreversible disease, hearing loss, a fractured or cracked bone, or a punctured ear drum) during his or her employment. A Medical Treatment Incident can also occur because a PLHCP has issued a prescription strength medication (whether individual fills prescription or not) during an office visitation. There are several additional provisions that can trigger a recordable Medical Treatment Incident and are listed as follows: an incident that involves work-related needle-stick injuries or cuts from sharp objects contaminated with a potentially infectious material (e.g., blood); exposure to anyone with a known case of active tuberculosis or Covid-19 followed by an active infection; incidences that require wound closing devices (e.g., sutures, staples, tapes/glues [exception: butterfly bandages and Steri-Strips]); results in using devices with rigid means of support (e.g., stays); systems designed to immobilize parts of the body (exception: using temporary immobilization devices to transport an accident victim); results in using devices other than irrigation or a cotton swab to remove foreign material from eye; results in removing the outer layer of skin to remove foreign material from areas other than the eye; and/or results in chiropractic treatment or physical/massage therapy associated with the management and care of a patient to combat disease or disorder.

The acceptance of prescription medication includes the following list that will trigger an OSHA recordable incident:

- All antibiotics (exception: dermal applications such as Neosporin®, Iodine, or similar preparation);
- Diphenhydramine (Benadryl® greater than 50 milligrams (mg) in one application);
- All analgesic and non-steroidal anti-inflammatory medication, including Ibuprofen (e.g., Advil®), greater than 467 mg in a single dose;
- Naproxen Sodium (e.g., Aleve®) greater than 220 mg in a single dose;
- Codeine analgesics greater than 16 mg in a single dose;
- All dermally-applied steroid applications (exception: hydrocortisone in strengths of 1% or less);
- All vaccinations for work-related exposure (exception: Tetanus);
- All narcotic analgesics (exception: Codeine, as listed above);
- All bronchodilators (exception: Epinephrine aerosol 5.5 mg/ml or less);
- Any muscle relaxants; and
- All other medications that legally require a prescription for purchase or use in the state or country where the incident occurred.

It should be noted that a Medical Treatment does not include visits to a PLHCP solely for observation or counseling; conducting diagnostic procedures such as x-rays and blood tests; and/or use of diagnostic medications (e.g., eye drops to dilate pupils) or First Aid treatment. The following First Aid treatments are exempt from any medical treatment reporting during diagnostic procedures:

- Use of nonprescription medication at nonprescription strength (e.g., dermal applications such as Neosporin®, Iodine, or similar preparation);
- Tetanus immunization; and
- Cleaning, flushing, or soaking wounds on the surface of the skin, wound covering devices (e.g., bandages, Band-Aids®, gauze pads), or butterfly bandages or Steri-Strips.

Also included as non-recordable first aid would be the following:

- Hot or cold therapy (e.g., compresses, soaking, whirlpools);
- Any non-rigid means of support (e.g., elastic bandages, wraps, non-rigid back belts), temporary immobilization devices while transporting an injury victim (e.g., splints, slings, neck collard, back boards);
- Drilling of a finger or toenail to relieve pressure, or draining fluid from a blister;
- The use of an eye patch, removing foreign material from the eye using only irrigation or a cotton swab, removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
- Use of a finger guard, massages not associated with the management and care of a patient to combat disease or disorder; and
- The drinking of fluids for relief of heat stress.

7.0 PERSONAL PROTECTION AND MONITORING REQUIREMENTS

7.1 Personnel Protection

Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices and PPE are used to protect employees. Appropriate PPE shall be worn by Site personnel when there is a potential exposure to chemical hazards or physical hazards (e.g., falling objects, flying particles, sharp edges, electricity and noise), as determined by the SHSO, the Roux PM, and the ExxonMobil PM. The level of personal protection, type and kind of equipment selected will depend on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors will be made before work can be safely executed.

Roux maintains a comprehensive written PPE program that addresses proper PPE selection, use, maintenance, storage, fit and inspection. Roux's PPE program can be found within **Appendix M**. PPE to be used at the Site will meet the appropriate American National Standards Institute (ANSI) standards and the following OSHA (General/Construction Industry) standards for minimum PPE requirements.

The minimum level of PPE for entry onto the Site is Level D. The following equipment shall be worn:

- Work uniform (long pants, sleeved shirt)
- Hard hat
- Steel or composite toe work boots
- Safety Glasses (must comply with one of the following ANSI/ISEA Z87.1-2010, ANSI Z87.1-2003, ANSI Z87.1-2003)
- Boot Covers (as needed)
- Hearing Protection (as needed)
- High visibility clothing (shirt/vest)
- Hand Protection (e.g., minimum cut resistance meeting ANSI 105-2000 Level 2)

Note that jewelry shall be removed or appropriately secured to prevent it from becoming caught in rotating equipment or unexpectedly snagged on a fixed object. (e.g., wrist watches bracelets, rings, chains and necklaces, open earrings). Do not wear loose clothing and all shoulder length hair should be tied back.

Site specific PPE ensembles and materials are identified within task specific JLAs located within **Appendix D**, and any upgrades or downgrades of the level of protection (i.e., not specified in the JLA) must be approved by the PP and immediately communicated to all Roux personnel and subcontractors as applicable. PPE is used in accordance with manufacturer's recommendations.

7.2 HAZWOPER Personal Protective Equipment

Three levels of protective equipment are discussed below including Level D, Level C, and Level B.

7.2.1 Level D Protection

1. Personal Protective Equipment:
   - Boots, leather or chemical-resistant, steel (or composite) toes, including task-specific boot requirements as consistent with ASTM F2413-11;
   - Boots (outer), chemical-resistant (disposable)*;
   - Cut and chemical resistant gloves (with minimum blade cut-rating of ANSI Level 2) carried on each person;
   - Long sleeved shirts;
   - Chemical resistant clothing (e.g., Tyveks)*;
   - ANSI Z87.1-rated safety glasses or chemical splash goggles;
   - Hard hat;
   - Hearing protection**; and
   - High-visibility clothing or traffic safety vest; reflective vest required for all work in low-light conditions and when working in roadways.

   * Optional for activities except when handling petroleum product (e.g., well bailing) and materials (e.g., soil, sorbent products, etc.) exhibiting high degrees of petroleum contamination, or when performing other activities that warrant this equipment.

   ** Optional based on noise levels, as described in Section 4.

2. Criteria for Selection:
   - Non-intrusive activities and intrusive activities in areas where the potential airborne hazards are substantially characterized and do not pose a threat of exposure more than one-half of the PEL.
   - PID instrument (such as a MiniRAE 3000 or other comparable instrument) readings in the breathing zone are less than 5-parts per million (ppm) and benzene is not detectable utilizing colorimetric indicator tubes (e.g., Dräeger tubes). Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

Notes:
1. Benzene may also be monitored initially and periodically in the breathing zone utilizing activated charcoal sampling devices.
2. Modifications of Level D will be used to increase or decrease the level of skin protection during activities that increase or preclude, respectively, the degree of contact with chemical hazards. Modifications for increased protection may include the use of chemical resistant coveralls (e.g., Tyveks) and chemical resistant gloves. Any modifications of Level D will require approval of the SHSO and PM.

7.2.2 Level C Protection

1. Personal Protective Equipment:
   - Full-face, air-purifying, cartridge-equipped respirator (Mine Safety and Health Administration / National Institute of Occupational Safety and Health [MSHA/ NIOSH] specifically approved for protection from organic vapors and/or other COCs present per OSHA 1910.1028);
   - Chemical-resistant clothing (coverall; hooded, two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls);
   - Cotton coveralls;
   - Gloves (outer), chemical-resistant, nitriles;
   - Gloves (inner), cut resistant (with minimum blade cut-rating of ANSI 105-2000 Level 2);
   - Boots (inner), chemical-resistant, steel (or composite) toe and including task-specific boot requirements as consistent with ASTM F2413-11;

- Boots (outer), chemical-resistant (disposable);
- Hard hat;
- Hearing protection**; and
- Escape mask*.

* Optional

** Optional based on noise levels as described in Section 4.

2. Criteria for Selection:

   Meeting any of these criteria warrants use of Level C protection:

   - Airborne hazards are known to be present but are unlikely to exceed protection factors provided by air purifying respirators.
   - Continuous total organic vapor readings in the breathing zone register between 5 ppm and to less than a 25-ppm on a PID (such as a MiniRAE 3000 or other comparable instrument), and benzene readings utilizing colorimetric indicator tubes (e.g., Dräeger or Sensidyne) are undetectable.
   - See the Combustible Gases table for decisions based on LEL.
   - Measured air concentrations of known organic vapors will be reduced by the respirator to at or below one half of the permissible exposure limit (PEL), and the individual and combined compound concentrations are within the service limit of the respirator cartridge.
   - Atmospheric contaminant concentrations do not exceed Immediately Dangerous to Life and Health (IDLH) concentrations.
   - Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
   - Job functions have been determined not to require self-contained breathing apparatus.

   Notes:
   1. Benzene may also be monitored initially and periodically in the breathing zone utilizing activated charcoal sampling devices.
   2. Modifications of Level C will be used to increase or decrease the level of skin protection during activities that increase or preclude, respectively, the degree of contact with chemical hazards. Modifications for increased protection may include, but are not limited to, the use of chemical resistant coveralls (e.g., Tyveks) and cut and chemical resistant gloves. Any modifications to Level C will require approval of the SHSO and PM.

7.2.3 Level B Protection (Contact the OHSM and/or CHSD)

1. Personal Protection Equipment:
   - Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved);
   - Chemical-resistant clothing (overall and long-sleeved jacket; coveralls; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant coveralls);
   - Cotton coveralls;
   - Chemical-resistant gloves (outer) nitriles;
   - Gloves (inner), cut-resistant (with minimum blade cut rating of ANSI Level 2);
   - Boots (inner), chemical-resistant, steel (or composite) toe, and task-specific boot requirements as consistent with ASTM F2413-11;
   - Boots (outer), chemical-resistant, (disposable);
   - Hard hat;

- Hearing protection*; and
- 2-way radio communications (intrinsically safe).

* Optional based on noise levels as described in Section 4.

2. Criteria for Selection:

   Meeting any one of these criteria warrants use of Level B protection:

   - PID instrument (such as a MiniRAE 3000 or other comparable instrument) readings in the breathing zone are greater than 5 ppm and less than 25 ppm and benzene is detectable utilizing colorimetric indicator tubes (e.g., Dräeger or Sensidyne).
   - Airborne hazards are known to be present, but are not identified or quantified.
   - The type(s) and atmospheric concentration(s) of toxic substance(s) have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. These would-be atmospheres:
     - With IDLH concentrations;
     - Exceeding limits of protection afforded by a full-face, air-purifying respirator; or
     - Containing substances requiring supplied-air PPE, but substances and/or concentrations do not represent a serious skin hazard.
   - The atmosphere contains less than 19.5% oxygen.
   - Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.
   - If work is performed in an enclosed space.

7.3 Hearing Conservation

Hearing protection is made available when noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA. Hearing protection is required when the 8-hour time weighted average sound level $\geq$ 85 dBA. Where noise exposure meets or exceeds this level, noise is listed as a physical hazard in the JLA for the tasks/operation, and hearing protection is included as one of the control measures (PPE).

7.4 Air Monitoring

An air monitoring program is important to the safety of on- and off-Site personnel. A preliminary survey, to establish background conditions in the immediate sampling area, may be made prior to the initiation of Site work including, but not limited to, monitoring wind direction and approximate temperature during all invasive site activities. This survey will be conducted with the appropriate air monitoring instrument(s) as warranted by the field activity. Once this survey has been complete, any change in the type of PPE will be determined.

Air monitoring may be performed to verify that the proper level of equipment is used and to determine if increased protection or work stoppage is required. The following equipment may be used to monitor conditions:

- Photoionization Detector (PID)
- Multi-gas meter
- Colorimetric indicator tubes (e.g., Dräeger or Sensidyne).

Monitoring equipment will be calibrated in accordance with applicable regulatory requirements and manufacturer specifications.

Below are monitoring action levels for Site-specific chemicals of concern. In the event that PID readings above the thresholds identified below are sustained for 5 minutes in the breathing zone, worker protection will require upgrading following notification to the OHSM and applicable parties (e.g., client, board of health, regulators, etc.).

Action Levels for Respiratory Protection

ORGANIC VAPOR CONCENTRATIONS		
PID[1]	**BENZENE[2]**	**ACTION[3]**
< 5 ppm	Not detected	No Action
< 5 ppm	Detected but < 5 ppm	Ventilate space until Benzene is not detected. If non-detect concentrations of benzene cannot be achieved, upgrade to Level C.
5 ppm - < 25 ppm	< 5 ppm	Ventilate space until PID reads < 5 ppm. If < 5 ppm cannot be achieved, upgrade to Level C.
5 ppm - < 25 ppm	5+ ppm	Ventilate space until Benzene is not detected and the PID reads < 5 ppm. If benzene is detected and the PID reads = or >25 ppm, upgrade to Level B.
25 ppm - <100 ppm	5+ ppm	Ventilate space and evacuate the area.

1 Based on relative response/sensitivity of PID to benzene.

2 Colorimetric indicator tube readings. Action level in accordance with ExxonMobil Occupational Exposure Limits (OELs) or ACGIH TLVs®, whichever are lower.

3 Measured air concentrations of known organic vapors will be reduced by the respirator to or below one half of the permissible exposure limit, and the individual and combined compound concentrations are within the service limit of the respirator cartridge.

Action Levels for Oxygen Levels and Combustible Gases

Combustible Gases[1]	
< or = 5.0% LEL	Continue monitoring
>5.0% LEL	Stop Work and Notify SHSO
20.0% LEL or greater	Potential Explosion Hazard: Interrupt task/Evacuate area/Notify SHSO
Oxygen[1]	
20.9% O_2	Oxygen level normal
19.5% O_2—20.9 O_2	Oxygen deficient – Notify SHSO
< 19.5% O_2	Oxygen deficient: Interrupt task/Evacuate area
>23.5% O_2	Oxygen enriched: Interrupt task/Evacuate area

1 Action levels based on USEPA Standard Operating Safety Guides; Table 5-1, Atmospheric Hazard Action Guidelines may be further restricted based on the CHSD's professional judgment and experience.

Action Levels for Carbon Monoxide

Carbon Monoxide Action Levels[1]	
Concentration of CO in Air	**Action**
<25 ppm	Inspect exhaust system for leaks or other sources of CO. Monitor initially and every 15 minutes during use of CO-generating equipment.
25-50 ppm	Ventilate area. Monitor continuously and record measurements. Contact PM.
>50 ppm	Cease Field Operations. Ventilate area.

1. Based upon The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 25 ppm as an 8-hour time-weighted average (TWA) [ACGIH 2015 TLVs® and BEIs®] and OSHA's Permissible Exposure Limit (PEL) of 50 ppm as an 8-hour TWA concentration [29 CFR Table Z-1].

7.4.1 Air Monitoring During Site Operations & Community Air Monitoring

The SHSO and field personnel will monitor, and record air monitoring measurements as required for onsite activities (Section 7.4.3 below) and during confined space entry (Section 11.2).

A Community Air Monitoring Plan (CAMP) will be implemented during Site excavation work to monitor dust and odor potentially emanating from the work area. CAMP implementation will include air monitoring and periodic odor inspections during excavation, backfill or soil management activities. Air monitoring and odor inspection results will be documented and reported in accordance with the CAMP.

If community air monitoring indicates the need for dust suppression or if dust is visually observed leaving the Site or impacting the residences adjacent to the Site, Roux will spray water across the excavation, surrounding areas, and on-Site haul roads as necessary to mitigate airborne dust formation and migration. Water will either be obtained from a public hydrant or provided by the on-Site water service, if available. Other dust suppression techniques that may be used to supplement the water spray include:

- Hauling materials in properly covered containers or vehicles;
- Restricting vehicle speeds on-Site; and
- Hydro-seeding of disturbed areas (as needed).

If community air monitoring indicates that VOC concentrations downwind of the excavation exceed the levels described in the CAMP, noxious odors are present in the vicinity of the residences adjacent to the Site, or noxious odors are migrating off-Site, BioSolve Pinkwater® (BioSolve), or other commercially available vapor suppression product, will be applied to: the active excavation areas; material contained in on-Site roll off containers or dump trailers; stockpiled material (if any); or other areas emitting VOCs or odors. Other techniques to control migration of fugitive organic vapors and/or odors may be employed, including:

- Limiting the excavation size;
- Backfilling portions of the excavation;
- Spraying water onto the excavation faces and equipment;
- Covering soil stockpiles (if any) with 6-mil polyethylene sheeting;
- Hauling waste materials off-Site in properly covered container;
- Odor masking; and/or
- Pausing operations until the wind conditions change such that fugitive organic vapors and/or odors are not migrating toward downwind receptors.

The CAMP has been prepared to ensure that investigation activities do not adversely affect nearby workers, residents or pedestrians on Site or in the area immediately surrounding the Site and to preclude or minimize airborne migration of VOCs and particulates to on and off-Site areas. The CAMP is included as **Appendix N** and will be available on-Site during the remediation activities.

Real-time community air monitoring will be performed during remedial activities at the Site. Roux will monitor for airborne particulates and VOCs along the downwind perimeter of the work area, including in the vicinity of the Site. Air monitoring will occur during excavation, grading, and soil/fill handling activities. Air monitoring data gathered in accordance with the CAMP will be provided to the NYSDOH project manager following the completion of remediation activities (anticipated duration of one week). Any monitoring results which exceed the action levels set by the CAMP will be reported:

1. When identified, when a NYSDEC representative is present at the Site; and
2. Within two days of any exceedance through an electronically submitted exceedance report to NYSDEC and NYSDOH project managers, which will also include the duration and corrective actions taken in response to any exceedance.

Any monitoring results which exceed the action levels set by the CAMP will also be summarized in a CAMP report provided to NYSDOH. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, the CAMP follows procedures and practices outlined under NYSDEC DER-10, including NYSDOH's Generic Community Air Monitoring Plan, and Fugitive Dust and Particulate Monitoring.

7.4.2 Equipment Bump Testing and Calibration

Prior to each day's use, every gas detection monitor should be bump tested to confirm the response of all sensors and activation of all alarms by exposing the monitor to a concentration of target gas that exceeds the low alarm set point. A bump test is also recommended if the monitor has been subjected to physical impact, liquid immersion, an Over Limit alarm event, or custody changes, or anytime the monitor's performance is in doubt. To ensure greatest accuracy and safety, only bump test in a fresh air environment.

All monitoring equipment should be calibrated to the manufacturer's specifications and whenever bump testing fails. Field instruments that are rented from third-party rental services should be calibrated prior to being delivered to the Site. Documentation of calibration will be provided by the rental service. The calibration requirements documented in this HASP apply to equipment use for the evaluation and mitigation of exposure hazards to onsite personnel. Refer to the project-specific Quality Assurance Project Plan (QAPP) for calibration requirements when utilizing field instruments to generate environmental data (e.g., soil screening with a PID).

Manufacturer's Calibration Requirements

Equipment	Frequency (at a minimum)
MultiRAE Multiple-Gas Monitor	Every 6 months
MultiRAE Plus Multiple-Gas Monitor	Every 30 days
MSA ALTAIR 4XR Multigas Detector	Every 6 months
MiniRAE 2000/3000 Portable VOC Monitor (PID)	Every 30 days Anytime the lamp, sensor or gas type has been changed
ION Cub Personal VOC Detector	Annually *Can be calibrated by the manufacturer or by connecting it to a Cub Doc or remote calibration adaptor

7.4.3 Onsite Activities

Activities requiring air monitoring include any Site activity which will, or will possibly, result in exposure(s) to hazardous or toxic chemicals or physical agents at or above the permissible exposure limit (PEL), or to flammable or oxygen deficient atmospheres. These activities include, but are not limited to, excavation activities, operation and maintenance (O&M) of air strippers, and entry into interior of all tanks. The following procedures will be followed for any activities requiring air monitoring:

Air monitoring will be performed to establish the concentrations of volatile organic compounds during invasive activities using the following instrument(s):

- Photo ionization detector (PID);
- Colorimetric indicator tubes (e.g., Dräeger or Sensidyne), if necessary based on PID readings; and
- Activated charcoal sampling devices, if necessary.

The PID and colorimetric indicator tubes will be used to provide direct readings of organic vapor concentrations during intrusive activities to determine that personnel protection is adequate.

A multi-gas meter will be used to monitor the potential for oxygen deficient atmospheres and for explosive concentrations of organic vapors and contaminants such as CO and H_2S during intrusive operations and confined space work. Monitoring will be performed according to the action levels for oxygen, combustible gases and contaminants provided in Section 7.4.

Monitoring equipment will be calibrated in accordance with the manufacturer's specifications. Air monitoring during invasive site activities will be performed as appropriate, as specified in Section 7.4. All air monitoring results will become part of the project records.

Level D Intrusive Activities

Level D intrusive activities will initially include all intrusive Site activities. These investigations/activities will begin utilizing Level D protection as described in Section 7.2.1, with necessary upgrading to assure adequate personnel protection.

The SHSO and/or field personnel will monitor the breathing zone with the PID in continuous operating mode and with the alarm activated. The alarm will be set at 5 ppm, which is below the PEL for all constituents of concern, except benzene. If the PID indicates the 5 ppm concentration has been exceeded, the SHSO and/or field personnel will order cessation of the activity and the exclusion zone cleared of all personnel until the PID indicates a reading less than 5 ppm, or until the nature of the hazard has been more thoroughly evaluated.

Colorimetric indicator tubes will be used to establish the concentration of benzene. The use of colorimetric tubes for benzene will enable the SHSO to make an immediate decision on the appropriate level of protection. Benzene may also be monitored initially in the breathing zone, using activated charcoal sampling devices. If any detections of benzene are noted based on the colorimetric indicator tube readings, the SHSO will order cessation of the activity until: 1) the benzene concentrations are non-detectable by the colorimetric indicator tubes; or 2) all potentially exposed personnel have donned Level C respiratory protection as described in Section 7.4.3 and PID readings are less than 5 ppm; or 3) until the nature of the hazard has been more thoroughly evaluated and it is determined the measured compound(s) was not benzene.

To confirm the adequacy of respiratory protection, personnel monitoring utilizing activated charcoal sampling devices may be performed to measure the airborne concentrations of benzene and possibly other organic compounds (as necessary) at the beginning of new activities and periodically during intrusive activities. This activity would be undertaken at the direction of the CHSD. These samples would be sent to an American Industrial Hygiene Association (AIHA) accredited laboratory for analysis using approved OSHA/NIOSH analytical methods.

Level C Intrusive Activities

Level C intrusive activities will initially include only those activities that require upgrading from Level D. Level C protection will be as described in Section 7.2.2, with upgrading, as necessary, to Level B to assure adequate personnel protection. Downgrading to Level D protection will also be possible if monitoring demonstrates no inhalation hazard exists for this activity.

The SHSO will monitor the breathing zone with the PID in continuous operating mode and with the alarm activated. The alarm will be set at 5 ppm, which is below the PEL for all constituents of concern except benzene. If the PID indicates the 5 ppm concentration has been exceeded for a sustained period (greater than five minutes), the SHSO, SS, or delegate will initiate measurements utilizing the colorimetric indicator tubes for benzene.

If the PID readings exceed 25 ppm total organic vapor or the benzene colorimetric indicator tubes detect benzene, the SHSO will order cessation of the activity until: 1) the PID indicates a reading less than 25 ppm, and benzene is not detectable based upon the colorimetric indicator tube readings; 2) all potentially exposed personnel have donned Level B respiratory protection; or 3) the nature of the hazard has been more thoroughly evaluated, and it is determined that the measured concentrations do not pose a potential exposure in excess of the PEL utilizing the Level C protection.

To confirm the adequacy of respiratory protection, personnel monitoring utilizing activated charcoal sampling devices may be performed to measure the airborne concentrations of benzene and possibly other organic compounds (as necessary) at the beginning of new activities and periodically during intrusive activities. This activity would be undertaken at the direction of the CHSD. These samples would be sent to an AIHA accredited laboratory for analysis using the approved NIOSH analytical methods.

Level B Intrusive Activities

Level B intrusive activities will initially include only those activities that require upgrading from Level C or D, and only those activities required to bring work to a safe stoppage. No work is currently planned utilizing Level B protection, and this HASP will require amending when Level B work becomes necessary (except for safe work stoppage activities).

When Level B protection is utilized, the SHSO will monitor the breathing zone with the PID in continuous operating mode and with the alarm activated. The alarm will be set at 25 ppm. If the PID indicates the 25 ppm concentration is exceeded, the SHSO will order cessation of the activity until: 1) the PID readings are below 25 ppm; or 2) until the nature of the hazard has been more thoroughly evaluated, and it is determined the measured concentrations do not pose a potential exposure more than the PEL utilizing the Level B protection.

To confirm the adequacy of respiratory protection, personnel monitoring utilizing activated charcoal sampling devices may be performed (under the direction of the CHSD) to measure the airborne concentrations of benzene and possibly other organic compounds (as necessary) whenever Level B protection is utilized.

7.5 Medical Surveillance

The medical surveillance section of the HASP describes how worker health status is monitored at this Site. Medical surveillance is used when there is the potential for worker exposure to hazardous substance at levels above OSHA permissible exposure limits or other published limits. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by Site hazards. The provisions for medical surveillance at this Site are based on the Site characterization and job hazard analysis found in Section 5 of this HASP and are consistent with OSHA requirements in 29 CFR 1910.120(f) as applicable.

7.5.1 Site Medical Surveillance Program

Medical surveillance requirements are based on a worker's potential for exposure as determined by the Site characterization and job hazard analysis documented in Section 5 and JLAs within **Appendix D** of this HASP and in compliance with the requirements of 29 CFR 1910.120(f)(2). Based on Site information and use of direct reading instruments, limited use of respirators (less than 30 days per year), and the absence of an employee-staffed HAZMAT team, a limited medical surveillance program is required and implemented at this Site. The medical surveillance program provides that:

1. Workers assigned to tasks requiring the use of respirators receive medical examinations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment, and

2. If a worker is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substance or health hazards, medical examinations are provided to that worker as soon as possible after the occurrence and as required by the attending physician.

3. These medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after any apparent over-exposure.

7.5.2 Medical Recordkeeping Procedures

Medical recordkeeping procedures are consistent with the requirements of 29 CFR 1910.1020 and are described in the company's overall safety and health program. A copy of that program is available at the Roux Corporate office in Islandia, NY.

The following items are maintained in worker medical records:

- Respirator fit test and selection
- Physician's medical opinion of fitness for duty (pre-placement, periodic, termination)
- Physician's medical opinion of fitness for respirator protection (pre-placement, periodic)
- Exposure monitoring results

7.5.3 Program Review

The medical program is reviewed to ensure its effectiveness. The CHSD in coordination with the HR Director is responsible for this review. At minimum, this review consists of:

- Review of accident and injury records and medical records to determine whether the causes of accidents and illness were promptly investigated and whether corrective measures were taken wherever possible,
- Evaluation of the appropriateness of required medical tests based on Site exposures,
- Review of emergency treatment procedures and emergency contacts list to ensure they were Site-specific, effective, and current.

8.0 EMERGENCY RESPONSE PLAN

Because of potential hazards at the Site and the conditions under which operations are conducted, the possibility of an emergency exists. An emergency plan is required by OSHA (29 CFR 1910.120) to be available for use and is included below. A copy of the Site's Emergency Action Plan (EAP) is attached in **Appendix O** to this HASP.

This emergency response plan details actions to be taken in the event of Site emergencies. The PM and SHSO is responsible for the implementation of emergency response procedures onsite. The SHSO/PM provides specific direction for emergency action based upon information available regarding the incident and response capabilities and initiates emergency procedures and notification of appropriate authorities.

8.1 Emergency Response

In the event of an emergency, such as fire, explosion, significant release of particulates, etc., all persons in both the restricted and non-restricted areas will evacuate and assemble near the SZ or other safe area as identified by the SS/ SHSO. Site personnel are expected to evacuate and are not to participate in emergency response activities, response is facilitated through external emergency services. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given.

After investigating the incident and relevant information, the SS/ SHSO shall determine the level of response required for containment, rescue and medical care. The SS/ SHSO has authority to initiate additional actions if outside services are required.

The SS/ SHSO must ensure that access for emergency equipment is provided and that all spark-producing apparatus has been shut-down once the alarm has been sounded. Once the safety of all personnel is confirmed, the Fire Department and/or other emergency response groups will be notified by telephone of the emergency. The SHSO will provide relevant information to the responding organizations, including but not limited to the hazards associated with the emergency incident, potential containment problems, and missing Site personnel.

8.2 Emergency Alerting and Evacuation

If evacuation notice is given, Site workers leave the worksite, if possible, by way of the nearest exit. Appropriate primary and alternate evacuation routes and assembly areas have been identified with Emergency Muster Area and are shown on **Figure 2**. The routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by SHSO/PM.

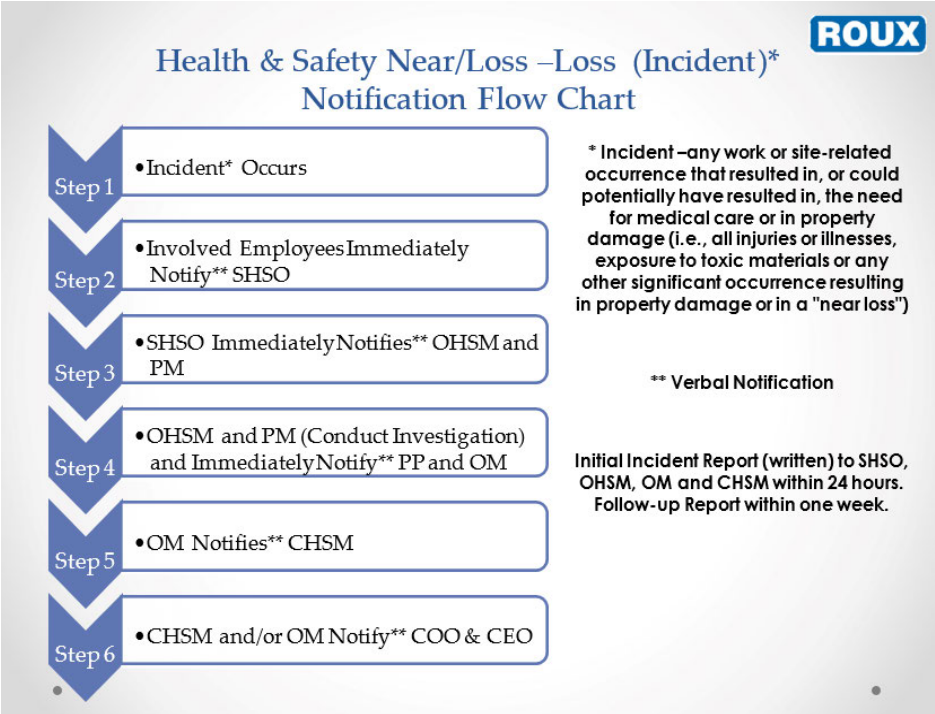
Personnel exiting the Site gather at a designated assembly point. To determine that everyone has successfully exited the Site, personnel will be accounted for at the assembly Site. If any worker cannot be accounted for, notification is given to so that appropriate action can be initiated. Subcontractors on this Site have coordinated their emergency response plans to ensure that these plans are compatible and potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

Withdrawal Upwind: Work parties will continually note general wind directions while onsite. Upon noting the conditions warranting movement away from the work site, the crew will move upwind a distance of approximately 100 feet or farther, as indicated by the Site monitoring instruments and material properties. When access to the Site is restricted and escape possibly hindered, the crew may be instructed to evacuate the Site rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes.

Site Evacuation: Upon determination of conditions warranting Site evacuation, work parties will proceed upwind of the work site and notify the SHSO, Roux PM, and the ExxonMobil PM of hazardous Site conditions. If the hazard is toxic gas, respirators will be donned by workers certified and trained to wear them. The crew will proceed to the field office to assess the situation. The advisability and type of further response action will be coordinated and carried out by the ExxonMobil PM, Roux PM, and SHSO.

8.3 Emergency Medical Treatment and First Aid

In the event of a work-related injury or illness, employees are required to follow the procedures outlined below. All work-place injury and illness situations require Roux's Project and Corporate Management Team to be notified when an injury/illness incident occurs, and communication with the contracted Occupational Health Care Management Provider, AllOne Health (AOH), is initiated. The Injury/Illness Notification Flowchart is provided below and within Roux's Incident Investigation and Reporting Program included within Roux's Corporate Health and Safety Manual. Based on discussions with the Project Team, Corporate Management and the AOH evaluation, if medical attention beyond onsite First Aid is warranted, transport the injured / ill person (IP) to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications with Corporate Management Team. An Urgent Care/Hospital Route map with location to Strong Memorial Hospital located at 601 Elmwood Avenue in Rochester, New York. The telephone number for the hospital is (585) 275-2100 is included at the beginning of this HASP.



8.4 Personal Injury

In the event of a work-related injury or illness, employees are required to follow procedures outlined in the Roux Incident Investigation and Reporting Management Program. All work-place injury and illness situations require Roux's Project and Corporate Management Team to be notified when and injury / illness incident occurs, and communication with the contracted Occupational Health Care Management Provider, AOH, is initiated.

If on Site personnel require any medical treatment, the following steps will be taken:

a. Notify Roux's Project and Corporate Management Team for any work-related injury and/or illness occurrence, and communicate with the contracted Occupational Health Care Management Provider, AOH, immediately following the notification.

b. Based on discussions with the Incident Management Team and AOH evaluation, if medical care beyond onsite First Aid is warranted, transport the IP to the Urgent Care Center, or notify the Fire Department or Ambulance Emergency service and request an ambulance or transport the victim to the hospital, and continue communications as per the Emergency Action Plan (**Appendix O.1**).

c. Decontaminate to the extent possible prior to administration of first aid or movement to medical or emergency facilities.

d. First aid medical support will be provided by onsite personnel trained and certified in First Aid, Cardio Pulmonary Resuscitation (CPR), Automatic External Defibrillation (AED), and Blood-Borne Pathogens (BBP) Awareness, until relieved by emergency medical services (EMS).

e. The SHSO and PM will perform a Loss Investigation (LI) and the Project Team will complete the final ExxonMobil Loss Report (**Appendix P**). If a Roux employee is involved in a vehicular incident, the employee must also complete the Acord form (**Appendix Q**).

8.5 Overt Personnel Exposure

If an overt exposure to toxic materials occurs, the exposed person shall be treated at the Site as follows.

- Skin Contact: Wash/rinse affected area thoroughly with copious amounts of soap and water, then provide appropriate medical attention. An emergency shower or drench system shall be accessible at the Site always. Utilizing an eyewash station or mobile kit, eyes should be rinsed for at least fifteen (15) minutes upon chemical contamination.
- Inhalation: Move to fresh air and/or, if necessary, decontaminate, initiate and transport to the hospital.
- Ingestion: Decontaminate and transport to emergency medical facility.
- Puncture Wound or Laceration: Decontaminate and transport to emergency medical facility.

8.6 Environmental Incident (Release or Spread of Contamination)

If possible, the spread of contamination should be controlled or stopped. The Site Coordinator must contact the Roux PM and the ExxonMobil PM per the Incident Response Plan (**Appendix O.2.**). PM are responsible for contacting the appropriate personnel and/or authorities. If a significant release has occurred, the PM or their designees should contact the National Response Center and other appropriate groups. Those groups will alert National or Regional Response Teams as necessary. Following these emergency calls, the remaining personnel listed in the table below shall be notified if necessary.

In the case of an emergency (i.e., fire or immediate threat to personal or public health), immediately contact the appropriate personnel in the Emergency Notification Flowchart (above).

8.7 Adverse Weather Conditions

In the event of adverse weather conditions, the PM and SHSO will determine if work can continue without compromising the health and safety of any field workers. Some of the items to be considered prior to determining if work should continue are:

- Heavy rainfall;
- High wind;
- Thunderstorm/Lighting: Stop working immediately and wait until 20 minutes after last thunderclap/lightning strike;
- Potential for heat stress;
- Potential for cold stress and cold-related injuries;
- Limited visibility;
- Potential for electrical storms;
- Potential for malfunction of health and safety monitoring equipment or gear (based on temperature and/or humidity); and
- Potential for vehicular incidents.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lightning. Observe daily weather reports and evacuate if necessary, in case of inclement weather conditions.

8.8 Electrical Storm Guidelines

In the event that lightning and/or thunder are observed while working on Site, all on-Site activities shall stop and personnel shall seek proper shelter (e.g., substantial building, enclosed vehicle, etc.). Work shall not resume until the threat of lighting has subsided and no lightning or thunder has been observed for 30 minutes. If the possibility of lightning is forecast for the day, advise the onsite personnel on the risks and proper procedure at the pre-work safety briefing. Continuously monitor for changing weather conditions and allow enough time to properly stop work if lightning is forecast.

8.9 Near Loss and Loss Investigations

A “Loss” is a specific event, sequence of events, or extended conditions that had unwanted or unintended impacts on the safety or health of people, property, environment, or on legal/regulatory compliance.

A “Near Loss” is a specific event, sequence of events, or extended conditions that COULD HAVE had unwanted or unintended impacts on the safety or health of people, property, environment, or on legal/ regulatory compliance (or when something almost happened).

An “Investigation” is a process to determine facts, root causes, and solutions. The process of investigating a Loss or Near Loss is nearly the same because Near Loss factors are the same as Loss factors. Near Losses must be investigated like Losses, using the applicable report form (**Appendix O**) and process as follows:

- Ensure immediate medical attention is provided;
- Secure the scene;
- Notify Supervisor and the ExxonMobil contact immediately;
- Assemble an investigation team;
- Initiate the investigation;
- Gather facts;
- Draw conclusions;
- Determine root cause factor(s);
- Develop solution(s);
- Communicate incident investigation information to Global Remediation Organization; and
- Perform verification and validation activities.

In the circumstance of an injury or illness, communicate with the Project Management Team and AOH, the contracted Occupational Health Care Management Provider, ensuring immediate medical attention is provided. Have someone transport and accompany the injured person to the medical facility if additional treatment or diagnosis is required. Utilize the ExxonMobil E&PS Incident “Go Book,” provided in **Appendix R**, which is a compilation of standards and guidelines to provide effective and immediate case management. Keep the ExxonMobil contact appraised of IP status and any work limitations resulting from injury. Act to secure the scene and initiated emergency response actions as necessary. Notify the Supervisor, the Roux CHSD, OM, OHSM, and SHSO of the incident.,

The PM and Supervisor will assemble an investigation team and take the lead role. The team may include Supervisors, Managers, subject matter experts, and involved employees. The investigation should be initiated as quickly as possible. For high-risk incidents, begin the investigation immediately. For lower-risk incidents, begin the investigation within 24 hours.

When gathering facts, speak only with persons directly involved in the incident. The interviews should be one-on-one. Deal only in facts, don’t speculate. If needed, the investigation team may reenact the incident. Take photos of the scene. Use experts, if needed, to help gather and validate data. Review pertinent files, past incidents, etc. Collect drawings, sketches, and site maps. Ask the questions “who, what, when, where, and how.” Organize the facts in the sequence of events, before and after the incident occurred. Develop a clear picture of what happened. Identify the causal factors by employing the Factors, Root Causes and Solutions (FRCS) methodology. FRCS walks the supervisor/manager through the seven (7) factors for each questionable item (in an LPO) or equivalent (in an NLI/LI Report) to arrive at the correct solutions. This leads to implementing the Solution(s) and communicating the incident investigation information throughout the Global Remediation Organization.

9.0 GENERAL SAFETY PROCEDURES

This section of the HASP presents the specific safety procedures to be implemented during Roux's activities at the Site in order to protect the health and safety of various on-Site personnel. In this section, non-monitoring, safety-related procedures are described. The content of this HASP has been implemented in accordance with the guidelines provided in ExxonMobil's Operations Integrity Management System (OIMS) Procedures, Life Saving Actions (LSA) Program, the Loss Prevention System® (LPS), and Roux's Corporate Health and Safety Manual.

9.1 General Safety Briefings

9.1.1 Site-Specific Safety Briefings for Visitors

A Site-specific briefing is provided to all Site visitors who enter this Site beyond the Site entry point. For visitors, the Site-specific briefing provides information about Site hazards, the Site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

9.1.2 HASP Information and Site-Specific Briefings for Workers

Site personnel review this HASP and are provided a Site-specific tailgate briefing prior to the commencement of work to ensure that employees are familiar with this HASP and the information and requirements it contains as well as relevant JLAs. Additional briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during ongoing Site characterization and analysis. Conditions for which we schedule additional briefings include but are not limited to: changes in Site conditions, changes in the work schedule/plan, newly discovered hazards, and incidents occurring during Site work.

9.1.3 Tailgate Safety Meetings

The Roux Oversight Staff shall begin each work shift with a tailgate meeting including, but not limited to, a discussion of Site-specific hazards for that day's activities. The JLA will be reviewed, prior to the start of fieldwork in accordance with the associated ExxonMobil JLA Protocol. The tailgate health and safety meeting (safety briefing) will record the topics of the meeting and address any additional mitigative measures that need to be documented for the specific field activities on relevant JLAs and filed with the project files on Site.

A designated Site worker will provide daily safety briefings (e.g., tailgate meetings) including, but not limited to, the following scenarios:

- When new operations are to be conducted;
- Whenever changes in work practices must be implemented; and
- When new conditions are identified and/or information becomes available.

Daily safety briefings shall be recorded on the Roux Daily Tailgate Health and Safety Meeting Log (**Appendix S**), and all completed forms will become a part of the project file.

9.1.4 Contractor Orientation Meeting

All personnel must attend a contractor orientation meeting hosted by a SS/SHSO prior to the commencement of remediation or construction activities. The purpose of the meeting is an effort to ensure that contractors are aware of the project scope, required safety practices, Site procedures, and other issues that will enhance the contractor's safety performance. The SS/SHSO will address key Safety, Health, and Environmental (SH&E) items in accordance with the project orientation checklist provided in the project job planning form. SH&E items will be additionally addressed prior to daily work using both Roux Daily Site Safety Checklist and Tailgate Meeting forms thereafter. These checklists are provided in **Appendix S** of this HASP and must be completed by a designated individual as needed.

9.2 Site Walk-Throughs

Safety considerations during Site walk-throughs are important since this activity will usually precede all other field operations. Air monitoring will be performed as indicated in Section 7.4 and will be used to assist in prescribing levels of protection for future site operations, designating Site layout, and identifying areas of particular hazard, if any.

9.3 Spill Containment

Spill containment equipment and procedures should, at a minimum, meet the requirements of the facility's Spill Prevention, Control and Countermeasure Plan, if applicable. Otherwise, spill containment equipment and procedures must be considered depending on the task including, but no limited to, chemical/product transfer points and handling.

9.3.1 Initial Spill Notification and Response

Any worker who discovers a hazardous substance spill will immediately notify the SS. The worker will, to his/her best ability, report the hazardous substance involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, and any associated injuries without compromising their own safety.

9.3.2 Spill Evaluation and Response

The SS is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area will be isolated and demarcated to the extent possible. If necessary, to protect nearby community members, notification of the appropriate authorities is made by the PM as appropriate. On-Site response is limited to small spills (e.g., <10 gallons), large spills require external emergency responders who will be contacted by the SHSO.

9.4 Decontamination

The decontamination section of the HASP describes how personnel and equipment are decontaminated when they leave the EZ. This section also describes how residual waste from decontamination processes is disposed. The Site decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These procedures minimize worker contact with contaminants and protect against the transfer of contaminants to clean areas of the Site and off-Site. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and can permeate PPE surfaces. Decontamination is facilitated within the CRZ at the Site.

9.4.1 Contamination Prevention

One of the most important aspects of decontamination is the prevention of contamination. Contamination prevention minimizes worker chemical exposures, spread of contamination, and increases sample results validity by precluding potential cross contamination. Procedures for contamination avoidance include, but are not limited to:

Personnel

- Do not walk through areas of obvious or known contamination;
- Do not handle or touch contaminated materials directly;
- Make sure all PPE has no cuts, tears or other signs of deterioration prior to donning;
- Fasten all closures on suits, covering with tape, if necessary;
- Take care to protect any skin injuries;
- Stay upwind of airborne contaminants; and
- Do not carry cigarettes, gum, etc. into contaminated areas.

Heavy Equipment

- Care should be taken to limit the amount of contamination that contacts heavy equipment;
- Excavated soils should be contained and staged away from workers when possible; and
- Decontamination of equipment should be performed prior to moving to another work area.

9.4.2 Decontamination Procedures for Personnel and PPE

The following are general decontamination procedures established and implemented at the Site.

1. Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the SZ only after undergoing the decontamination procedures described below in the next section.
2. Protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness.
3. PPE used at this site that requires maintenance or parts replacement is decontaminated prior to repairs or
4. PPE used at this Site is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment have been trained in the proper means to do so to avoid hazardous exposure.
5. This Site uses an off-Site laundry for decontamination of PPE. The Site has informed the facility of the hazards associated with contaminated PPE from this Site.
6. The Site requires and trains workers that if their permeable clothing is splashed or becomes wetted with a hazardous substance, they will immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing.
7. Procedures for disposal of decontamination waste meet applicable local, State, and Federal regulations.

9.4.3 Decontamination Procedures for Equipment

All tools, equipment, and machinery from the EZ or CRZ are decontaminated in the CRZ prior to removal to the SZ. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure and to avoid cross-contamination and chemical incompatibilities.

General Equipment Decontamination Procedures:

1. Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the SZ only after undergoing the equipment decontamination procedures.

2. Vehicles that travel regularly between the contaminated and clean areas of the site are carefully decontaminated each time they exit the EZ and the effectiveness of that decontamination is monitored to reduce the likelihood that contamination will be spread to other parts of the Site.

3. Particular attention is given to decontaminating tires, scoops, and other parts of heavy equipment that are directly exposed to contaminants and contaminated soil.

The following items may be used to decontaminate equipment:

- Fresh water rinse;
- Non-phosphorus detergent wash;
- Distilled water rinse;
- Acetone rinse;
- Distilled water rinse; and
- A steam cleaner or pressure washer (heavy equipment only)
    - If a steam cleaner will be utilized to decontaminate equipment, personnel should exercise caution as the high-pressure steam can cause severe burns, lacerations, and fluid injection injuries. Protective gloves, face shields, hard hats, steel-toed (or composite-toed) boots including task specific requirements consistent with ASTM F2413-11, and Tyvek suits or rain gear will be worn when using steam cleaners.

9.4.4 Monitoring the Effectiveness of Decontamination Procedures

Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures. Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants under changing site conditions. Visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

Personnel who work in contaminated areas of the site, either the CRZ or the EZ, are trained in the principles and practices of decontamination described in this section of the HASP and in related SOPs. If Site procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

9.5 Automobile Safety

Motor vehicle safety and awareness is a very important aspect in the prevention of injuries and of the HASP. Deaths, injuries, and property damage can occur from careless and unsafe driving practices. The main rule for vehicle safety is being smart and driving defensively. Driving defensively means not only taking responsibility for yourself and your actions but also keeping an eye on other vehicles and pedestrians to avoid dangerous situations.

The following guidelines are provided to help reduce potential risks on the road:

- Secure each passenger before starting engine.
- Lock all doors.
- Check mirrors.
- Driving too fast or too slowly can increase the likelihood of collisions.
- Avoid impaired drivers by turning right at next corner or exiting roadway. If on-coming car appears to cross into your lane, pull over, sound horn, and flashlights.
- Don't contest the "right of way" or try to race another car during a merge.
- Be aware of sudden traffic slow-downs due to security checkpoints and third-party vehicular accidents.
- While driving, be cautious, aware, and responsible.

Before operating a vehicle, and on a regular basis, check the following:

- Does the driver have a valid driver's license?
- Does the vehicle(s) have a valid inspection sticker(s) and insurance information?
- Are tires inflated to manufacturer designated pressures?
- Is there an inflated spare tire?
- Are lights and indicators working properly?
- Are windshield wipers and washer fluid working?
- Are vehicle attachments (such as ladders) secured?
- Is the warning horn working?
- Is the license plate clean and visible?
- Does the vehicle have any dirt or residual material inside or outside that requires decontamination?

Note: commercial vehicles are prohibited from left lanes, HOV lanes, and many expressways. Also, be aware of your surroundings and be responsible for your possessions and company equipment.

Additional information can be found within Roux's Fleet Safety Management Program found within **Appendix T**.

9.6 Vehicular Traffic Safety Procedures

A vehicular traffic area is any area where a vehicle may legally travel including, but not limited to, a roadway, roadway shoulder, driveway, or parking area.

Site Traffic Control Plan

A Traffic Control Plan (TCP) should be developed and implemented if activities at the Site are conducted within proximity of a public roadway or onsite access roadways. These measures should be implemented in accordance with ExxonMobil E&PS Minimum Safety Expectation: Traffic Control (**Appendix C**) to protect personnel working in these areas as well as to alert roadway users of necessary precautions.

It is the goal of the TCP to achieve balance between providing a safe working environment within the right-of-way and providing a safe and efficient means to travel through the work area.

Traffic control should be included in daily site safety meetings with all affected Site workers. During these meetings, ensure workers understand traffic safety issues/controls and traffic flow patterns. Site activities and work zones may change the traffic flow pattern and should be discussed in a daily site safety meeting. Modifications to control measures should be made, as needed.

Any vehicle not active in Site operations should be parked either in a parking lot, parked out of the way, and/or used as a barrier to oncoming traffic near the work zone. All parked vehicles, trailers, and heavy equipment, including those needing to idle while in use, should be secured either by emergency brake set or automatic transmission in "Park." All heavy equipment or service vehicles that could roll should be wheel-chocked if parked or placed on slope.

Backing of vehicles, heavy equipment, and/or trailers should be avoided whenever possible. If a vehicle operator cannot utilize a drive-through parking spot allowing forward movement when leaving, then back into parking space for safer subsequent egress.

Before backing a work/ service vehicle, conduct an initial walk around the vehicle to alert others in the work area and inspect for obstructions, use a spotter (if available), and/or an automated/audible reverse signal. If an automated/audible reverse signal is not installed in the vehicle, sound the horn signal twice before backing. Use a spotter when backing up and ensure that workers or pedestrians are not in the operator's "blind spots" (where the operator cannot see). The buddy or watchperson should communicate with the operator using a combination of radio, predetermined hand signals, and voice direction/ commands.

Low visibility conditions often occur during the day, and can be caused by heavy rain, thick fog, blowing dust or smoke, and heavy snowfall. To reduce the risk of a vehicular accident in low visibility conditions:

- Slow down;
- Use your low beams;
- Turn on your rear fog lamps (if present); and
- Avoid entering an area if you cannot see a safe distance ahead.

Site Traffic Safety Procedures

When performing activities on or adjacent to onsite roads, including activities at well vaults, the following traffic safety procedures must be followed.

- High visibility clothing or fluorescent vests which meets the Performance Class 2 or 3 requirements of the American National Standards Institute/International Safety Equipment Associated (ANSI/ISEA) 107-2015 "American National Standard for High-Visibility Safety Apparel and Headwear" and hard hats, as well as any other applicable PPE specified in the HASP, must be worn always.
- The worker's vehicle(s) should be positioned, to the fullest extent possible, to form a barrier between the worker(s) and on-coming traffic. In addition, each work vehicle will be equipped with a minimum of four (4) high visibility 42" traffic cones. All traffic cones will be placed as necessary to alert traffic of on-going activities.
- In high volume traffic areas or areas with unpredictable traffic patterns, a traffic watchman or police detail should be utilized. The traffic watchman must be equipped with a warning flag and remain alert and focused on traffic conditions always. The need for a traffic watchman or police detail should be discussed with the Roux PM and ExxonMobil PM prior to deployment.
- Notify the local police, as required / needed, of the work location, dates of work, and the anticipated work times when work is to be conducted in a public roadway.

- Additional requirements of local transportation, highway, public safety, and police departments must also be followed when work is performed in a public roadway.
- Any time work is initiated or there is a change in the type of work or location of work, the SHSO should consider the potential traffic safety hazards. If appropriate, implement protective measures in addition to those described above.
- Daily safety briefings should include a discussion of traffic safety as it relates to the activities planned for that day.
- All Roux subcontractors performing work at the Site must also adhere to the above safety procedures.

The following procedures shall be followed to mitigate vehicular traffic hazards posed at the work areas at the Site during any activities within a roadway, roadway shoulder, or any active parking area unless the area is secured (fenced and gated without any vehicle movement potential).

- Double parking shall not be permitted.
- All workers shall wear hard hats and high visibility clothing and reflective yellow or orange vests.
- Workers shall use caution when crossing any road.
- Workers should take care to avoid sudden movements across the road.
- Workers shall position vehicles and equipment to minimize exposure to traffic and to facilitate safe access and egress from vehicles while loading and unloading equipment and/or materials.
- Traffic cones and rigid barricades or temporary fences shall be deployed around work areas while workers are present.
- Traffic barricades and/or temporary fences and appropriate traffic control signage shall be placed at strategic locations to warn approaching traffic.
- All vehicles shall be parked as close to the work area as possible to use the vehicle as a barrier against oncoming traffic.
- When performing activities on a roadway or on the shoulder of any roadway, a minimum of two people must be present. One person will serve as a “traffic watchman” whose sole responsibility is to monitor vehicular traffic conditions and alert worker(s) of potential traffic hazards. The “traffic watchman” must be alert always and focused on traffic conditions. At no time should the “traffic watchman” engage in activities other than monitoring traffic conditions.

All activities at the Site requiring Traffic Control will be performed in accordance with ExxonMobil’s E&PS MSE: Traffic Control (**Appendix C**).

9.7 Personal Security and Lone Worker Procedures

In accordance with ExxonMobil procedures, all personnel who work on ExxonMobil property are required to take all practical measures to ensure their own personal safety is considered, and hazards mitigated, before performing any task. Situations and circumstances occur where work activities are implemented outside of normal business hours and hazard assessments may identify heightened risks that affect worker safety. OIMS procedures 2.1 and 5.2 address Personal Security and Lone Worker Protocols, respectfully. Hazards may be created by changing conditions associated with security, lighting, localized criminal activities, either lack of/ inability to have effective communication, etc. The project’s schedule may include off-hours/weekend operation and maintenance tasks or other investigation activities, where there is potential for personal security hazards to occur when Roux employees or Subcontractors work alone, or the scheduled secondary person/ buddy is elsewhere on Site.

To assist with security hazard evaluation and response, a Personal Security Assessment Checklist will be completed and is included in **Appendix X**. When operating under "lone worker" or heightened personal security circumstances at the Site, an effective means of periodic communication is to be established and maintained between onsite field personnel and with supervisory staff.

9.8 Additional Safe Work Practices

Refer to the SS/SHSO for specific concerns on each individual Site task. The safety rules listed below, as well as the ExxonMobil Contractor Safety Requirements must be strictly followed.

- Inform SS/SHSO of planned activities and evaluate the degree of health and safety protection required for each task. (LPSA)
- Practice contamination avoidance; avoid any skin contact with potentially contaminated materials (i.e., surface or groundwater, soil, etc.).
- Jewelry shall be removed or appropriately secured to prevent it from becoming caught in rotating equipment or snagged on fixed objects. (e.g., wrist watches, bracelets, rings, chains and necklaces, open earrings).
- Do not wear loose clothing that could become caught in rotating equipment or snagged on fixed objects and, similarly, all shoulder length (or longer) hair should be tied back.
- Hardhat, eye protection, high-visibility/reflective clothing, hand protection with level 2, cut resistant gloves being carried (minimum) and/or worn or on each worker's person (as appropriate), and, leather or chemical-resistant safety boots having steel or composite toes including task-specific boot requirements as consistent with ASTM F2413-11 will be worn when inside work area EZ.
- The use of mobile phones or other mobile communications devices (e.g., "smart" phones, tablets, etc.) while operating vehicles/equipment/tools or while working in defined work area EZ is prohibited.
- Do not carry gum, cigarettes, cosmetics, food, or drink of any kind into potentially contaminated areas.
- Practice good hygiene and wash hands before handling food and drink and other activities that could cause hand-to-mouth transfer of contaminants resulting in contaminant ingestion.
- No facial hair that interferes with the face-to-facepiece seal of respirators will be allowed if respirators are to be used by any individuals.
- Personnel not involved in the operations, excavating, or monitoring activities will follow heavy equipment EZ policies and maintain recommended safe distance from the equipment.
- Do not climb over/under obstacles.
- Be alert to and continuously evaluate your own relative fitness for duty, and similarly, the fitness of those workers with whom you come in contact. Report any concerns to the SS immediately.
- Watch your buddy and coworkers for signs of fatigue, exposure, heat or cold stress, etc.
- No work will be conducted without adequate light.
- Report all incidents and vehicular accidents, no matter how minor, immediately to the SHSO and the Roux PM. The Roux PM will communicate and coordinate with the ExxonMobil PM.

9.9 Waste Disposal

All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left onsite. All potential-contaminated materials should be bagged, drummed, or placed in waste roll-off containers, as necessary, and placed in designated areas as determined by SS or ExxonMobil PM.

All petroleum products generated from product recovery activities (e.g., well bailing, etc.) will be drummed or transported to off-site, ExxonMobil Approved Waste Site Listed (AWSL) facilities by licensed and ExxonMobil-approved waste haulers. All hazardous waste storage containers, tanks, and drums will be labeled with the appropriate hazardous waste labels and/or placards. All contaminated materials will be disposed by ExxonMobil in accordance with appropriate regulations. All non-contaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste.

UNDER NO CONDITION WILL ROUX PERSONNEL SIGN HAZARDOUS WASTE MANIFESTS AND WILL ONLY SIGN NON-HAZARDOUS WASTE MANIFESTS AFTER AUTHORIZATION BY THE PROJECT PRINCIPAL.

10.0 UNUSUAL OR SIGNIFICANT RISKS

Field activities that appear to have unusual or significant risks that cannot be adequately managed with existing risk tools such as LPS®, HASPs, traffic safety plans, work permits, design and O&M practices, equipment HAZOPS or other safety tools must be referred to the CHSD to help with the assessment and management of the associated potential safety risks. Examples include the use of explosives for demolition, use of firearms to control wildlife, rappelling, demolition over water, etc.

11.0 ACTIVITY-SPECIFIC SAFETY PROCEDURES

In addition to the general hazards discussed above, there are activity-specific hazards associated with each work activity planned for the Site. An activity specific JLA has been completed for each of the activities planned for the Site. JLAs are provided in **Appendix D**. In the event that new work activities or tasks are planned, JLAs will be developed and implemented prior to performing the new activities. In the absence of a JLA, the personnel performing work must prepare a field JLA and receive clearance from a designated competent safety official prior to performing any task with significant risk. In emergency situations where time is critical LPSAs will be utilized to identify the task, associated hazards and mitigative actions to take. For lower risk activities (as deemed by the discretion of a Competent Person) where a JLA is determined to not be needed, the individual(s) conducting the activities must perform LPSAs prior to and during the work.

11.1 Construction Activities

Activities involved with construction of any remedial action treatment systems will initially be considered non-intrusive activities. Initial and/or periodic monitoring, as described in Section 7.4, however, may be performed by the SHSO or designee.

Any personnel involved with ground-intrusive activities must be LPS® trained before being allowed to work and provide training records verifying compliance with 29 CFR 1910.120 to the SHSO who will maintain the records onsite as described in Section 6.2 of the HASP. PPE shall be worn as follows: hard hat, safety glasses, high-visibility clothing and/or reflective vest, cut-resistant gloves, steel-toed or composite safety-toed boots including task-specific requirements consistent with ASTM F2413-11, and hearing protection, when applicable.

A variety of physical hazards may be present during any construction-type project. Personnel should be aware of safety issues associated with noise, excessive hot/cold temperatures, hot work such as welding, cutting and burning, heavy lifting, rough terrain, heavy equipment operation, ladders, scaffolding, excavating and trenching, uneven and/or elevated work surfaces, underground and overhead utilities, electrical hazards, and the hazards associated with hand and power tools. These hazards are not unique and are generally familiar to most construction personnel.

11.2 Confined Space Entry

Confined space entry will not be performed. However, should the need arise the following section outlines safety requirements for confined space entry at the Site.

- **ROUX PERSONNEL ARE NOT AUTHORIZED TO ENTER AN OSHA PERMIT REQUIRED CONFINED SPACE;**
- Currently the scope of work **DOES NOT** require personnel to enter permitted confined space for this project; and
- Any changes to the field activities that may necessitate confined space entry will be reported to the PP and OHSM.

Confined space is defined as any space, depression, or enclosure that:

- Has limited opening for entry and egress;
- Is large enough for and employee to enter and perform assigned work; and
- Is not intended for continuous occupancy.

A permit required confined space is one that meets the definition of a confined space and has one or more of the following characteristics:

- May contain or produce life-threatening atmospheres due to oxygen deficiency the presence of toxic, flammable, or corrosive contaminants;
- Contains a material that has the potential for engulfment;
- Has an internal configuration that may cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; and
- Contains any other serious safety or health hazards.

Although Roux personnel will not perform confined space entry, it is expected that subcontractors performing cleaning and mitigation and/or remedial measures activities may be required to enter structures that are considered to be a permit required confined space. Permitting of the confined space as well as hazard mitigation for entry will be completed by the subcontractor in accordance with 1910.146.

All Confined Space Entry will be performed in accordance with Roux Safety Considerations for Site-Specific Work Activities at Remediation System Vaults and Manholes, and ExxonMobil E&PS MSE: Confined Space included in **Appendix V**. The purpose of this document is to assist Roux personnel and subcontractors in:

- Performing all work activities in accordance with OSHA standards and guidance documents;
- Identifying potential hazards;
- Properly classifying and labeling permit-required confined spaces; and
- Implementing proper procedures to temporarily reclassify a confined space as “Non-Permit Required Confined Space” if the hazards are eliminated for the entry event.

A permit-required confined space is one that meets the definition of confined space, and has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or
- Contains any other recognized serious safety or health hazards.

11.3 Control of Hazardous Energy (Lock Out/Tag Out)

Hazardous energy at the Site will be controlled using a Lock Out / Tag Out (LO/TO) procedure developed in accordance with OSHA’s Lock Out / Tag Out Standard (29 CFR 1910.147) as well as ExxonMobil E&PS MSE: Energy Isolation (**Appendix W**). The purpose of LO/TO procedures is an effort to minimize exposures to hazards from the unexpected energizing, startup, or release of residual or stored energy from equipment, machinery, or processes. LO/TO procedures will be followed during the installation, servicing, and maintenance of machines or equipment that involve hazardous energy sources. Hazardous energy sources include any electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy source that can cause injury to personnel.

LO/TO procedures require the placement of a lock and/or tag on an energy isolating device (a device that physically prevents the transmission or release of energy such as manually operated electrical circuit breakers, disconnect switches, valves and selector switches). After an energy isolation device is placed in the "off" or "safe" position, the lock out and tag out is placed on the energy isolation device to secure it in the "off" or "safe" position. This ensures that the equipment, machinery, or process is not capable of being operated while installation, servicing, or maintenance is taking place.

If it is determined LO/TO procedures are required for any aspect of site work, the following generic LO/TO procedures will be implemented. Note, these procedures will be tailored to the specific application of a lock out / tag out if there is a need for same.

1. Affected Personnel and Authorized Personnel will receive LO/TO orientation training to become familiar with procedures to control hazardous energy. *Affected Personnel* is defined as personnel whose job requires that they operate or use equipment, machinery or processes on which servicing or maintenance is being performed under LO/TO, or whose job requires them to work in an area in which such servicing or maintenance is being performed. *Authorized Personnel* is defined as a qualified person to whom authority and responsibility to perform a specific lock out and/or tag out assignment has been given by the employer.
2. Before proceeding with the installation, maintenance, or servicing of any equipment, machinery, or process at the Site for which LO/TO procedures apply, a survey will be made to locate and identify associated energy isolation devices.
3. Once the survey is complete, the Authorized Personnel will notify all affected personnel, including the SHSO that a shutdown of the equipment or machine will occur.
4. Following notification, the equipment, or machine, if operating will be shut down by normal stopping procedure (i.e., depress stop button, open toggle switch, turn light switch off, etc.).
5. Once turned off, the energy isolating device (e.g., circuit breaker, disconnect switch, valve, etc.) will be operated in such a manner that the machine or equipment will be isolated from the energy source (e.g., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.).
6. The energy isolating device is then "locked out" by applying the lock out, padlock, and tag to the device. In some cases, a chain must be used (in combination with a padlock) to sufficiently "lock out" a device (e.g., LO/TO of a steam valve, hydraulic valve, etc.).
7. The tag will be filled out by the authorized personnel indicating the personnel's name and the date and time of the lockout.
8. Once the energy isolating device has been locked out and tagged out, all potentially hazardous sources or residual energy will be purged or dissipated (e.g., by grounding, bleeding, venting, lowering, etc.).
9. After ensuring no personnel are exposed, the authorized personnel will operate the normal operating controls to make certain the equipment will not restart. The operating controls must be returned to the "off" or "neutral" position after the test.
10. Use a voltmeter to make sure that work is not energized, if applicable.
11. Attach a "ground stick" of sufficient size to handle any possible fault current to all three phases of the power source, if applicable.
12. Maintenance or servicing of the machine or equipment can now be performed. Each personnel involved with the service or maintenance of the locked out equipment will place their assigned, uniquely keyed padlock and tag to each lock out device and/or chain in such manner that if every other padlock were removed, the personnel would still have a padlock assuring that each source of energy is still "locked out." No personnel may affix or remove the personal lock out / tag out device of other personnel.

13. When the maintenance and/or service is completed, the work area is to be inspected to ensure that all affected personnel are safely positioned and/or removed from the line of fire. Service and/or maintenance personnel's locks and tags are removed. In addition, remove all non-essential items from the equipment. Replace any covers, guards, or reinstate interlocks if applicable.
14. The lock out, padlock, and tag shall then be removed from the energy-isolating device by the authorized personnel who applied the lockout devices.
15. If work on a piece of equipment of machinery that is locked out carries over to the next shift, the authorized personnel may remove their lockout device, provided that the next authorized personnel apply their lockout device at the same time the previous authorized personnel removes their lock device.

11.4 Hot Work

Roux shall not perform welding unless specific clearance and a permit have been obtained from the ExxonMobil PM, Roux PM, and SS/SHSO. Any contractors or Roux personnel performing welding must adhere to ExxonMobil E&PS MSE: Hot Work (**Appendix X**) and the procedures outlined below.

Welding equipment shall be chosen for safe application to the work and shall be installed properly. Employees designated to operate welding equipment shall be properly instructed and qualified to operate it. Mechanical ventilation shall be provided when welding or cutting:

- Where there is less than 10,000 cubic feet of air space per welder;
- Where the overhead ceiling height is less than 16 feet; and
- Where required by ExxonMobil practices and procedures (e.g., Confined Space Permitting).

Proper shielding and eye protection shall be worn to prevent exposure of personnel to welding hazards. Proper precautions (isolating welding and cutting, removing fire hazards from vicinity, etc.) for fire prevention shall be taken in areas where welding or other "hot work" is being done. All welding operations and other "hot work" shall be scheduled and performed in accordance with the ExxonMobil permitting system.

All welding and cutting operations carried out in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency and shall be performed in compliance with ExxonMobil E&PS MSE: Confined Space documentation (**Appendix V**). In general, oxygen shall never be used for ventilation. In such circumstances where it is impossible to provide ventilation, OSHA requires airline respirators or hose masks approved by NIOSH for this purpose to be utilized. In areas immediately dangerous to life, self-contained breathing apparatus (SCBA) shall be used.

11.5 Electrical and Other Utility Assessment and Accommodations

Roux shall perform a site walk to identify any potential overhead electrical or utility lines. All applicable guidelines will be followed in the vicinity of overhead power and utility lines.

The positioning or operation of heavy equipment near utility services will not be initiated until the activities have been coordinated with the ExxonMobil PM and SS/SHSO. Operation of equipment adjacent to or under overhead power lines will follow ExxonMobil E&PS MSE: Excavation (**Appendix H**) requirements.

When working near overhead electrical lines, the power must be de-energized whenever feasible. Working near overhead power lines in which the power line is de-energized and visibly grounded, or sufficiently insulated, the following requirements apply:

- A pre-job briefing must be conducted with the work crew and other workers who will be in the area to review the location of the power lines and the steps that have been implemented to prevent encroachment/electrocution.

If it is not possible to avoid working inside the Minimum Approach Distance (MAD) as specified in the table below, the following additional requirements apply whether the electrical line is energized or de-energized.

If the Minimum Approach Distance outlined by owner/operator of the electrical line are more stringent than the table below, personnel must comply with the more stringent approach distance.

Roux and subcontractors must ensure that:

- Equipment with booms, lifts, rigging, excavator arms, etc., are set up a minimum clearance of the full height of the equipment plus the distance noted in the table below.
- Line voltage is confirmed to determine safe approach distances (contact owner/operator of electrical line to confirm).

A spotter must understand the additional risk of the overhead electrical lines and have a warning device such as an air horn to alert the operator if minimum clearance is compromised.

Minimum Approach Distance requirements for working near overhead electrical lines are as follows but may be superseded by more conservative local or regional standards.

Minimum Approach Distances when Working Near Overhead Electrical Lines (Based on ASME B30-5; Table 5-3.4.5.1-1)	
Nominal System Voltage of Power Line (kV)	**Distance Between Line and any Part of Heavy Equipment (feet)**
Up to and including 50	10
Over 50 to 200	15
Over 200 to 350	20
Over 350 to 500	25
Over 500 to 750	35
Over 750 to 1000	45
Over 1000	As established by the operator of the line or registered professional engineer who is a Qualified Person

1 kilovolt (KV) = 1,000 volts

Minimum Approach Distances in Transit (no load and boom or mast lowered) (Based on ASME B30-5; Table 5-3.4.5.1-1)	
Nominal System Voltage of Power Line (kV)	**Distance Between Line and any Part of Heavy Equipment (feet)**
Up to and including 0.75	4
Over 0.75 to 50	6
Over 50 to 350	10
Over 350 to 750	16
Over 750 to 1000	20
Over 1000	As established by the operator of the line or registered professional engineer who is a Qualified Person

1 kilovolt (KV) = 1,000 volts

Signs warning of overhead hazards shall be in place on each side of the electrical line, when traveling under the lines. Equipment with booms, lifts, rigging, excavator arms, masts, etc., must be fully lowered to the maximum extent prior to transit. Roux has also reviewed all available Site maps showing buried utility lines to identify potential hazards, which revealed that no underground hazards are known to exist in the vicinity of the areas of the Site pertinent to this HASP.

11.6 Subsurface Work

The protocol for exercises to be conducted prior to and during ground disturbance activities has been established by ExxonMobil in the Global Remediation OIMS manual, Subsurface Clearance Procedure as well as ExxonMobil E&PS MSE: Excavation (**Appendix H**). The objective of the procedure is to prevent damage to subsurface structures during drilling, auguring, excavation, earthmoving, sampling, or other ground penetrating, intrusive, advancement operations. The proximity of chemical, water, sewer, and electrical lines will be identified by a utility mark-out service before any subsurface activity or sampling is attempted.

The PM shall confirm that the local DigSafe public utility mark-out service and any other affected utility owners have been notified by the Subcontractor Excavator at least 72 hours prior to earth-disturbing activities, and that required mark-outs have been completed before conducting earth-disturbing activities. Depending on the circumstances and location of potential subsurface structures to be identified, it may be necessary to additionally utilize private utility mark-out services to fully evaluate proposed ground disturbance areas. Supporting documentation furnished to Subcontractors by the utility operators will be provided to Roux personnel and will be maintained in on-Site project files.

Roux personnel and Subcontractors will practice sound investigation and drilling practices as well as employ all necessary measures to avoid damage to subsurface product systems and structures. Adequate training and supervision for these activities will also be provided. Roux field personnel will be present on-Site during invasive operations such as excavation and drilling and will provide health and safety oversight, in addition to the Subcontractor's air quality screening to ensure that appropriate levels of protection and safety procedures are followed by both Roux and Subcontractor personnel.

Subsurface work activities will also require adherence to Roux's Corporate Subsurface Utility Clearance Management Program found within **Appendix H**.

11.7 Heavy Equipment

The SS, with support from the SHSO, will be present on Site during all invasive operations and will provide health and safety monitoring to ensure appropriate levels of protection and safety procedures are followed by Roux and Subcontractor personnel.

Heavy equipment poses a serious hazard if not operated properly or if operators cannot see personnel near machinery. All heavy equipment work activities shall follow ExxonMobil E&PS MSE: Working Near Moving Equipment, found within **Appendix H**. The following heavy equipment hazards are common at the Site and will be considered from a safety standpoint:

- Hazards associated with truck traffic – Be sure to observe and comply with posted speed limits and traffic signs. Use caution when traveling within the Site limits.
- Hazards associated with forklift – Be sure to observe and comply with posted speed limits and traffic signs. While loading, verify the distribution of weight is balanced and load restrictions are not exceeded.
- Interaction/ contact with heavy equipment contractors – Heavy equipment (e.g., backhoes, bulldozers, etc.) operators may not be aware of your presence. Isolate heavy equipment from personnel though the delineation of Heavy Equipment Exclusion Zones (HEEZ). Be sure that the operator is aware of your presence and displays a "show-of-hands" off the equipment controls before approaching any heavy equipment and follow ExxonMobil E&PS MSE: Working Near Moving Equipment. Inform operators of your planned activities in the area prior to them beginning their activities.
- Vehicle access to remote areas – Tanker trucks contracted for product removal must adhere to standard operating procedures (i.e., grounding of hose and truck) while pumping out USTs, Frac tanks, oil/water separators, well and equipment vaults, etc.
- All equipment should be chocked (minimum of 2 chocks) when stationary in accordance with the Roux Wheel Chocking Program which can be found within the Roux Fleet Safety Management Program (**Appendix T**).

11.7.1 Inspection of Equipment

Each piece of potentially hazardous equipment (e.g., power tools, machines, vehicles, etc.) will be inspected for proper and safe operation prior to its use. All mechanical and rigging equipment will be inspected by the operators prior to beginning any work task, and at least daily thereafter to ensure proper operating capability. Defective equipment must be repaired or replaced prior to continued use/ operation.

- Inspect all cables, sheaves, slings, chains, hooks, and eyes prior to use.
- Secure equipment firmly or be sure it is supported.
- Be sure all power lines are inactivated, removed, or at a safe distance.
- Always use proper loading for capacity at lifting radius.
- Keep all equipment lubricated and maintained.
- Employ signaling, spotting, and traffic control persons whenever needed.
- Make certain that signals are understood and observed.

11.7.2 Heavy Equipment Exclusion Zone Policy

Use of heavy equipment at the Site will require adherence to Roux's Corporate Heavy Equipment Exclusion Zone Management Program found within **the corporate Health and Safety Manual**.

EZs must be established and maintained during activities involving the movement/ operation of heavy equipment. The purpose of the HEEZ is to establish the minimum clearance and delineate the distance that must be maintained between workers and the heavy equipment while the equipment is in operation (i.e., engaged or moving). The HEEZ policy applies to all personnel on the Site, but is primarily focused on those personnel who are required to be working near the equipment. The HEEZ is in effect when heavy equipment is moving or engaged (i.e., movement of an arm or bucket of an excavator, rotation of an auger, lifting of a load with a forklift, raising/lowering/working from a man-lift, etc.) to protect all employees from the potential contact hazard associated with heavy equipment operations. The ExxonMobil E&PS MSE: Working Near Moving Equipment is enclosed in **Appendix H**.

The MSE for Working Near Moving Equipment provides general guidance on the areal extent and minimum size of proposed HEEZ, but each work zone will need to be determined on a task-specific basis considering the size of heavy equipment in use, location of operation, and task being performed. Prior to all heavy equipment operations, the exclusion zone(s) distance must be specifically identified on the Job Loss Analysis (JLA) for each day of heavy equipment operations.

11.7.3 Excavation and Backfill Operations

The SHSO will be present onsite during all Roux contracted excavation and backfill operations and will supplement health and safety monitoring conducted by the SS and the Subcontractor air quality screening to ensure that appropriate levels of protection and safety procedures are utilized. The inspections and procedures outlined in the ExxonMobil Subsurface Clearance Procedure and Excavation MSE (**Appendix H**) shall be performed prior to and during any excavation. The proximity of chemical, water, sewer, and electrical lines will be identified by the ExxonMobil PM before any subsurface activity or sampling is attempted.

The following safe work practices will be implemented during this task.

- The proximity of chemical, water, sewer, and electrical lines will be identified by a facility representative prior to beginning any subsurface activity.
- While earthmoving, stay out of the excavator's delineated HEEZ and away from the excavation sides, where there is potential for cave in (within excavations that are 6 feet or more in depth, a delineated perimeter 6 feet away from the excavated edge is required).

Maximum Allowable Slopes

Soil or Rock Type	Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[3]
Stable Rock	Vertical (90°)
Type A[2]	3/4 : 1 (53°)
Type B	1 : 1 (45°)
Type C	1 1/2 : 1 (34°)

OSHA (29 CFR 1926.652, Subpart P, Appendices A and B)

Notes:

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
2. A short-term maximum allowable slope of 1/2H : 1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 meters) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 meters) in depth shall be 3/4H : 1V (53°).
3. Sloping or benching for excavations greater than 20 feet deep shall be designed and stamped by a registered professional engineer.

Proper stockpiling (i.e., 2 feet minimum distance from the excavation edge), containment, transport, storage, and disposal practices will be utilized regarding the potential amount of waste generated during operations. The location of safety equipment and evacuation procedures will be established prior to initiation of operations according to this HASP. The use of hard hats, eye protection, ear protection, high-visibility clothing or reflective vest, hand protection and steel-toed (or composite-toed) boots including task specific boot requirements consistent with ASTM F2413-11, will be required during excavation or other heavy equipment operations.

12.0 FIELD TEAM REVIEW

Each person performing work at or visiting this site shall sign this section after Site-specific training is completed and before being permitted to access the CRZ or EZ.

I have read and understand this Site-specific HASP. I will comply with the provision contained therein.

Site/Project: Former Vacuum Oil Refinery, Rochester, New York

Name & Company	Signature	Date

13.0 APPROVALS

By their signature, the undersigned certify that this HASP is approved and will be utilized at the Site (Former Vacuum Oil Refinery, Rochester, New York).

Grace van der Ven – Project Manager & Site Health and Safety Officer — February 12, 2021 (Date)

Jim Dick - Project Manager — February 12, 2021 (Date)

Ian Reed – Project Principal — February 12, 2021 (Date)

Anthony Marsocci – Office Health and Safety Manager — February 12, 2021 (Date)

TABLES

1. Toxicological Properties of Hazardous Substances Present at the Site

TABLE 1: POTENTIAL SITE-SPECIFIC HAZARDS - TOXICOLOGICAL, PHYSICAL, AND CHEMICAL PROPERTIES OF COMPOUNDS

Compound	CAS#	TLV (mg/m^3)	IDLH (ppm)	PEL (mg/m^3)	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Gasoline	8006-61-9	900 300 ppm	None	900 300 ppm	Dermal; inhalation; ingestion	Sensory Irritant CNS Depressant Dermatitis Pulmonary Edema	CNS, skin, eyes respiratory tract	Liquid Aromatic Fl Pt. = 50□F
Petroleum hydrocarbons (Petroleum distillates) (Red Dye Liquid)	8002-05-9	1,600 400 ppm	10,000	1,600 400 ppm	Dermal; inhalation; ingestion	CNS depressant Respiratory irritant Dried/cracked skin	CNS respiratory tract skin	Colorless liquid BP = 86-460□F UEL = 5.9% LEL = 1.1% Flammable
Benzene	71-43-2	30 10 ppm	None	1 ppm	Dermal; inhalation; ingestion	CNS depressant Hematopoietic Depression Dermatitis	CNS, blood, skin, eyes, respiratory tract, bone marrow	Liquid BP = 176□F Fl Pt. = 12□ F UEL = 8% LEL = 1.4%
Bromomethane	74-83-9	1 ppm	250	80 20 ppm	Dermal; inhalation;	CNS depressant; liver, kidney, respiratory damage; Skin burns; eye damage, potential carcinogen	CNS, eyes, skin, respiratory system	Gas BP = 38□F UEL=16.0% LEL=10.0%
1,1-Dichloroethene	75-35-4	405 100 ppm	3,000	400 100 ppm	Dermal; Inhalation; ingestion	CNS depressant; nausea; liver, kidney, lung damage; Skin irritation; Burning sensation.	CNS, lungs, kidneys, liver, lungs, skin	Liquid BP = 189□F UEL = 10.5% LEL = 8%
Carbon Monoxide	630-08-0	25 ppm	1,200 ppm	50 ppm	Inhalation	Carboxyhemogloemia	Blood	Colorless, odorless Gas

Table 1:Potential Site-Specific Hazards - Toxicological, Physical, and Chemical Properties of Compounds *(Continued)*

Compound	CAS#	TLV (mg/m^3)	IDLH (ppm)	PEL (mg/m^3)	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Tetrachloroethene	127-18-4	170 25 ppm	150	100 ppm	Dermal; inhalation; ingestion	CNS depressant; nausea; liver damage; Skin irritation; Carcinogen	CNS, eyes, skin, respiratory system, liver, kidneys	Liquid BP = 250□F UEL = NA LEL = NA
Trichloroethene	79-01-6	100 ppm	1000	100 ppm	Dermal; Inhalation; ingestion	irritation eyes, skin; CNS depressant; vomiting; dermatitis; cardiac arrhythmia,; liver damage; carcinogen	CNS, eyes, sking, respiratory system, heart, liver, kidneys	Liquid BP = 189□F UEL = 10.5% LEL = 8.0%
Toluene	108-88-3	375 100 ppm	2,000 ppm	375 100 ppm	Dermal; inhalation; ingestion	CNS depressant Liver damage Kidney damage Defatting of skin	CNS, Liver, Kidney, Skin	Liquid Benzene odor BP = 110.4□F Flammable UEL = 7.1% LEL = 1.2%
Ethylbenzene	100-41-4	435 100 ppm	2,000 ppm	436 100 ppm	Dermal; inhalation; ingestion	Sensory Irritant CNS depressant Narcosis Hematological disorders	CNS, blood, skin, eyes, respiratory sytem	Liquid Aromatic odor BP = 277□F Fl Pt. = 59□F UEL = 7.0% LEL = 1.2%

Table 1:Potential Site-Specific Hazards - Toxicological, Physical, and Chemical Properties of Compounds *(Continued)*

Compound	CAS#	TLV (mg/m^3)	IDLH (ppm)	PEL (mg/m^3)	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Xylene	1330-20-7	435 100 ppm	1,000 ppm	435 100 ppm	Dermal; inhalation; ingestion	Sensory Irritant CNS depressant Blood dyscrasia Bronchitis	CNS, Liver, Kidney, Skin, eyes, blood, GI tract	Liquid Aromatic odor BP = 138.5□F Flammable UEL = 7.0% LEL = 1.1%
Lead	7439-92-1	0.15	700	0.2	Dermal; inhalation; ingestion	Abdominal Pain CNS depressant Anemia Nephropathy Reproductive Effects	GI tract, CNS, blood, kidneys	Metal-soft gray BP: 3164□F
No. 2 Fuel Oil	8008-20-6	100	None	NL	Dermal; inhalation	Sensory Irritant Pulmonary Edema	Skin, eyes, respiratory tract	Liquid Aromatic odor BP = 347-617□F Fl Pt. = 100-162□F UEL = 5.0% LEL = 0.7%
Arsenic	7740-38-2	0.01	Ca[1]	0.01	Dermal; inhalation; Ingestion	Sensory irritant Ulceration of nasal septum	Liver, kidneys, skin, lungs, lymphatic system	Appearance and physical properties vary depending on specific compound
1,2-Dichloroethane	107-06-2	40 10 ppm	Ca No data	4.0 50 ppm	Dermal; inhalation; Ingestion	CNS depressant Liver neurosis Kidney damage Dermatitis	CNS liver kidneys skin	Colorless liquid BP: 83.5□ LEL: 6.2% UEL: 15.9%
Vinyl Chloride	75-01-4	2.6 1 ppm	Ca No data	1 ppm	Inhalation; ingestion	Liver tumors Blood tumors Sensory irritant CNS depressant	liver blood eyes skin CNS	Colorless gas Highly flammable BP: 13□ FP: -159.7□ LEL: 4% UEL: 22%

References:

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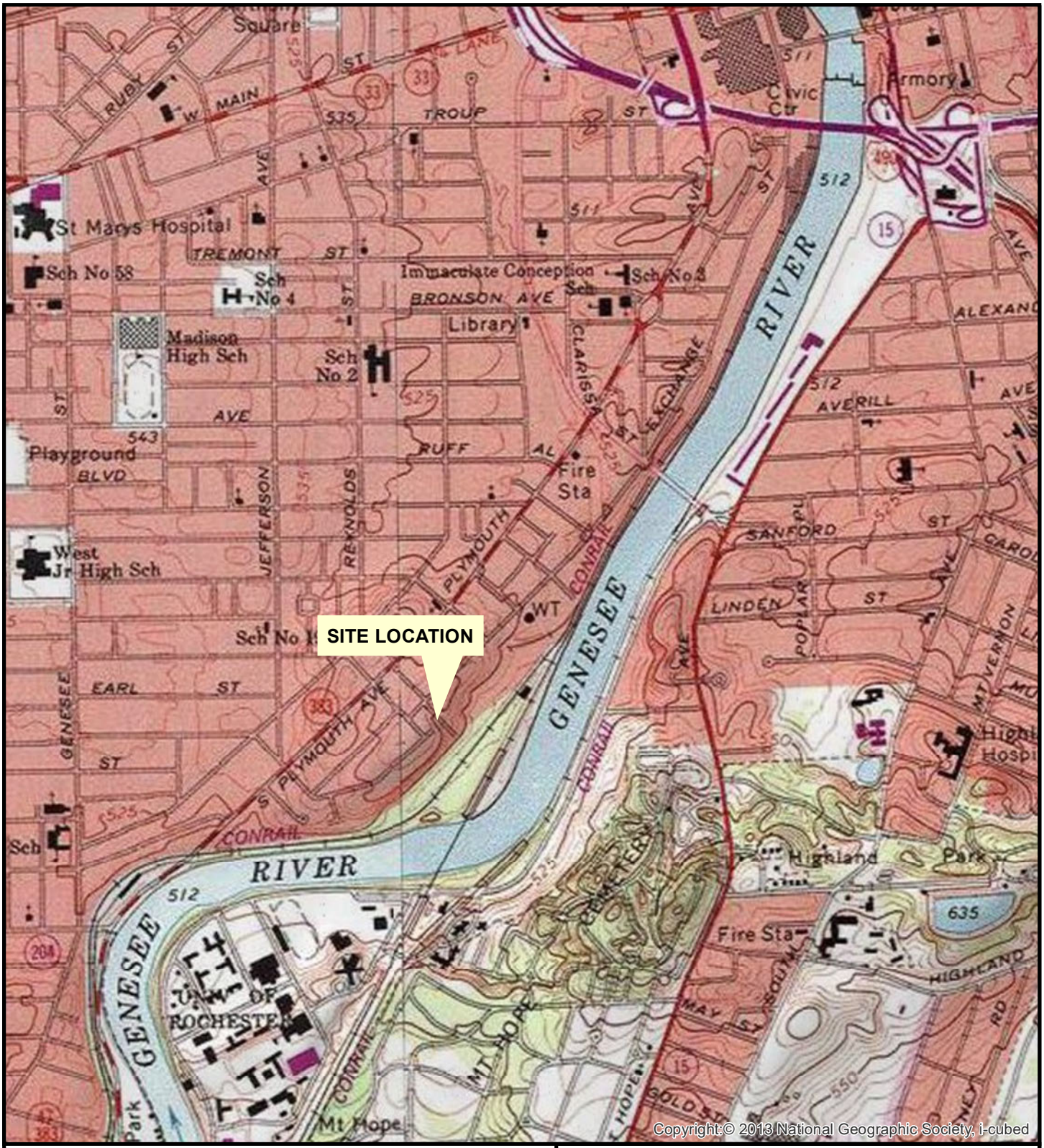
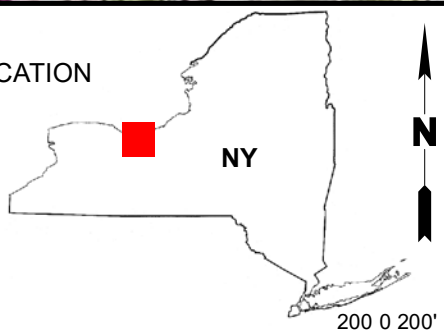
[1]NIOSH recommends substance be treated as a potential human carcinogen—IDLH values are not assigned for such substances



QUADRANGLE LOCATION



200 0 200'

Source:
USGS; 1978. Rochester East and West, New York 7.5 Minute Topographic Quadrangle Contour Interval 3 Meters

Title:

SITE LOCATION MAP

FORMER VACUM OIL REFINERY
ROCHESTER, NEW YORK

Prepared for:

EXXONMOBIL ENVIRONMENTAL AND PROPERTY SOLUTIONS

ROUX

Compiled by: G.V.	Date: 01/21/21
Prepared by: G.V	Scale: AS SHOWN
Project Mgr: G.V.	Project: 0172.0180
File: MC8010001_REV1.mxd	

FIGURE 1

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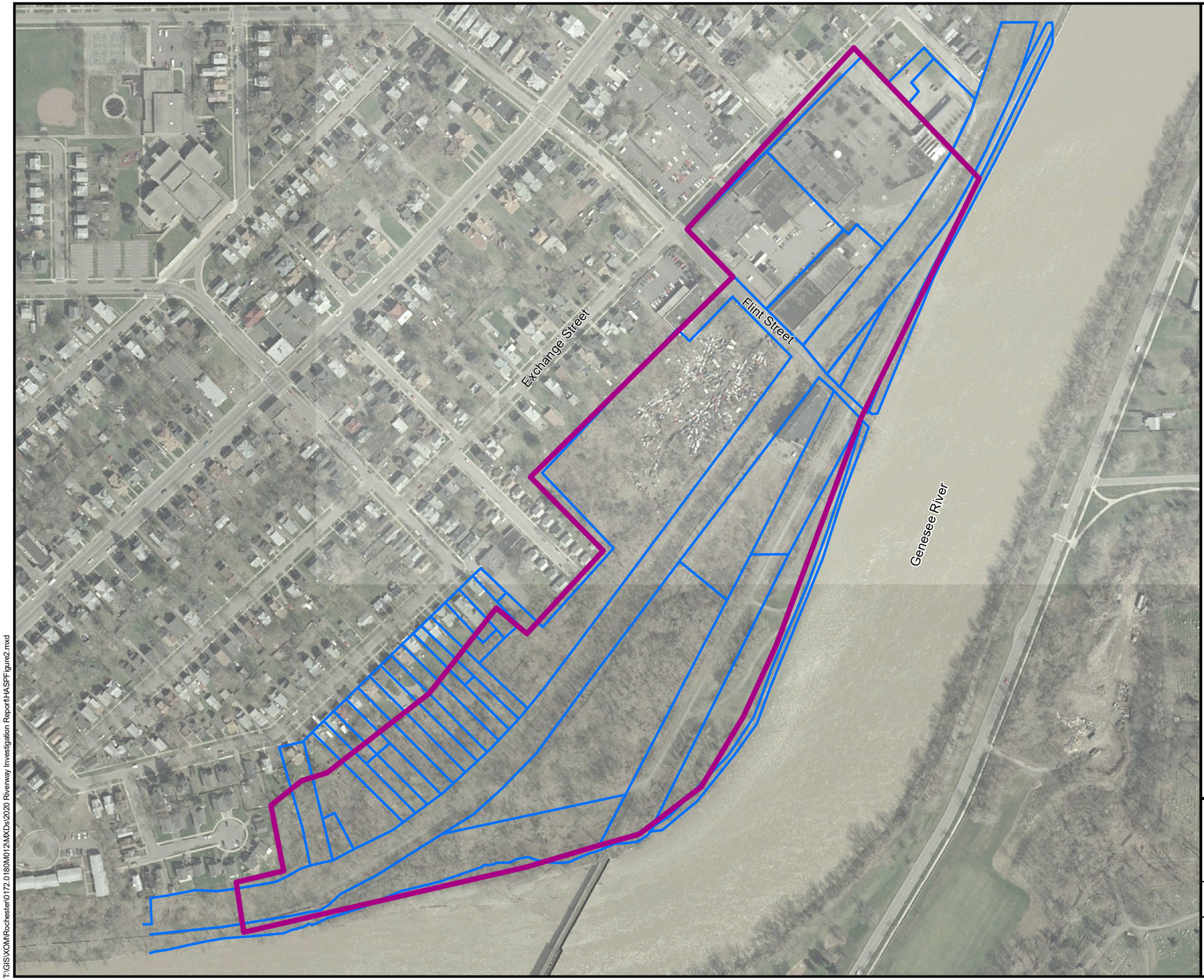

Legend

- Approximate Former Refinery Footprint
- Parcel Boundaries

Notes:

- All Locations Are Approximate

N

130 0 130 260

Feet

Title:

SITE PLAN

FORMER VACUUM OIL REFINERY
ROCHESTER, NEW YORK

Prepared For:
EXXONMOBIL ENVIRONMENTAL AND PROPERTY SOLUTIONS CO.

ROUX

Compiled by: GV	Date: 22JAN21	FIGURE
Prepared by: SB	Scale: AS SHOWN	2
Project Mgr: IR	Project: 0172.0180M011	
File: HASPFigure2.mxd		

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APPENDICES

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APPENDIX A

OSHA Worker Safe and Healthful Workplace Rights Poster

U.S. Department of Labor

OSHA®
Occupational Safety and Health Administration

Job Safety and Health
IT'S THE LAW!

All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a work-related injury or illness, without being retaliated against.
- Receive information and training on job hazards, including all hazardous substances in your workplace.
- Request a confidential OSHA inspection of your workplace if you believe there are unsafe or unhealthy conditions. You have the right to have a representative contact OSHA on your behalf.
- Participate (or have your representative participate) in an OSHA inspection and speak in private to the inspector.
- File a complaint with OSHA within 30 days (by phone, online or by mail) if you have been retaliated against for using your rights.
- See any OSHA citations issued to your employer.
- Request copies of your medical records, tests that measure hazards in the workplace, and the workplace injury and illness log.

This poster is available free from OSHA.

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health and safety concern with you or with OSHA, or reporting a work-related injury or illness.
- Comply with all applicable OSHA standards.
- Notify OSHA within 8 hours of a workplace fatality or within 24 hours of any work-related inpatient hospitalization, amputation, or loss of an eye.
- Provide required training to all workers in a language and vocabulary they can understand.
- Prominently display this poster in the workplace.
- Post OSHA citations at or near the place of the alleged violations.

On-Site Consultation services are available to small and medium-sized employers, without citation or penalty, through OSHA-supported consultation programs in every state.

Contact OSHA. We can help.

1-800-321-OSHA (6742) • TTY 1-877-889-5627 • www.osha.gov

OSHA 3165-04R 2019

APPENDIX B

Safety Data Sheets (SDS)

B.1 List of Site Material Safety Data Sheets

B.2A Chemical and Hazardous Substance Approval Process

B.2B Instructions for Completing the Chemical and Hazardous Substance Review Form

B.2C Chemical and Hazardous Substance Review Form

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REFERENCES

4B. Chemical and Hazardous Substance Approval Process

APPLICABILITY:
This process applies to E&PS operational sites. This database can be used when submitting a chemical or hazardous substance through the approval process.

This process does not apply to E&PS operations that have adopted the site Business Line's chemical and hazardous substances review procedures, such as industrial facilities.

OBJECTIVE:
To prevent injury or illness to ExxonMobil employees or contractors by establishing an approval process for chemicals and hazardous substances introduced into the workplace.

The procedure applies even if the chemical/hazardous substance is intended for temporary use.

If the chemical or hazardous substance is listed on the Chemical & Hazardous Substance Inventory List and is intended for use in the same manner, same equipment, etc.; document completion of this review and confirmation of prior approval for use at site.

For chemicals and hazardous substances that require approval, the user/requester must obtain the current SDS, initiate and forward the Chemical and Hazardous Substance Review Form (see Reference 4D) to the site Chemical Approver and obtain approval before ordering it.

PREREQUISTE REQUIREMENTS:
A comprehensive Hazard Communication program is established at the site.

A person should be designated who can approve chemicals and hazardous substances ("Chemical Approver").

CONSUMER PRODUCT EXEMPTION:
The principles used in determining if a chemical or hazardous substance qualifies for a "consumer product exemption" are based on 5 questions that can be found on the “Consumer Product Exemption Determination” form. This checklist must be used to evaluate products for the consumer exemption.

Step	Action	Responsible Person
1	Evaluate whether the chemical or hazardous substance qualifies for a "consumer product exemption". If so, complete the E&PS "Consumer Product Exemption Determination" checklist and submit to the Chemical Approver.	Requestor
2	Complete the Chemical Approval Form (Form) **prior to ordering** any material that: • Does not meet the consumer product exemption, or • Is not currently approved by E&PS (check the Site Chemical & Hazardous Substance Inventory List), or • Is going to be used for a different purpose than the one originally approved. It is strongly encouraged that you use a product that is already approved for the activity whenever possible.	Requestor
3	Send Form and SDS to the Chemical Approver. • Obtain the latest electronic version of the SDS, if possible, or paper copy if electronic version is not available. In most cases, the SDS should be no more than five-years old.	Requestor
4	Review Form and SDS to decide if Industrial Hygiene (IH) Contact review is required. Criteria for IH review is located here.	Chemical Approver
5	If IH Contact review is required: • Go back to the requestor to find suitable substitutes for this product or chemical where possible. • If no suitable substitutes are available, forward the Form and SDS to IH via email and go to STEP 6. If IH Contact review is not required: • Send endorsement via signed Form or email to requestor and the Site Hazardous Material Coordinator (include the Form and SDS) that the material can be used as specified and go to STEP 7. (NOTE: At some sites the roles of Approver and Coordinator are handled by the same person)	Chemical Approver
6	Determine if the material can be used on site and notify Chemical Approver via email of review determination. • Endorsed as specified • Endorsed with additional precautions • Not Endorsed (Requestors should find suitable substitutes for chemical products where possible.)	IH Contacts
7	Upon receipt of approved/endorsed Chemical and Hazardous Substance Review Form from Chemical Approver, the chemical/material can be ordered. Add approved hazardous substance or chemical to the site Chemical & Hazardous Substance Inventory List and the Form and SDS to the SDS files.	Site Hazardous Materials Coordinator

REFERENCES

4D. Chemical and Hazardous Substance Review Form

INSTRUCTIONS FOR COMPLETING THE CHEMICAL and HAZARDOUS SUBSTANCE REVIEW FORM

The Requestor is to complete the form and submit to Chemical Approver for endorsement.

Field #	Field Name	Instructions
1	Site/Location	Site where chemical / hazardous substance is to be used. Describe location and area where the chemical / hazardous substance is to be used.
2	Requestor Name	Name of the person requesting to bring in a new chemical / hazardous substance.
3	Contract Company	If applicable, the name of the requestor's company.
4	Product Name	Product Name exactly as it appears on the Safety Data Sheet (SDS). Include any alternative names stated on the SDS.
5	Manufacturer	Manufacturer Name exactly as it appears on the SDS.
6	SDS Date	Date when the SDS was issued or last revised. Note: This is usually not the print date.
7	Amount Per Use	Typical amount of material to be used per task.
8	Inside or Outside Use	Indicate whether the material will be used inside or outside.
9	Application Type	Indicate the method of application; sprayed, rolled, brushed on, etc.
10	Hazards	Review the physical and health hazards stated on the SDS sheet. Review all SDS sections carefully as hazards may be listed in several sections. Check boxes on the form that apply. Indicate any other hazards not identified in the SDS that are not included on form.
11	Site Use/Work Task(s) and Frequency	Enter a brief description of how the material will be used and how often. Be sure to note if the product will be used in a Confined Space.
12	Protective Equipment (PPE) and Other Exposure Controls or Precautions	List the PPE required for each task to prevent product contact/overexposure. Review each task for potential exposure (skin, eye, respiratory). Determine the potential for product splashing or contact with the skin, eyes, work clothing. Determine the potential for product inhalation due to gas/vapor from volatilization, aerosols and mists from spraying, or dusts/fibers from product handling. Identify the manufacturer PPE recommendations on the SDS. Select PPE consistent with SDS recommendations, and the potential exposures anticipated for the task
13	Chemical / hazardous substance approved for use?	If the Chemical Approver determines the material is appropriate for use they will check the "Yes" box.

		If Industrial Hygiene review is NOT required, the Chemical Approver will check "No" in box 15. If Industrial Hygiene review is required, the Chemical Approver will check "Yes" in box 15. • Chemical Approver will go back to the Requestor to find a suitable substitute for the chemical / hazardous substance where possible. • If no suitable substitute is available, forward the Form and SDS to the IH Contact via email.
14	Chemical Approver	Chemical Approver will enter their name and date of approval into these fields.
15	IH Endorsement Needed?	Industrial Hygiene review and endorsement is required for products that pose particular Health Hazards. See the Chemical and Hazardous Substance Approval Process for listing of all criteria for IH review. • If the answer is "yes" check the 'Yes" box, and send a copy of the Form and the SDS to your IH contact for review and Endorsement. Do not order the product until it has been endorsed by IH • If the answer is "no", check the "No" box. Only local site approval is required for the product.
16	Chemical / hazardous substance use endorsed?	IH Contact will indicate whether the chemical / hazardous substance is endorsed or not.
17	Chemical / hazardous substance endorsed for use with additional precautions	IH Contact will indicate any additional precautions required for use of the chemical / hazardous substance. These would be in addition to the precautions listed on the SDS.
18	IH Endorsement	IH Contact will enter name and date into these fields. • IH review of the product may require discussions of work tasks to clarify anticipated exposures, and any special controls (local exhaust, special PPE, special procedures) or exposure monitoring required to safely handle and use the product. • IH may contact the Chemical Approver to discuss the possibility of using alternative, less hazardous products.

Chemical and Hazardous Substance Review Form

SECTION 1 TO BE COMPLETED BY REQUESTOR:

1. Site/Location:					
2. Requestor Name:			**3. Contractor Company:**		
4. Product Name:			**5. Manufacturer:**		
6. SDS Date:			**7. Amount per use:**		
8. Inside or Outside Use:					
9. Application Type:	**Check all which are applicable:**				
		Sprayed		Mopped	
		Brushed		Poured	
		Rolled		Other (describe):	
		Hand wiped/applied		Other (describe):	
10. Hazards:	**Check all which are applicable:**				
		Flammable		Carcinogen	
		Combustible		Corrosive - Severe Irritants, Skin/Eye Burns	
		Oxidizer		Sensitizer - Allergic Reaction	
		Unstable (Reactive)		Neurotoxin, Nervous System Damage	
		Pyrophoric		Poison	
		Explosive		Highly Toxic, Acutely Toxic	
		Water Reactive		Heart, Liver, Blood, Lung Damage	
		Irritant		Reproductive/developmental Toxin	
		Odor			
List Other Hazards:					

11. Site Use/Work Task(s) and Frequency:	**12. PPE and Other Exposure Controls or Precautions:**

NOTE: Whenever possible, use hazardous and odorous chemicals in closed systems. If that is not possible handle in well ventilated, non-occupied spaces. Additionally, precautions must always be taken when handling materials above or below ambient temperature and pressure.

NOTE: SDS/Chemical hazards, PPE and any special precautions must be reviewed and understood by users.

NOTE: Attach a copy of SDS.

SECTION 2 TO BE COMPLETED BY CHEMICAL APPROVER:

13. Chemical / hazardous substance approved for use?		**Yes**		**No**
14. Chemical Approver:			**Date:**	
15. IH Contact Endorsement Needed?		**Yes**		**No**

SECTION 3 TO BE COMPLETED BY IH CONTACT (IF NECESSARY):

16. Chemical / hazardous substance use endorsed?		**Yes**		**No**
17. Chemical / hazardous substance endorsed for use with additional precautions:				
18. IH Endorsement:			**Date:**	

If IH endorsement is required, send this form and a copy of the SDS to your Industrial Hygiene contact.

APPENDIX C

Roux Traffic Control Guidance Management Program and ExxonMobil E&PS Minimum Safety Expectations – Traffic Control

TRAFFIC CONTROL GUIDANCE
MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**1**

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1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has established this Traffic Control Guidance Management Program to assure its employees and contractors work safely in situations where they are exposed to traffic hazards. This document provides guidance for assessing traffic hazards, mitigating traffic hazards and developing a traffic control plan for Roux projects to maintain a safe and secure work environment, provide a safe and efficient means of travel through a work area, and ensuring egress points are not obstructed in case of an emergency. (Note: Use of the word traffic is to be inclusive of vehicles and pedestrians.)

2. SCOPE AND APPLICABILITY

This guidance document shall be used when conducting work on Roux projects with actual or potential traffic hazards from external or internal traffic including:

- Active sites or facilities (e.g. parking lots, terminals, third party sites)
- Inactive and vacant sites
- Roadways, rights-of-ways

Nothing specified in this guidance document should be construed to suggest conducting work or traffic control in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site requirements. This document provides guidance for traffic control and may not contain all the information necessary to develop and implement a traffic control plan for public roadways. If necessary, a traffic control professional and/or licensed traffic control company should be contacted.

3. REQUIREMENTS AND MINIMUM SAFETY EXPECTATIONS

A Traffic Control Plan is used for the safe movement of vehicle and pedestrian traffic through a work zone/site and must be developed for each site with actual or potential traffic hazards.

The plan must include:

- Site map* that shows the location of work, flaggers, appropriate buffer areas, traffic flow, parking areas, existing structures and any required traffic control devices; and
- Established maximum speed limits for the site.

* For sites where work zones and/or traffic plans are changing frequently, consider using laminated site maps to allow for updates.

Safety Expectations

- Vehicles and heavy equipment must have an audible reverse signal or a horn will be used to signal backing.
- If backing a work vehicle is required, use a spotter and sound the horn twice before backing. If a spotter is not available, sound the horn twice before backing.
- Individuals who are not familiar with the work site are not permitted to drive on site without an escort.
- Identify a safe entrance and exit path for personnel, vehicles, trucks and heavy equipment that is clear of obstructions, requires no or minimal backing and allows maximum visibility for drivers and

others in the area. If visibility is obstructed when entering or exiting the site, mirrors must be installed to enhance visibility or a spotter must be used.

- Establish check-in / check-out procedures for heavy equipment onsite.
- Traffic control must be in place before any work that exposes individuals to a traffic hazard is conducted. All work should be completed before traffic control devices are removed.
- Traffic control devices must be secured to prevent movement in windy conditions.
- The Site Health and Safety Officer (SHSO) is responsible for communicating the traffic control plan including traffic communication methods to all site personnel prior to the start of any activities and periodically assessing site conditions and revising the traffic control plan as needed.

3.1 Buffer Areas

- Buffer area is a lateral and longitudinal area that separates traffic from the work. The minimum buffer area must be established between traffic and personnel, vehicles, and equipment.
- Buffer areas must be sized to provide separation between workers and internal and external traffic including vehicular, heavy equipment and pedestrian.
- The size of buffer zone depends on speed of traffic, volume, type of work, duration of work, visibility of work zone (curves, corners, rises and dips), access and egress and proximity to public facilities.
- If an unauthorized vehicle or pedestrian enters the work zone or buffer area, work must stop immediately and the traffic control plan reevaluated for effectiveness.

3.2 Levels of Traffic Control

Site factors and work factors are used to help determine the level of traffic control needed for safe operations. All work areas should keep in mind pedestrian and small motorized traffic as well as vehicle and heavy equipment traffic. Levels of traffic control are defined as follows:

Factor	Level 1	Level 2	Level 3
Speed in or next to Work Area	Low / <30km/h or 20 mph	High / >30 km/h 20 mph	NA
Use of Heavy Equipment	No	Yes	NA
Work in Public Roadway / Sidewalk/ Footpath	No	Yes	Yes
Lane Closure	No	No	Yes

The highest traffic control level based on the single highest ranking factor in the above table should be implemented. Site-specific factors or hazards not presented in the above table may justify selection of a higher traffic control level and/or additional control devices.

3.2.1 Level 1 Traffic Control

- Use delineators (cones with flags, stacker cones, looper tubes, grabber tubes, etc.) to surround work zone.
  - 1.1 meter (42-inches) in total height.

- 1.2 meter (4 feet) distance between delineators.

- Use caution tape or barricade boards between delineators.
- Use work vehicle parked between workers and on-coming traffic to provide visual warning to and physical protection from traffic.
- If working close to site entrance, use a second line of delineators to create an additional buffer or utilize a spotter.
- Use the buddy system or a watchperson when traffic conditions warrant.

Examples of Level 1 Traffic Control

Figures A1.2.2(a)(b)(c) - Examples of Level 2 Traffic Control

3.2.2 Level 2 Traffic Control

- Plastic security fencing and/or barricades:
  - meter (42-inches) in total height (1.8 meters/6 feet high in areas where drivers have poor visibility or other higher risk factors present).
  - meter (4 feet) distance between delineators.
- Use cautionary signs (e.g., “Men Working”, “Work Zone”) in all directions from which vehicles can approach (recommended 0.8 meter or 32 inches high) and any additional signage/protection required by local, regional or national regulations.
- Use work vehicle parked between workers and on-coming traffic to provide visual warning to and physical protection from traffic.
- If working close to site entrance, use second line of delineators to create an additional buffer or utilize a spotter.

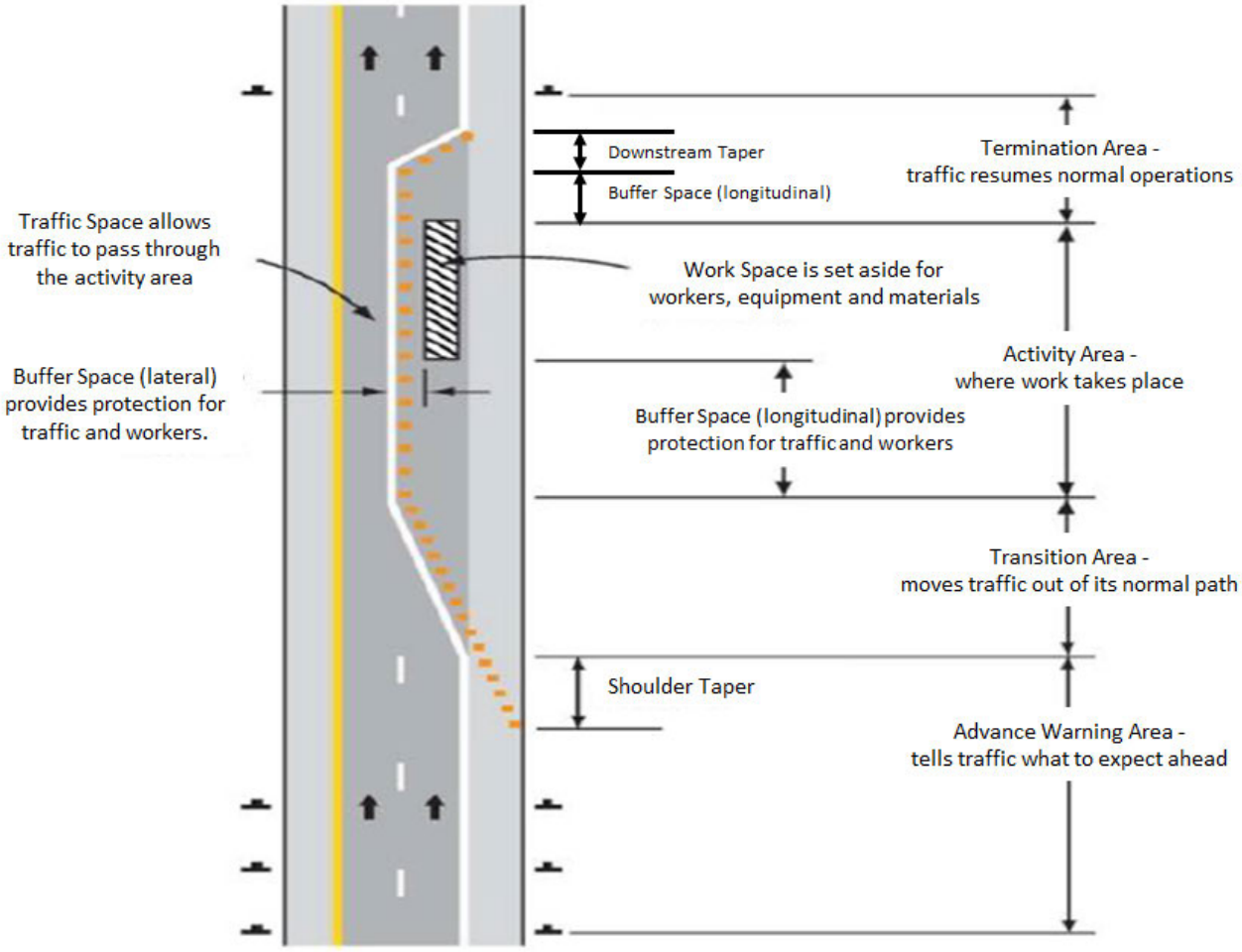
- Use the buddy system or a watchperson when traffic conditions warrant.
- Provide oversight by persons dedicated to traffic control.
- Coordinate work with appropriate authorities which may require a police detail.

Examples of Level 2 Traffic Control

3.2.3 Level 3 Normal Traffic Flow Interruption (Temporary Traffic Control Zone)

A temporary traffic control zone consists of four areas and may be needed when normal traffic flow is interrupted. A temporary control zone is the entire section of roadway between the first warning sign through the last traffic control device, where traffic returns to its normal path. Most temporary traffic control zones are divided into four areas:

1. Advance warning area – drivers are informed what to expect
2. Transition area – redirection of the driver's normal path
3. Activity area – area where the work is taking place
4. Termination area – traffic returns to normal path



Example of a temporary traffic control zone layout

3.3 Flagging

- Flagging is used when all other methods of traffic control are inadequate to direct or control traffic.
- Flagger locations must be documented on the Traffic Control Plan.
- Minimum standard flagging paddle size allowed is 18 inches (.45 m). It is recommended that a 24-inch (.6 m) paddle be used to improve visibility or for high speed operations.

3.4 Parking

Any vehicle not active in site operations should be parked either in a designated parking area or out of the way and/or used as a barrier to oncoming traffic to protect personnel in the work zone.

All parked vehicles (except light-duty pick-up trucks), trailers and heavy equipment; including those needing to idle while in use, must be secured as follows:

- Emergency brake set
- Manual transmission in gear (if not idling) or automatic transmission in “Park”, AND

- One of the following methods:
  - Lowered hydraulic rams
  - Connection of trailer to vehicle that is secured
  - Two properly sized chocks set on either side of a wheel

Please refer to the Wheel Chocking Management Program 2.16 for additional information.

4. TRAFFIC CONTROL PLANNING

4.1 Components of a Traffic Control Plan

A traffic control plan will be part of the site Health and Safety Plan (HASP) and in addition to the items listed in the Minimum Safety Expectations section, should include, but is not limited to the following:

- Traffic control design.
- Traffic control devices.
- Traffic control operations.
- Method for communicating any Traffic Control Plan changes.

4.2 Assessing Traffic Hazards

Before developing the plan, conduct a site/project assessment to identify internal and external traffic hazards including:

- Traffic flow patterns around and within the work zone.
- Vehicle/heavy equipment operations within work zone.
- Entry and exit routes for project-related and third-party vehicles/heavy equipment (e.g., congested roadways, limited visibility).
- High traffic areas (e.g., active roadways, parking lots and garages).
- Terrain conditions (e.g., hills, loose gravel, steep slopes).
- Survey of adjacent sites activities that may change traffic patterns (e.g., school drop-off, pick-up times).
- Weather and lighting conditions.
- Visibility of work area in relation to traffic flow.
- Areas of previous traffic accidents.
- Traffic hazards that may be encountered when traveling to and from site (including heavy equipment impacts on local streets, turning radius restrictions, etc.).

Movements of motor vehicles, bicycles, and pedestrians around the work zone should be considered, as well as the movements of personnel, vehicles and heavy equipment within the work zone. A work zone is an unexpected obstacle for those not involved in the work and may cause them to respond in unpredictable ways.

Any work in public roadways, right-of-ways, lanes, alleys, or sidewalks may require approval of appropriate jurisdiction, such as a municipality, county, state, or highway authority. This may require an application

for a permit and a permit fee. Work schedules should take into account the time needed to obtain required permits.

In addition, when transporting oversized equipment to a site over public roadways or right-of-ways coordinate with local jurisd ictions for needed traffic control and permits.

4.3 Buddy System or Watchperson

If there are any questions regarding number of personnel required to safely perform project tasks on a site, a two-person crew should be dispatched for the first site visit for potential use of one person as a traffic watch. Subsequent review will determine if site activity remains a two-person job.

A two-person crew should also be scheduled if:

- Location requires traffic to be redirected into another lane or detoured.
- Traffic lane will be temporarily closed.
- Work is conducted alongside heavily-traveled roadway.
- Pedestrian or cyclists require direction or assistance for temporary crossing/diversion.
- Areas where hybrid or electric vehicles are prevalent since they may not be heard at slow speeds.

4.4 Project Specific Hazards

When working at active sites:

- Determine safest travel routes into and out of work areas for project-related vehicles and heavy equipment.
- If possible, minimize work-related impacts on existing site operations.
- Discuss TCP with site operator/manager and others who may be impacted.

When work involves excavation, consider the following:

- Space for support of the sidewalls (sloping, benching, shoring, and/or trench boxing)
- Space for the safe movement of workers and heavy equipment around the excavation.
- Should controls, such as physical barriers or visual indicators, be applied to limit access to utilities?
- When working near aboveground or underground utilities, consider the following:
  - Can equipment be operated in a way to maintain safe distances from overhead utilities?
  - Could equipment displace or crush underground utilities?

When laying out work zones, consider the following in allowing space for work activities:

- Can equipment and materials be delivered, stored, and handled readily?
- Can workers perform their tasks safely and efficiently?
- Is there space to walk so as to minimize slip, trip, and fall hazards?
- Are two-way roads three-times as wide as the widest piece of equipment using the road or does traffic need to be controlled?

On-Site Workers should take the following actions:

- Check surroundings often for potential changing traffic hazards.
- Listen for and respond to warnings such as horns, whistles, and sirens.
- Position yourself facing traffic. Where this is not practical, a “second set of eyes” should be considered such as a buddy or watchperson.
- If walking on/near a road or access way, walk in single file (not in a group) towards/facing oncoming traffic.
- Remove hearing protection when not needed.
- Look out for the safety of other workers in area.
- Turn off cell phones and do not use while operating or being in the vicinity of operating vehicles / heavy equipment.

4.5 Deploying/Removing Traffic Control Devices

- Begin placing devices in upstream (traffic advance warning area) locations.
- Flag person used to warn incoming traffic should be placed far enough in front of work zone to allow vehicles to maneuver.
- Delineate transition zone with cones and barricades.
- Establish work zone.
- Delineate downstream taper.
- Place signs for end of work zone.
- Remove devices in reverse order of deployment (remove devices at beginning of set-up last).

4.6 Traffic Control Devices

The work zone should be highly visible so that drivers can see and avoid the area. Geometry, color and reflectivity of devices affect how people see them. Location of devices relative to terrain and other objects also affects visibility. Visibility may be enhanced by increasing the height and number of traffic control devices.

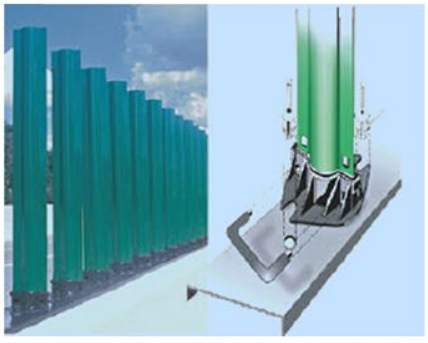
Traffic Control devices provide visibility and can include the following:

- Traffic cones with flags, looper tubes, grabber tubes and stacker cones (recommended height 1.1 meter/ 42 inches)
- High visibility security / temporary fencing (may require addition of reflective tape or lights)
- Warning tape
- Reflective tape
- Automated Flagger Assistance Device
- Warning and speed limit signs (e.g., "Caution Work Area")
- Traffic flow arrows (e.g., posted or painted on ground)
- Molded plastic barricades (sawhorses)

- Type I and II barricades
- Plastic channelizers (orange barrels)
- Concrete barriers (Jersey barriers or K-rails)
- Water-filled barricades
- Vehicles used as barricade (with hazard lights activated if possible)
- Light bars and reflective lights on vehicles
- Portable gates
- Glare screens
- Buddy system / Watchperson
- Temporary speed bumps or rumble strips

Commonly used traffic control devices

Extender bars used in place of tape



Glare screens can make a highly visible barrier

Barrier constructed of PVC pipe and orange fencing

Traffic control devices should be routinely inspected to ensure continued integrity and visibility.

Many traffic control devices only provide visual clues to drivers. Physical barriers, such as parked vehicles, concrete barriers, or water filled barriers can provide more protection if a driver has lost control or is not paying attention.

4.7 Night/Low Visibility

As much as practical, work should be conducted during daylight. Night operations may result in poor visibility for drivers and workers.

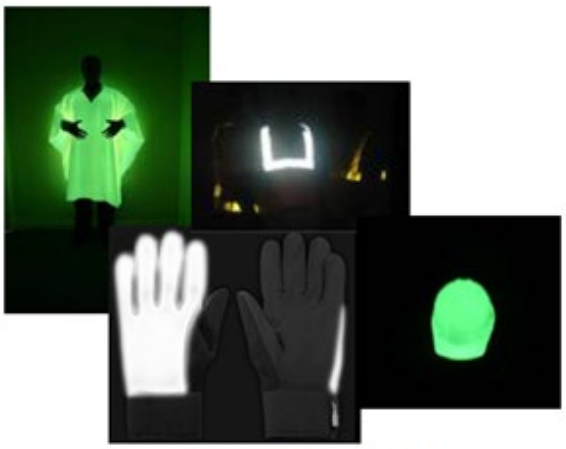
If work must be done at night, additional lighting/traffic control measures should be provided to warn vehicles and pedestrians. Glare from lighting should be controlled so as not to interfere with the vision of workers or drivers.

Nighttime visibility can be increased by:

- Lighted delineators
- Flood lights/Work area lights
- Higher class of high-visibility apparel
- Flashing lights on clothing/vehicles/hard hat
- Glow sticks attached to traffic vests
- Reflective tape on equipment

Glow stick

Lighted traffic control devices



Highly reflective safety gear

TRAFFIC CONTROL

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Life Saving Essentials

Traffic Control minimum safety expectations will protect people from being struck by motor vehicles.

The following life saving essentials are required and will achieve the life saving action:

- Protect personnel from moving vehicles
- Make personnel visible

When managing hazards associated with moving vehicles within a **Red Zone**, refer to the Working Near Moving Equipment minimum safety expectations.

The consultant/contractor (CC) is responsible for ensuring that these safety expectations are implemented. Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1 Management of Change (MOC). Additional mitigations may be required based on level of risk.

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Traffic Control Plan

The plan must:

- Include the location of work:
    - Flaggers
    - Appropriate buffer areas
    - Traffic flow
    - Parking areas
    - Safe access to public roadways
    - Existing structures
    - Any required traffic control devices
- Establish maximum speed limits for the site when possible
- Verification that personnel are competent in their roles and responsibilities

Traffic control must be in place before individuals perform site works.

Measures to protect personnel must be considered while traffic control is being implemented/removed (i.e., flag person).

Traffic control devices must be secured to prevent movement in windy conditions.

All work should be completed before traffic control is removed.

Buffer area (a lateral and longitudinal area that separates traffic from the work) must be sized to provide separation between personnel and internal and external traffic, including vehicular and pedestrian.

The size of buffer area depends on:

- Speed of traffic
- Volume
- Type of work
- Visibility of work zone (i.e. curves, corners, rises, dips, etc.)
- Access and egress
- Proximity to public facilities.

If an unauthorized vehicle or pedestrian enters the work zone or buffer area, work must stop immediately and the traffic control plan reevaluated for effectiveness.

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Use of Flagger

Flagger must be used when traffic control by other means is inadequate, or the minimum expectations in this document can't be implemented.

- Flaggers must understand traffic control procedures such as:
  - Signaling
  - Communication tools
  - Traffic control techniques
  - Safety equipment
  - Safe positions
  - Emergency procedures
- Flagger location(s), when used, must protect flagger from traffic and be identified as part of the Traffic Control Plan. Consider barrier protection if appropriate
- Minimum standard flagging paddle size allowed is 18 inches (0.45 m). It is recommended that a 24-inch (0.6 m) paddle be used to improve visibility or for high speed operations

Parking

Any vehicle not active in site operations should be parked either in a designated parking area or out of the way and/or used as a barrier to oncoming traffic to protect personnel in the work zone.

All parked vehicles (except light-duty vehicles), trailers and heavy equipment; including those needing to idle while in use, must be secured as follows:

- Emergency brake set **OR**
- Manual transmission in gear (if not idling) or automatic transmission in "Park", **AND** one of the following methods:
  - Lowered hydraulic arms
  - Connection of trailer to vehicle that is secured
  - Two properly sized chocks set on either side of a wheel

Working Along Non-Public Roadways in a Plant/Facility/Project Site

Follow the plant or facility requirements when working in or along roadways. If the site does not have any requirements, these minimum expectations must be followed.

- Warning signs shall be placed at least 50 ft (15m) from each end of operation
- In heavy traffic areas, flaggers wearing high visibility vests/clothing must be at least 50 ft (15m) from each end of operation to alert/control approaching traffic
- Flaggers shall have a means of communication (i.e. air horn)
- Red flags or other warning devices must be attached to parts of machinery that may protrude into any traffic thoroughfare

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Exposure to Third Party Traffic

Personnel working in areas where there are exposure(s) to third party traffic, such as an active retail station or along a public road, must implement the following mitigations:

Stop Element:

- Position the service vehicle/van/truck as a barrier

Visibility:

- Personnel must wear high visibility vests with reflective properties
- Use minimum 3 ft (0.9m) height cone/pole (high visibility), 4ft (1.2m) distance between cones
- Use signs when working near site entrance, in higher traffic situations and when drivers may have a limited line of sight to personnel

Isolate:

- Use a continuous horizontal barrier to clearly demarcate the work area

Safety Perimeter:

- Position cones at least 10 ft (3m) from the work area

When other hazards are present, consider additional signs, a spotter or flagger, and additional barriers.

If necessary, temporarily close the site, after coordination with the site operator or ExxonMobil.

Coordinate work with appropriate authorities which may require a police detail as needed.

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Examples of Traffic Control for Third Party Traffic

Traffic Flow Interruption (Temporary Traffic Control Zone)

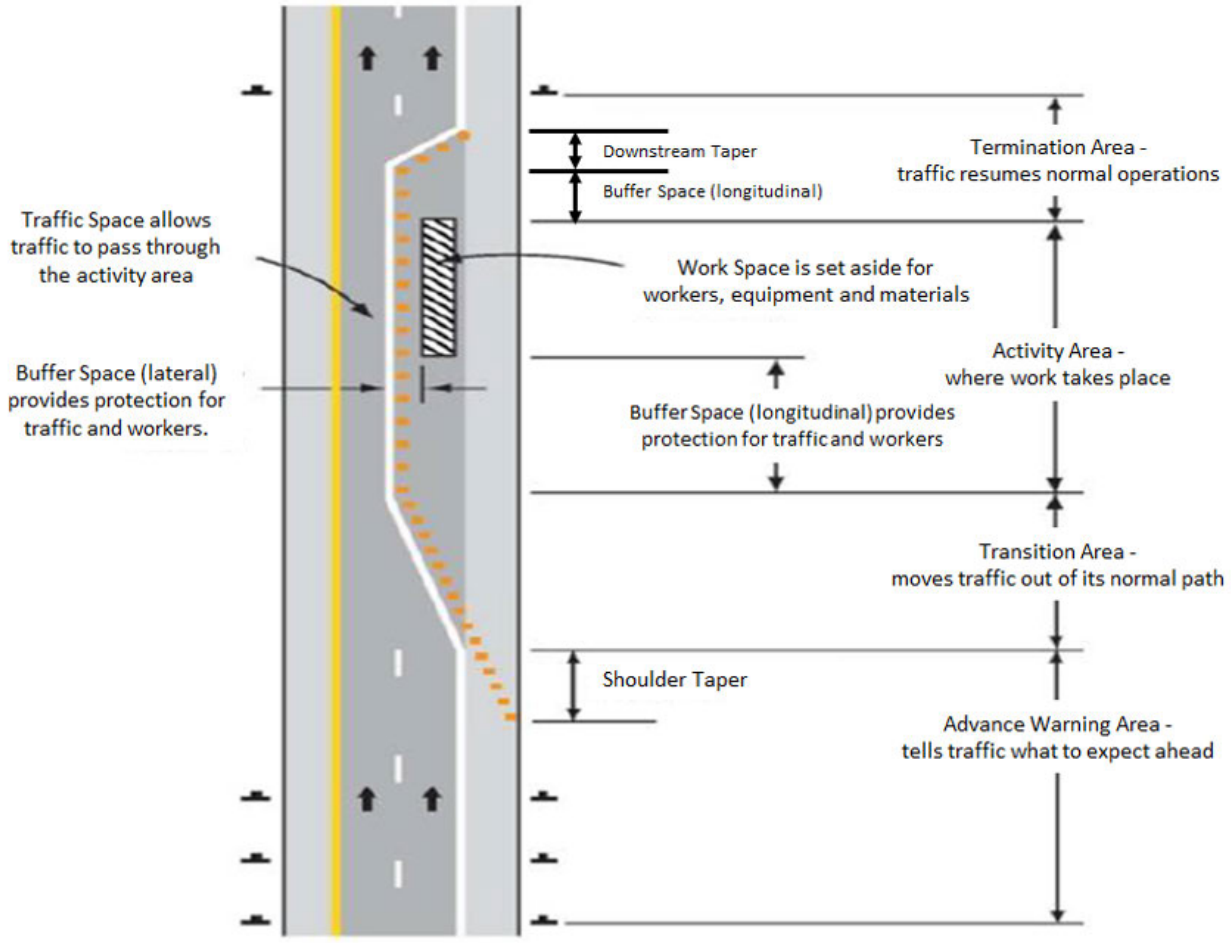
Follow local laws or regulations when there is a need to interrupt traffic flow, (i.e. working in public roadways, sidewalk and/or footpath and/or lane closure, etc.).

Use site factors and work factors to help determine the level of traffic control needed for safe operations.

Temporary traffic control zones have four areas:

1. Advance warning area – drivers are informed what to expect
2. Transition area – redirection of the driver's normal path
3. Activity area – area where the work is taking place
4. Termination area – traffic returns to normal path

Example of a Temporary Traffic Control Zone Layout



Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

APPENDIX D

Job Loss Analysis (JLAs)

D.1 ExxonMobil Job Loss Analysis (JLA) template

D.2 Site Job Los Analysis Forms

JOB LOSS ANALYSIS	**Ctrl. No.**	DATE:	☐ NEW ☐ REVISED	PAGE 1 of 1
JSA TYPE CATEGORY **Site Specific** **Site:**	WORK TYPE	WORK ACTIVITY (Description)		

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☒ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Nitrile and Cut Resistant ANSI Level 2
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent long sleeve shirt or long sleeve shirt and reflective safety vest.	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or composite toe		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Commitment to LPS – All personnel onsite will actively participate in LPSA performance by verbalizing LPSAs throughout the day.

EXCLUSION ZONE: A 10' heavy equipment exclusion zone (HEEZ) will be delineated and maintained around ICE unit. This should be defined prior to operating each piece of equipment.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1.	1a. 1b.	1a. 1a. 1b. 1b.
2.	2a. 2b. 2c.	2a. 2b. 2c.
3.	3a. 3b.	3a. 3b.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.

[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source- Compression, tension/torque, pressure, electricity.

[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-006	DATE 8/6/2018	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
Generic	**Drilling**	**Direct Push Soil Borings / Well Installation**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Timothy Zei	Project Hydrogeologist	Raymond Olson	Staff Assistant Geologist
		Christine Pietrzyk	Office Health & Safety Manager
		Brian Hobbs	Corporate Health & Safety Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION: (as needed) ☒ SAFETY SHOES: Composite-toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing, Long Sleeve Shirt	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect Repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Geoprobe or Truck-Mounted Direct Push Drill Rig, Hand Tools, Photoionization Detector, Multi-Gas Meter (or equivalent), Macrocore liners, Liner Opening Tool, 20 lb. Type ABC Fire Extinguisher, 42" Cones & Flags, "Work Area" Signs, Water

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ) – All non-essential personnel will maintain a distance of 10 feet from drilling equipment while equipment is moving/engaged

"SHOW ME YOUR HANDS"
Driller and helper should show that hands are clear from controls and moving parts

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilization of drilling rig (ensure the Subsurface Clearance Protocol and Drill Rig Checklist are completed)	**1a. CONTACT:** Equipment/property damage.	1a. The drill rig's tower/derrick will be lowered and secured prior to mobilization. 1a. A spotter should be utilized while moving the drill rig. If personnel move into the path of the drill rig, the drill rig will be stopped until the path is again clear. Use a spotter for all required backing operations. 1a. Set-up the work area and position equipment in a manner that eliminates or reduces the need for backing of support trucks and trailers. 1a. When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver visibility. 1a. Inspect the driving path for uneven terrain. Level or avoid if needed. 1a. Drill rig should have a minimum **exclusion zone of 10 feet** for non-essential personnel (i.e., driller helper, geologist) when the rig is moving/ in operation.
	1b. FALL: Slip/trip/fall hazards.	1b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 1b. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 1b. Use established pathways and walk on stable, secure ground.
	1c. CONTACT: Crushing from roll-over.	1c Geoprobe should cross all hills/obstructions head on with the mast down to reduce risk of roll-over.
2. Raising tower/derrick of drill rig	**2a. CONTACT:** Overhead hazards.	2a. Prior to raising the tower/derrick, the area above the drilling rig will be inspected for wires, tree limbs, piping, or other structures, that could come in contact with the rig's tower and/or drilling rods or tools. 2a. Maintain a safe distance of 10' from overhead structures.
	2b. CONTACT: Pinch Points/Amputation Points when raising the rig and instability of rig	2b. Inspect the equipment prior to use and avoid pinch/amputation points. 2b. Lower outriggers to ensure stability prior to raising rig tower/derrick. 2b. If the rig needs to be mounted, be sure to use three points of contact.
3. Advancement of drilling equipment and well installation	**3a. CONTACT:** Flying debris	3a. Be aware of and avoid potential lines of fire and wear required PPE such as eye, ear, and hand protection.
	3b. EXPOSURE: Noise and dust.	3b. Wet borehole area with sprayer to minimize dust. 3b. Stand upwind and keep body away from rig. 3b. Dust mask should be worn if conditions warrant. 3b. Wear hearing protection when the drill rig is in operation.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Advancement of drilling equipment and well installation (Continued)	**3a. CONTACT:** Flying debris **3b. EXPOSURE:** Noise and dust. **3c. FALL:** Slip/trip/fall hazards. **3d. CAUGHT:** Limb/extremity pinching; abrasion/crushing. **3e. CONTACT:** Equipment imbalance during advancement of drill equipment. **3f. EXPOSURE:** Inhalation of contamination/vapors. **3g. EXERTION:** Potential for muscle strain/injury while lifting and installing well casings, lifting sand bags, and/or lifting rods.	3c. Contain drill cuttings and drilling water to prevent fall hazards from developing in work area. 3c. See 1b. 3d. Ensure all Emergency Safety Stop buttons function properly. 3d. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools. 3d. Inspect the equipment prior to use for potential pinch/amputation points. Keep hands away from pinch/amputation points and use of tools is preferable compared to fingers and hands. 3d. Inspect drill head for worn surface or missing teeth; replace if damaged or blunt. 3d. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 3d. All non-essential personnel should stay away from the immediate work area; position body out of the line-of-fire of equipment. 3d. Drillers and helpers will understand and use the "Show Me Your Hands" Policy. 3d. Spinning rods/casing have an **exclusion zone of 10 feet** while in operation. 3e. Drillers will advance the borehole with caution to avoid causing the rig to become imbalanced and/or tip. 3e. The blocking and leveling devices used to secure the rig will be inspected by drillers and Roux personnel regularly to see if shifting has occurred. 3e. In addition, personnel and equipment that are non-essential to the advancement of the borehole will be positioned away from the rig at a distance that is at least as far as the boom is high (**minimum exclusion zone of 10 feet**). 3f. Monitor ambient air for dangerous conditions using a calibrated photoionization detector (PID) to periodically monitor the breathing zone of the work area. 3f. If a reading of >5ppm is recorded, the Roux field personnel must temporarily cease work, instruct all Site personnel to step away from the area of elevated readings and inform the Roux PM of the condition. The Roux PM will then recommend additional precautions in accordance with the site specific health and safety plan. 3f. Use a multi-gas meter to monitor ambient air for dangerous conditions (i.e. unsafe levels of carbon monoxide when drilling indoors or the presence of explosive vapors). 3g. Keep back straight and bend at the knees. 3g. Utilize team lifting for objects over 50lbs. 3g. Use mechanical lifting device for odd shaped objects.
4. Remove sample liner.	**4a. EXERTION:** Potential for muscle strain/injury while removing liner from probe rod. **4b. CONTACT:** Pinch points and cuts **4c. EXPOSURE:** Inhalation and/or dermal contact with contaminants.	4a Utilize team lifting for objects over 50lbs. 4a. Use hydraulic liner extruder if available. 4b. Place liner on sturdy surface when opening. 4b. Don cut-resistant gloves and use appropriate liner cutter when opening liners. 4b. Always cut away from the body. 4c. Wear chemical-resistant disposable gloves when handling liners. 4c. See 3e.
5. Decontaminate equipment.	**5a. EXPOSURE/CONTACT**: To contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors). **5b. EXPOSURE:** To chemicals in cleaning solution including ammonia.	5a. Wear chemical-resistant disposable gloves and safety glasses. 5a. Contain decontamination water so that it does not spill. 5a. Use an absorbent pad to clean spills, if necessary. 5a. Spray equipment from side angle, not straight on, to avoid backsplash. 5a. See 3b. 5b. See 4a. Review SDS to ensure appropriate precautions are taken and understood.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-007	DATE 8/6/2018	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**General Site Activity**	**Driving**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Valerie Sabatasso	Staff Scientist	Brian Hobbs	Corporate Health & Safety Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather/ cut-resistant level 2
☒ HARD HAT: when outside vehicle	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER _____
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION	☒ PPE CLOTHING: high visibility vest, when outside vehicle	
☒ SAFETY GLASSES:when outside vehicle	☒ SAFETY TOE BOOTS: when outside vehicle		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Motor Vehicle (i.e. car, truck, SUV)

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE: A 10' minimum exclusion zone will be maintained around motor vehicles when operating.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Driving to/leaving Site	**1a. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc. *Common factors that may lead to CONTACT incident, but not limited to: • distracted driving (cell phone, GPS, radio, billboards, "rubber necking") • lack of situational awareness • unfamiliarity with traffic patterns/road layout • weather conditions (wet/icy roads, hydroplaning, black ice) • weariness • high speeds • obstructed vision (solar glare, debris on windshield, blind spots) • changes in travel pathway (construction, snow banks, non-operational signals, potholes, detours, special events) • improper vehicle maintenance (non-operational signal light, worn tires, cracked windshield, ineffective wipers) • loose or unsecure objects	1a. PLAN AHEAD – review/make yourself familiar with maps and driving directions before beginning the drive to the Site. Do not attempt to drive and review maps/directions at the same time. Pull over and stop your vehicle before looking at maps/directions. 1a. Complete a basic vehicle inspection before driving. Verify Inspection and Registration are current, tires and wipers are in good condition, all lights are functional, all glass/mirrors are undamaged, the horn is functional, roof/hood/trunk are free from accumulated snow and visibility is not impaired due to snow/ice/frost/fog on windows. 1a. Do not hang items in car that can obstruct your view or become projectiles in a collision. 1a. Do not get distracted using touch screen radios or GPS units built into newer models. Keep your eyes on the road and stay alert. 1a. Follow posted speed limits and obey traffic signals and roadway signs. 1a. Always wear your seat belt and shoulder harness when driving. 1a. When driving around large vehicles and trucks, maintain extra space as these vehicles may not be able to see a smaller car too close. 1a. Follow the "Rules of the Road" including: using your turn signals, coming to a complete stop, and allowing vehicles the right of way (yield) when they are when traffic laws require. 1a. Apply the Smith Five Keys® of safe driving • Aim High in Steering® - Expand eye lead time to a minimum of 15 seconds • Get the Big Picture® - Maintain proper a 4 second minimum following distance at all times - Scan mirrors every 5-8 seconds to achieve a circle of awareness - Position your vehicle so you can see relevant/non-relevant objects • Keep Your Eyes Moving® - Try to maintain about 180 degrees of visibility - Avoid blank and fixed stares. Avoid focusing on one object for more than 2 seconds • Leave Yourself an Out® - Avoid traveling in traffic clusters - Surround yourself with space - Anticipate the actions of others

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Driving to/leaving Site (cont'd)	**1a. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc.	• Make Sure They See You® - Maintain eye contact with on-coming vehicles/pedestrians - Use warning devices (e.g., hand signals, high-lights, horns etc.) - Proper timing is essential 1a. Do not perform reconnaissance or inspections while driving. Your vehicle should be parked in a safe location when viewing or surveying the Site and vicinity 1a. Avoid sudden turns and stops. Don't drive recklessly – be in control of vehicle at all times. 1a. In inclement weather, first determine if work can be POSTPONED. Otherwise, plan according to weather conditions including checking forecast along entirety of travel route (especially, for long distances). Reduce speed as road conditions warrant. Travelling with winter car equipment, in the winter, is strongly recommended (i.e., shovel, scraper, brush, blanket, extra clothing, flashlight, bag of sand). If your vehicle has 4-wheel drive, review to operators manual and understand operating procedure prior to engaging 4-wheel drive. If at any point on your drive weather becomes too severe to proceed safely pull over if safe to do so or seek nearest cover (e.g., overpass) 1a. If feeling drowsy or sleepy, do not drive. Pull over in a safe place to rest if you experience any signs of drowsiness. Make sure to get adequate sleep the night before an early drive. 1a. Never operate a vehicle under the influence of alcohol or illegal substances or medications affecting your performance. 1a. Keep your eyes on the road. Do not call or talk on cellular phones. Pull over to a safe location if you must answer or make a call. (Legal requirement in: CA, CT, DE, D.C., HI, IL, LA*, MD, NV, NH*, NJ, NM, NY, OK*, OR, TX*, VT, WA, WV as of 01/20/15; per www.IIHS.org) * = Applicable to some drivers, situations or to be implemented in 2015 1a. When parking, pull-through when possible. If backing is required visually inspect area to ensure it is free from obstructions prior to backing in and relying solely on mirrors; use spotters when available.
2. Entering/Exiting Vehicle.	**2a. CAUGHT:** Personal injury (broken fingers/hand) while entering or exiting vehicles **2b. FALL:** Personal injury (twisted ankle, deep contusion, concussion, broken wrist/arm, etc.) from slip/fall on uneven or unstable or slippery surface while exiting/entering vehicle **2c. CONTACT:** Severe injury/disability, property damage, monetary loss (insurance premiums, deductibles, loss of license/job) caused by collision with or struck by other vehicles, obstructions, pedestrians, animals, etc.	2a. Open and close doors slowly. Never put hands or feet in between door and vehicle to avoid pinch points. 2b. When exiting the vehicle make sure your feet are on firm footing and weight is evenly distributed before exiting/standing. In inclement weather use hands to support yourself, by holding the car door and/or steering wheel, when exiting the vehicle. 2c. Check both directions for traffic before opening door. Do not exit vehicle if traffic does not permit you to exit safely 2c. Check anticipated path of door prior to opening, do not open door into any obstructions (e.g., bollards, high curbing)

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

JOB SAFETY ANALYSIS	Ctrl. No. GEN-009	DATE: 8/6/2018	☐ NEW ☒ REVISED	PAGE 1 of 1
JSA TYPE CATEGORY **Generic**	WORK TYPE **O&M**	WORK ACTIVITY (Description) **Movement of 55-Gallon Drums/Drum Handling with Mobile Carrier**		

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Michael Sarni	Technician	Brian Hobbs	Corporate Health & Safety Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Cut-resistant gloves
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER:
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent long sleeve shirt or long sleeve shirt and reflective safety vest.	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Steel or composite toe		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Mobile Drum Carrier, safety cones, and caution tape

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): A 10-foot exclusion zone will be maintained around heavy equipment (i.e. forklift).

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Preparing for and Inspection of Drum	**1a. FALL:** Tripping/falling due to uneven surface. Loose debris/garbage in work area.	1a. Clear area of loose garbage and debris. Inspect 55-gal drums for proper condition, labeling, check drum ring and bolts for tightness, inspect mobile drum carrier. 1a. Do a Test Lift to get a general sense of the weight of the drum. 1a. Inspect and use established pathways to avoid uneven terrain, weather-related hazards (i.e., debris, puddles, ice, etc.), and other obstructions. 1a. Secure work area and coordinate and communicate the planned work activities with other personnel working in the area. 1a. Delineate work area with 42" safety cones.
	1b. CONTACT/EXPOSURE: Drums could potentially be damaged or contain hazardous material. Mobile drum carrier could potentially be in poor working condition causing malfunctioning during operation.	1b. Prior to inspecting drums don cut-resistant gloves. If drum is not properly labeled, do not open and cease all drum transport activities. Immediately contact project manager and inform him/her of drum situation. 1b. Do not continue drum transport activities until further actions are determined by the project manager. 1b. If the drum is properly labeled, but leaking, improperly sealed or in poor condition, place drum in an over-pack drum. 1b. Inspect mobile drum carrier to ensure its overall integrity. Look for rust marks or potential weak points where the drum carrier could malfunction. Inspect the wheels to ensure that they easily turn and nothing is impeding their movement.
	1c. EXERTION/CAUGHT: Potential pinching/exertion hazards while securing ring/ tightening bolts	1c. Keep back straight and knees slightly bent while securing drum ring/tightening bolt. Wear cut-resistant gloves.
2. Position drum clamp tightly in between drum ribs, securing drum clamp to drum with chain	**2a. CAUGHT:** Pinching fingers between drum clamp and handle/chain.	2a. Attach drum clamp with chain and tighten until snug. Do not place hands between drum clamp and drum as the chain is tightened; wear cut resistant gloves. Keep face away from drum when handling in case of escaping vapors.

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[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift." Avoid general statements such as, "be careful."

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
3. Disengage safety latches on handle, pull handle down until drum is lifted off ground and safety latches are reengaged; slightly suspending drum off the ground	**3a. EXERTION/ CONTACT:** Potential muscle strain associated with lifting/engaging drum/handle. Drum could shift/slip downward and crush toes.	3a. Ascertain whether the drum is overweight; if it is, then two people are needed to lower handle while drum is secured with clamp so that safety latches can be engaged. Keep body out of the line of fire of the handle (do not position head above handle) as it is being pushed down. Do not allow feet/toes to be positioned under the drum as it is being lifted; wear steel/composite toe boots.
	3b. CAUGHT: Fingers could be pinched while engaging/disengaging safety latches on handle	3b. Wear cut-resistant gloves while disengaging/reengaging safety latches. 3b. Avoid placing hands in pinch points.
4. Transport drums to designated location and disengage drum clamp (repeat Step 3 in reverse order)	**4a. FALL:** Tripping/ falling due to obstructions and uneven terrain. Potential for drum to fall during transport.	4a. Ensure transport path is free of potential obstructions that may cause the drum/carrier to become unstable. Position drum clamp between the ribs on the drum to prevent possible slipping.

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JOB SAFETY ANALYSIS Ctrl. No. GEN-013	DATE 8/6/2018	☐ NEW ☒ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE:	WORK ACTIVITY (Description):
Generic	**Gauging and Sampling**	**Gauging and Sampling**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Brandon Tufano	Staff Geologist	Brian Hobbs	Corporate Health & Safety Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☒ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☐ HEARING PROTECTION ☒ SAFETY SHOES: Composite-toe or steel toe boots	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Knee pads, Insect Repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

42-inch Safety Cones, Caution Tape, Interface Probe and/or Water Level Meter, 20-lb., Type ABC Fire Extinguisher, Buckets. Tools as needed: Socket Wrench, Screw Driver, Crow Bar, Mallet, and Wire Brush.

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilization to monitoring well(s).	**1a. FALL:** Personal injury from slip/trip/fall due to uneven terrain and/or obstructions.	1a. Inspect pathway and plan for most suitable designated pathway prior to mobilization. 1a. Use established pathways, walk and/or drive on stable, secure ground and avoid steep hills or uneven terrain. 1a. If working near open water with an unguarded edge, wear life vest.
	1b. CONTACT: With traffic/third parties.	1b. Identify potential traffic sources and delineate work area with 42-inch traffic safety cones. Position vehicle to protect against oncoming traffic. Use caution tape to provide a more visible delineation of the work area if necessary. 1b. Wear appropriate PPE including high visibility clothing or reflective vest. 1b. Face traffic, maintain eye contact with oncoming vehicles, and establish a safe exit route.
	1c. EXERTION: Muscle strain from lifting equipment	1c. Use proper lifting techniques when handling/moving equipment; bend knees and keep back straight. 4c. Use mechanical assistance or team lifting techniques when equipment is 50 lbs. or heavier. 4c. Make multiple trips to carry equipment.
	1d. EXPOSURE: To biological hazards.	1d. Inspect work area for bees and insects. 1d. Use insect/tick repellent as necessary.
2. Open/close well.	**2a. EXERTION:** Muscle strain.	2a. Use proper lifting techniques; keep back straight, lift with legs and bend knees when reaching to open/close well.
	2b. CAUGHT: Pinch/crush points associated with removing/replacing manholes and working with hand tools.	2b. Wear leather gloves or cut resistant gloves when working with well cover and hand tools. 2b. Use proper tools (ratchet and pry bar for well cover) and inspect before use. 2b. Do not put fingers under well cover.
	2c. CAUGHT: Pinch points associated with placing J-plug back onto PVC pipe.	2c. See 2b. 2c. Keep fingers out of line-of-fire when securing cap.
	2d. EXPOSURE: To potential hazardous vapors.	2d. No open flames/heat sources. 2d. To minimize exposure to vapors, allow well to vent after opening it and before sampling activities begin. 2d. Stand up-wind, if possible, to avoid inhaling vapors.
3. Gauge well.	**3a. CONTACT:** With contamination (e.g. contaminated groundwater).	3a. Wear chemical-resistant disposable gloves (over cut-resistant gloves) and safety glasses when gauging well. 3a. Insert and remove probe slowly to avoid splashing. 3a. Use an absorbent pad to clean probe.
	3b. CONTACT: With traffic.	3b. See 1b.
Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS

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4. Purge and sample well	**4a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors) and/or sample preservatives.	4a. Open and fill sample jars slowly to avoid splashing and contact with preservatives. 4a. Wear cut-resistant gloves and chemical-resistant disposable gloves when sampling. 4a. Fill sample containers over purge container to avoid spilling water onto the ground. 4a. Use an absorbent pad to clean spills. 4a. When using a bailer to purge a well, pull the bailer slowly from the well to avoid splash hazards. 4a. When sampling or purging the water using a bailer, pour out water slowly to reduce the potential for splash hazards with groundwater. 4a. When using a tubing valve always remove the valve slowly after sample collection to release any pressure and avoid pressurized splash hazards. 4a. When collecting a groundwater sample always point sampling apparatus (tubing, bailer, etc.) away from face and body.
	4b. CONTACT: Personal injury from cuts, abrasions, or punctures by glassware or sharp objects.	4b. To avoid spills or breakage, place sample ware on even surface. 4b. Do not over tighten caps on glass sample ware. 4b. Wear chemical-resistant nitrile disposable gloves over cut-resistant (i.e., Kevlar) gloves when sampling and handling glassware (i.e., VOA vials) or when using cutting tools.
	4c. EXERTION: Muscle strain while carrying equipment.	4c. Use proper lifting techniques when handling/moving equipment, bend knees and keep back straight. 4c. Use mechanical assistance or team lifting techniques when equipment is 50 lbs. or heavier. 4c. Make multiple trips to carry equipment.
	4d. CONTACT: With traffic.	4d. See 1b.
	4e. CONTACT: Pinch points with groundwater pump components (i.e., wheel, line, clamps).	4e. Wear leather gloves when working with groundwater pumps. 4e. Never place hands on or near pinch points such as the wheel, clamps or other moving parts during pump operations. 4e. Use the correct mechanisms, such as a pump reel, to lower pump into well. 4e. Never attempt to manually stop any moving part of equipment including hose reels and/or tubing.
	4f. EXERTION: Muscle strain from repetitive motion of bailing and sampling a well.	4f. See 4c. 4f. Include a stretch break when repetitive motions are part of the task.
5. Management of purge water.	**5a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors).	5a. Do not overfill container and pour liquids slowly so that they do not splash. 5a. Properly dispose of used materials/PPE in appropriate container in designated storage area.
	5b. EXERTION: Muscle strain from lifting/carrying and moving containers.	5b. Use proper lifting techniques when lifting / carrying or moving container(s) (see 4c.). 5b. Do not overfill container(s).
6. Decontaminate equipment.	**6a. EXPOSURE/CONTACT:** To contamination (e.g., SPH, contaminated groundwater, vapors).	6a. Work on the upwind side, where possible, of decon area. 6a. Wear chemical-resistant disposable gloves and safety glasses. 6a. Use an absorbent pad to clean spills.
	6b. CAUGHT: Pinch points associated with handling hand tools	6b. See 2b. 6b. Inspect hand tools for sharp edges before decontaminating.

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-015	DATE: 8/6/2018	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)	
GENERIC	**Site Recon**	**Mobilization/Demobilization**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Rebecca Lowy	Staff Assistant Geologist	Brian Hobbs	Corporate Health & Safety Manager
Tally Sodre	OHSM		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION (as needed) ☒ SAFETY SHOES: Steel Toe or composite toe	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest of high-visibility clothing; long sleeve shirt; long pants	☒ GLOVES: Leather, nitrile, and cut resistant (as needed) ☐ OTHER

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Varies

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs

EXCLUSION ZONE (EZ): A 10-foot exclusion zone will be maintained around equipment in use..

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Mobilize/demobilize and establish work area	**1a. FALL:** Slip/trips/falls from obstructions, uneven terrain, weather conditions, heavy loads, and/or poor housekeeping.	1a. Use 3 points-of-contact/ensure secure footing when entering and exiting vehicle. 1a. Inspect walking path for uneven terrain, steep hills, obstructions, and/or weather-related hazards (i.e., ice, snow, and puddles) prior to mobilizing equipment. Use established pathways. Walk on stable/secure ground. 1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping; organize and store equipment neatly in one area at its lowest potential energy. 1a. Wear boots with adequate treads. 1a. Delineate unsafe areas with 42” cones, caution tape and/or flagging.
	1b. CONTACT: Personal injury and/or property damage caused by being struck by Site traffic or equipment used in Site activities.	1b. Observe and maintain the posted speed limits. 1b. When first arriving onsite, park vehicles in designated parking space and/or out of the way locations. Use parking brake on all vehicles and tire chocks on work trucks and trailers. 1b. Check in with Site Manager/Supervisor to ensure coordination with other Site activities and to discuss any special hazards. Ensure that short-service employees (SSE) are identified. 1b. Identify potential traffic sources. 1b. Wear PPE including high visibility clothing or reflective vest. 1b. Use a spotter while moving work vehicles; plan ahead to avoid backing whenever possible. 1b. Maintain a minimum 10’ exclusion zone when vehicles are in motion. When backing up truck rig with an attached trailer use a second spotter if there is tight clearance simultaneously on multiple sides of the equipment or if turning angles limit driver-to-spotter visibility. 1b. Delineate work area with 42” cones, flags, caution tape, and/or other barriers. 1b. Position “Work Area” signs at Site entrances, if possible, or at either side of work area.

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Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
		1b. Position largest vehicle to protect against oncoming traffic. 1b. Face traffic, maintain eye contact with oncoming vehicles, use a spotter, and establish a safe exit route. 1b. Observe potential overhead and ground surface features that may interfere with moving equipment. Clear the path of physical hazards prior to initiating mobilization.
	1c. CAUGHT: Personal injury from pinch points and being in line-of-fire of vehicle and/or equipment.	1c. Make sure driver has engaged parking brake and placed wheel chocks in a position to prevent movement. Be sure that vehicle is parked in front/down gradient (positioned to best block oncoming traffic) of work area. 1c. Wear leather gloves when handling any tools or equipment. Wear cut-resistant gloves (Kevlar or similar) when handling sharp objects/cutting tools/glass. 1c. Keep body parts away from line-of-fire of equipment. 1c. Always carry tools by the handles and/or designated carrier. Ensure sharp-edged tools are sheathed/secure. 1c. Remove any loose jewelry. Avoid wearing loose clothing and/or ensure loose clothing is secure. 1c. Secure all items on the equipment, tighten up any items or features that have potential to shift or break during mobilization.
	1d. OVEREXERTION: Muscle strains while lifting/carrying equipment.	1d. Use body positioning and lifting techniques that avoid muscle strain; keep back straight, lift with legs, turn with whole body, keep load close to body, and never reach with a load. 1d. Ensure that loads are balanced. Use assistance (mechanical or additional person) to carry equipment that is either unwieldy or over 50 lbs.
	1e. EXPOSURE: Personal injury from exposure to biological and environmental hazards.	1e. Inspect area to avoid contact with biological hazards (i.e. poisonous plants, stinging insects, ticks, etc.). 1e. Wear long sleeved clothes treated with Permethrin, apply insect repellant containing DEET to exposed skin, and inspect clothes and skin for ticks during and after work. 1e. Apply sunscreen (SPF 15+) if exposure to sun for 30 minutes or more is expected.
	1f. EXPOSURE: Weather related injuries.	1f. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, nausea, rapid and shallow breathing). Take breaks in cool places and hydrate as needed. 1f. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks in warm areas as needed. 1f. Wear clothing appropriate for weather and temperature conditions (e.g., rain jackets, snow pants, multiple layers). 1f. If lightning is observed, wait 30 minutes in a sheltered location (car is acceptable) before resuming work.
	1g. EXPOSURE: Personal injury from noise hazards.	1g. Wear hearing protection if sound levels exceed 85 dBA (if you must raise your voice for normal conversation).

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JOB SAFETY ANALYSIS	Ctrl. No. GEN-019	DATE: 8/6/2018	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
GENERIC	**Site Recon**	**Site Walk and Inspection**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Sara Barrientos	Staff Geologist	Brian Hobbs	Corporate Health and Safety Manager
		Joe Duminuco	Vice President

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☐ FACE SHIELD ☒ HEARING PROTECTION: ear plugs as necessary ☒ SAFETY SHOES: Steel or composite toed	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: High-visibility vest or high-vis outerwear	☒ GLOVES: Leather/cut-resistant/chemical resistant ☒ OTHER: Tyvek and rubber boots as necessary, dust mask as necessary

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Site map, emergency contact list, documentation of urgent care/hospital routes and / or guide familiar with Site, operating cell phone or walkie-talkie if Site allows.

Commitment to Safety – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

EXCLUSION ZONE (EZ): A minimum 10' exclusion zone will be maintained around equipment.

SITE SECURITY: Prior to site inspection verify appropriate method to address Site Security concerns as it relates to potential criminal activity, homeless population, and/or isolation concerns. Work with the Project Principal and/or Project Manager to address appropriately.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Check in with Site contact.	**1a. CONTACT/EXPOSURE/FALL:** Personal injury caused by lack of site specific hazards.	1a. Inquire about hazards and other activities taking place at the Site. 1a. Inform Site contact of work scope, timeline and location(s). 1a. Discuss emergency evacuation procedures and muster points with Site contact.
2. Traversing the Site	**2a. CONTACT:** Property damage and personal injury caused by obstructions/vehicles or unauthorized personnel at remote Sites.	2a. All equipment must be stowed and secured prior to moving. 2a. Maintain speed limit as posted on-site. 2a. When possible drive on established roadways. 2a. Yield to all pedestrians. 2a. Use pull-through spots or back into parking spots. 2a. Don high visibility clothing/safety vest. If working at remote Site, add orange accessories during hunting season.
	2b. FALL: Uneven terrain and weather conditions. Overgrown shrubs and vines. Equipment in the work zone.	2b. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 2b. When possible, use established pathways and walk on stable, secure ground. 2b. Communicate traversing hazards with others.
	2c. OVEREXERTION: Muscle strain while carrying equipment.	2c. When carrying equipment to/from work area, use proper lifting techniques; keep back straight, lift with legs, keep load close to body, never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Use mechanical assistance or make multiple trips to carry equipment.
	2d. EXPOSURE: Biological hazards – ticks; bees/wasps; poison ivy; insects; (Ticks are most active any time the temperature is above freezing, typically from March to November.)	2d. Inspect area to avoid contact with biological hazards. 2d. Ticks: • Treat outer clothing including pants, shirts, socks, boots and hats the evening before with Permethrin (allowing at least two hours before use). • Apply DEET to exposed skin before travelling to the Site and reapply after two hours. • Check for ticks during and after work. 2d. Bees: • Use bee spray as appropriate to deter/eliminate bees. • Protect exposed skin with insect repellent. 2d. Poison Ivy:

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	2e. EXPOSURE: Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	• Identify areas of poison ivy and spray with weed killer. Don Tyvek and rubber boots while traversing poison ivy areas. • If skin contacts poison ivy, wash skin thoroughly with soap and water. 2e. Wear sunscreen with SPF 15 or greater on exposed skin whenever 30 minutes or more of sun exposure is expected. 2e. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 2e. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 2e. Wear appropriate rain gear as needed. 2e. Take frequent breaks if tired, wet, or cold/hot. Drink water. 2e. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
3. Walking near heavy equipment and machinery.	**3a. CONTACT:** Personal injury from Site and roadway traffic. Personal injury from flying debris **3b. OVEREXERTION:** Personal injury from lifting/moving/rotating equipment. **3c. EXPOSURE:** Hearing damage from noise generating equipment/processes. Inhalation/exposure to hazardous vapors and or dust. **3d. EXPOSURE:** Working in a remote area.	3a. See 2a. 3a. Maintain an exclusion zone of at least 10'-25' feet from all engaged equipment. 3a. Keep body parts out of the line of fire of pinch points. 3a. Wear appropriate PPE always. 3b. See 2c. 3c. Wear hearing protection if >85 dBA. (i.e. noise levels which require you to raise your voice to communicate) 3c. Always wear leather gloves when handling any tools or equipment. 3c. Always wear appropriate PPE based off chemicals present. 3d. Use the "buddy system" whenever possible. If working alone, contact PM upon arrival/departure, as well as during work activities prior to commencing work if applicable. 3d. Always carry a communication (i.e., cell phone, walkie-talkie) or directional (i.e., map, compass, etc.) device when traversing remote areas.
4. Working in adverse weather conditions.	**4a. EXPOSURE:** Heat Stress & Cold Stress. Personal injury from working in inclement weather conditions.	4a. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). Take breaks as needed. 4a. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). Take breaks as needed. 4a. Wear appropriate rain gear as needed. 4a. Take frequent breaks if tired, wet, or cold/hot. Drink water. 4a. If lightning is observed, wait 30 minutes after last thunder boom/lightning bolt in a sheltered location (car acceptable) before starting work again.
5. Departing Site.	**5a. EXPOSURE:** Exposure to unnecessary hazards should personnel believe Roux is on-Site during an emergency and conduct a search.	5a. Sign out or notify Site contact and Roux Project Manager of your departure.

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JOB SAFETYANALYSIS Ctrl. No. GEN-020	DATE: 8/6/2018	☐NEW ☒REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
GENERIC	**Gauging & Sampling**	**Soil Sampling**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
MaryBeth Lyons	Project Scientist	Brian Hobbs	Corporate Health and Safety Manager

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather, Nitrile and cut resistant
☒ HARD HAT	☐ FACE SHIELD:	☐ SUPPLIED RESPIRATOR	
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION: (as needed)	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ OTHER: Insect repellant, sunscreen (as needed)
☒ SAFETY GLASSES	☒ SAFETY SHOES: Composite-toe or steel toe boots		
☒ FLAME RESISTANT CLOTHING (as needed)			

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Recommended Equipment: 42" traffic cones, caution tape, trowel

COMMITMENT TO SAFETY- All personnel onsite will actively participate in hazard recognition and mitigation throughout the day by verbalizing SPSAs.

EXCLUSION ZONE (EZ): A 10-foot exclusion zone will be maintained around moving equipment, if present.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Secure location	**1a. CONTACT:** Personnel and vehicular traffic may enter the work area.	1a. If in an area with foot or vehicle traffic, delineate the work area with 42" traffic cones and/or caution tape to prevent exposure to traffic and inform others of work activity. 1a. Wear reflective vest and/or high visibility clothing. 1a. Face the direction of any vehicular traffic. Position vehicle to protect worker from traffic. 1a. Communicate work activity with adjacent work areas.
	1b. FALL: Tripping/falling due to uneven terrain or entry/exit from excavations.	1b. Inspect pathways and work area for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions. 1b. Use established pathways and walk on stable, secure ground. 1b. Stage equipment and tools in a convenient, stable, and orderly manner. Store equipment at lowest potential energy. 1b. Roux employees should stay 5 feet from in-progress excavations and trenches. Should entry to an excavation be required (when stabilization is complete), ladders must be employed for steep embankments, excavations, pits, and trenches.
	1c. EXPOSURE: Exposure to sun and excessive heat, possibly causing sunburn, heat exhaustion or heat stroke. Exposure to cold temperatures possibly causing cold stress. Skin burn as a result of fire, if applicable. Exposure to explosive vapors due to tank farm operations. Exposure to airborne dust due to high wind speeds. Biological hazards - ticks, bees/wasps, poison ivy, thorns, insects, etc.	1c. Wear sunscreen with an SPF 15 or greater whenever 30 minutes or more of exposure is expected. 1c. Use a tent to shade the work area from direct sunlight particularly when warm temperatures are expected. 1c. Be aware of the location of all Site personnel. 1c. Watch for heat stress symptoms (muscle cramping, exhaustion, dizziness, rapid and shallow breathing). 1c. Watch for cold stress symptoms (severe shivering, slowing of body movement, weakness, stumbling or inability to walk, collapse). 1c. Take breaks for rest and water as necessary. Move to an area that is well shaded or a climate controlled area (i.e., car, site trailer, etc.). 1c. No open flames/heat sources. 1c. Flame retardant clothing must be worn when specified by Site policy. 1c. Cell phones should be disabled when specified by Site policy. 1c. Pre-treat field clothing with Permethrin prior to site visit to kill ticks and insects. 1c. Wear long sleeved shirts and tuck in (or tape) pant legs into socks or boots to prevent ticks from reaching skin. 1c. Spray insect repellant containing DEET on exposed skin when working in overgrown areas of the Site. 1c. Inspect area to avoid contact with biological hazards. 1c. Wear cut-resistant gloves when handling branches, shrubs, etc. that may lie within the walking path. 1c. Wear spoggles if the average wind speeds are above 15 mph. 1c. Personnel shall examine themselves and co-worker's outer clothing for ticks periodically when onsite. 1c. If skin comes in contact with poison ivy, wash skin thoroughly with soap and water. If rash persists after washing, immediately notify your supervisor, the OM and OHSM for possible consultation with a physician at an approved Occupational Health Clinic.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
2. Collect Soil Sample	**2a. CONTACT:** Personal injury from pinch points, cuts, and abrasions from sampling equipment tools, and material within soil sample. Personal injury from contact with moving equipment while sampling. Personal injury from contact with glass sample jars.	2a. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant (nitrile) disposable gloves when handling soil samples and sampling jars. 2a. Where possible, use trowel or equivalent tool to avoid contact with soil. 2a. If sampling from bucket of heavy equipment, ensure all equipment is off and operator utilizes the “show me your hands” policy. 2a. See 1a.
	2b. EXPOSURE: Exposure to contamination (impacted soil) and/or lab preservatives.	2b. Wear chemical-resistant (nitrile) disposable gloves over cut resistant gloves to protect hands when handling samples; use containment material or plastic sheeting to protect surrounding areas. 2b. Wear safety glasses to protect eyes from dust or air-borne contaminants that may results from disturbing the soil. 2b. Where possible, remain upgradient from sample location if collecting soil sample from stockpile, drill rig, etc. to avoid breathing contaminant vapors, if they are present. 2b. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil on to the ground. 2b. Open sample jars slowly and fill carefully to avoid contact with preservatives.
	2c. EXERTION: Exertion due to repetitive motion and ergonomics.	2c. Utilize a table or raised surface for soil sampling if multiple soil samples are going to be taken to minimize repetitive bending motion.
3. Decontaminate equipment	**3a. EXPOSURE/CONTACT:** Contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated vapors and/or soil). **3b. EXPOSURE:** Chemicals in cleaning solution including ammonia.	3a. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3a. Use an absorbent pad to clean spills. 3a. Properly dispose of used materials/PPE in provided drums in designated drum storage area. 3a. Remain upwind of sample and avoid breathing contaminant vapors, if they are present. 3b. Wear chemical-resistant (nitrile) disposable gloves and safety glasses. 3b. Work on the upwind side of decontamination area. 3b. Use an absorbent pad to clean spills. 3b. Properly dispose of used materials/PPE in provided drums in designated drum storage area. Ensure that all drums are properly labeled and secured.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

APPENDIX E

Roux COVID-19 Interim Health and Safety Guidance

COVID-19 INTERIM HEALTH AND SAFETY GUIDANCE

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**03/2020**
REVISION DATE	:	**10/08/2020**
REVISION NUMBER	:	**5**

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APPENDICES

1. PURPOSE

This guidance has been implemented to establish work practices, administrative procedures, and engineering controls to minimize potential exposure to SARS-CoV-2, the virus that causes COVID-19. The following guidance has been developed based on local, state and federal recommendations/requirements regarding COVID-19. The purpose of this document is to supplement existing site-specific Health and Safety Plans (HASPs) and provide interim health and safety guidance to minimize potential exposure to SARS-CoV-2. Should additional scientific information or regulatory information change, this document shall be updated accordingly.

2. SCOPE AND APPLICABILITY

This guidance covers all Roux employees and the subcontractors that Roux oversees. Site specific HASPs shall be developed to incorporate elements of mitigative measures against COVID-19 exposure. If work cannot be carried out in compliance with this guidance, the project shall be further evaluated by the Project Principal (PP), Office Manager (OM), and Corporate Health and Safety Manager (CHSM) prior to work authorization.

Roux subcontractors are required to review, comply with, and implement Roux's COVID-19 Interim Health and Safety Guidance while on site. Subcontractors may implement additional preventative measures as they see fit. All work shall be conducted in a manner consistent with the federal, state, and local guidance as it relates to COVID-19.

3. BACKGROUND

What is COVID-19?

COVID-19 is a respiratory illness that can spread from person to person. The virus that causes COVID-19 is a novel coronavirus that was first identified during an investigation into an outbreak in Wuhan, China. This virus continues to spread internationally and within the United States. There is currently no vaccine to prevent COVID-19.

What are the symptoms of COVID-19?

Reported illnesses have ranged from mild symptoms to severe illness and death for confirmed COVID-19 cases. Symptoms may appear 2 to 14 days following exposure to the virus. People with these symptoms or combinations of symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list is not all possible symptoms. The CDC will continue to update this list as they learn more about the virus. For an updated symptom list please reference the following link for CDC Symptoms of Coronavirus.

If someone develops emergency warning signs for COVID-19, they should be instructed to get medical attention immediately. Emergency warning signs can include those listed below; however, this list is not all inclusive. Please consult your medical provider for any other symptoms that are severe or concerning.

- Trouble breathing
- Persistent pain or pressure in the chest
- New confusion
- Inability to wake or stay awake
- Bluish lips or face

How does COVID-19 spread?[1]

SARS-COV-2 spreads very easily from person to person during close contact.

Individuals who are within close contact (within 6 feet) of a person with COVID-19 or have direct contact with that person are at greatest risk of infection.

- When people with COVID-19 cough, sneeze, sing, talk, or breathe they produce respiratory droplets. These droplets can range in size from larger droplets (some of which are visible) to smaller droplets. Small droplets can also form particles when they dry very quickly in the airstream.
- Infections occur mainly through exposure to respiratory droplets when a person is in close contact with someone who has COVID-19.
- Respiratory droplets cause infection when they are inhaled or deposited on mucous membranes, such as those that line the inside of the nose and mouth.
- As the respiratory droplets travel further from the person with COVID-19, the concentration of these droplets decreases. Larger droplets fall out of the air due to gravity. Smaller droplets and particles spread apart in the air.
- With passing time, the amount of infectious virus in respiratory droplets also decreases.

SARS-CoV-2 can sometimes spread by airborne transmission under certain circumstances.

Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space. This kind of spread is referred to as **airborne transmission** and is an important way that infections like tuberculosis, measles, and chicken pox are spread.

- There is evidence that under certain conditions, people with COVID-19 seem to have infected others who were more than 6 feet away. These transmissions occurred within enclosed spaces that had inadequate ventilation. Sometimes the infected person was breathing heavily, for example while singing or exercising.
    - Under these circumstances, scientists believe the amount of infectious smaller droplet and particles produced by the people with COVID-19 became concentrated enough to spread the virus to other people. The people who were infected were in the same space during the same time or shortly after the person with COVID-19 had left.
- Available data indicate it is much more common for the virus that causes COVID-19 to spread through close contact with a person who has COVID-19 than through airborne transmission.[2]

Spread from contact with contaminated surfaces or objects is less common.

Respiratory droplets can also land on surfaces and objects. It is possible that a person could get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or eyes. Spread from touching surfaces is not thought to be a common way that COVID-19 spreads.

4. TRAINING REQUIREMENTS

All employees with potential exposure to COVID-19 shall be provided training that incorporates COVID-19 exposure mitigation strategies, such as implementation of proper social distancing, personal hygiene (e.g., handwashing), as well as disinfection procedures, as outlined by CDC guidelines.

5. EXPOSURE RISK POTENTIAL

Worker risk of occupational exposure to COVID-19 can vary from very high, high, medium, or lower (caution) risk. This level of exposure is dependent on several factors, which can include industry type; need for contact within

1 How COVID-19 Spreads https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html#edn1

2 Scientific Brief: SARS-CoV-2 and Potential Airborne Transmission | CDC https://www.cdc.gov/coronavirus/2019-ncov/more/scientific-brief-sars-cov-2.html

6 feet of people known to be or suspected of being infected with COVID-19; density of work environment; and industrial setting (i.e., healthcare building, occupied interior work area, minimal ventilation).

Provided below is background risk level information taken from the U.S. Department of Labor Occupational Safety and Health Administration Guidance on preparing workplaces for COVID-19. Risk evaluations for each project shall be conducted by the PP and OM in consultation with the CHSM to ensure Roux employees and subcontractors remain within the lower exposure (caution) category. If it is identified there is a medium exposure risk or higher, further evaluation and mitigative measures shall be evaluated to reduce overall exposure risk prior to work authorization.

Very High Exposure Risk (Activities not conducted by Roux)

Very high exposure risk includes occupations/work activities with high potential for exposure to known or suspected sources of COVID-19 during specific medical, postmortem, or laboratory procedures. This can include but is not limited to:

- Healthcare workers (e.g., doctors, nurses, dentists, paramedics, emergency medical technicians) performing aerosol-generating procedures (e.g., intubation, cough induction procedures, bronchoscopies, some dental procedures and exams, or invasive specimen collection) on known or suspected COVID-19 patients.
- Healthcare or laboratory personnel collecting or handling specimens from known or suspected COVID-19 patients (e.g., manipulating cultures from known or suspected COVID-19 patients).
- Morgue workers performing autopsies, which generally involve aerosol-generating procedures on the bodies of people who are known to have, or suspected of having, COVID-19 at the time of their death.

High Exposure Risk (Activities not conducted by Roux)

High exposure risk occupations/work activities include exposure to known or suspected COVID-19 positive individuals. This can include but not limited to:

- Healthcare delivery and support staff (e.g., doctors, nurses, and other hospital staff who must enter patients' rooms) exposed to known or suspected COVID-19 patients. (Note: when such workers perform aerosol-generating procedures, their exposure risk level becomes very high.)
- Medical transport workers (e.g., ambulance vehicle operators) moving known or suspected COVID-19 patients in enclosed vehicles.
- Mortuary workers involved in preparing (e.g., for burial or cremation) the bodies of people who are known to have, or suspected of having, COVID-19 at the time of their death.

Medium Exposure Risk

Medium exposure risk occupations/work activities include those that require frequent and/or close contact with (i.e., within 6 feet of) people who may be infected with COVID-19, but who are not known or suspected to be COVID-19 positive. For most of our worksites, it is assumed there is on-going community transmission for COVID-19. Therefore, workers who work at sites and may have contact with the general public, other contractors, high-population-density work environments (i.e., greater than 10 people) fall within medium exposure risk group category. This can include, but is not limited to, sampling events that require two or more workers to collect and log samples in close contact or work occurring in an interior space with limited ventilation and several workers present.

Lower Exposure Risk (Caution)

Lower exposure risk (caution) occupations/work activities are those that do not require contact with people known to be or suspected of being COVID-19 positive. During these activities, there is limited contact (i.e., within 6 feet of) the general public or other workers. Workers in this category have minimal occupational contact with the public and other coworkers. This can include construction oversight that does not require close contact as well as sampling or gauging events performed by one worker.

6. COVID-19 HEALTH SCREENING

6.1 Roux Employees

All Roux employees are required to self-attest to a COVID-19 Daily Health Questionnaire which is to be completed at home through a mobile application on scheduled workdays. The purpose of this program is to ensure business continuity as well as mitigate any potential exposure to our employees and others if it is determined employees are at-risk for contracting COVID-19. As part of this self-attestation, all employees are required to take their temperatures daily at home to confirm they do not have a fever (≥ 100.4). Employees who answer yes to any of these questions are instructed to contact their Office Manager and/or Department Head immediately and should not enter the office or go to a field site. Information shall be used to determine appropriate internal response in consultation with the Human Resources Director and Corporate Health and Safety Manager.

Below, you will find our COVID-19 Daily Health Questionnaire that all Roux employees are required to self-attest to **every scheduled workday by 9:30 am.** If employees do not promptly fill out the questionnaire by the time listed above, there will be additional follow up by HR, H&S, and/or OMs.

According to the U.S. Centers for Disease Control and Prevention & the World Health Organization, COVID-19 Symptoms include:

- *Fever (≥100. 4°F) or chills*
- *Cough*
- *Shortness of breath or difficulty breathing*
- *Fatigue*
- *Muscle or body aches*
- *Headache*
- *New loss of taste or smell*
- *Sore throat*
- *Congestion or runny nose*
- *Nausea or vomiting*
- *Diarrhea*

Have you experienced any of the COVID-19 related symptoms noted above in the last 14 days? Please Note: We do not expect employees to answer "yes" to the symptoms question if these are symptoms you normally experience due to another condition or medication.

- *Yes*
- *No*

Have you been in close contact with someone who is suspected or confirmed to have COVID-19 or who is under investigation for COVID-19 within the last 14 days? *Close contact is defined as someone who was within 6 feet of an infected person for at least 15 minutes or coming into direct contact with secretions (e.g., sharing utensils, being coughed on) from an infected person.*

- *Yes*
- *No*

Have you traveled outside of the country, been on a cruise ship and/or traveled to areas within the United States which have state mandated travel restrictions in the last 14 days?

- *Yes*
- *No*

Have you tested positive for COVID-19 within the last 14 days?

- *Yes*
- *No*

6.2 Subcontractors

In an effort to mitigate the risk of transmission of COVID-19, Subcontractors who shall perform work on-site are required to attest to the fitness of their work crew on a daily basis. This requires each worker to self-assess by asking themselves the four questions listed in the section above and also contained within the Roux Subcontractor Work Crew COVID-19 Daily Health Attestation. If any crew member answers "yes" to any of the questions, that worker is not to report to the field site and should seek proper medical advice, in accordance with local, state and federal guidelines.

On a daily basis, the subcontractor supervisor must provide the Subcontractor Work Crew COVID-19 Daily Health Attestation complete with the names of all work crew fit to be on the site for that day (i.e., who have answered "no" to all questions on the self-assessment) to Roux's Project Manager. The Subcontractor must notify Roux if there have been any "yes" responses daily. Subcontractors shall not be required to provide the name or any other personal information of any employee who has answered "yes" to any of the self-assessment questions, however, the subcontractor should provide the date and times that employee has been onsite in the prior 14 days. Records shall be maintained within the project files indicating health screening has been performed, records shall be retained for not less than 14 days following the date of submission. The Roux Subcontractor Work Crew COVID-19 Daily Health Check Attestation can be found within Appendix A.

7. SELF-ISOLATION & QUARANTINE

7.1 Self-Isolation

What if I am asked to self-isolate at home and when can I return from home isolation?

Depending on the situation, if you are COVID-19 positive or suspected to have COVID-19, employees may be required to self-isolate in their homes as per CDC or local health department guidelines. As per CDC guidance, return from isolation has been broken out into two categories. The first includes confirmed or suspected COVID-19 individuals exhibiting symptoms and the second includes those who have not had COVID-19 symptoms (i.e., asymptomatic) but tested positive and are under self-isolation. Both categories, along with strategies to return from home isolation, are outlined below.

People with COVID-19 under home isolation:

Accumulating evidence supports ending isolation and precautions for persons with COVID-19 using a symptom-based strategy. Specifically, researchers have reported that people with mild to moderate COVID-19 remain infectious no longer than 10 days after their symptoms began, and those with more severe illness or those who are severely immunocompromised remain infectious no longer than 20 days after their symptoms began. Therefore, CDC has updated the recommendations for discontinuing home isolation as follows:

1. **Persons with COVID-19 who have symptoms** and were directed to care for themselves at home may discontinue isolation under the following conditions:
   a. At least 10 days* have passed since symptom onset;
   b. at least 24 hours have passed since resolution of fever without the use of fever-reducing medications; and
   c. other symptoms have improved.

* *A limited number of persons with severe illness may produce replication-competent virus beyond 10 days, which may warrant extending the duration of isolation for up to 20 days after symptom onset. Consultation with your healthcare provider will be warranted in such cases of severe illness.*

2. **Persons infected with SARS-CoV-2 who never develop COVID-19 symptoms** may discontinue isolation and other precautions 10 days after the date of their first positive RT-PCR test for SARS-CoV-2 RNA.

7.2 Quarantine

Employees may be required to self-quarantine due to potential exposure with a suspected and/or confirmed COVID-19 positive individual as well as recent travel as per local/state guidelines. People in quarantine should stay home, separate themselves from others, monitor their health, and follow directions from their state or local health department. If Roux employees meet the criteria to self-quarantine based on potential exposure/travel, they are required to self-quarantine for 14 days regardless of local/state exemptions. Even if you test negative for COVID-19 or feel healthy, symptoms may still appear 2 to 14 days after exposure to the virus.

7.2.1 Close Contact Quarantine

Employees who have come into close contact with someone who has COVID-19 are required to self-quarantine for 14 days following their last contact with the COVID-19 positive person. Close contact can be defined as being within 6 feet of someone who has COVID-19 for a total of 15 minutes or more, providing care at home to someone who is sick with COVID-19, having direct physical contact with COVID-19 individual, sharing utensils with COVID-19 individual, and being sneezed/coughed on by someone with COVID-19.

7.2.2 Travel Related Quarantine

All travel out of state must be communicated with the OM and/or Department Head prior to departure. Please note, some state/local entities require submissions of traveler health forms. It is expected all Roux employees will comply with such state/local travel requirements. All employees returning from international and/or cruise ship travel must quarantine for 14 days from the time they have returned home.

Personal Travel

Employees who will be traveling out of state are responsible for checking the local/state quarantine guidance for the regions they are traveling from and to in advance of travel and notifying their OM prior to traveling in order to evaluate the impact on the business. Based on state/local guidelines you may be required to quarantine for 14 days from the time you have returned home.

Work-Related Travel

The Project Team (i.e., PM & PP) and field staff who will be traveling are responsible for checking the local/state quarantine guidance for the regions they are traveling from and to in advance of travel and notifying their OM prior to traveling in order to evaluate the impact to the business. Additionally, health and safety considerations shall be reviewed by the OM in consultation with the CHSM regarding logistics and overnight accommodations. Based on state/local guidelines, you may be required to quarantine for 14 days from the time you have returned home.

8. WORKPLACE CONTROLS

During the project planning phase, worksite evaluations shall be carried out by the PP and OM in consultation with the CHSM to determine risk exposure levels for work activities. If it is determined there is a medium exposure risk level or higher, additional workplace controls shall be evaluated and implemented as required in addition to the basic infection prevention measures outlined below in Section 8. Additional workplace controls can include engineering controls (i.e., ventilation, physical barriers), administrative controls (i.e., minimizing contact between workers, rotating shifts, site specific training), and additional personal protective equipment (i.e., respiratory protection). If exposure risk cannot be mitigated, potential project postponement may be necessary at the discretion of the OM in consultation with the CHSM.

A Job Safety Analysis (JSA) has been developed and is provided in Appendix B, which summarizes and applies concepts within this guidance including the infection prevention measures listed below. This JSA shall be required for all field work in areas where there is community-based transmission of COVID-19.

9. INFECTION PREVENTION MEASURES

The following is basic infection prevention and personal hygiene practices which shall be implemented for all Roux field activities as well as in the office setting.

- ***Personal Hygiene***
  - Wash your hands often with soap and water for at least 20 seconds.
    - If soap and water are not available, use an alcohol-based sanitizer that contains at least 60% ethanol or 70% isopropanol.
    - Key times to wash your hands include after blowing your nose, coughing or sneezing, after using the restroom, and before eating or preparing food.
  - Do not touch your eyes, face, nose and mouth with unwashed hands.
  - Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow.
  - Throw potentially contaminated items (e.g., used tissues) in the trash.
- ***Avoid Close Contact/Secondary Contact with People and Potentially Contaminated Surfaces***
  - Apply appropriate social distance (6+ feet).
  - Stop handshaking—use and utilize other noncontact methods for greeting.
  - Do not work in areas with limited ventilation with other Site workers (e.g., small work trailer which lacks HVAC system). If working in a trailer, the following conditions must be met: limited to 4 workers, large enough to have the ability to apply social distance and has open windows and/or operational HVAC to ensure proper ventilation of the workspace.
  - Morning tailgate/safety meetings shall occur outside and not within work trailers.
    - Do not require employees or subcontractors to sign in using the same tailgate form. The Site Supervisor/SHSO should record names of those in attendance on the form.
    - If the Site has more than 10 workers, separate tailgate meetings should be performed in smaller groups.
  - Do not share equipment or other items with co-workers and subcontractors unless wearing appropriate PPE (e.g., nitrile gloves). Assume equipment and other surfaces are potentially contaminated and remove gloves aseptically.
  - If receiving labware or other equipment disinfect to the extent feasible. If there are concerns for contaminating labware please wear appropriate PPE (e.g., gloves) to minimize contact.
  - Contact your lab/equipment vendor to confirm equipment is properly disinfected prior to being shipped.
  - Do not carpool with others (e.g., clients, coworkers).
  - For company owned vehicles limit sharing of vehicles with coworkers. If unable to limit sharing of company owned vehicles, properly disinfect vehicle before driving with a focus on commonly touched surfaces (e.g., steering wheels, shifters, buttons, etc.).
  - Use caution when using public restrooms, portable toilets. Use paper towel as a barrier when touching door handles and faucets.
- ***Cleaning and Disinfecting***
  - Clean and disinfect frequently touched surfaces daily. Commonly touched items can include but are not limited to tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, sinks, and field equipment (i.e., photo-ionization detector, field equipment).
  - **Hard (Non-porous) Surfaces**
    - If surfaces are dirty, they should be cleaned with a detergent/soap and water prior to disinfection.

- Refer to the manufacturer's instructions to ensure safe and effective use of the product and wear appropriate personal protective equipment (e.g., gloves, safety glasses, face shield).
- Many products require:
  - Keeping surface wet for a period of time (i.e., contact time)
    - Refer to manufacturer's instructions outlining adequate contact time.
  - Precautions such as wearing gloves and making sure you have good ventilation during use of the product.
- Disposable gloves should be removed aseptically and discarded after cleaning. Wash hands immediately following removal of gloves. Refer to Appendix C for how to remove gloves aseptically.
- For disinfection, diluted household bleach solutions, alcohol solutions with at least 70% alcohol, and most common EPA-registered household disinfectants should be effective.
  - Diluted household bleach solutions can be used if appropriate for the surface. Follow manufacturer's instructions for application and proper ventilation. Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. Unexpired household bleach will be effective against coronaviruses when properly diluted. Leave the solution on the surface for at least 1 minute.
    - Prepare a bleach solution by mixing:
      - 5 tablespoons (1/3 cup) bleach per gallon of water or
      - 4 teaspoons bleach per quart of water
- Products with EPA-approved emerging viral pathogen claims are expected to be effective against COVID-19. Follow the manufacturer's instructions for all cleaning and disinfecting products (e.g., concentration, application method and contact time, etc.).

- **Soft (Porous) Surfaces**
  - For soft (porous) surfaces, remove visible contamination if present and clean with appropriate cleaners indicated for use on the surfaces. After cleaning:
    - Launder items as appropriate in accordance with the manufacturer's instructions. If possible, launder using the warmest appropriate water setting for the item and dry items completely; or
    - Use products with the EPA-approved emerging viral pathogens that claim they are suitable for porous surfaces.
- **Electronics**
  - For electronics such as tablets, touch screens, keyboards, remote controls, etc. remove visible contamination if present.
    - Follow the manufacturer's instructions for all cleaning and disinfection products.
    - Consider use of wipeable covers for electronics.
    - If no manufacturer guidance is available, consider the use of alcohol-based wipes or sprays containing at least 70% alcohol to disinfect touch screens. Dry surfaces thoroughly to avoid pooling of liquids.
- ***Linens, Clothing, and Other Items that Go in the Laundry***
  - Although it is unlikely field clothing would become potentially contaminated with COVID-19, it is recommended that field staff regularly launder field clothing following any field event upon returning home.
  - In order to minimize the possibility of dispersing the virus from potentially contaminated clothing, do not shake dirty laundry.
  - Wash items as appropriate in accordance with the manufacturer's instructions. If possible, launder items using the warmest appropriate water setting for the items and dry items completely.
  - Clean and disinfect hampers or other containers used for transporting laundry according to guidance listed above.

10. CLOTH FACE COVERINGS

The CDC recommends the use of cloth face coverings in public settings where other social distancing measures are difficult to maintain, such as grocery stores and pharmacies, and especially in areas of significant community-based transmission. This recommendation is based on recent studies and an understanding that a significant portion of asymptomatic, as well as pre-symptomatic, individuals can shed the virus to others before showing symptoms. Studies indicate that COVID-19 can spread among people interacting in close proximity through speaking, coughing, or sneezing. The purpose of the cloth covering is NOT to provide protection to the wearer, but to protect the wearer from unknowingly infecting others if they are asymptomatic/pre-symptomatic. The use of cloth face coverings is to supplement and NOT replace the existing practices outlined above.

Based on existing studies and on-going recommendations and/or requirements from federal, state, and local entities, Roux is recommending the use of cloth face coverings, when appropriate. Appropriate use is defined when local authorities or clients require the use of cloth face coverings in conjunction with established social distancing, or if an employee elects to use a cloth covering on their own accord. Roux will provide cloth face coverings that shall meet the basic requirements outlined by the CDC guidance.

Cloth Face Coverings should:

- Fit snugly but comfortably against the side of the face;
- Be secured with ties or ear loops, when possible;
- May include multiple layers of fabric;
- Allow for breathing without restriction; and
- Be able to be laundered and machine dried with no damage or change to shape.

When donning and doffing the cloth face covering, individuals should avoid touching their eyes, nose, and mouth. Following removal of the cloth face covering, employees should wash their hands immediately using the guidelines described in Section 8 above. Cloth face coverings should be routinely washed depending on the frequency of use.

The use of existing cloth covering products/materials, such as a scarf, neck gaiter, or bandana, is deemed acceptable by the CDC. Note, the cloth face coverings recommended are not surgical masks or N-95 respirators. Those are critical supplies that must continue to be reserved for healthcare workers and other medical first responders, as recommended by current CDC guidance. Should there be a requirement for workers to be in respiratory protection (e.g., full-face respirator w/cartridges, P100, N95 respirators), it shall be addressed during the project pre-planning phase, which includes discussions with the PP and OM in consultation with CHSM.

11. HOTEL SELECTION PROCESS AND OVERNIGHT/REMOTE WORK

Hotel Selection

Due to the current COVID-19 situation, Roux is recommending overnight travel be limited to the extent possible. If there is a project requiring the overnight stay at a hotel, accommodations shall be made only after the hotel and hotel's location have been vetted in accordance with Roux's established guidance as defined below. The Project Team, which includes the Project Manager (PM) and PP along with the OM, in consultation with the CHSM, shall verify the hotel has appropriate protocols in place to limit the potential exposure and spread of COVID- 19 through proper cleaning and disinfection practices. Discussions with the hotel shall include, but are not limited to, measures taken to keep guests safe during their stay, guest room sanitization schedule, training of staff regarding disinfecting protocols using EPA-approved disinfectants, hotel staff fitness for duty requirements, etc. Some example questions are listed below. Following the initial hotel assessment by the Project Team, the OM and the CHSM shall review the hotel assessment findings prior to the CHSM's authorization that the hotel may be used by any Roux employees.

Sample Questions for Evaluating Hotels

1. Is there an established COVID-19 guidance/policy your location is following?
2. What additional measures are being implemented to keep workers and customers safe?; (e.g. signs/placards, social-distancing/mask reminders)
3. Is there a guest room sanitization schedule?
4. Have staff been trained on properly cleaning/disinfecting areas?
5. What types of disinfectants are in use at your location?
6. How are you evaluating staff fitness for duty? (e.g., temperature checks, not reporting to work when sick, etc.)

Employees staying overnight should abide by the following guidance:

- Ensure you properly disinfect your room upon arrival. This should include a wipe down of all commonly touched surfaces with an approved disinfectant. Use appropriate PPE (e.g., nitrile gloves) when disinfecting surfaces.
- Place the "Do Not Disturb" placard on the room while away and consider limiting hotel housekeeping service to the extent feasible (e.g., not having the room cleaned each day) to minimize potential secondary contact with others.
- Do not spend any more time in hotel common areas (i.e., lobby, hallways, etc.) than is necessary.
- Follow proper Infection Prevention Measures found within Section 8 above.
- Have meals in your hotel room after disinfecting outer package surfaces, as outlined in Section 8 above. Do not eat in public spaces or restaurants.
- If the hotel has a restaurant or café, do not have your meal in a common area; instead order food to be picked up or delivered to your room. If delivered, opt for contactless delivery (left outside the door, delivery person knocks and leaves). Always use your own pen if you need to sign something.
- Employees may also pick up food from takeout locations, order groceries or food for delivery to the hotel. Call local restaurants to order food for delivery (call the hotel lobby for recommendations) or use food ordering apps. Some apps have options for contactless delivery.

12. TRANSPORTATION-RENTAL CARS AND ROUX-OWNED VEHICLES

Rental Cars

Due to the current COVID-19 situation, Roux recommends rental car usage be limited to the extent possible. If there is a project requiring the use of a rental car (e.g. truck/van), accommodations shall be made only after the rental car company and their store's location have been vetted in accordance with Roux's established guidance, as defined below. The Project Team (PM and PP) and OM in consultation with the CHSM shall verify the rental company where you are picking up your vehicle has appropriate protocols in place to limit the potential exposure and spread of COVID- 19 through proper cleaning and disinfection practices. Discussions with the rental car company shall include, but are not limited to, measures to be taken to keep customers safe during pickup/drop-off, rental car disinfection protocols, training of staff regarding disinfecting protocols using EPA-approved disinfectants, rental car company staff fitness for duty requirements, etc. Some example questions are listed below. Following the initial rental car company store assessment by the Project Team, the OM and the CHSM shall review the rental car company assessment findings prior to the CHSM's authorization that the rental car company store may be used by any Roux employees.

Sample Questions for Evaluating Rental Car Companies

1. Is there an established COVID-19 guidance your location is following?
2. What additional measures are being implemented to keep workers and customers safe?
3. Is there a car sanitization schedule?

4. Have staff been trained on properly cleaning/disinfecting vehicles?
5. What types of disinfections are in use at your location?
6. How are you evaluating staff fitness for duty? (e.g., temperature checks, not reporting to work when sick, etc.)

Upon vehicle pickup, employees shall don nitrile gloves and safety glasses and clean/disinfect all high-touch surfaces (steering wheel, knobs, door handles, turn signals, radio, etc.) by wiping thoroughly with approved disinfectants (following manufacturer's instructions). Aseptically remove gloves and dispose of them along with rags/wipes, appropriately. Wash hands or use hand sanitizer immediately after each episode of cleaning. Due to social distancing requirements, personnel shall not carpool to destinations.

Roux-Owned Vehicles

Due to the current COVID-19 situation, Roux-owned vehicles should be dedicated to individual employees to the extent feasible, and if authorized by the OM. In the case this cannot be accommodated, employees shall don nitrile gloves and safety glasses, and clean/disinfect all high-touch surfaces (steering wheel, knobs, door handles, turn signals, radio, etc.) by wiping thoroughly with approved disinfectants (following manufacturer's instructions). This cleaning and disinfection shall occur before and after each use of the vehicle. Aseptically remove gloves and dispose of them along with rags/wipes, appropriately. Wash hands or use hand sanitizer immediately after each episode of cleaning. Due to social distancing requirements, personnel shall not carpool to destinations.

APPENDIX A

Roux Subcontractor Work Crew

COVID-19 Daily Health Screening Questionnaire

Subcontractor Work Crew
COVID-19 Daily Health Attestation

Date:
Company Name:
Supervisor Name: Signature:
Project Name:
Site Address:
Number of Workers on site:

Prior to entry onto a field site, the following questions shall be asked by the Subcontractor Supervisor to their work crew.

It is preferred this questionnaire is completed for each individual prior to their arrival at the field site. If the answer to any of these questions is YES, the worker is not to report to the field site and seek proper medical advice, in accordance with CDC Guidelines.

The Subcontractor Supervisor must provide this form on a daily basis to the Roux primary contact for the project and notify Roux of any YES responses.

1. Have you experienced any signs/symptoms of COVID-19 such as fever (≥100.4ºF), cough, shortness of breath, chills, fatigue, muscle/body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea/vomiting or diarrhea in the last 14 days?

2. Have you been in close contact* with someone who is suspected or confirmed to have COVID-19 or who is under investigation for COVID-19 within the last 14 days?

*Close contact is defined as someone who was within 6 feet of an infected person for at least 15 minutes or coming into direct contact with secretions (e.g. sharing utensils, being coughed on) from an infected person.

3. Have you traveled outside of the country, been on a cruise ship and/or traveled to areas within the United States which have state mandated travel restrictions in the last 14 days?

4. Have you tested positive for COVID-19 within the last 14 days?

Please list the crew member's names on site for the day.

1.	9.
2.	10.
3.	11.
4.	12.
5.	13.
6.	14.
7.	15.
8.	16.

APPENDIX B

Job Safety Analysis-Working in Areas Affected by COVID-19

JOB SAFETY ANALYSIS	Ctrl. No. CVD-19	DATE: 04/16/2020	☒ NEW ☐ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
Generic	**Fieldwork**	**Working in Areas Affected by Coronavirus**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Kristina DeLuca	Health and Safety Specialist	Brian Hobbs	CHSM

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES – Leather/cut-resistant in field and nitrile as needed
☒ HARD HAT – In field	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING – High visibility vest in field	☐ OTHER
☒ SAFETY GLASSES – In field	☒ SAFETY SHOES – Steel/composite toe in fie		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Cloth face covering, nitrile gloves, hand soap, water source, hand sanitizer, disinfectant spray and disinfectant wipes.

Commitment to Safety – All personnel onsite will actively participate in SPSA performance by verbalizing SPSAs throughout the day.

SOCIAL DISTANCING: Maintain 6' of distance between yourself and all other people at all times. If you do not believe the scope of work can be conducted while maintaining this distance, contact your Project Manager immediately.

Assess [1]JOB STEPS	Analyze [2]POTENTIAL HAZARDS	Act [3]CRITICAL ACTIONS
1. Project Preplanning	N/A	• Review and follow COVID-19 CDC, Roux, Client and local orders/protocols. • Ensure all workers are fit for duty - anyone feeling sick should remain at home even if symptoms do not align with COVID-19. If a worker has been in contact with someone potentially positive or positive for COVID-19, contact your Office Manager. • Determine PPE needs and ensure adequate supply of disinfectant wipes/spray, soap and water or hand sanitizer at Site. Due to high demands and limited supply, plan ahead. • Use the minimum number of employees necessary to safely complete the work.
2. Mobilization	**Exposure:** Becoming infected or infecting co-workers	**Personal/Rental/Roux Owned Vehicle** • Do not carpool. • Use the same vehicle every day and do not share with co-workers. • Verify workers/other people are not approaching vehicle prior to exiting the vehicle. Maintain 6' of distance from others. • DO not valet your car or allow others to use your car. If necessary, don nitrile gloves and safety glasses and clean/disinfect all high touch surfaces (steering wheel, knobs, door handles, turn signals, radio, etc.) by wiping thoroughly with approved disinfectants (follow manufacturer's instructions). This cleaning and disinfection shall occur before and after each use of the vehicle. Aseptically remove gloves and dispose of them along with rags/wipes, appropriately. Wash hands or use hand sanitizer immediately after each episode of cleaning. **Public Transportation** • Public transit should not be used unless absolutely necessary. Consider renting a car rather than taking public transit. If public transit is required, wear appropriate PPE and apply social distancing (6 ft). Use proper donning and doffing procedures for nitrile gloves. Wash hands or use hand sanitizer immediately after. **Hotel Stay (Refer to COVID-19 H&S Guidance for more info)** • If a hotel stay is deemed necessary for the given field work, ensure that you disinfect your room upon initial arrival and returning each day. Disinfect all surfaces of your room with an appropriate disinfectant using nitrile gloves. Use proper donning and doffing procedures for nitrile gloves. • Place the "Do Not Disturb" placard on the room while away and limit housekeeping services to the extent feasible during your stay to minimize the reintroduction and spread of the virus from others. Minimize, or avoid entirely, time spent in hotel common areas (i.e., the lobby, dining areas, gyms, etc.). Wash hands or use hand sanitizer often.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.
[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards, energy source; Energy Source – electricity, pressure, compression/tension.
[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

3. Tailgate Meeting	**Exposure:** Becoming infected or infecting co-workers	• Must occur outside or remotely (i.e. video or conference call). • Maintain at least a 6+ ft distance between you and others. • Discuss primary infection prevention measures listed below. • Do not require employees or subcontractors to sign in, the Site Supervisor shall record names on the attendance form. • If the Site has more than 10 workers, separate tailgate meetings should be performed. • Discuss COVID-19 symptoms with coworkers and subcontractors to ensure fitness for duty. Anyone exhibiting signs or symptoms should be instructed to leave the Site, contact your Project Manager.
4. Site Activities	**Exposure:** Becoming infected or infecting co-workers	• Coordinate field activities at the beginning of the day (i.e. Tailgate meeting) to minimize time spent in crowded spaces or overlap while completing job tasks. • Don cloth face coverings as appropriate. • Apply social distancing (6+ ft) when interacting with others. If anyone comes within 6 ft of you while conducting work and your work prevents you from moving away, politely ask them to move back. If others are unable to move from your space, stop work and leave area. • Do not shake hands or touch others. • Do not share equipment or other items with co-workers and subcontractors unless wearing appropriate PPE (e.g. nitrile gloves). Assume equipment and other surfaces are potentially contaminated and remove gloves aseptically. • If anyone is coughing or sneezing in your vicinity, stop work and leave the area. • Do not work in areas with limited ventilation with others. • Cover your mouth and nose with tissue or paper towel or with your elbow when coughing or sneezing and wash hands or use hand sanitizer immediately after. If sick contact SHSO/PM and leave Site immediately. • Disinfect work surfaces/areas with approved disinfectant you're responsible for (ex: desk, office doorknob, computer, etc.) at least once at the beginning of your shift and at least once at the end of your shift with either sanitizing wipes or disinfectant spray. • Phones should be operated hands free to extent feasible. Sanitize your phone on a regular basis. Disinfection should also take place whenever suspected contaminated material comes in contact with any work surfaces/areas. Wash hands or use hand sanitizer immediately after. • Avoid public spaces and going out to eat by bringing your own lunch to the Site. If performing work in high density urban areas, it is recommended all food must be consumed at or in your vehicle. Wash hands or use hand sanitizer before eating and immediately after.

Primary Infection Prevention Measures

- Wash your hands often with soap and water for at least 20 seconds.
  - If soap and water are not available, use an alcohol-based sanitizer that contains at least 60% ethanol or 70% isopropanol. Key times to wash hands include after blowing your nose, coughing or sneezing, after using the restroom, and before eating or preparing food.
- Do not touch your eyes, face, nose and mouth with unwashed hands.
- Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. Throw potentially contaminated items (e.g. used tissues) in the trash.
- Avoid close contact/secondary contact with people and potentially contaminated surfaces.
  - Apply appropriate social distance (6+ feet).
  - Stop handshaking/touching others and use caution when accessing public spaces.
- Clean and disinfect frequently touched surfaces daily. Commonly touched items can include but are not limited to tables, doorknobs, light switches, countertops, handles, desks, phones, keyboard, toilets, sinks and field equipment. If surfaces are dirty, they should be cleaned with soap and water prior to disinfection. If surface cannot be cleaned/disinfected, then wash hands or use sanitizer as soon as possible.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.

[2] A hazard is a potential danger. Break hazards into six types: Contact - victim is struck by or strikes an object; Caught - victim is caught on, caught in or caught between objects; Fall - victim falls to ground or lower level (includes slips and trips); Exertion - excessive strain or stress / ergonomics / lifting techniques; Exposure - inhalation/skin hazards; Energy source – electricity, pressure, compression/tension.

[3] Using the first two columns as a guide, decide what actions or procedures are necessary to eliminate or minimize the risk. List the recommended safe operating procedures. Say exactly what needs to be done - such as "use two persons to lift". Avoid general statements such as, "be careful".

APPENDIX C

How to Remove Gloves

How to Remove Gloves

To protect yourself, use the following steps to take off gloves

1

Grasp the outside of one glove at the wrist. Do not touch your bare skin.

2

Peel the glove away from your body, pulling it inside out.

3

Hold the glove you just removed in your gloved hand.

4

Peel off the second glove by putting your fingers inside the glove at the top of your wrist.

5

Turn the second glove inside out while pulling it away from your body, leaving the first glove inside the second.

6

Dispose of the gloves safely. Do not reuse the gloves.

7

Clean your hands immediately after removing gloves.

APPENDIX F

ExxonMobil Work Permit Procedure

EPS Work Permit Procedure

1. GENERAL INFORMATION

1A. Objective

The E&PS work permit is a formal documented system, used to control higher-risk activities. Authority is given by competent persons for the work to commence under the conditions defined within it. This system provides checks and authorizations to manage risks that could impact the health and safety of personnel and the public. The purpose of the work permit is to:

- Manage, control and communicate site risks associated with permitted activities
- Control the work activities and interfaces at the work site to prevent the occurrence of incidents
- Communicate information clearly to all affected personnel to ensure understanding of work task hazards
- Act as a last minute risk assessment
- Authorize Scope of Work

1B. Applicability

Prior to the start of the work, the Site Supervisor, Project Manager or Issuer must determine whether a Work Permit is required and which Higher Risk Checklist(s), if any, should be used. More than one type of Higher Risk Checklist (HRC) may be required on the same work activity. A work permit must accompany any necessary HRC, as an HRC cannot stand alone. A work permit does not always require an HRC.

The only HRC that is suitable for use when working alone on a site is the Energy Isolation HRC. In this situation, the lone worker must self-issue the Work Permit and HRC. None of the other HRCs are permitted for use by a lone worker.

At a minimum, every work permit should be paired with a Job Loss Analysis (JLA). The work permit and HRCs are not a substitute for a field procedure. Procedures, including JLAs, define how work is to be done, where-as the permit is used to approve the work when the Permit Issuer is satisfied all procedures are in place.

Contractors are responsible for ensuring that workers and subcontractors under their supervision comply with all the requirements of the Work Permit(s) and Higher Risk Checklists.

Nothing specified in this procedure should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Work Activities That Require a Work Permit

A work permit is required when a work activity involves any Life Saving Action, or higher risk activities as defined by the HRCs (energy isolation, lifting and rigging, excavation, confined space, work at heights, work near moving equipment or hot work). Typically, this would be activities involving complex operations or maintenance, construction or demolition.

Other work activities outside of the designated HRCs (e.g., landscaping near open water) may require a work permit in the presence of risk amplifiers, scenarios such as simultaneous operations, extreme weather condition, workforce or contractor experience level, potential exposures, etc. Each situation should be evaluated and if a work permit is deemed required, the supervision requirements as stated below apply to this work activity.

When a work permit is deemed to be required, a supervisor must be present on site prior to the start of the work activity. This is to ensure clear start work alignment, meaning that all of the required safeguards are in place, the work crew and work site are prepared for the work activity. The supervisor is defined as the individual accountable for overseeing the work crew and may be a contractor or sub-contractor to E&PS. The supervisor is accountable for the start work checks but is not required to be physically present for the duration of the job unless the work scope specifies otherwise. In some cases the Site Supervisor or Project Manager may specify on-site supervision requirements that exceed this minimum requirement.

Work Activities That Do Not Require a Permit

Lower risk work activities typically do not require a permit. This work still requires planning and often requires a JLA. Project planning requirements are documented in OIMS system 3.1. Refer to the flowchart in 1.C to determine if a work permit is needed. The following are examples of work activities which, under normal circumstances, do not require a work permit:

- Site visits, on-site surveying (line locating), inspection of equipment
- Lower risk maintenance, repair work in shops or commercial site maintenance, as conditions permit
- Loss Prevention System (LPS) tasks (e.g. Loss Prevention Observations (LPOs), Investigations, Field Assessments, Field Audits)
- Gardening, landscaping, snow removal (e.g. using hand tools and riding lawn mowers)
- Mowing at a non-operational facility
- General housekeeping / janitorial activities / food service
- Office equipment services (maintenance/repair), office moves, furniture assembly/repair, hanging artwork or other items (where height is < 1.8m, 6 ft from the ground)
- Minor carpet replacement / repairs / installation
- Courier/simple pickup and delivery services
- Low voltage (50 volts or less AC or DC) electrical work
- Assembly / Disassembly of mobile scaffolds/podiums (platform is < 1.8m, 6ft from the ground)

Deviations

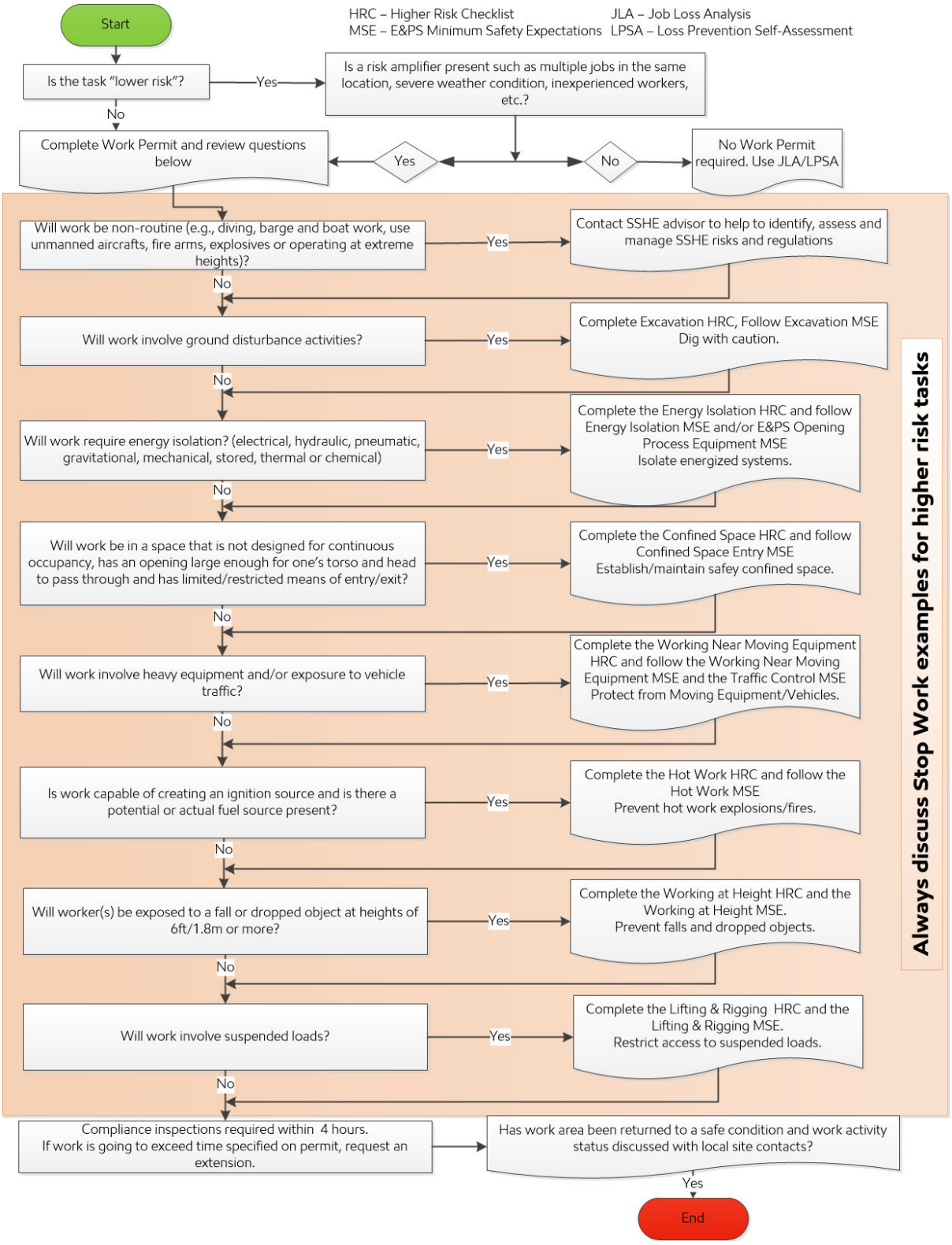
Any deviation from the E&PS work permit requirements should be documented using OIMS Procedure 7.1. Management of Change.

If performing work at an operating site with their own ExxonMobil work permit process (e.g. refinery, terminal, chemical facility), a Bridging Agreement must be in place to document what work permit program will be followed.

Stop Work

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

1C. Flow Chart



2. GENERAL REQUIREMENTS

There is 1 type of Work Permit:

1. Work Permit

There are 7 types of Higher Risk Checklist that accompany E&PS Life Saving Actions:

1. Confined Space - Establish/Maintain Safe Confined Space
2. Working Near Moving Equipment – Protect from Moving Equipment/Vehicles
3. Lifting and Rigging – Restrict Access to Suspended Loads
4. Excavation – Dig with Caution
5. Energy Isolation – Isolate Energized Systems
6. Hot Work – Prevent Hot Work Explosions/Fires
7. Working at Heights – Prevent Falls & Dropped Objects

The 8th Life Saving Action, Respect Critical Safety Devices, does not have a corresponding higher risk checklist. This is because defeat of a critical safety device follows the control of defeat process and form documented in OIMS system 6.3.

2A. Work Permit Process

A planning discussion between the Permit Issuer and the Permit Recipient/Work Team must occur before the start of the work to determine if a work permit is needed and if higher risk checklist(s) are required. Safety precautions shall be identified and documented on the Work Permit and HRCs, as applicable, or in the accompanying documentation (e.g., JLA or Procedure). This includes updating the JLA at the work site for specific risks, equipment and environmental conditions, preparing access and egress routes and confirming that required safety and communications equipment is on site and readily accessible. Interfaces with routine or critical operations or other planned work must also be identified and appropriately managed.

Permit must be written at the job site by both the Permit Recipient and the Permit Issuer. Permit is valid only for the location, work, and time specified on the permit. Work must begin within 2 hours of the permit being issued; otherwise a new work permit is required. A work permit may remain valid for a maximum of eight hours unless one of the following occurs that immediately terminates the permit:

- work is completed or suspended
- significant change in job scope or condition (e.g. significant weather change, unsafe job condition, significant personnel changes, Issuer or Recipient leave site while work is being performed without transfer of responsibility)
- persons trained in the work permit process terminates the work permit

If work activity will exceed the time specified on the permit, the Permit Recipient will request an extension from the Permit Issuer. Permit Issuer must approve the extension. Work permit may not exceed a total of 16 hours per day (extensions may not exceed 8 hours).

A Work Permit that includes HRCs is only valid for one day. A Work Permit without HRCs may be revalidated for up to seven total days, at the Permit Issuer's discretion, provided the scope of work, conditions, location, potential hazards, and personnel performing the work have not changed from day to day, and the requirements of the Work Permit are discussed prior to the start of the shift.

For revalidation of multi-day work permits, a discussion should take place, prior to activities, with the work team and Permit Issuer. Discussion should include a review/update of the work permit and associated documentation, work activities in the immediate area that may create a conflict, any additional hazards, potential change in scope of work or personnel, etc. Once it has been determined that the permit can be re-validated, Issuer and Recipient sign off on permit as appropriate

One copy of the work permit stays in the field and one copy stays with the Permit Issuer, as appropriate. Work permit should be prominently displayed when possible. If working in an environment that is remote, the permit should be readily accessible, and in a location known to all workers while the permit is active.

2A.1 Higher Risk Activities

Higher Risk Activity - Confined Space Entry

A confined space is a space that meets all of the following requirements:

- Is not designed for continuous occupancy;
- Has an opening large enough for one's torso and head to pass either intentionally or unintentionally;
- Has limited or restricted means of entry and exit

Entry into a confined space requires compliance with E&PS Confined Space Entry MSE, completion of a Work Permit and a Confined Space HRC.

Higher Risk Activity - Working Near Moving Equipment

Work that involves heavy equipment and/or exposure to vehicle traffic requires compliance with E&PS Working Near Moving Equipment MSE and/or Traffic Control MSE, completion of a Work Permit and the Working Near Moving Equipment HRC.

Higher Risk Activity - Lifting and Rigging

Work that involves crane operations, manual hoists, shifting (bull rigging) powered hoists, and lifting activities with excavators and forklifts requires compliance with the E&PS Lifting and Rigging MSE, completion of a Work Permit, completion of the Lifting and Rigging HRC and completion of appendices A-G as required by the MSE.

Higher Risk Activity - Excavation

Work that involves ground disturbance activities requires compliance with the E&PS Excavation MSE, completion of a Work Permit and the Excavation Higher Risk Checklist.

If pooling liquid or saturated soil is encountered during a ground disturbance activity, **Stop Work** immediately and asses the change in conditions. If hydrocarbons are encountered, determine if activity is considered Hot Work and complete Hot Work HRC as required. Reference E&PS Hot Work MSE.If personnel will be required to enter an excavation that meets the definition of Confined Space, requirements in the Confined Space Entry section of this Work Permit procedure must be complied with.

Higher Risk Activity - Energy Isolation

Work that involves isolating equipment from potentially hazardous energy, requires compliance with E&PS Energy Isolation (Lock Out/Tag Out) MSE and/or E&PS Opening Process Equipment MSE, completion of a Work Permit and the Energy Isolation HRC.

Higher Risk Activity - Hot Work

Work that is capable of producing an **ignition source** when **flammable** or **combustible** materials are present. The fuel source could be potentially or actually present. This work requires compliance with the E&PS Hot Work Minimum Safety Expectation, completion of a Work Permit and Hot Work Higher Risk Checklist. Hot work will not be permitted if gas monitoring/tests indicate an LEL greater than 5%. Some sites (i.e., active refineries/terminals) may establish a limit of 0% LEL until the source is determined.

Higher Risk Activity - Working at Height

Work that involves working at heights and the possibility of dropped objects to lower elevations requires compliance with the E&PS Work at Height MSE, completion of a Work Permit and the Working at Height HRC. Work at height is defined as exposure to falls and dropped objects when personnel are working in elevated areas (1.8m / 6 ft).

2A.2 Emergencies

If an emergency situation evolves, one level above the Site Supervisor has authority to endorse immediate action without a work permit being executed.

2A.3 Simultaneous Operations

When multiple parties / operations are working at a site, any conflicts between the work permit and other work processes must be resolved. In addition, a site lead for permit coordination must be established to eliminate conflicting permit requirements. If conflicts are identified, the conflicts must be resolved before work can continue.

2A.4 Non-Routine Operations

Occasionally E&PS may perform work in extreme environments or unusual conditions. Examples of these non-routine operations includes opening process equipment, pyrophoric management, underwater operations (diving), working at extreme heights, barge and boat work, use of unmanned aircraft systems (UAS) or drones, remote operating vehicles (ROV) fire arms, explosives. In these situations, contact the SSHE advisor for additional guidance. The SSHE advisor should contact other ExxonMobil business line subject matter experts (SMEs) to help identify, assess and manage the SSHE risks and regulations associated with this work. The work permit and HRC will be supplemented with other safe work practices, procedures and processes, as appropriate.

2A.5 Compliance Inspections

The purpose of the compliance inspection is to verify that conditions at the worksite are still safe and have not changed over the course of the job. It is also used to confirm that the work being performed matches what is authorized on the work permit. The compliance inspection may also be used to verify competency of the workforce.

The First Line Supervisor, Work Permit Issuer or designated alternate must complete an inspection within four hours of permit being issued. This inspection must be documented on the work permit. Compliance inspections are not required when a lone worker is performing energy isolation.

Where it is not practical to complete a compliance inspection on every permit, such as in large operating sites, a process or schedule to steward work permit compliance will be developed and approved by the E&PS Regional, Area or Facility Manager.

2A.6 Work Authorization

Personnel

All personnel involved in the work activities specified by the work permit must be able to recognize and identify the potential hazards associated with work. All personnel must adhere to the conditions set in the work permit and HRCs.

Permit Issuer

The Permit Issuer signs the permit at the work location after verifying a safe set of conditions exists with the Permit Recipient. The issuer authorizes that work is ready to begin. Any safety concerns raised must be resolved prior to authorizing the permit and applicable higher risk checklist(s).

Permit Recipient

The Permit Recipient is a member of the work team responsible for overseeing the scope of work. By signing the permit, the Permit Recipient accepts the responsibility of compliance with all stated conditions in the permit and applicable higher risk checklist(s),

Relief Issuers and Recipients

When there is a need to transfer a single day work permit to a new Issuer or Recipient, the following must occur:

- Discuss the details of the permit with their relief
- Communication between current and relief issuer / recipient must be established
- Verify that conditions allow for continued work
- Document the transfer on the work permit

Multi-day permits cannot be transferred to a relief issuer or recipient.

Post Work/Sign Off

The Permit Recipient must submit the completed work permit to the Permit Issuer for sign-off and closure. A work permit must be signed off by the Issuer and Recipient in Post Work / Job Status section. The sign-off indicates whether or not the work is complete and that the area has been secured.

2B. Gas Testing Requirements

An initial gas test is required before a Work Permit is issued if:

- The work activity has the potential to expose personnel to hazardous substances.
- The work activity has the potential to create a hazardous atmosphere.

Examples of when an initial gas test is required:

- Opening process equipment such as wells containing hydrocarbons, remediation systems, removal or demolition of piping / tanks, drums containing hazardous substances, etc.
- Disturbing sediment/sludge from vessels, drums, tanks, piping, etc.

- Gauging and sampling wells that are down gradient or if the well and/or well network is new (ex. has been sampled less than two times).
- Operation of a vehicle or internal combustion engine if the potential for flammable / combustible vapors or gasses exists.
- Use of non-intrinsically safe equipment in an area where there is the potential for flammable / combustible vapors or gasses exist.
- Any work where hydrocarbon or hazardous atmosphere may be present.

Gas testing should only be performed by individuals who have been trained and qualified on how to use the gas testing equipment per the manufacturer's recommendations.

Initial Gas Test:
The initial gas test must be performed as close to when work begins as possible, but never more than 2 hours before beginning work.

If the work activities have the potential for changing conditions that could expose personnel to hazardous substances, or to develop a hazardous atmosphere as the work progresses, periodic monitoring and a mitigation plan are required.

If work is in an area where a hazardous atmosphere is not found or expected, there are no gas testing requirements.

Personal Gas Monitoring:

If a potential respiratory hazard exists (gas and vapor contaminants), a personal gas monitor is required.

Calibration:
Proper calibration of gas testing equipment is critical to ensure the equipment is functioning accurately. This is the process of exposing the equipment sensors to known concentrations of gases in order for the sensors to be adjusted to those values. The manufacturer of the equipment will provide the required time intervals for calibrations. Calibrations should be done only by a trained and qualified gas tester.

Prior to using the gas testing equipment in the desired field location, a bump test must be done. The bump test is a last minute check to confirm the equipment is operating correctly and it should not be done in an atmosphere that is potentially hazardous.

Additional information on gas testing is available in the Gas Testing Guidance document.

3. RESPONSIBILITIES

Site Management must:

- Verify that Issuers are checking effectiveness of work permit process in the field and reporting concerns and improvement opportunities up-line. If deficiencies are repeatedly discovered PM/FM should work with the Contractor to develop an action plan to identify the causes.
- Share site learnings with area/regional managers and with OIMS Global System Administrator
- Assess the quality of the Contractor's Issuer training and the delivery of the training the Issuer provides to the Recipient at the worksite. Frequency of ad-hoc quality checks should depend on the level of risk involved in the work and the performance history of the Contractor.

- At least once per quarter, review effectiveness of the Work Permit and HRCs in the field. This should include speaking with field workers on-site to confirm they understand the purpose of the permit and are following it, as well as reviewing the accuracy of the written permit. Deficiencies should be addressed with the work team and/or Issuer. Sites experiencing deficiencies should be re-checked to validate that deficiencies are corrected. If deficiencies are system related, these deficiencies should be documented and send to System Owner/Steward

Permit Issuer must:

- Receive Permit Issuer Training
- Be familiar with the work site and associated hazards
- Prepare the Work Permit and Higher Risk Checklist(s) with input from the recipient and those that will be participating in the work, as appropriate
- Approve work permit extension, as appropriate
- Discuss specialized PPE needed for work and ensure it is listed in the JLA
- Identify the type of gas testing required, as appropriate
- Determine the need for a Hazard Watch or Fire Watch
- Verify Authorized Person has isolated, de-energized and locked out equipment.
- Ensure proper exposure monitoring is performed per Hazardous Communications/ Safety Data Sheets (SDS) data.
- Complete the following with the Permit Recipient and as appropriate, the recipient's work team
    - Inspect work/job site to review potential hazards, identify Risk Amplifiers (e.g., simultaneous operations, inexperienced workforce, etc.) and ensure protective measures are in place for the scope of work
    - Discuss the requirements / limitations of the work permit and HRCs
    - Communicate to the recipient that they have the authority to stop work at anytime if they feel that the work has become unsafe
    - Ask the recipient to provide examples of when stop work authority would be used (Stop Work Triggers) during the execution of higher risk tasks and document these examples on the HRC
    - Ask the Recipient if there is anything on the work permit or HRCs that they typically do differently than what is being asked of them and if there is, seek to understand why it is done differently
    - Ask the Recipient if they have any concerns about what is written on the work permit or HRCs
    - Communicate the location of the fire extinguisher and safety equipment
    - Confirm Recipient understands and accepts their role and responsibilities.
- Sign the work permit in the appropriate space.
- Remain on site until the work is completed or the work permit is transferred to another Permit Issuer.
- Perform a work permit compliance check within 4 hours of issuing the work permit to ensure the activity is being performed within the requirements of the work permit.
- Reports deficiencies in execution of the work permit process and improvement ideas to the Project/Facility Manager
- If required, submit completed work permit to the appropriate site contact for file retention

Permit Recipient must:

- Receive a briefing from the Permit Issuer on the role of the Permit Recipient.
- Ensure the work team understands any potential hazards and protective measures
- Understand the content of the work permit and be involved in preparing the work permit.
- Answer and discuss questions on HRCs with Permit Issuer to ensure alignment with potential risk/mitigations
- Be familiar with any hazardous materials used to complete the task, or are in the work area, and the necessary protective measures to prevent exposure.
- Install appropriate barricades when required.
- If applicable, ensure energy isolation has been completed prior to work beginning.
- Monitor the work area for changing conditions and report any changes to the Permit Issuer.
- If applicable, ensure Hazard Watch / Fire Watch are qualified and understand their role
- Sign the work permit and post the work permit at the job site in an obvious location.
- Remain at the job site until the work is completed or the work permit is transferred to another Permit Recipient.
- Ensure site is secure / or returned to normal status prior to Sign Off

Gas Tester must:

- Be trained and qualified to use the gas testing instrument per manufacturer's guidance
- Be responsible for performing gas testing, including monitoring atmospheric concentrations of hazardous substances

4. TRAINING

E&PS employees will document training in Career Connect. E&PS Contractors are expected to track and maintain their training records.

- Permit Issuer must receive Initial Permit Issuer Training (Refresher every 3 years). Initial permit Issuer training should be delivered face-to-face (virtual face-to-face is acceptable) from a certified Permit Issuer or from an E&PS SSHE Advisor, using the CBT materials. Refresher training for Permit Issuers may be completed by CBT.
- General work permit awareness training may be completed by CBT.
- Permit Recipient will receive a briefing from the Permit Issuer on the expectations for the specific Permit(s) and Higher Risk Checklist(s) they will be using. This briefing is the Permit Recipient training.
- Gas testers must be trained on the gas testing equipment per manufacturer's specifications.
- Additional training may be required for certain activities (e.g., Permit Required Confined Spaces, Energy Isolation (LOTO), Working at Heights, etc.)

5. REFERENCES

- E&PS Minimum Safety Expectations – (OIMS 5.2)

6. ACRONYMS AND DEFINITIONS

Direct Read or portable gas detector – bump tested daily and calibrated per the manufacturer's requirements against a known gas standard; permitted to be used for permit gas test results.

Fire Watch / Hazard Watch - A person designated to monitor, control, and/or warn persons of hazardous or emergency conditions that could affect their safety.

Fuel source – a substance that will burn or ignite.

Ground Disturbance or Subsurface Clearance – ground disturbance activities at a depth greater than 15 cm (0.5 ft) below ground surface.

Hazardous Atmosphere – an atmosphere that may expose workers to the risk of death, incapacitation, impairment, fire, explosion or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 5% LEL
- Oxygen concentration below 19.5 percent or above 23.5 percent
- Concentration of any toxic substance in excess of its exposure limit
- Any atmospheric condition that is immediately dangerous to life or health

Hazardous Substances - any substance that has one or more of the following properties:

- Explosive
- Flammable
- Ability to oxidize (accelerate a fire)
- Human toxicity (acute or chronic)
- Corrosive (to human tissue or metal)
- Eco toxicity (with or without bioaccumulation)
- Capacity, on contact with air or water, to develop one or more of the above properties.

Hot work – welding, brazing, cutting, soldering, torches, chipping operations or the use of spark producing tools such as drilling or grinding.

HRC – Higher Risk Checklist

Ignition source - any fire or spark producing activity, component or piece of equipment. Ignition sources include, but are not limited to, welding; grinding; saw-cutting concrete; non-explosion proof power tools and other electronic or electrical equipment; internal combustion engines; and heavy equipment (including diesel powered) operation.

Initial Gas Test - An initial test for hazardous substances must be performed and recorded to confirm the safety of the work site before certain work can commence. Results must be recorded on work permit.

Lower Explosive Limit (LEL) - The lowest concentration of a flammable gas or vapor in air that will ignite when an ignition source is present.

Lockout - The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

LOTO - Lockout Tagout

MSE – E&PS Minimum Safety Expectation

Periodic Monitoring- Repeat gas tests carried out at specified intervals (may be based on time or by progression in work activity) using a gas detector. In addition to the specified intervals, periodic gas tests are performed after any break greater than thirty minutes or where the work site conditions may have changed.

Personal Gas Monitor - continuously evaluate a worker's environment for **gas** hazards, worn on the outermost layer of clothing; not permitted to be used for permit gas test results.

Risk Amplifier - Situational characteristics that increase the risk for a job or a task that would otherwise be deemed lower risk. Examples may include but are not limited to: i) inexperienced workforce ii) challenging environmental factors – high winds/storms/dust clouds iii) SIMOPS or stacked work.

SIMOPS – Simultaneous operations; two or more work activities are executed at the same time, and in the same location.

Stacked Work - Two or more work activities that occur in the same vertical space, and workers are working above or below one another at the same time.

7. REVISION HISTORY

Date	Description of Change	Global Owner	Global Administrator
	New harmonized procedure		

WORK PERMIT

WORK PERMIT DURATION MAY NOT EXCEED 16 HOURS PER DAY.
WORK PERMIT MAY BE REVALIDATED UP TO 7 DAYS FOR NON-HRC WORK.

A. Location and type of work to be performed:				**Permit #:**	
Issue Date:	Time: ❑ AM ❑ PM		Expiration Date:	Time:	❑ AM ❑ PM
Specific Location:				Extension Time:	❑ AM ❑ PM
Work Description (Specify Work Activities):				Extension Approval:	❑ Verbal Approval
				Signature: _____	
Supervisor:			Supervisor Phone #:		
Site First Aid / Emergency Phone #:			**# of Workers:**		

Has short service worker(s) (SSW) received orientation? ❑ Yes ❑ No ❑ N/A

Does SSW have a designated mentor? ❑ Yes ❑ No ❑ N/A

B. Complete the Permit and Applicable Higher Risk Checklist(s) HRC, if applicable

❑ Confined Space ❑ Working at Heights ❑ Hot Work ❑ Working Near Moving Equipment
❑ Energy Isolation ❑ Lifting & Rigging ❑ Excavation

C. Pre-Work Checklist (jobsite inspection required):	Yes	N/A
1. Has the impact of this task on neighboring equipment, services and third parties been considered and addressed?		
2. Has the work activity, safety concerns and emergency procedures work been discussed with the local site contact?		
3. Have procedures for working with Hazardous Materials been reviewed and are understood by workers (e.g. Chemical approval/SDS, Asbestos controls, etc.)?		
4. Is emergency equipment available, per plan (e.g. Fire Extinguisher, Radio, Rescue Harness, etc.)?		
5. Are standby personnel trained and understand their responsibilities? ☐ Spotter ☐ Hazard Watch		
6. Has work area been evaluated for hazards (overhead, behind walls, below ground, etc.) with plan to mitigate hazards prior to starting work?		
7. Have you confirmed PPE identified during planning is available and in good condition?		
8. Have SIMOP hazards been identified and discussed with impacted personnel (List SIMOPs at bottom of page)?		

D. If there is a potential hazardous atmosphere or hazardous substance present, complete the Gas Test Supplement

E. Site Setup (work may not begin until these are completed)	Yes	N/A
9. Overhead utility lines and minimum clearance requirements reviewed with site workers?		
10. Appropriate warning signs, temporary lighting and barricades have been considered to protect workers, prevent unauthorized access and establish work zone?		

F. Signatures (sign at work location before beginning work) If issuer/recipient changes, new issuer/recipient reviews and signs.

❑ I have reviewed this checklist and all work arrangements with all workers involved and discussed work scope with local site contact as applicable. I verify I understand the purpose of the permit and applicable higher risk checklists.

Local Site Contact (if applicable):	Contact Phone #:
Issuer Company:	
Issuer / Relief Name:	Issuer Phone #:
Recipient Company:	
Recipient / Relief Name:	Recipient Phone #:

G. Permit Compliance Inspection (required each day) If additional space is needed use bottom/back of form.

Date:	Time: ❑ AM ❑ PM	Performed By:	Comments:	
Date:	Time: ❑ AM ❑ PM	Performed By:	Comments:	
Date:	Time: ❑ AM ❑ PM	Performed By:	Comments:	

H. Post Work / Job Status Permit issuer (or relief) is to sign off at end of work/shift

Has the work site been inspected?	❑ Yes	❑ No	
Discussed work activity status w/ local contact?	❑ Yes	❑ No	❑ N/A
Is anything out of service and has everything been returned to safe condition?	❑ Yes	❑ No	❑ N/A
Higher risk checklist(s) closeout completed?	❑ Yes	❑ No	❑ N/A
Area/equipment/load secured, cleaned and returned to safe condition?	❑ Yes	❑ No	

Permit Issuer (or relief):	Print:	Signature:	Date:
Permit Recipient (or relief):	Print:	Signature:	Date:
Local Site Contact (as applicable):	Print:	Signature:	Date:

Use this space to capture SIMOPS hazards and other site specific hazards and mitigation strategies:

Prominently display permit at job site, if possible. Retain according to local regulations.

WORK PERMIT SUPPLEMENT

ONLY COMPLETE SECTIONS APPLICABLE TO THE WORK DOCUMENTED ON THE WORK PERMIT

A. Initial Assessment

IMPORTANT: Sections A must be completed prior to the use of a gas dector being used in any job. Prior to use, all gas detectors must pass the bump test using manfuacturer guidance. If a bump test is failed, a full calibration of the gas detector is required. Consider gas detector location placement. Always check the Oxygen value first. Most combustible gas meters are Oxygen dependent and are unreliable if Oxygen is insufficient.

1. **Is the work capable of producing an ignition source when flammable or combustable materials are present? ❑ YES (HRC - HOT WORK REQUIRED) ❑ NO**
2. **Date of last full calibration: _____**
   Is this compliant with the manufacturer's recommended calibration frequency? ❑ YES ❑ NO (STOP WORK)
3. **Is the gas detector working properly according to the bump test? ❑ YES ❑ NO (STOP WORK)**

Chemical (Check in the following order)	Safe Working Range		Stop All Work	
1. Oxygen	> 19.5% & < 23.5%		< 19.5% **OR** > 23.5%	
2. LEL (%)	≤ 5% LEL		> 5% LEL	
3. Toxic Gasses	**No Respirator Required**	**Respirator**	**SCBA or Supplied Air**	**STOP ALL WORK**
Hydrogen Sulfide	≤ 5 ppm	NO RESPIRATOR	>5 ppm	≥ 100 ppm
Carbon Monoxide	≤ 25 ppm	NO RESPIRATOR	>25 ppm	≥ 1200 ppm

B. Gas Test Readings

Location: _____

Continuous Monitoring or Periodic Monitoring (Circle One) **Testing/Recording Interval _____ Hours**

	Time	Oxygen	LEL	H2S	CO	Other	Other
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Gas Tester's Company:_____

Gas Tester's Signature: _____ **Date/Time_____ AM/PM**

C. Confined Space Entrant Log

IMPORTANT: This log should always accompany a Work Permit, Confined Space Higher Risk Checklist and any other applicable Procedures or JLAs.

Name of Confined Space_____

	Entrant Name (Print)	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out	Time In	Time Out
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Print Name of Supervisor: _____ **Supervisor's Signature: _____** **Date/Time_____ AM/PM**

D. Revalidation (Multiday Permit)

ALLOWED FOR WORK PERMITS WITHOUT AN HRC IN ONE DAY INCREMENTS UP TO 7 TOTAL DAYS IF SITE PERSONNEL AND CONDITIONS HAVE NOT CHANGED. HRC CHECKLISTS MAY NOT BE REVALIDATED.

COMPLETE INITIAL SITE INSPECTION. IF SITE CONDITIONS OR PERSONNEL HAVE CHANGED, NEW PERMIT REQUIRED

Date	Issue Time	Expiry Time	Recipient Signature	Issuer Signature	Day's Work Complete?	Time	Comments
	AM/PM	AM/PM			❑ Yes	AM/PM	
	AM/PM	AM/PM			❑ Yes	AM/PM	
	AM/PM	AM/PM			❑ Yes	AM/PM	
	AM/PM	AM/PM			❑ Yes	AM/PM	
	AM/PM	AM/PM			❑ Yes	AM/PM	
	AM/PM	AM/PM			❑ Yes	AM/PM	

Supervisor's Signature: _____ **Date/Time_____ AM/PM**

APPENDIX G

ExxonMobil E&PS Minimum Safety Expectations
Working Near Moving Equipment

WORKING NEAR MOVING EQUIPMENT

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Life Saving Essentials

Working Near Moving Equipment minimum safety expectations will protect people from being struck by mobile heavy equipment. This document replaces the Heavy Equipment Exclusion Zone (HEEZ) for Construction and Demolition document.

The following life saving essentials are required and will achieve the life saving action:

- Separate people from machines
- Spotter required when operating heavy equipment
- Establish communications between operator(s) and spotter(s)

When managing hazards associated with on-site or off-site traffic (i.e., working in an active retail station or along a public road) refer to the Traffic Management procedures.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Planning

Prior to heavy equipment operations the following must be completed:

- Verify equipment operators and spotters are trained and competent in their roles and responsibilities
- Review work area and address site specific hazards (i.e., traffic, nearby structures, utilities, sidewalks, simultaneous operations, etc.)
- Inspect and plan the path(s) of movement for heavy equipment, considering overhead lines, obstacles, etc.
- Utilize one-way traffic whenever possible
- Ensure heavy equipment (that allows for it) has,
    - A Rollover Protective Structure (ROPS)
    - A Falling Object Protective Structure (FOPS)
    - Seat belt
    - Backup alarm

Unloading/Loading Heavy Equipment

During loading and unloading of equipment and/or material handling* the following precautions will be taken:

- Perform loading and unloading on level stable ground
- Inspect the equipment and correct deficiencies
- Use a spotter to direct movement of heavy equipment
- Verify ramps and trailer are designed for the use/weight of the equipment and tooling
- Distribute the load according to the manufacturers' recommendations

*Material handling with heavy equipment includes moving materials (i.e. dirt, rebar, waste, construction materials, etc.) from one location to another, regardless of distance. Does not include task-specific construction, demolition and/or excavation activities.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Working Near Overhead Electrical Lines

When working near overhead electrical lines, the power should be de-energized whenever possible.

Regardless of whether the electrical line is energized or de-energized, personnel must comply with the Electrical Line Minimum Clearance (see table below) or as outlined by owner/operator of electrical line.

The consultant/contractor supervisor must ensure that:

- Equipment with booms, lifts, rigging, excavator arms, etc., are set up a minimum clearance of the full height of the equipment plus the distance noted in the table below.
- Line voltage is confirmed to determine safe approach distances (contact owner/operator of electrical line to confirm). Use the greater of:
    - The determined safe approach distance **OR**
    - The full height of the equipment plus 23 ft (7m)

A spotter must understand the additional risk of the overhead electrical lines and have a warning device such as an air horn to alert the operator if minimum clearance is compromised.

Minimum clearance requirements for working near overhead electrical lines are as follows but may be superseded by more conservative local or regional standards.

Minimum Clearance between Operating Heavy Equipment and Overhead Electrical Lines

Voltage (kV)	Distance Between Line and any Part of Heavy Equipment	
Up to and including 50	10 feet	3.1 meters
Over 50 to 200	15 feet	4.6 meters
Over 200 to 350	20 feet	6.1 meters
Over 350 to 500	25 feet	7.6 meters
Over 500 to 750	35 feet	10.7 meters
Over 750 to 1000	45 feet	13.7 meters
Over 1000	As established by the operator of line or registered professional engineer who is a Qualified Person	

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Minimum Clearance between Heavy Equipment in Transit and Overhead Electrical Lines

Signs warning of overhead hazards are in place 23 ft (7m) on each side of the electrical line, when traveling under the lines.

Equipment with booms, lifts, rigging, excavator arms, masts, etc., must be fully lowered to the maximum extent prior to transit.

Voltage (kV)	Distance Between Line and any Part of Heavy Equipment	
Up to and including 0.75	4 feet	1.2 meters
Over 0.75 to 50	6 feet	1.8 meters
Over 50 to 345	10 feet	3.1 meters
Over 350 to 750	16 feet	4.9 meters
Over 750 to 1000	20 feet	6.1 meters
Over 1000	As established by the operator of line or registered professional engineer who is a Qualified Person	

Work Zone Definitions

Red Zone - Area where personnel that are not essential to the **Red Zone** activity are prohibited while heavy equipment is operating. This includes the Drop Zone, Fall Zone, Predicted Debris Area, Swing Zone and Tip Zone.

Orange Zone - General site work zone requiring PPE.

Green Zone - Used to address personnel needs, for example a rest area or meeting area.

Establish the Work Zones

Establish the work zones using the color-coded zone classifications (**Red**, **Orange** and **Green**) and document the zones on a site layout plan prior to all heavy equipment operations. Update the site layout plan as the work progresses and work zone configurations change.

Spotter location, equipment staging locations, and intended equipment travel paths are defined on the plan.

Specify the location of controlled access/egress for personnel and vehicles, including emergency escape.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Establish check-in procedures before allowing site entry.

Familiarize visiting drivers with the layout of the site; this can be covered during check-in at the site entrance.

If a site does not allow for all three types of work zones due to limitations, the **Orange Zone** or **Green Zone** may be omitted.

Red Zone Requirements

Only essential personnel wearing high-visibility clothing are permitted inside the **Red Zone** while equipment is operating.

Personnel in the **Red Zone** will not be permitted to cross under any suspended loads/heavy equipment or to step over or straddle any equipment.

A spotter or a designated person must be assigned to control access to the **Red Zone.**

A site may have multiple **Red Zones.**

Multiple pieces of heavy equipment can operate in a single **Red Zone,** however, two-way radios/CB (no cell phones) must be used and additional spotters and barriers may be needed.

Spotter will have a warning device, like an air horn, to alert the operator of an immediate shutdown situation.

Limit walkways to outside the **Red Zone** when possible. If a walkway must be inside the **Red Zone** then provide barriers according to the Work Zone Demarcation tables, especially where pedestrians and heavy equipment will intersect.

The **Red Zone** must be greater than the:

- Swing zone of any moving part on the heavy equipment
- Tip zone of the heavy equipment
- Fall zone of equipment and their contents
- Distance that debris/projectiles may travel during demolition activities
- Foot print of the structure to be demolished

Certain activities (i.e. lifts, drops, precision grabbing, etc.) may require personnel to be inside the swing zone, fall zone of an elevated load, etc., when the equipment is operating. These individuals are considered essential.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

If a person needs to be in the swing zone while equipment is operating, then approval is required by the Area Manager/Facility Manager/Major Projects Project Manager/OSP Project Manager or EM Engineer.

- As part of the approval, detailed task specific procedures that address:
  - Additional communications/interactions between essential personnel in the **Red Zone** and the equipment operator
  - Human-machine interface such as where essential personnel will be positioned (i.e. in front of the excavator, clear line of site of the operator, outside of fall zone of equipment, etc.)
  - Equipment handling (i.e. where hands may be placed when handling, etc.)

Essential personnel are in the swing zone only long enough to perform that activity. For example, after shears are in position for a precision grab, the individual would leave the area.

Work Zone Demarcation

Effective barriers must be used to separate people from heavy equipment.

Natural barriers (i.e. heavily forested area, shoreline, drainage ditch, etc.) may be used if they will effectively prevent individuals from accessing the work zone/**Red Zone**.

The table below identifies the suitable barriers that must be used when demarcating the **Red Zones**.

✓ Suitable demarcation

\+ Lower risk and / or short duration (less than 12 hrs., remote location, low traffic isolated site)

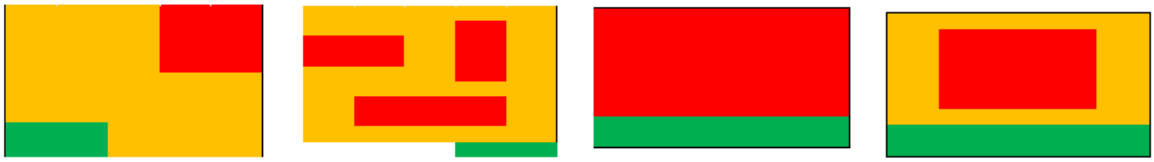
X Not suitable

No Perimeter Fence Present	Demolition	Construction & Excavation	Cranes/Lifting	Drilling	M & R
Construction Panels/Hoarding	✓	✓	✓	✓	✓
Fence and-or mesh panels -6' to 8'	✓	✓	✓	✓	✓
Fence and/or mesh panels – 4'	X	✓	✓	✓	✓
Barricades	X	+	✓	✓	✓
Jersey Barricades	X	+	✓	✓	✓
Safety Snow Fencing	X	+	✓	✓	✓
Collapsible Barriers	X	X	✓	✓	✓
Delineators/Cones and Tape	X	X	+	✓	✓
Cones	X	X	X	+	X

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Perimeter Fence Present	Demolition	Construction & Excavation	Cranes/Lifting	Drilling	M & R
Construction Panels/Hoarding	✓	✓	✓	✓	✓
Fence and-or mesh panels -6' to 8'	✓	✓	✓	✓	✓
Fence and/or mesh panels – 4'	X	✓	✓	✓	✓
Barricades	X	✓	✓	✓	✓
Jersey Barricades	X	✓	✓	✓	✓
Safety Snow Fencing	X	✓	✓	✓	✓
Collapsible Barriers	X	+	✓	✓	✓
Delineators/Cones and Tape	X	+	+	✓	✓
Cones	X	+	+	+	✓
No Demarcation	X	X	X	X	✓

Examples of acceptable **Red** / **Orange** / **Green** Zone configurations



Roles and Responsibilities

Spotter responsibilities:

- Not conduct other tasks
- Control entry/exit of the **Red Zone** and prevent personnel from entering while equipment is moving/engaged
- Stop work if the **Red Zone** is compromised or if communications with the equipment operator is lost
- Guide vehicle and heavy equipment movements and/or relocations
- Verify the area around, beneath and overhead of equipment and give the signal to the operator that operations may begin
- Know the minimum clearance distances from structures, electrical lines and other overhead hazards
- Maintain communication with the operator by using a standard set of signals (hand, verbal, or radio communication). Signals must be developed and always used (no cell phones allowed in the exclusion zone)
- Have an air horn to alert the operator if an immediate shutdown is required

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Spotter position**:**

- Spotter must have clear "line of sight" of operator so work can be stopped if the **Red Zone** is compromised. A second person may be appointed to control the access gate
- It is preferable that the spotter be positioned outside of the **Red Zone**, but if a spotter must be in the **Red Zone,** they must be in a designated delineated area that is outside of the:
    - Swing zone, tip zone and fall zone of the heavy equipment
    - Lifted load swing and fall zone
    - Line of fire of lifted loads
    - Fall zone of debris

If the spotter must enter the swing zone, the spotter will notify the operator. The operator must shut-off the equipment with boom/arm on the ground and show their hands to indicate it is safe to approach.

If multiple **Red Zones** are necessary or if more than one piece of equipment is working in one **Red Zone,** one spotter may be adequate if there is a clear line of sight, and if the spotter has the ability to control the zone(s). Radios would be required since hand signals would not be adequate when two pieces of equipment are operating.

Equipment Operator responsibilities:

- If any part of the cab is open (such as a window) or when operators exit an enclosed cab, then operators must wear the minimum PPE specified for the site or task
- If an operator is working inside an enclosed cab, then the minimum PPE may be changed if documented in the JLA
- Inspect the equipment that will be operated daily and as needed. Correct any deficiencies identified prior to using equipment
- Ensure a communication plan is established with all spotters. Stop equipment operation if communication is lost or spotter is not available
- Use three points of contact when getting on or off equipment. Do not jump from equipment. Know pinch points and rotating parts on the machine
- Know the clearance from structures, electrical lines and other overhead hazards (i.e. overpasses, overhangs, etc.)
- Be aware of hazardous atmospheric conditions and vapor concentrations as the equipment may be an ignition (flashing) source

Operate equipment at speeds slow enough to maintain control. Travel slowly over rough or slippery ground and when traveling in congested areas. Avoid or be aware of previously excavated areas that may be soft.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Safe Heavy Equipment Operations

- Stop equipment operation upon signal from spotter or if non-essential personnel enter the exclusion zone. If non-essential personnel are about to enter the exclusion zone, the operator must shut down and/or make equipment safe with boom/arm on the ground and show their hands to indicate it is safe to approach
- MUST not operate the machine if the spotter is not present, not visible, or in an incorrect spotting position
- Remain in operator's seat at all times when starting and operating equipment. Wear seatbelt or restraint when operating the machine
- Do not exit a running vehicle
- Make sure the area is clear of all non-essential personnel before starting to operate the machine and do not allow passengers to ride outside of equipment cabs
- Do not drive across a steep slope. Drive straight up and down the slope to prevent roll over
- If a turn is required on an incline, turn wide and slow with the bucket carried low
- Carry the bucket low for maximum stability and visibility while traveling
- Heavy equipment must never be used as a work platform or personnel carrier, unless specifically designed for that purpose
- Avoid backing when possible
- For an excavator, the cab should always be facing the direction that the machine is moving

Additional Resources

Additional guidelines, mitigations, and best practices are available in the Life Saving Action Library.

Definitions

Heavy Equipment (including but not limited to):

- Backhoe
- Earth Moving Vehicle
- Personnel Lift/Telehandler
- Skid Steer/Bobcat
- Bull Dozer/Grader
- Excavator
- Mobile Access Platform
- Trackhoe
- Crane
- Fork Lift
- Rock Crusher
- Mobile Elevated Work Platform

Drop Zone: The immediate hazard area where the principle mass of a collapsing structure and/or held material can drop.

Essential Personnel: Personnel needed to be in the **Red Zone** for the work to be successfully completed (i.e. operator, rigger).

Protect From Moving Equipment / Vehicles: Establish and control red zones and / or traffic

Fall Zone: The area beneath or adjacent to the equipment into which the load could fall. The fall zone is not always just beneath the load.

M&R: Maintenance and Repair

Material Handling: Material handling with heavy equipment is defined as lower risk activities associated with moving materials (i.e. dirt, rebar, waste, construction materials, minor site cleanup, etc.) from one location to another, regardless of distance. Not inclusive of task-specific construction demolition and/or excavation activities (i.e. backfilling in a static location, etc.)

Mobile Elevated Work Platform: Scissor lift, cherry picker, boom lift, etc.

RAM: Retail Asset Management

Spotter: The spotter is designated to observe and direct equipment operators and drivers in order to maintain a safe working area. The spotter is designated to make sure no personnel enter the **Red Zone** and no part of the equipment or load enters the minimum clearance area.

Swing Zone: The area where an excavator arm/bucket, picker boom, counterweights, personnel-lift, crane, etc., can rotate through. The equipment or its load could swing anywhere within this zone.

Tip Zone: The area into which the equipment could fall if it is not balanced or stabilization fails, regardless of whether the equipment is operating or under a load. Examples include a crane or forklift tipping under a load, or a dump truck tipping on unstable ground.

Work Zone Definitions:

Red Zone - Geographic area where personnel that are non-essential to the **Red Zone** activity are prohibited while heavy equipment is operating. This includes the Drop Zone, Fall Zone, Predicted Debris Area, Swing Zone and Tip Zone.

Orange Zone - General site work zone requiring PPE.

Green Zone - Used to address personnel needs, for example a rest area or meeting area.

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Example of Work Zone Designated in Work Site

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Barrier Examples

Chain Link Fence

Construction Panels/Hoarding

Chain Link Panels

Construction Panels/Hoarding

Wire Mesh/Heras Fencing

Barricades

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Jersey Barricades (k-rail or water filled barriers)

Safety fencing (snow fencing)

Collapsible or Expandable barriers

Delineators/ Bollards

Collapsible or Expandable barriers

Cones (minimum of 90 cm / 36 in in height)

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	

Protect From Moving Equipment / Vehicles:
Establish and control red zones and / or traffic

Rev 1.1	EMES Excavation Minimum Safety Expectations	Oct 2016



Revision History	Comment	Date
Rev 0	Initial Issue	March 2008
Rev 1.0	Revised to combine all excavation minimum safety expectations into one document.	May 2016
Rev 1.1	Aligned HEEZ guidance among Excavation, Drilling, and Demo	Oct 2016

1 Contents

2 SCOPE AND OBJECTIVES

This document provides minimum safety expectations and guidelines on excavation and trenching safety for employees and contractors to ensure personnel safety, prevent damage to property, the environment and utilities.

This document will be used when conducting excavation and trenching activities at EMES sites. Vac-ex trenches and holes are considered out of scope.

Nothing specified in this document should be construed to suggest conducting work or excavation/trenching activities in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site requirements. This document may not contain all the information necessary to plan and execute excavation and trenching activities. Site specific conditions may require additional measures. In all cases, this guidance should only be used by personnel who are trained and have sufficient technical knowledge of the subject matter.

- Refer to the Heavy Equipment Exclusion Zone for the minimum requirements in establishing heavy equipment exclusion zones during demolition and construction activities.
- Refer to Drilling Guidelines for minimum requirements when establishing exclusion zones during drilling activities.
- Refer to Traffic Control Plan Guidelines when traffic hazards need to be managed.

Statement of Corporate Separateness

EMES is a global functional organization established as a part of the Global Real Estate and Facilities (GREF) functional organization to provide functional guidance regarding soil and groundwater remediation activities, as well as non-operating surplus site stewardship activities, for Exxon Mobil Corporation and its affiliates.

EMES has developed considerable expertise in the stewardship of soil and groundwater remediation activities and non-operated surplus sites. Exxon Mobil Corporation and its affiliates have concluded that a greater centralization of remediation services will increase efficiency and effectiveness by promoting a greater sharing of best practices and expertise and standardizing of processes and procedures across ExxonMobil affiliates worldwide.

EMES performs these activities as a service to Exxon Mobil Corporation and its affiliates pursuant to the provisions of a Master Services Agreement and/or other interaffiliate agreements. In the United States, EMES operates through ExxonMobil Environmental Services Company, a Delaware corporation established on January 1, 2008 as a wholly owned subsidiary of ExxonMobil Global Services Company. Outside the United States, those ExxonMobil affiliate employees who are part of the EMES functional organization perform these activities.

EMES has concluded that the implementation of consistent processes and procedures will facilitate the protection of human health and the environment and mitigate potential liability of Exxon Mobil Corporation and its affiliates.

It is expected that these processes and procedures will be considered for adoption by each EM affiliate conducting activities stewarded by the EMES functional organization, and that following affiliate approval and adoption, these processes and procedures will be implemented by members of the EMES functional organization insofar as possible. Decisions not to adopt these process and procedures in

whole or in part and any deviations should be referred to EMES management for endorsement as appropriate, consistent with corporate separateness considerations. Nothing in this Guide or the associated materials is intended to override the corporate separateness of local entities.

Compliance with all applicable laws and regulations and ExxonMobil policies and the timing of such compliance are independent of the requirements expressed here. Notwithstanding anything to the contrary expressed or implied in these materials, applicable legal and policy requirements must be met. This includes, among other things, GREF MPI Guidelines, Data Privacy laws, and applicable local record retention guidelines.

3 DOCUMENT ORGANIZATION

- Section 1: Minimum safety requirements that must be implemented during each excavation.
- Appendix 1: Guidance and reference material on excavation project planning, soil collapse, water infiltration/accumulation

Any deviations from the requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

4 ACRONYMS AND DEFINITIONS

Competent Person – individual capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and can take prompt corrective measures to eliminate them.

Excavation - any man-made cut, cavity, trench, or depression in an earth surface.

Heavy Equipment: For the purposes of this document, examples of Heavy Equipment are:

- Excavators / Backhoes
- Bull Dozers / Graders / Rock Crushers
- Vibrating Packers
- Dump Trucks / Roll-off Trucks

Trench - a narrow excavation. In general, the depth is greater than the width.

Swing Zone: The area where an excavator arm/bucket, picker boom, counterweights, personnel-lift, etc. can rotate through.

Blind Spot: The area around any piece of mobile equipment that cannot be seen by the operator when seated or at the controls. (See Appendix A for additional Blind Spot recommendations)

Fall Zone: The area beneath or adjacent to the equipment into which the load or equipment could fall. The fall zone is not always just beneath the load.

Tip Zone: The area into which the equipment could fall if it is not balanced or stabilization fails. Examples include a crane or forklift tipping under a load, or a dump truck tipping on unstable ground.

Work Zones:

Red Zone (Exclusion Zone): Specific geographic area of a facility or site where personnel that are not essential to the **Red Zone** activity and equipment are prohibited while heavy equipment is being operated or demolition activities are being completed.

Orange Zone (General Work): General work zone requiring PPE

Green Zone (No Work): is the area where no permitted work is conducted. This zone is used to address the needs of personnel on site, for example a rest area or meeting area.

5 REQUIREMENTS AND MINIMUM SAFETY EXPECTATIONS

5.1 Planning

Complete the following prior to excavating:

- Review the work area and site specific hazards such as, traffic, nearby structures, utilities, etc.
- Excavations greater than 20 feet/6.1 meters in depth require a protection system designed by a registered Professional Engineer, or local equivalent.
- Identify equipment needed and Competent Person as well as any other required personnel and their role.
- Determine Soil Type in area to be excavated and type of excavation protection system.
- Document monitoring requirements (breathing zone, hazardous atmospheres, vibration, dust or noise).
- Review the Subsurface Clearance Procedure (SCP) and review the proximity of public and private utility mark outs to the planned excavation locations.
- Develop plan with defined work zones and document on a site map.
    - Overlay work zones on the Traffic Control Plan

5.2 Unloading/Loading Equipment

During loading and unloading of equipment, follow these precautions:

- Load and unload equipment on level ground
- Inspect equipment upon arrival for deficiencies
- Delineate the unloading area to prevent entry by non-essential personnel. Attempt to unload equipment to minimize movement of equipment across the Site
- Plan the path of movement for heavy equipment. Inspect the equipment and path for encumbrances prior to moving
- Spotter must direct movement of heavy equipment
- If using ramps, verify that they are designed for equipment and any tooling
- If using a trailer, verify that it is designed for the equipment and any tooling, and follow manufacturer's recommendations for load placement

5.3 Working in Proximity of Electrical Lines

Power-line contacts are a potential cause of serious injury and death. All site personnel must understand how to work around power lines to avoid these consequences.

When working around overhead power lines, the power should be de-energized whenever possible, or personnel must comply with Power Line Safe-Approach Distances (see table below)or as outlined by utility company.

The consultant/contractor supervisor must ensure that:

- Signs warning of overhead hazards are in place 7 m (23 ft) on each side of the power line, when equipment will be working near power lines
- Equipment with booms, lifts, rigging, excavator arms, etc. are set up a minimum distance of the full height of the equipment plus 3 m (10 ft) away from the live power lines
- Line voltage is confirmed to determine safe approach distances (contact utility company to confirm)

A **Spotter** must direct the movement of any equipment near overhead power lines and must:

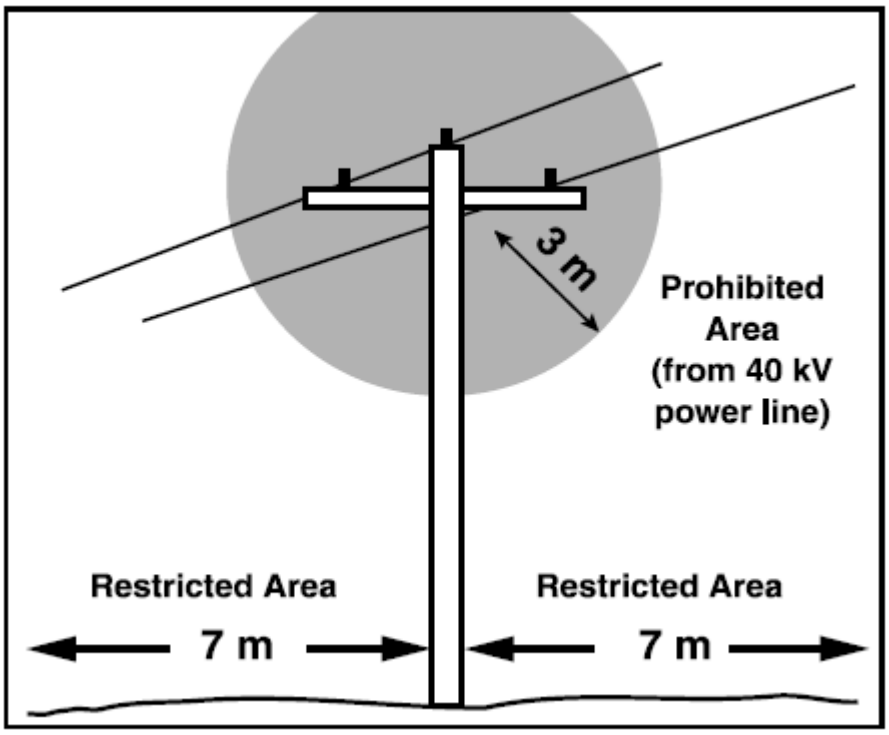
- Be used for any work within 7 m (23 ft) of a power line
- Be clearly visible to the equipment operator
- Have a warning device, i.e., air horn, to alert workers of encroachment on the prohibited area

Minimum clearance requirements for working in proximity to electrical distribution and/or transmission lines are as follows, but may be superseded by more conservative local or regional standards.

Power Line Safe-Approach Distances

Operating Voltage of Overhead Power Line Between Conductors	Minimum Distance for People and Equipment	
(kV)	metres	feet
0.75 - 40	3	10
69 - 72	3.5	12
138 - 144	4	14
230 - 260	5	17
500	7	23

Source: USP Safety Management System Manuals



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Work locations where these requirements cannot be achieved will require a written MOC per our OIMS 7.1 before work begins.

5.4 Equipment Inspection

The primary Consultant/Contractor (CC) is responsible for ensuring that all heavy equipment is fully serviced according to the manufacturer's requirements and is licensed and/or tested in accordance with any necessary regulatory standards.

Inspect heavy equipment daily with the **Heavy Equipment Checklist** unless a more specific equipment checklist is available. Equipment should be serviced and inspected prior to arriving onsite.

Malfunctioning equipment must be taken out-of-service. Repairs should be completed off site if practical. If repairs are done on an EMES site, place containment or impermeable barriers to prevent release of spills to the environment. After repairs, equipment must be re-tested before being used again.

5.5 Trenching and Excavation Hazards

Hazardous Atmosphere

Follow OIMS procedure 6.2 Work Permit for air monitoring.

If hydrocarbons or other site specific contaminants are present or expected in soil and/or groundwater, they must be monitored and the action limits reviewed prior excavating.

Hydrogen Sulfide

If H2S could be present, wear a personal H2S gas monitor below the breathing zone. If H2S is detected, implement the control measures documented in the HASP.

Confined Space / Fall Protection

Follow the EMES Work Permit requirements.

5.6 Soil Classification

Soil types are typically classified based on cohesiveness.

In layered geological strata, the weakest underlying soil layer determines the soil classification.

- **Stable Rock**: Stable rock is exempt from excavation protection/support requirements.
- **Type A Soil** - Most stable: *Compressed strength of 1.5 tons per square foot (144 kilopascal [kPa] or greater)*. Clay, silty clay, and hardpan (resists penetration).
- **Type B Soil** - Medium stability: *Compressed strength greater than 0.5 tons per square foot (48 kPa) but less than 1.5 tons per square foot (144 kPa)*. Silt, sandy loam, medium clay and unstable dry rock; previously disturbed soils unless otherwise classified as Type C; soils that meet the requirements of Type A soil but are fissured or subject to vibration.
- **Type C Soil** - Least stable: *Compressed strength of 0.5 tons per square foot (48 kPa) or less.* Gravel, loamy sand, soft clay, submerged soil or dense, heavy unstable rock, and soil from which water is freely seeping.

5.7 Soil Test Methods

The Competent Person is responsible for classifying the soil. If the Competent Person classifies the soil as Type C, no soil test methods are required. However, tests must be conducted to determine if the soil can be classified as Type A or B. When evaluating soil conditions, review available soil boring logs and geotechnical engineering data. Consider collecing additional geotechnical data if existing data is insufficient. The Competent Person will use a visual test coupled with one or more manual tests. Soil testing methods are provided in Appendix A.

5.8 Excavation Protective Systems

Typical excavation protection methods include but are not limited to:

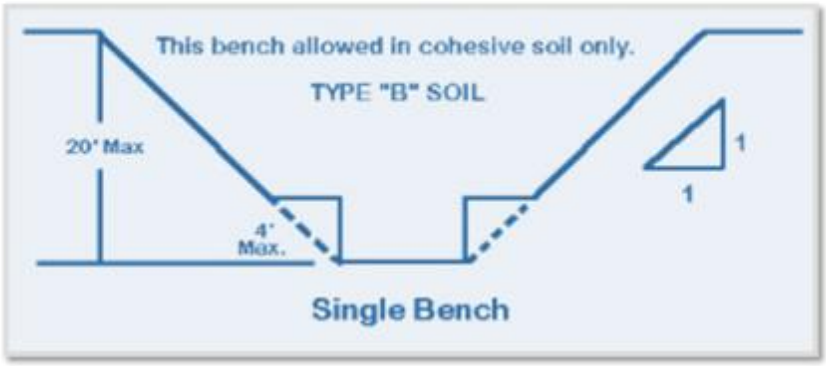
Benching and Sloping

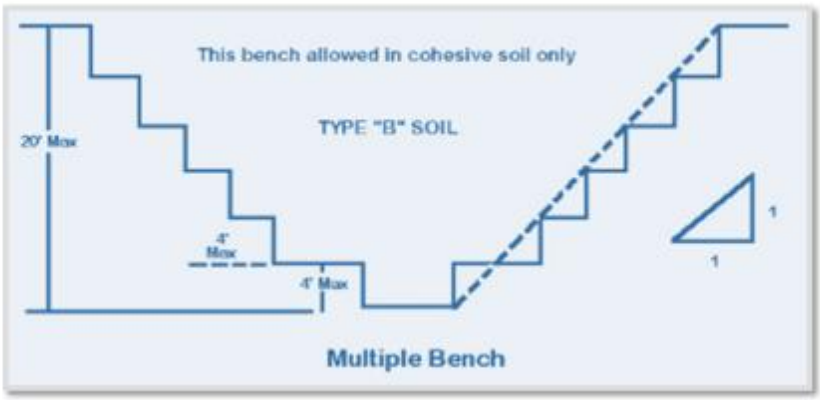
Benching is a method of preventing cave-ins by creating "steps" up the sidewall. The series of steps should be no steeper than the recommended horizontal to vertical ratio for the soil type (see example below). Benching is not permitted for Type C soil. For Type B soil, the excavation is permitted in cohesive soil only.

The bench height must not exceed 4 feet/1.2 meters to a total trench depth of 20 feet/6.1 meters. Subsequent benches must be below the maximum allowable slope degree for that soil type.

Example: Bench for Type B Soil

(Source: OSU, 2006)





Sloping is a method of preventing cave-ins by forming the sides of an excavation into a slope away from the excavation. The default slope for excavations is 1.5 feet (.457 m) horizontal distance to 1 foot (.3 m)vertical distance (34 degrees measured from the horizontal). The slope may be adjusted based on soil type.

The table below lists the maximum allowable slope ratio and degree from horizontal for excavations **less than 20 feet/6.1 meters** based on soil type:

Soil Type	Horizontal: Vertical Ratio	Slope Degree
Stable Rock (Granite or Sandstone)	**N/A - Vertical**	**90°**
Type A (e.g. clay)	**¾ : 1**	**53°**
Type B (e.g. silt)	**1 : 1**	**45°**
Type C (e.g. sand/gravel)	**1 ½ : 1**	**34°**

Refer to Appendix A for the different types of slopes in layered soils.

Shoring

Shoring is a support system for trench/excavation faces used to protect workers and prevent movement of soil, underground utilities, roadways, and foundations. Use horing (and shielding) when the location or depth of the cut makes sloping back to the maximum allowable slope impractical. Additionally, the regulatory agency governing safe work practices in your area may dictate the allowable size and spacing of shoring components which should be considered in the design.

Shoring systems typically consist of:

- **Walers -** horizontal timber or steel beam supporting an upright component, like sheeting
- **Posts, Struts, Rakers or Jacks** - lateral supports between the excavation sidewalls which resist pressure in the direction of its own length
- **Boards or Sheeting** - physical structure against the earth walls used to support the sidewall of the excavation
- **Piles** -vertically oriented steel wide beams or flanges which may be encased in a cylinder of concrete and are placed at prescribed distances on center in a straight line
- **Timber Planks (Lagging)** -span horizontally from one pile to the next and the entire assembly holds back earth
- **Caissons -**interlocking concrete caissons reinforced with internal steel beams

At times, tie-back anchors are used to reinforce the system. These function by placing anchors in the soil behind the potential failure plane and attaching the anchors to the shoring wall with a cable or rod.

Shoring struts/jacks must be installed from the top down. The top (first) strut/jack must be placed approximately 18 inches/0.5 meters below the surface, then the second strut/jack placed according to the shoring design. The first and second strut/jack are installed first support the uprights which is very important for sidewall stability. Reverse the procedure when removing shoring. That is, the struts are removed from the bottom to the top. As the shoring is removed, ensure that the worker(s) removing

the shoring components remain protected from collapse by following the shoring removal procedure specified by the manufacturer and/or the design.

Refer to Appendix A for Shoring Variations.

5.9 Establishing the Work Zones

Establish the work zones using the color-coded zone classifications (**Red**, **Orange** and **Green**) and document the zones on a site layout plan prior to all heavy equipment operations and demolition activities. Update the site layout plan as the work progresses and work zone configurations change.

Spotter location, equipment staging locations and intended equipment travel paths must be defined on the plan.

Specify the location of controlled access/egress for personnel and vehicles, including emergency escape.

Establish check-in procedures before allowing site entry.

Familiarize visiting drivers with the layout of the site, this can be covered during check-in at the site entrance.

By default, anywhere that is not the **Green Zone** or the **Red Zone** is the **Orange Zone**.

If a site does not allow for all three types of work zones due to limitations, the **Orange Zone** or **Green Zone** may be omitted.

Any time an unauthorized person enters a **Red Zone** without the permission of the person controlling access, it should be considered as a near loss with a minimum potential hurt level 4.

Red Zone (Exclusion Zone)

Only personnel essential to the **Red Zone** activity are permitted inside the **Red Zone** while equipment is operating.

A designated person must be assigned to control access to the **Red Zone**.

A site may have multiple **Red Zones**.

Multiple pieces of heavy equipment can operate in a single **Red Zone,** however, two-way radios/CB (no cell phones) must be used and additional spotters and barriers may be needed.

Note: Spotter may need a warning device, like an air horn, to alert workers of encroachment on the prohibited area.

Limit walkways to outside the **Red Zone** when possible. If a walkway must be inside the **Red Zone** then provide barriers according to 5.11 Work Zone Demarcation.

The **Red Zone** must be:

- Greater than the swing zone of any moving part on the heavy equipment
- Greater than the tip zone of the heavy equipment
- Greater than the fall zone of equipment and their contents
- Record clearance distances per machine working in the exclusion zone on the JSA and the equipment

Red Zone must factor in the heavy equipment blind spots.

Sites that have space limitations and can't meet the requirements above must document limitations and additional mitigations (i.e., closing roads/pathways) in the work zone plan.

Certain excavation activities (sheet piling, utility spotting) may require a spotter, watchperson or tagman to be inside the swing zone when the equipment is moving. Consider if a portable, mounted camera could replace the need for a spotter standing within the swing radius. If a person needs to stand within the swing radius, in the fall zone of an elevated load, etc then approval is required by the EMES Area Manager and the following mitigations must be implemented:

- Detailed task specific procedures that address:
  - communications/interactions between personnel in the **Red Zone** and the equipment operator
  - human-machine interface such as where the spotter will be positioned (i.e. in front of the excavator, clear line of site of the operator, etc.)
  - equipment handling (i.e. where hands may be placed when handling, etc.)
- Personnel are in the **Red Zone** only long enough to perform that activity. For example, after sheetpiling is in position, the spotter would leave the area.
- Set back distances for the personnel in the **Red Zone** from excavation edge or other structures will be identified
- Personnel in **Red Zone** will not be permitted to cross under any suspended loads
- Personnel in **Red Zone** will not be permitted to step over or straddle any equipment
- Additional communication requirements (i.e. air horn to announce lifting/dropping activities) should be considered/implemented)

Any deviations from the **Red Zone** requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel

Orange Zone (General Work Zone)

The **Orange Zone** zone, also known as the general work zone, requires PPE and typically a work permit. The color "orange" is to be used as the standard color representing this zone. This is the preferred zone where the spotter is located while equipment is being operated in the red zone.

Orange Zone is beyond the swing, fall, tip zone of any piece of equipment within the **Red Zone**.

Green Zone (No Permitted Work)

Green Zone is the area where no permitted work is conducted. The zone is used to address the needs of personnel on site, for example a rest area or meeting area.

5.10 Work Zone Demarcation

Effective barriers must be used to separate people from heavy equipment.

Natural barriers (heavily forested area, shoreline, drainage ditch) may be used if they will effectively prevent individuals from accessing the work zone / **Red Zone.**

The table below identifies the suitable barriers that must be used when demarcating the **Red**, **Orange** and **Green Zones**.

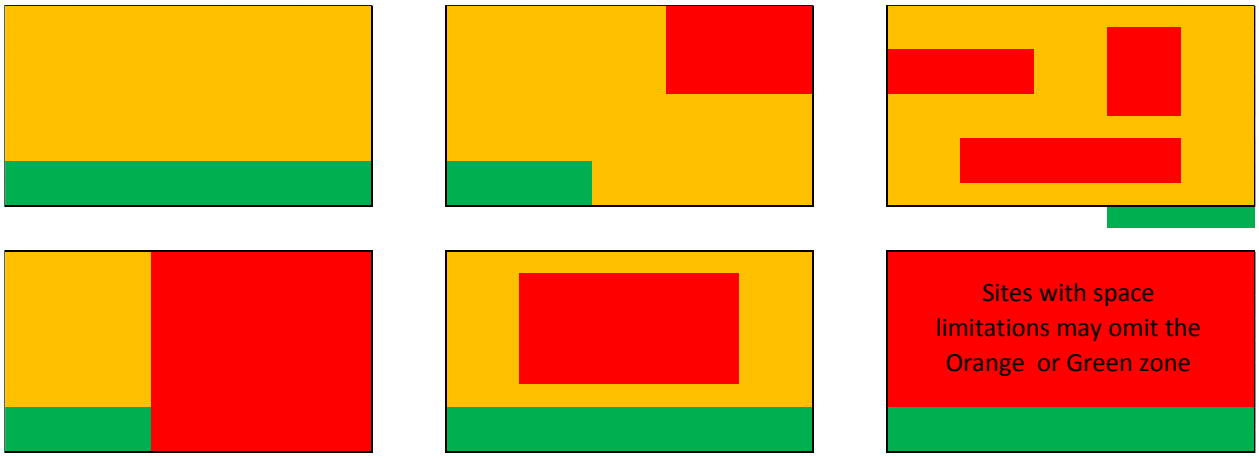
	Red Zone							Orange Zone	Green Zone
	Demolition	Construction		Excavation		Drilling	Cranes / Personnel	Vac Truck	All Activity	All Activity
Chain link / wire mesh permanent fence - 6' - 8'	✓	✓		✓		✓	✓			
Chain link / wire mesh panels - 6' - 8'	✓	✓		✓		✓	✓			
Construction Panels / Hoarding	✓	✓		✓		✓	✓			
Heras Fencing	✓	✓		✓		✓	✓	✓	✓	✓
Chain link panels - 4'		+	*	+	*	✓	✓	✓	✓	✓
Safety snow fencing		+	*	+	*	✓	✓	✓	✓	✓
Barricades		+	*	+	*	✓	✓	✓	✓	✓
Jersey barricades		+	*	+	*	✓	✓	✓	✓	✓
Collapsible barriers		+	*	+	*	✓	✓	✓	✓	✓
Delineators						+	+	✓	✓	✓
Cones						+	+	✓	✓	✓

✓	-Suitable for demarcation
+	-Lower risk and short duration (<12 hour shift, remote location, low traffic, isolated activity)
	-Not suitable for demarcation
	-Not required
*	-Sites with a perimeter fence

Note: Length measurements are not exact and should be adjusted for local units and measurements. For example, 6 ft may be represented as 2 m or 1.8 m.

Note: If the exclusion zone requirements dictate that the **Red Zone** demarcation should extend beyond the limits of the site perimeter fence, e.g. into a sidewalk or active traffic lane of a roadway, ensure that such area is secured per the above requirements and per the Traffic Control Plan requirements.

Detailed descriptions of barrier types and their appropriate uses are provided in **Appendix A**.



Examples of acceptable Red / Orange / Green Zone configurations.

5.11 Setback Distances

The Competent Person determines safe setback distances for personnel, equipment, spoils and other items to prevent collapse/accidental entry of personnel and equipment. Base the setback upon site-specific factors - including but not limited to - soil types, type and weight of equipment, space constraints, tasks and personnel roles.

If local, regional, or national regulations specify the setback distances for excavation activities (spoils, equipment, personnel), those distances, at a minimum, must be followed. If such regulations do not exist, the Competent Person must establish safe setback distances, but at minimum the setback distances will be:

- Soil - 2 feet/.6 meters
- Support equipment - 5 feet/1.5 meters away from any open excavation, mark the locations of the excavation with brightly painted markers/cones/barricades
- Personnel - 6 feet/2 meters unless a barrier protecting personnel from the excavation edge is present.

5.12 Entering and Exiting an Excavation

It is preferred that personnel do not enter an excavation. If personnel must enter an excavation then follow the Work Permit Procedure 6.2 and these safety rules:

- The excavation must be inspected by a Competent Person

If personnel must enter an excavation that is 4 feet/1.2 meters or deeper:

- Protect excavation sidewalls from collapse - shoring, sloping, benching, shielding or combination of methods.
- Protective system must have the capacity to resist the expected loads on the system.
- Position stairway, ladder, ramp, or other safe means of egress so individuals do not have to travel more than 25 feet/7.6 meters to exit an excavation. Do not use metal ladders when electric utilities are present.

Isolate all lines entering an excavation to prevent liquid or gas from discharging into the excavation.

No worker may be in an excavation:

- while material is being added to or removed from the excavation
- when an underground storage tank or other structure is unsupported or there is the possibility that the unit may roll
- when standing water has or is accumulating or when it is raining
- until a suitable rescue plan is developed should a worker become disabled.

5.13 Excavation and Trench Inspection

The Competent Person conducts daily inspections of excavations, trenches, adjacent areas, and protective systems for evidence of possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions. The following events may create additional hazards and require an additional excavation inspection:

- As dictated by the work being done in the excavation
- After every rainstorm
- After other events that may increase hazards, such as snowstorm, thaw, earthquake, dramatic change in weather, etc.
- When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur
- When there is a change in the size, location, or placement of the spoil pile that may affect the integrity of the excavation
- When there is any indication of change or movement in adjacent structures

During the inspection, the Competent Person will check for:

- hair-line openings along the failure zone that would indicate tension cracks
- existing utilities that indicate that the soil has been previously disturbed, and, if so, what sort of backfill was used
- layered geologic structuring
- signs of bulging, boiling, or sloughing
- signs of water seeping from the sides of the excavation or from the water table
- signs of foundations or other intrusions into the failure zone not previously identified
- under-mining, surcharging, and the spoil distance from the edge of the excavation

When unsafe conditions are identified, personnel must stop work, leave the unsafe area, and report the condition to the Competent Person to ensure corrective actions are implemented.

5.14 Roles and Responsibilities

Competent Person

A Competent Person must:

- classify the soil
- oversee installation of the excavation protective system
- develop excavation inspection schedule and complete excavation inspections
- establish a safe setback distance for personnel, equipment, spoils, and other items
- detect conditions that may result in a cave-ins, failures in protective systems, hazardous atmospheres and other hazards.
- prevent pedestrian and vehicle exposure to open excavations with acceptable barriers
- secure excavations that are left open after work hours (fencing, coverings, etc.)
- communicate to the work team who the spotter is each day

A Competent Person must inspect the excavation, protective system and surrounding area daily, after significant rain or snow events and as needed throughout the shift.

Spotter

A spotter must:

- not conduct other tasks
- control entry/exit of the exclusion zone and prevent personnel from entering while equipment is moving/engaged
- stop work if the **Red Zone** is compromised
- guide vehicle and heavy equipment movements and/or relocations
- inspect the area around, beneath and overhead of equipment and give the signal to the operator that operations may begin
- know the minimum clearance distances from power lines and other overhead hazards
- maintain communication with the operator by using a standard set of signals (hand, verbal, or radio communication). Signals must be developed, documented and always used (no cell phones allowed in the exclusion zone)

- It is preferable that the spotter be positioned outside of the **Red Zone**, but if a spotter must be in the **Red Zone** they must be in a designated area with a physical barrier (vehicle, elevated platform or additional barriers) that is outside of the:
  - swing zone, tip zone and fall zone of the heavy equipment
  - lifted load swing and fall zone
  - line of fire of lifted loads
  - fall zone of debris

If the spotter must enter the swing zone, the spotter will notify the operator. The operator must shut-off the equipment with boom/arm on the ground and show their hands to indicate it is safe to approach.

If multiple **Red Zones** are necessary or if more than one piece of equipment is working in one **Red Zone**, one spotter may be adequate if there is a clear line of sight and the spotter has the ability to control the zone(s). Radios would be required since hand signals would not be adequate when two pieces of equipment are operating.

Two persons are required when working near overhead lines or near structures that must be protected. One person will control access and one person will serve as the spotter to guide the operator.

Equipment Operator

Equipment operator responsibilities:

- On a daily basis, or more frequently when necessary, inspect the equipment and document on the Heavy Equipment Checklist. Correct any deficiencies prior to using equipment.
- If non-essential personnel enter the exclusion zone, shut-off the equipment with boom/arm on the ground and show your hands to indicate it is safe to approach
- Know the clearance from overhead hazards (e.g., power lines, overpasses, overhangs)
- Be aware of hazardous atmosphere conditions and vapor concentrations as the equipment may be an ignition (“flashing”) source
- Verify the area is clear of all nonessential personnel before operating the machine and do not allow passengers to ride outside of equipment cabs
- If any part of the cab is open (such as a window) or when operators exit an enclosed cab, then operators must wear the minimum PPE specified in OIMS Procedure 5.2.2.

- If an operator is working inside an enclosed cab, then the minimum PPE may be changed if documented in the JSA.

5.15 Safe Equipment Operations

- Operate equipment at speeds slow enough to maintain control. Travel slowly over rough or slippery ground and when traveling in congested areas. Avoid or be aware of previously excavated areas that may be soft
- Equipment operators and drivers MUST not operate the machine if the Spotter is not present, not visible, or in an incorrect spotting position
- Remain in operator's seat at all times when starting and operating equipment. Wear seatbelt or restraint when operating the machine
- Ensure a communication plan is established with all spotters. Stop equipment operation if communication is lost or spotter is not available
- Use three points of contact when getting on or off equipment. Do not jump from equipment. Know pinch points and rotating parts on the machine
- Do not drive across a steep slope. Drive straight up and down the slope to prevent roll over
- If a turn is required on an incline, turn wide and slow with the bucket carried low
- Carry the bucket low for maximum stability and visibility while traveling
- Backup alarms are required and backup cameras are recommended on all mobile equipment in areas where workers could be struck
- The equipment bucket must never be used as a work platform or personnel carrier

5.16 Stockpiling Soil

Refer to Setback distances (Section 5.12) for proper placement of excavated material (spoils).

Place stockpiles away from drainage systems to minimize sediment transport.

If a stockpile will remain on-site overnight, or if weather conditions indicate the chance for precipitation, consider the following:

- Cover the pile with water repellent material
- Install silt fencing or construct a berm around the base of the pile to prevent transport of sediment
- Apply other control methods appropriate to the site

Consider implementing wind erosion measures like wetting or covering stockpiles.

If excavated soil is contaminated, place stockpiles on top of polysheeting and then cover and secure to prevent cross contamination or contaminant migration.

To ensure safe, secure, and efficient covering practices, consider the stockpile size and shape when moving soil.

5.17 Soil Disposal/Loading

Choose an appropriately sized machine to easily collect the soil, turn, and load the truck without causing safety hazards.

Consider the truck hauling size during planning to ensure truck can access the site and/or comply with any road restrictions.

Follow Waste Management procedures in OIMS System 6.5 Environmental Management.

Identify or create a traffic route with flat and solid drive surfaces in advance of soil loading activities.

Prior to loading, check that the waste containment pin, safety latches, and locks (if applicable) are in the closed position. These safety devices should only be unsecured when the truck reaches its destination and is preparing to dump its load;

Prior to loading, communicate to the truck driver the loading procedure and method of checking the load. Secure the load while the driver remains in the cab. If this is not possible, the driver may be allowed to inspect the load and/or cover the load after the area has been secured. At this time, the loading equipment should be locked-out or shut-off with the bucket on the ground and “show me your hands” used.

During loading, always ensure that the driver does not leave the cab of the vehicle. If site specific procedures prevent the driver from being inside the cab while the truck is being loaded, then the driver will position the vehicle for loading and then move to the green zone while the truck is loaded. The driver shall set the emergency brake prior to leaving the cab and chock the wheels ..

Trucks must not be moving when the tarp is being raised over the truck to cover the load to prevent the driver from striking overhead lines on his way out of the site.

A WORKER IS NEVER ALLOWED TO CLIMB INSIDE OF THE DUMP TRUCK TRAILER OR STAND ON TOP OF THE CAB WHILE ON AN EMES SITE.

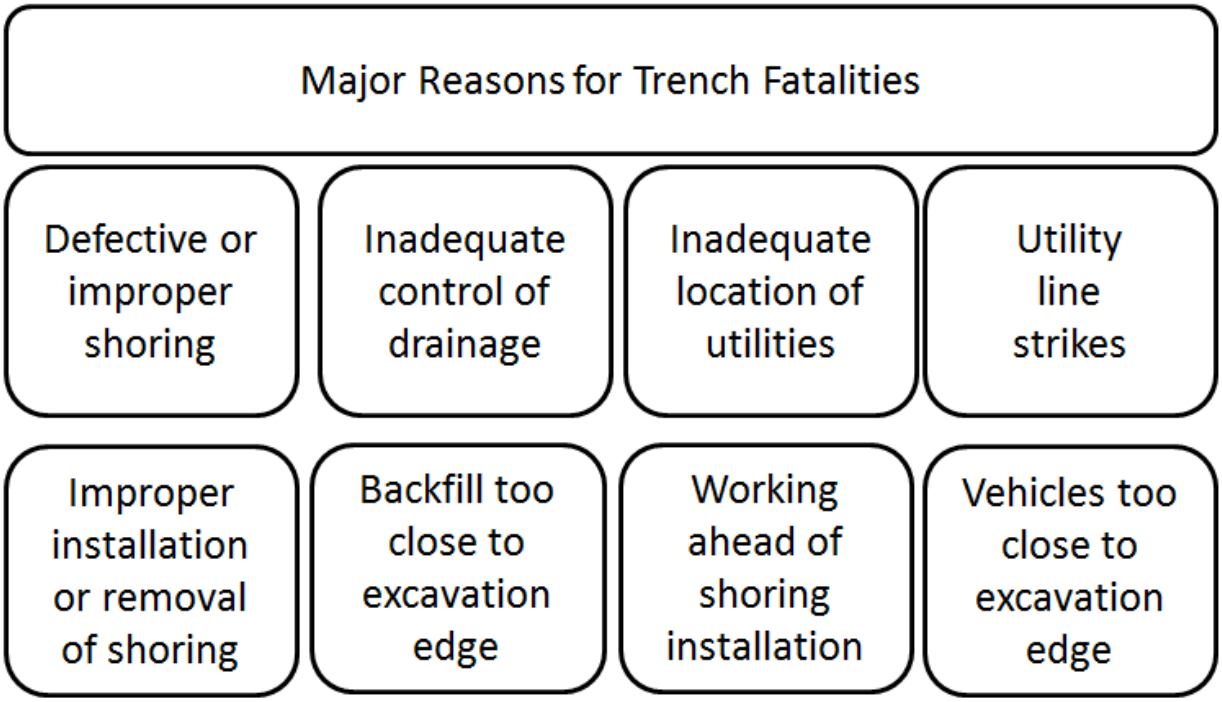
If the truck is contaminated, a truck wash/wheel wash (decontamination procedure) must be designed to avoid cross contamination of surrounding soils.

6 APPENDIX A

This appendix includes guidance and reference material that may be considered when planning and executing excavation activities. This material is in addition to the minimum requirements in section 1.

6.1 Introduction

Incidents involving heavy equipment have a higher probability of resulting in a fatality than other types of incidents.



Trench incidents can be prevented by following safe excavation practices.

6.2 Job Planning and Preparation

Even if you have experience performing or supervising excavation, trenching, shoring, and backfilling projects, it is important to approach each new project with great care and preparation. Many on-the-job accidents result directly from inadequate initial planning and/or complacency. Waiting until after work has started to correct a problem slows the work, may add cost, and increases the possibility of an incident. Flow charts to aid in planning an excavation or trench project are provided in this Appendix**.**

6.3 Identify and Define Work Scope

Prior to beginning any excavation work and if the work scope changes, the objectives, including size and depth of the excavation should be clearly defined and the following should be considered/discussed:

- The limits of the work area and associated site-specific hazards (traffic, proximity of nearby structures and sensitive receptors, soil and groundwater information, utilities, weather, etc.).
- EMES OIMS procedures, specifically but not limited to:
    - 3.1.2 Project Orientation and Daily site Safety Meeting
    - 3.1.3 Subsurface Structures Identification
    - 3.1.4 Post Construction and Excavation Inspection

    - 5.2.1 Loss Prevention System
    - 5.2.2 HASP
    - 6.2.1 Work permit
    - 6.4.1 Regulatory Compliance
    - 6.4.3 Permit Tracking
    - 6.5.1 Waste Management and Disposal
    - 7.1.1 Management of Change – Non Personnel
    - 8.1.2 Field Activity Notification
    - 9.1.1 Incident Investigation and Reporting
    - 10.1.2 Emergency Preparedness
- Personnel involved and their roles. Make sure to communicate critical expectations and rules to be followed;
- Review available soil boring logs, geotechnical engineering data, and/or geotechnical survey to understand site-specific subsurface conditions. A pre-mobilization soil boring investigation should be considered if site-specific data is not available or inadequate;
- The equipment involved and associated limitations;
- The excavation or trench protective system design selected and associated limitations;
- If necessary, video, survey or photographic documentation of area prior to and after excavation or shoring installation, including the entrances and exits to the site.

6.4 Job Safety Analysis

A JSA must be generated and reviewed for every major work task. These JSAs will serve to help ensure that the task procedure is outlined and associated potential hazards are identified and mitigated. The JSAs should be created by job experts which would include qualified and experienced personnel (operators, on-site workers, safety officers, and project managers), and must be communicated to appropriate personnel and followed. JSAs should be updated as needed. Applicable excavation work tasks requiring JSAs include, but are not limited to:

- Utility Mark Out
- Soft-Digging
- Excavating
- Soil Loading
- Equipment Loading and Unloading
- Dewatering
- Shoring/Shielding
- Backfilling
- Sample Collection

6.5 Barriers

The most commonly used demarcation barriers are:

- Chain-Link Fence
    - Available in various heights.
    - Setup can be time consuming.
    - Effective at keeping vehicles and pedestrians out of the work area
    - Can be fitted with access gates.
    - Somewhat permanent.

- Chain-link Panels
    - Framed chain-link panels supported on free standing platforms.
    - Available in various heights (commonly 4ft (1.2m), 6ft (1.8m)) and 7.5ft (2.3m).
    - Setup is faster than regular chain-link.
    - Can be maneuvered relatively easily.
    - Frames make the panels heavy and burdensome.
    - Stackable and easy to store.
    - Can be fitted with access gates.
    - Effective at keeping vehicles and pedestrians out of the work area
    - Less permanent than chain-link.

- Wire mesh/Heras fencing
  - Panels of mesh fencing supported on rubber bases.
  - Most readily available at 6.5 feet (2m).
  - Easy to setup since each panel is lightweight (1 person set-up)
  - Mesh is tighter and stronger than chain-link.
  - Effective at keeping vehicles and pedestrians out of the work area.
  - More difficult to cut than chain-link and bracing devices are available to secure panels together.

- Construction panels/hoarding
  - Available in timber or steel panels.
  - Solid panels eliminate visibility.
  - Panels secured together using braces.
  - Very secure, and can have anti-climb devices added.
  - Access gates available.
  - Closest to permanent fencing available.
  - Effective for longer duration construction and demolition projects, expensive for application on shorter duration projects.

- Barricades
  - Plain steel or reflective free standing panel, composed of vertical support pillars/posts with horizontal cross members.
  - Minimum of 36 inches (3-foot/0.9m) tall (from the ground to the top of the barricade), can be up to 60” (5ft/1.5m) tall.
  - Quick to setup and take down.
  - Panels do not interlock, providing gaps in delineation.
  - Effective for traffic control
  - Not effective for security including pedestrian access.
  - Widely used for traffic control where lane closure or traffic diversion is required,
  - Not effective for demarcation of exclusion zones, unless in very remote locations.

- Jersey barricades (k-rail or water filled barriers)
  - Available in plastic or concrete. The plastic variety are usually filled with water, sand, soil, or concrete.
  - Usually 36-inches (1 m) in height, but there is a 42-inch (or a little over 1 m) variation.
  - Concrete variety requires lifting equipment, for example forktruck style or some use a hook and cable lifting system.
  - Traditionally used to separate lanes of traffic or reroute traffic.
  - Effective for traffic control or pedestrian control (walking paths)
  - Not effective for security/pedestrian access (height)
  - Not effective for demarcation of exclusion zone, unless in very remote locations.

- Collapsible or Expandible barriers
  - Accordion style barrier.
  - Approximately 36 inches (0.9m) tall.
  - Quick and easy setup.
  - Usually bright and visible.
  - Provides visible delineation.

- Safety fencing (snow fencing)
  - Plastic mesh commonly supported by T-posts or fence posts.
  - Bright orange color for visibility.
  - Easy to setup and reusable.
  - Available in heights of 4-foot (1.2m) and greater.
  - Easily penetrated by vehicles and personnel. Easy to cut.

- Delineators / Bollards
  - Free standing supported on a rubber base.
  - Usually 28-inches (0.7m) to 42-inches (1m) in height.
  - Brightly colored and can have reflective bands.
  - Available with a Loop or 'T' top for application of connectors.
  - Can be knocked over or blown over easily.
  - Delineators are a warning device and not an effective barrier/fence for demarcation of an exclusion zone.

- Cones
  - Available in bright and fluorescent colors and can have reflective bands.
  - Usually range from 12-inches (0.3m) to 36-inches (0.9m) in height.
  - Cannot readily secure construction tape to a cone.
  - Can be knocked over, blown over, or moved easily.
  - Cones are a warning device and not an effective barrier/fence for demarcation of an exclusion zone.
  - Potential use is to identify isolated hazards.

6.6 Evaluate Structures/Utilities in Excavation Area

Prior to the excavation, an inspection of the work area is completed to identify:

- overhead and underground utilities.
- other structures (including tanks, pipelines, tunnels, foundations, trees etc.) to prevent injury to workers and damage to identified structures.
- Pre-construction conditions of potentially affected structures

Affected utilities must be managed to ensure that utility energy (electricity, compressed air, steam, natural gas, domestic water, etc.) will not be encountered when working near the utility. This may be accomplished by using isolation methods including lock out/tag out (LOTO), line blocking, line bleeding and/or blinding.

Remember that isolation methods should be applied to ALL forms of potentially hazardous energy including potential energy (for example but not limited to mechanical springs in tension or compression, compressed gas cylinders, counter weights, etc.) and kinetic energy (rotating flywheel, moving parts, rolling components, parked vehicles, etc.) that may be part of a particular machine or utility system.

6.7 Public "One-Call" / Call Before You Dig

Governing laws may require anyone who digs to notify utility companies before starting. Across the globe, there are "call before you dig" networks in place to assist in the location of public underground utilities.

These networks assist excavators, contractors and property owners by notifying the appropriate utilities and requesting a utility mark-out. These services are typically free and utility companies respond to the work area to identify the location of underground facilities.

Callers are given a permit or ticket number as confirmation. On projects with a longer duration, tickets may need to be renewed.

Project teams should be familiar with the limitations of utility mark outs. Below are some of the limitations with utility mark outs:

- Only companies that subscribe to the public utility mark out service are notified/located
- Utility markings can be inaccurate, estimated or missed
- Not all utility lines are known
- Markings can be hard to read
- Public utility markings will stop at the property boundary (a private utility locating company can be hired to locate utilities on private property)
- Dig location may be misinterpreted by those marking the utility location
- Utilities installed by the property owner may not be marked (gas, electric, sprinklers, cable, telephone)

Experience has shown that sewer systems are often not marked during a public mark-out and certain situations such as government right-of-ways may require additional permitting or notifications for subsurface clearance. Note that this list may not include every geographic area and network. Be sure to contact the appropriate governing entity and/or utility if a number is not shown for a geographic area or network.

6.8 Methods of Underground Utility Locating

There are various methods to detect underground utilities. Each of the methods require specialized equipment and knowledge, and should be performed by qualified personnel or contractors.

The EMES OIMS Procedure 3.1.3 Subsurface Clearance, provides guidance on which technology or combination of technologies to use. Limitations exist for the various technologies, so it is best to use multiple technologies in addition to a public and private utility mark-out.

Provided below is a brief description of the most common methods that might be used to locate utilities.

- **Magnetic Field Based Locators** - Magnetic Field (MF) locators are the most common technology used to determine the location and depth of existing buried metallic items, detecting both ferrous and non-ferrous metals, across varied soil moistures. MF based methods are able to identify both horizontal and vertical locations in most situations and are less costly to perform compared to other technologies.

Despite the advantages of MF technologies, there are several limitations including: only applicable to metallic items, require access to a cable or a pipe for accurate performance, performance decreases proportionally with the length of horizontal metallic signature present and MF are susceptible to signal congestion.

- **Ground Penetrating Radar Based Buried-Structure Detectors -** Ground Penetration Radar (GPR) works on the principle of radiating electromagnetic waves at different frequencies into the ground and analyzing the reflections from the anomalies that are encountered by the electromagnetic waves. GPR can be used to detect both metallic and non-metallic objects under favorable soil conditions as well as anomalies in soil stratigraphy from a previous excavation. GPR does not require physical access to pipes or cables and is a non-destructive method that can produce 3D imagery and mapping over a large area efficiently.

The GPR is more costly than MF detection. Also, resolution decreases with depth and through reinforced concrete. The GPR is also susceptible to clutter noise associated with non-uniform soils. Additional GPR limitations include difficult to operate in uneven terrain or snow cover and subsurface plastic structures.

- **Acoustic Based Plastic Pipe Locators -** Acoustic Based (AB) locators operate by using an acoustic transducer to apply a sound wave into a gas or Geophones or accelerometers are used to identify the peak vibration amplitude on the surface. This location of peak amplitude can be used to infer the location of the buried plastic pipe.

This technology is effective over limited distances and depths. AB is not susceptible to cross over signals and is effective in numerous soil and surface conditions. However, this technology is least effective in sandy and dry soils. It also requires a physical connection to the pipe and does not provide a depth estimate.

water stream within a pipe. Those sound waves propagate along the pipe and through the surrounding soil, and eventually to the ground surface. **Active Probes, Beacons or Sondes for Pipes** - These methods typically consist of a transmitter housed in a tubular enclosure that can be pushed or pulled through a pipe or conduit. The signal from that transmitter is detected on the ground surface directly above the transmitter. The strength of the signal is used to infer depth.

These devices can typically operate within any pipe where they can be pushed or pulled though and are capable of indicating long distances and depths without signal loss. This is useful for locating storm and sanitary sewers. Downsides to these devices are that they require access to the interior of the pipe and due to friction; the distance that the device may be pulled or pushed may become limited.

- **Cesium Magnetometer -** The Cesium Magnetometer (CM) operates in a similar fashion as the MF technologies and is often used in tandem with them.

Some of the advantages associated with CM include the ability to detect metallic objects with a very small horizontal profile that might not be detected by MF technologies and CM can cover a large area fairly quickly.

CM cannot be used with concrete containing rebar or large amounts of ferrous objects on the surface (cars, fences and buildings) and is only marginally effective with non-metallic items. Moist soil also degrades its locating ability.

6.9 Subsurface Structures Identification

The ExxonMobil OIMS Manual Procedure 3.1.3 Subsurface Clearance provides minimum guidance for subsurface clearance activities, which must be followed prior to and during ground disturbance activities at all ExxonMobil project sites.

6.10 Soil Test Methods

Soil testing methods are:

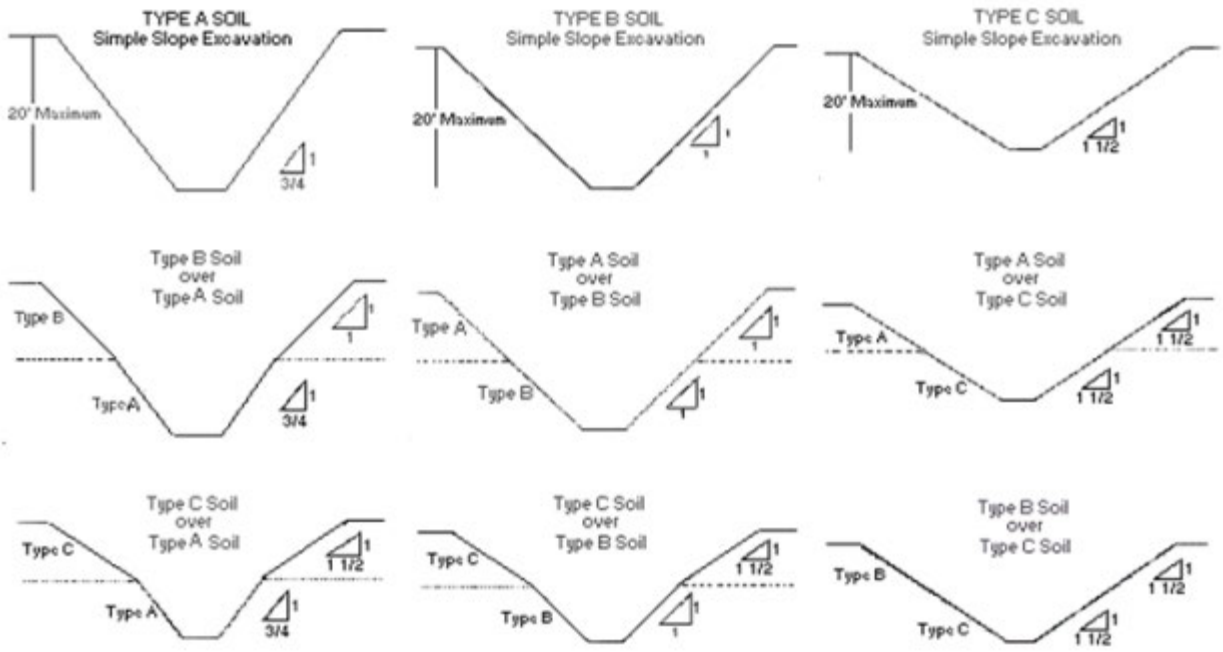
- **Pocket Penetrometer** - Penetrometers are direct-reading, spring-operated instruments used to determine the unconfined compressive strength of saturated cohesive soils. Once pushed into the soil, an indicator sleeve displays the reading;
- **Shearvane (Torvane)** - To determine the unconfined compressive strength of the soil with a shearvane, the blades of the vane are pressed into a level section of undisturbed soil, and the torsional knob is slowly turned until soil failure occurs;
- **Thumb Penetration Test** - The thumb penetration procedure involves an attempt to press the thumb firmly into the soil in question. If the thumb makes an indentation in the soil only with great difficulty, the soil is probably Type A. If the thumb penetrates no further than the length of the thumb nail, it is probably Type B soil, and if the thumb penetrates the full length of the thumb, it is Type C soil. The thumb test is subjective and is therefore the least accurate of the methods;
- **Dry Strength Test** - Dry soil that crumbles freely or with moderate pressure into individual grains is granular (Type C). Dry soil that falls into clumps that subsequently break into smaller clumps (and the smaller clumps can be broken only with difficulty) is probably clay in combination with gravel, sand, or silt (Type B). If the soil breaks into clumps that do not break into smaller clumps (and the soil can be broken only with difficulty), the soil is considered unfissured (Type A) unless there is visual indication of fissuring;
- **Plasticity or Wet Thread Test** - This test is conducted by molding a moist sample of the soil into a ball and attempting to roll it into a thin thread approximately 1/8 inch/3 millimeters (mm) in diameter (thick) by 2 inches/50 mm in length. The soil sample is held by one end. If the sample does not break or tear, the soil is considered cohesive (Type A or B); and/or,
- **Visual Test -** A visual test is a qualitative evaluation of conditions around the site. In a visual test, the entire excavation site is observed, including the soil adjacent to the site and the soil being excavated. If the soil remains in clumps, it is cohesive (Type A or B); if it appears to be coarse-grained sand or gravel, it is considered granular (Type C).

6.11 Sloping Configurations

The different types of slope excavations in layered soils are:

Slope Configurations: Excavations in Layered Soils

(Source: OSHA, Excavations)



6.12 Shoring Variations:

Hydraulic Shoring - Hydraulic shoring is the use of hydraulic pistons (strut or waler system) that can be pumped outward until they press up against the trench walls. They are typically combined with steel plates or plywood. Shoring of this type are generally used in a waler system, as an assist to timber shoring systems, or in shallow trenches where face stability is required. Hydraulic shoring should be checked at least once per shift for leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, and any other damaged or defective parts.

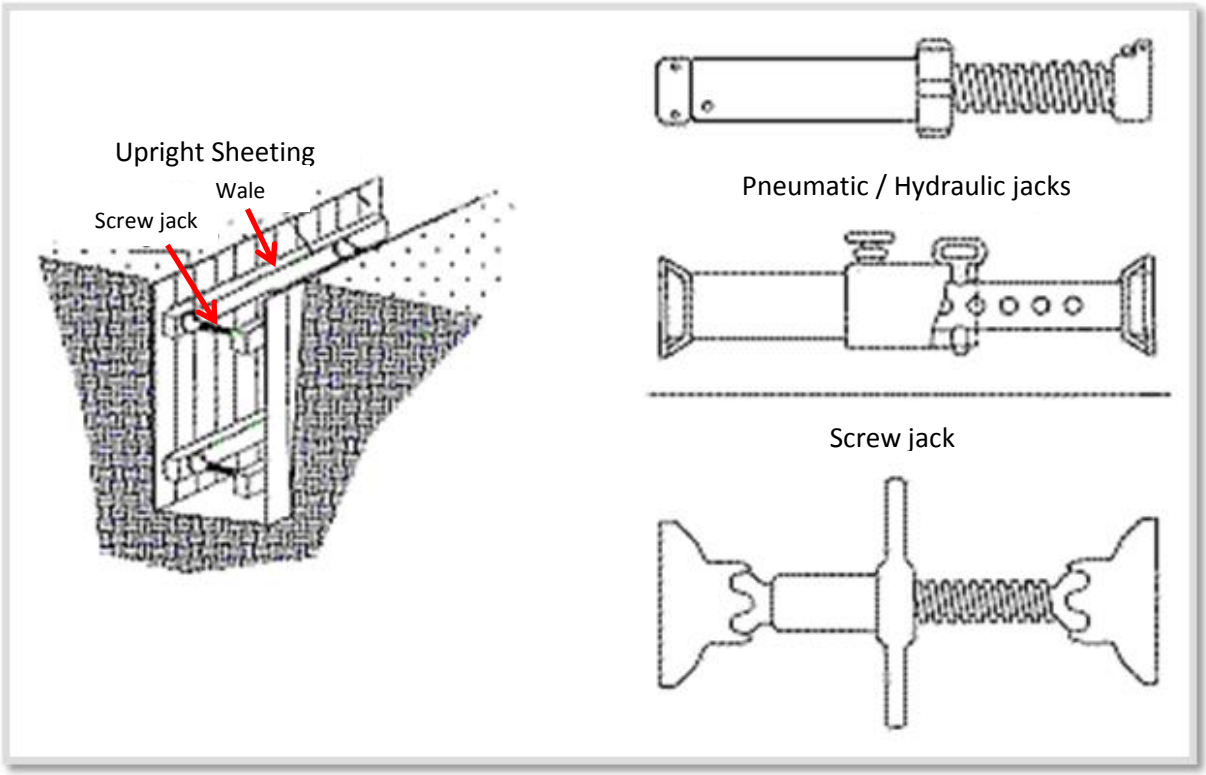
Hydraulic shoring provides a critical safety advantage over timber shoring because workers do not have to enter the trench to install or remove hydraulic shoring. Other advantages of most hydraulic systems are that they:

- Are light enough to be installed by one worker;
- Are gauge-regulated to ensure even distribution of pressure along the trench line;
- Can have their trench faces "preloaded" to use the soil's natural cohesion to prevent movement; and,
- Can be adapted easily to various trench depths and widths.

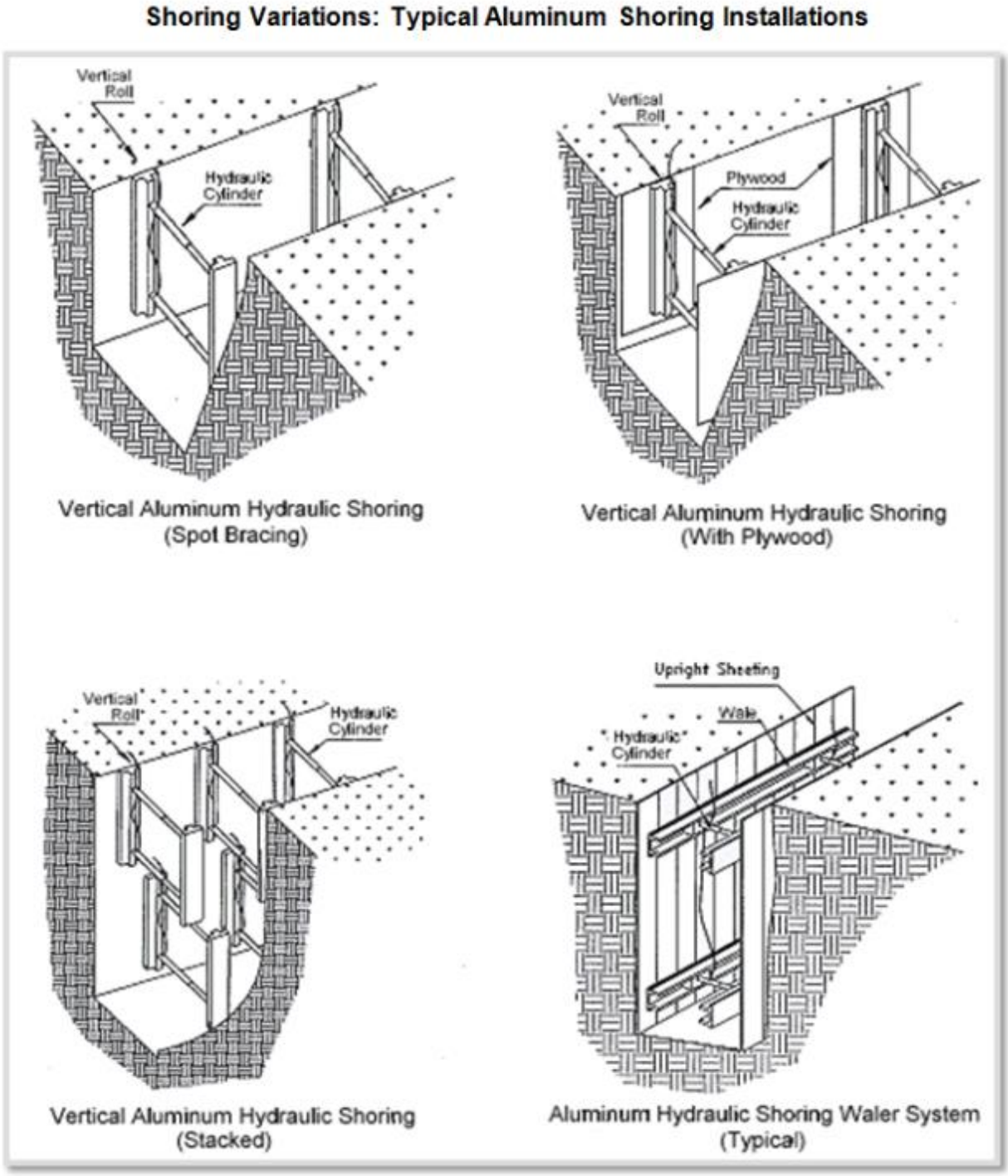
Pneumatic shoring - Pneumatic shoring works in a manner similar to hydraulic shoring. The primary difference is that pneumatic shoring uses air pressure in place of hydraulic pressure.

Screw Jacks - Screw jack systems differ from hydraulic and pneumatic systems in that the struts of a screw jack system must be adjusted manually. This creates a hazard because the worker is required to

be in the trench in order to adjust the strut. In addition, uniform "preloading" cannot be achieved with screw jacks, and their weight creates handling difficulties.



This figure has a diagram showing the various components of upright sheeting, along with pneumatic/hydraulic jacks and a screw jack. The various jacks press up against the wal, which in turn keep the shoring in position. (Source: OSHA, Excavations)



This figure illustrates four vertical aluminum hydraulic shoring variations. (Source: OSHA, Excavations)

APPENDIX H

ExxonMobil E&PS Minimum Safety Expectations
Subsurface Clearance Procedure and ExxonMobil E&PS
Excavation Minimum Safety Expectations

SUBSURFACE UTILITY CLEARANCE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**2**

TABLE OF CONTENTS

APPENDICES

1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has instituted the following program for completing proper utility mark-outs and for conducting subsurface clearance activities. This establishes a method to ensure, to the greatest extent possible, that utilities have been identified and contact and/or damage to underground utilities and other subsurface structures will be avoided.

2. SCOPE AND APPLICABILITY

The Subsurface Utility Clearance Management Program applies to all Roux employees, its contractors and subcontractors. Employees are expected to follow this program for all intrusive work involving Roux or other personnel (e.g., contractors/subcontractors) working for Roux unless the client's requirements are more stringent. Deviation from the program regardless of the specific work activity or work location must be pre-approved based on client's site knowledge, site experience and client's willingness for the use of this program. Any and all exceptions shall be documented and pre-approved by the Project Principal and the Office Manager.

3. PROCEDURES

3.1 Before Intrusive Activities

During the project kick-off meeting for intrusive activities the PM will review the Roux Subsurface Utility Clearance Checklist and Utility Verification (Appendix C) / Site Walkthrough Record (Appendix D) and the below bullet points with the project field team:

(Please note that these are intended as general reminders only and should not be solely relied upon.)

- Ensure the Mark-out / Stake-out Request Information Sheet (or one-call report) is complete and accurate for the site including address and cross streets and review for missing utilities. (Note: utility mark-out organizations do not have contracts with all utilities and it is often necessary to contact certain utilities separately such as the local water and sewer authorities).
- Have written confirmation prior to mobilizing to the site that the firm or Roux personnel performing the intrusive activity has correctly completed the mark-out notification process including requesting mark-outs, waiting for mark-outs to be applied to ground surfaces at the site, and receiving written confirmation of findings (via fax or email) from utility operators for all known or suspected utilities in the proposed area of intrusive activity, and provided utility owner written confirmation to Roux personnel for review and project files documentation.
- Do not begin any intrusive activity until all utilities mark-out has been completed (i.e., did all utilities mark-out the site?) and any unresolved mark-out issues are finalized. Perform a site walk to review the existing utilities and determine if said utilities have been located by the utility locators.

  (Note: The Tolerance Zone is defined as two feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks and other non-cylindrical utilities) of a utility and two feet from the outside edge of any subsurface structure.)
- Install Pre-Clearance exploratory test holes (e.g., hand-dug test holes or other soft digging techniques) for the first 5-ft below land surface (BLS) at each location prior to conducting mechanized intrusive activities. The size of the pre-clearance exploratory test hole should be at a minimum twice the diameter of any downhole tool or boring device. (Note: Pre-Clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for PM and PP to evaluate alternative approaches for the project. Alternative approaches will need to be pre-approved by the OM.

- For excavations, all utilities need to be marked and then exposed by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft digging around the perimeter). In these cases, dig in small lifts (<12" for first 5 feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes performed to expose the utility. Once structures have been verified a minimum clearance of two feet must be maintained between the utility and any powered equipment.
- In addition, the following activities should be conducted:
  - Review the work scope to be performed with the site owner/tenant to determine if it may impact any utilities;
  - Attempt to procure any utility maps or historic drawings of subsurface conditions of the site;
  - **Determine the need for utility owner companies to be contacted or to have their representatives on site**;
  - Where mark-outs terminate at the property boundary, consider the use of private utility locating / GPR / geophysical-type services which may be helpful in locating utilities. Use of private utility locating firms, however, does not eliminate the legal requirement for the Excavator firm to submit a request for Public Utility Mark-outs. Also, the information provided by the service may be inaccurate and unable to locate subsurface utilities and structures in urban areas, landfills, urban fill areas and below reinforced slabs, etc. They should not be relied upon as the only means of performing utility clearance;
  - Documented description of the dig site which is included in the projects Health and Safety Plan (HASP) and one call report will be maintained in the field and distributed amongst Roux personnel its contractors and subcontractors; and
  - Documentation of the actual placement of mark outs in the field shall be collected using dated pictures, videos and/or sketches with distance from markings to fixed objects. All documentation shall be maintained within the project file.

3.2 During Intrusive Activities

The PM, field team lead or personnel performing oversight is to:

- Ensure the mark-out remains valid. (In certain states there are limits regarding the duration of time after the mark-out was applied to the ground surface work can be started or interrupted.) Additionally, the mark-outs must be maintained, documented, and in many cases refreshed periodically to be considered valid, this will be accomplished through calls to the one call center.
- Ensure intrusive activities are only performed within the safe boundaries of the mark-out as detailed in the One-Call Report.
- Halt all work if intrusive activities have resulted in discovery of an unmarked utility. Roux personnel shall notify the facility owner/operator and the one call center. All incidents such as this will be reported as per Roux Incident Investigation and Reporting Management Program.
- Halt all work if intrusive activities must take place outside of the safe boundaries of a mark-out and only proceed after new mark-outs are performed.
- Halt the intrusive activities and immediately consult with the PP if an unmarked utility is encountered.
- Completing any subsurface utility clearance incident reports that are necessary.

- If a utility cannot be found as marked Roux personnel shall notify the facility owner/operator directly or through the one call center. Following notification, the excavation may continue, unless otherwise specified in state law.
- Contractors/subcontractors must contact the one-call center to refresh the ticket when the excavation continues past the life of the ticket. Ticket life shall be dictated by state law however at a maximum ticket life shall not exceed 20 working days.

3.3 Stop Work Authority

Each Roux employee has Stop Work Authority which he or she will execute upon determination of any imminent safety hazard, emergency situation, or other potentially dangerous situation, such as hazardous weather conditions. This Stop Work Authority includes subsurface clearance issues such as the adequacy of a mark-out or identification during intrusive operations of an unexpected underground utility. Authorization to proceed with work will be issued by the PM/PP after such action is reviewed and resolved. The PM will initiate and execute all management notifications and contact with emergency facilities and personnel when this action is appropriate.

Appendix A - Definitions

Intrusive Work Activities	All activities such as digging or scraping the surface, including but not limited to, excavation, test pitting or trenching, soil vapor sampling or the installation of soil borings, soil vapor monitoring points and wells, or monitoring wells, and drilling within the basement slab of a recently demolished building.
Mark-out / Stake Out	The process of contracting with a competent and qualified company to confirm the presence or absence of underground utilities and structures. This process will clearly mark-out and delineate utilities that are identified so that intrusive work activities can be performed without causing disturbance or damage to the subsurface utilities and structures. After utility mark-outs are completed the soft digging will be completed prior to intrusive work.
Tolerance Zone	Defined as two feet on either side of the designated centerline of an identified utility, plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct backs and other non-cylindrical utilities) of that utility and two feet from the outside edge of any subsurface structure.
Structure	For the purpose of this program a structure is defined as any underground feature that may a present potential source(s) of energy such as, but not limited to, utility vaults, bunkers, piping, electrical boxes, wires, conduits, culverts, utility lines, underground tanks and ducts.
Soft Digging	The safest way to remove material from unknown obstructions or services is by using tools such as a vactor or air knife, non-mechanical tools, or hand tools. The methods are clean and non-evasive and used for uncovering and exposing buried services, excavating and for providing a quick method of soil removal from sensitive areas.
Verification	Exploratory test-hole dug with hand tools within the Tolerance Zone to expose and verify the location, type, size, direction-of-run and depth of a utility or subsurface structure. Vacuum excavation (soft dig) methods can further facilitate exposure of a subsurface utility and accurately provide its location and identification prior to intrusive work approaching the Tolerance Zone.

Appendix B - Example of Completed One Call Report

Example Completed One-Call Report

New York 811

Send To: C_EMAIL Seq No: 744

Ticket No: 133451007 ROUTINE

Start Date: 12/16/13 Time: 7:00 AM Lead Time: 20

State: NY County: QUEENS Place: QUEENS
Dig Street: 46TH AVE Address:
Nearest Intersecting Street: VERNON BLVD
Second Intersecting Street: 11TH ST

Type of Work: SOIL BORINGS
Type of Equipment: GEOPROBE
Work Being Done For: ROUX

In Street: X On Sidewalk: X Private Property: Other:
On Property Location if Private: Front: Rear: Side:

Location of Work: MARK THE ENTIRE NORTH SIDE OF THE STREET AND SIDEWALK OF: 46TH AVE BETWEEN VERNON BLVD AND 11TH STREET

Remarks:

Nad: Lat: Lon: Zone:
ExCoord NW Lat: 40.7475399 Lon: -73.9534811 SE Lat: 40.7457406 Lon: -73.9493680

Company : ZEBRA ENVIROMENTAL Best Time: 6AM-5PM
Contact Name: DAVID VINES Phone: (516)596-6300
Field Contact: DAVID VINES Phone: (516)596-6300
Caller Address: 30 N PROSPECT AVE Fax Phone: (516)596-4422
LYNBROOK, NY 11563
Email Address: david@zebraenv.com

Additional Operators Notified:
ATTNY01 AT&T CORPORATION (903)753-3145
CEQ CONSOLIDATED EDISON CO. OF N.Y (800)778-9140
MCINY01 MCI (800)289-3427
PANYNJ01 PORT AUTHORITY OF NY & NJ (201)595-4841
VZQ VERIZON COMMUNICATIONS (516)297-1602

Link to Map for C_EMAIL: http://ny.itic.occinc.com/XGMZ-DF2-L23-YAY

Original Call Date: 12/11/13 Time: 1:15 PM Op: webusr
IMPORTANT NOTE: YOU MUST CONTACT ANY OTHER UTILITIES DIRECTLY

Appendix C - Roux Subsurface Utility Clearance Checklist

Roux Subsurface Utility Clearance Checklist ***Date of Revision – 12/3/14***

Work site set-up and work execution

ACTIVITY	Yes	No	N/A	COMMENTS INCLUDING JUSTIFICATION IF RESPONSE IS NO OR NOT APPLICABLE
Daily site safety meeting conducted, SPSAs performed, JSAs reviewed, appropriate work permits obtained.				
HASP is available and reviewed by site workers / visitors.				
Subsurface Utility Clearance Procedure has been reviewed with all site workers.				
Work area secured; traffic control established as needed. Emergency shut-off switch located. Fire extinguishers / other safety equipment available as needed.				
Utility mark-outs (public / private) clear and visible. Provide Excavator's Stake-Out Reference Number / Request Date / Time.				
Tolerance zone work identified.				
Work execution plan reviewed and adhered to (ground disturbance methods, clearance depths, any special utility protection requirements, or any other execution requirements; especially for Tolerance Zone work).				
Verbal endorsement received from Roux PM for any required field deviations to work execution plan.				

<u>Key reminders for execution</u>:

The Subsurface Utility Clearance Protocol should be referenced to determine all requirements while executing subsurface work. The bullet points below are intended as general reminders only and should not be solely relied upon.

- Tolerance zone is defined as two feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks and other non-cylindrical utilities) of a utility and two feet from the outside of any subsurface structure.
- Install Pre-Clearance exploratory test holes (e.g., hand-dug test holes or vacuum excavation) must be performed for the first five feet below land surface (BLS) at each location prior to conducting mechanized intrusive activities. The size of the pre-clearance exploratory test hole should be at a minimum twice the diameter of any downhole tool or boring device. (Note: Pre-clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for PM and PP to evaluate alternative approaches for the project. Alternate approaches will need to be pre-approved by the OM.
- For excavations, all utilities need to be marked and then exposed by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft

digging around the perimeter). In these cases, dig in small lifts (<12" for first five feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes to expose the utility. Once structures have been verified a minimum clearance of two feet must be maintained between the utility and any powered equipment.

Appendix D - Utility Verification/Site Walkthrough Record

Employee Name: _____

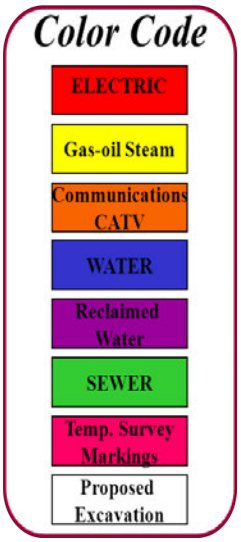
Date: _____

Instructions: For each utility suspected at the job site, indicate location on the job site, approximate burial depth, and means of detecting the utility. Leave blank if that utility is not believed to be present.

Utility	Description of Utility Location Identified Onsite	Approx. Depth (bls)	Method / Instrumentation used to determine Utility Location	Utility Owner Response (Date/Time)	Mark Out Indicates (Clear / Conflict)
Electrical Lines					
Gas Lines					
Pipelines					
Steam Lines					
Water Lines					
Sanitary and Stormwater Sewer lines					
Pressured Air-Lines					
Tank Vent Lines					
Fiber Optic Lines					
Underground Storage Tanks					
Phone Lines/ Other					

* bls - below land surface

Site Sketch Showing Utilities:



Other Comments / Findings:

Completed by: _____

Signature: _____ Date: _____

PROCEDURE SUBSURFACE CLEARANCE

This Procedure outlines E&PS Environmental's requirements to manage SSHE risks associated with subsurface structures (e.g., tanks, pipe lines, water lines, gas lines, electrical service) and ground disturbance activities, at a depth greater than 6 inches (including, but not limited to, installation of borings/monitor wells, well abandonment).

If there are any deviations from the requirements of this procedure then these are to be documented using MOC (Management of Change). More stringent federal, state, local, or contractor requirements may apply.

The Subsurface Clearance Procedure does not need to be considered for work in a backfilled excavation area as long as all requirements are met: (1) the site has been under E&PS Environmental control since backfilling occurred, and (2) the limits of the excavation are known. However, if subsurface work needs to be completed in any area outside of the backfill area then the procedure applies.

Procedures

Job Planning

1. **Contractor Consultant (CC)** Complete the Subsurface Clearance Checklist prior to any ground disturbance activity.

2. **(CC)** Obtain necessary permits and/or obtain site access.

3. **(CC)** Develop a site plan showing relevant above grade features for the work area/site (the "Site Plan").

4. **(CC)** Obtain, review and field verify/validate (to the extent practicable) relevant historical site data, which may include:

    - As-built drawings or site plans
    - Easement/right-of-way information
    - Historical aerial photographs or development plans
    - Fire insurance plans
    - Local or state permitting records (e.g., for underground storage tanks (UST))
    - Tank (dip) charts
    - Previous site investigations/boring logs
    - Interviews with persons having historical site knowledge
    - UXO and munitions impacts

Note: UXO and Munitions Constituents assessment, notification and removal activities should be conducted by certified specialists/experts in full compliance with any local requirements. Refer to Property Transaction Guide, Appendix 3 for more details.

Utility Mark-Out

1. (CC) Locate public and/or private utilities (e.g. electric, gas, water, sewer, communications) in and around the work area/job site.

2. (CC) Determine availability of public "one-call" service for the job site area (One-Call, First Call, Dial Before You Dig [DBYD], 811 One-Call in U.S., etc.).

If a public one call service is available:

- **(CC)** Arrange for utility mark-outs by the subscribing companies. Ensure the mark-outs are sufficient and will persist for the duration of the job (e.g., paint and tape/flags). If mark-outs fade, arrange for remark-out. Verify response by each member company on the Subsurface Clearance Checklist prior to proceeding with the work.
- **(CC)** Determine which, if any, utilities owners/operators do not subscribe to the one-call service (e.g., municipal sewers, transportation authorities, subway systems, etc.).

For non-suscribing utility owners or if a public one-call service is not available:

- **(CC)** Perform due diligence and request information regarding utility type, construction details, location and burial depth directly from public service providers/utility owners. Request utility mark-out by each public service provider/utility owner as applicable. Confirm contact and response by each public utility owner on the Subsurface Clearance Checklist.

3. (CC) Arrange for Private Utility Mark-Outs which are required for each job. This service is typically performed by a third party to mark all utilities (public and private).

4. (CC) Develop a plan with the utility contractor for which technology(s) will be used based upon Appendix A, Table 1: Private Utility Technology Applications and Considerations. If available, it is recommended that the utility contractor use more than one technology to sweep each location. Use tracer wire to locate the utility when tracer wires are present. Record the results of the private utility mark-out, i.e. on the Subsurface Clearance Checklist, Utility Verification section, attach results to the site plan or work permit.

5. (CC) When a private utility mark-out is performed, verify that the utility contractor has a standard operating procedure for testing the functionality of all locating equipment in accordance with the manufacturer's specifications.

Site Visit

1. (CC) Perform a site visit after utility mark-outs to determine job hazards and to look for visible signs that utilities may be present. Reference Appendix B: Site Visit Guide.

2. (CC) Identify "Critical Zones" for the job area. Refer to Appendix C: Critical Zone Development Guide.

3. Project Manager (PM), (CC) Determine the work areas, sequencing of the job tasks, and the need for traffic control. Identify which job locations are inside a Critical Zone, if any.

4. (PM/CC) Determine ground clearing methods (soft digging, etc.), utility protection tier level, and ground clearance depth requirements. Any subsurface clearance activity in the Critical Zone must be reviewed by the PM. The PM's review should be documented in an email or on the site plan.

- Refer to Appendix D: Utility Protection Matrix to determine tier levels and an approved clearing method
- Refer to Appendix F: Requirements for Boreholes, Drilling, Excavation, Trenching and Shoring to determine the required ground clearance depth.

Work Execution

1. (CC) Remove enough ground or surface covering (pavement, brush, debris, etc.) to ensure workers have clear visibility of the work area and subsurface conditions. Avoid jack hammering over known lines unless the lines are de-energized, locked-out/tagged-out, and repairs are planned.

2. (CC) Ensure all personnel know which work areas are within the Critical Zone, if any.

3. (CC) Begin the ground clearance activity following the requirements in this system and in the work permit system.

4. (CC) Continuously monitor the ground clearance activity for:

- indicators of subsurface structures, reference Appendix B: Site Visit Guide
- indications of damage to subsurface utilities or structures.

5. (CC) If utility damage occurs, or if unanticipated Utility Warning Signs are encountered, refer to procedure 3.1.3.5 Utility Damage.

NOTE: The ground disturbance location may be relocated provided that the requirements of the Subsurface Clearance Procedure to clear the new location have been met. The PM may endorse the revised location without an MOC. If refusal is encountered during soft digging and the location cannot be relocated, Area Manager can approve the subsurface work without soft digging to the required depth using the MOC process.

6. (CC) If subsurface structures are NOT indicated, struck or damaged, continue the ground clearance to the minimum required depth.

7. (CC) After the minimum required ground clearance depth is successfully reached, continue to complete the work using mechanical means (drilling, excavator, etc.).

Utility Damage

1. (CC) If utility damage occurs:

- Immediately stop work
- Safeguard personnel, the public, and the environment
- Make appropriate notifications (Emergency Responders, E&PS Environmental PM, Utility Owner)
- Implement any site specific Emergency Response Procedures

2. (PM) Contact the AM for additional guidance and coordinate repair activities with the utility owner.

3. (CC) If it is suspected that a subsurface utility or structure may have been struck/damaged.

- Immediately stop the job
- Contact the E&PS Environmental PM
- Notify the utility owner

4. (PM) Contact the AM for additional guidance.

5. (CC/PM) Develop and execute a plan for verification of utility damage. Plans must be approved by the PM and utility and/or facility owner. Plans may include:

- Energizing area lights, sprinkers, etc. to verify operation (when hydrocarbon releases are not suspected/confirmed)
- Activating monitoring systems designed to detect tank or line breaches (e.g., interstitial alarms, etc.)
- Exposing the utility to determine if damage has occurred.

6. (CC) The following must be completed prior to re-commencing work:

7. (CC) Review and if necessary, update the "Site Plan" for any site features not previously identified.

8. (CC) Review the job to determine if the previous steps must be revisited (due to a new work area or step-out from a previously identified work area) and any additional job re-start activities which may need to be completed in accordance with Work Execution.

9. (PM) Provide approval to re-commence work activities.

References

- Subsurface Clearance Procedure Checklist
- Property Transaction Guide, Appendix 3

Appendix A: Public/Private Utility Identification Guide

Table 1: Private Utility Technology Applications and Considerations

Technology ⇒ Utility/Object ⇓	Radio Frequency Electro-Magnetic Detector (connection to utility, or induction without connection)	Radio Frequency Electro-Magnetic Detector (passive sweep)	Ground Penetrating Radar (GPR)⊙	Acoustic Plastic Pipe Locator	Beacon, Sonde or Conductive Rodder Insertion	EM-61 (time domain electromagnetics) Ξ	
Power/Instrument Line (Energized/Signaled) □	❋ G	G	G	R	R	G	
Power Line (Non-energized) □	❋ G	R	G	R	R	G	
Sewer/Water Line (Metallic) □	❋ G	Y	G	Y	G	G	
Sewer/Water Line (Non-metallic)	R	R	G	G	❋ G	R	
Instrument / Telecomm Lines (Non-energized)	❋ G	R	G	R	R	Y Only if metallic	
Hydrocarbon Transmission Line (Pipeline)◆ □	❋ G	R	G	R	R	G	
Metallic/Non-Metallic Line (with Tracer Wire)	❋ G	Y	G	Y	Y	G metallic	Y non-metallic
Metallic/Non-Metallic Line (without Tracer Wire)	G metallic	R non-metallic	R	❋ G	Y	Y	G metallic	R non-metallic
Metal or Fiberglass UST	R	R	❋ G	R	R	G metallic	R non-metallic

Additional Considerations

Technology ⇒ Variable ⇓	Radio Frequency Electro-Magnetic Detector	Ground Penetrating Radar (GPR)⊙	Acoustic Pipe Locator	Beacon, Sonde, or Conductive Rodder Insertion	EM-61 Ξ
Moist Soil	G	Y	G	G	G
Dry Soil	Y	G	Y	G	G
Clay	Y	R	G	G	G
Concrete w/Rebar	R	Y	G	G	R
Long Horizontal Profile	G	G	G	G	G
Short Horizontal but Deep Vertical Profile	Y	G	R	R	G
Access to Line✚	G	N/A	G	G	G
No Access to Line✚	G (induction or passive)	G	R	R	G
	R (direct connect)				G
Ferrous Metal	G	G	G	G	G
Non-ferrous Metal	Y	G	G	G	G
Adjacent or crossing conductive utility(ies)	Y	N/A	N/A	N/A	Y

Each site will be unique. Do not use this table as the sole criteria for technology selection. Use it as a starting point to assess available, applicable technology(s).

❋ Indicates best technology for given object. Site structures, rebar in concrete, shallow groundwater tables, perched storm water, etc. can significantly affect performance and reliability of any electro/magnetic method. Other utilities which cross or are adjacent to the target line can cause the EM signal to bleed or jump to the other utility line.

□ Metallic lines that have power running through them or can be connected to a tracer signal generator.

◆ Natural gas pipeline locating technicians must be trained/certified (in the U.S. requires DOT and Office of Pipeline Safety standards, other regions may have similar certification or requirements).

⊙ Most sensitive to interpretation. The skill, training and experience of operator are critical.

Ξ Emerging technology with limited availability.

✚ Access: induce unique electronic signature, apply acoustical impulse or insert conductive rodder/beacon/sonde.

Green Generally, an applicable technology **Yellow** May or may not be applicable **Red** Not generally applicable

Appendix B: Site Visit Guide

For All Sites

Identifying overhead utilities is just as important as locating subsurface utilities/structures. Observe if any overhead lines become subsurface utilities on site.

Utilizing common site features such as observing pavement scars, which may indicate buried utilities, will help with the identification.

The presence of any of the following may indicate subsurface structures:

- Building locations, equipment locations, area lights/signs/sprinkler systems, phones, drains, junction boxes, lids or manholes, natural gas meters and/or connections, etc,.
- Warning tape (typically indicative of underground services)
- Pea gravel/sand/non-indigenous material (typically indicative of tanks or lines)
- Red concrete (typically indicative of electrical duct banks)
- Any unexpected departure from the native soil or backfill conditions as established in other on-site digging
- Any signs of damaged utilities in the cuttings (piping materials, insulation, odors, etc.)
- Other utilities, including: fire hydrants, on/below grade electrical transformers, splice cages, storm sewers, other sewer lines, pipeline markers, cable markers, valve box covers, clean-outs/traps, steam lines (including insulated tanks that may indicate steam lines), cathodic protection systems.

Determine possible or likely routing of on-site utilities by observing the path between the main service line and the connection point. NOTE: this is not to be solely relied upon and proper risk mitigation strategies must be in place to proceed with ground disturbance activities.

For Sites with USTs

- Determine whether the product piping is rigid or flexible.
- Visually inspect the location of the tank field, observation wells, dispenses, vent stack(s), and UST fill points.
- Note the location of the emergency shutoff button/switch (if present) and become familiar with operation.
- Note the orientation, arrangement, location, and the size/capacity of the tanks through the various features visible at grade (fill ports, extractor covers) and any as-built drawings.

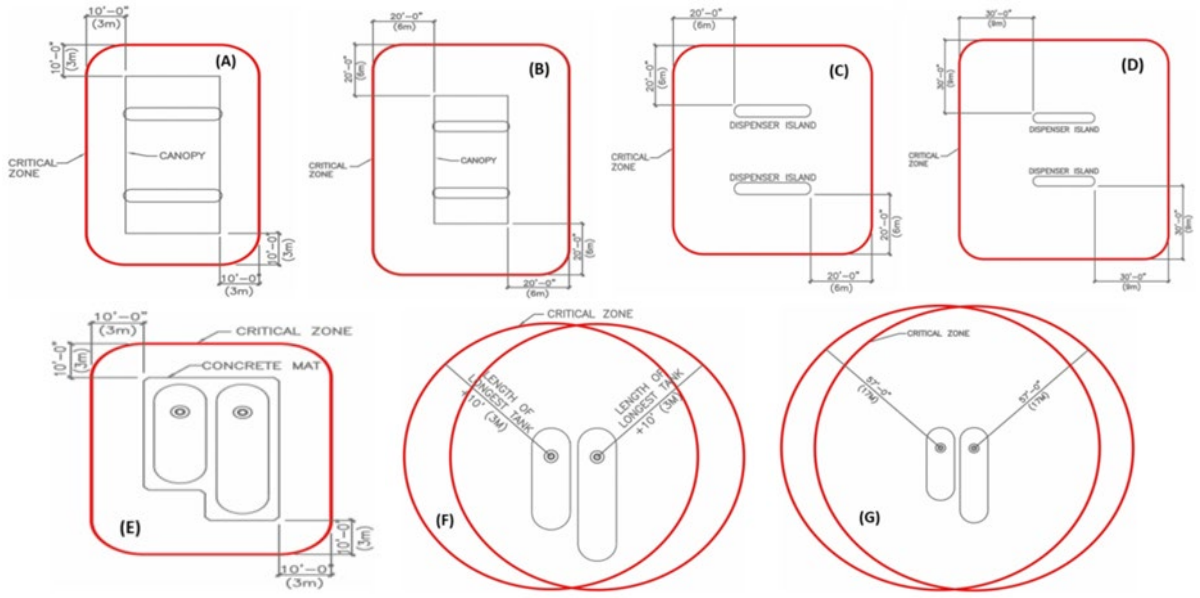
For Operating Facilities

- If the operating facility has an established procedure for subsurface clearance, document roles and responsibilities in the bridging agreement.
- Inspect for the presence of any electrical cables, including low voltage lines used for instrumentation. Note the location of all instrumentation, analyzers, and all lines leading from/to automatically controlled valves
- Inspect for the presence of any service air conduits or piping

Appendix C: Critical Zone Development Guide

Table 2: Critical Zone Guidelines

General Critical Zone				
Below ground structure	3 m (10 ft) distance in all direction from the furthest edge of any subsurface structure (i.e. foundations, oil/water separators)			
Below ground conduit	3 m (10 ft) distance in all direction from the furthest edge of any transmission conduit or utility and associated infrastructure (i.e. electric/gas/water/sanitary/storm/data cables).			
Canopy Critical Zone				
	Rigid Piping		**Flexible Piping**	
Canopy	(A)	Canopy Edge + 3 m (10 ft)	(B)	Canopy Edge + 6 m (20 ft)
No Canopy	(C)	Pump Island + 6 m (20 ft)	(D)	Pump Island + 9 m (30 ft)
Island Critical Zone				
The entire area between adjacent islands				
Vent Risers Critical Zone				
3 m (10 ft) on either side of the vent risers				
Tank Field Critical Zone				
Tank Mat	tank mat + 3 m (10 ft)		(E)	
Caution: in some geographies in which concrete slab only covers partially the tanks (usually only the area on top of the man holes). In this case, the concrete slab should not be considered a tank mat, nor used as a reference.				
	tank length known		**tank length unknown**	
No Tank Mat The greater of:	(F)	length of longest tank + 3 m (10 ft) radius around each manhole	(G)	17 m (57 ft) radius around each manhole
Critical Surface Zone				
Greater of:	1. The entire area between the furthest edge of the Tank Field Critical Zone and the furthest edge of the Canopy Critical Zone and/or the Island Critical Zone			
	2. The entire area between the Tank Field Critical Zone and the Vent Risers Critical Zone			



- Utilities which can be de-energized and easily repaired within 1 day may, at the discretion of the PM, be designated as being non-critical zone provided: (1) the utilities have been verified as de-energized via a formal LOTO program and (2) repair contingencies have been planned.

Appendix D: Utility Protection Matrix

The following requirements shall define when additional protections for ground disturbance activities within the **critical zone** (including borehole advancement, conventional drilling and excavations) are required. The risk matrix below must be reviewed and any additional activities approved by the PM prior to the start of work.

Potential Consequence Level ⇒ Distance to Utility ⇓	**Higher**	**Medium**	**Lower**
Less than 2 ft (less than 0.6 m)	TIER IV	TIER III	TIER I
Between 2 and 5 ft (0.6 and 1.5 m)	TIER III	TIER II	TIER I
Between 5 and 10 ft (1.5 and 3 m)	TIER II	TIER II	TIER I

The following shall be required:

TIER IV: Evaluate whether the work may be moved to an alternate location in order to provide greater buffer to the utility. If the work cannot be relocated, then positive, visual identification/uncovering of the utility is required, using soft or hand digging only. Additionally, isolation and protection of the utility from the mechanized work is similarly required using conductor casing, shoring or other means. Soft/hand digging required initially for the ground clearance. A Safety Hazard Risk Register (possibly a SBQRA) which conforms to the requirements outlined in OIMS Procedure 2.1.2 Project SSHE Risk Assessment is required prior to commencing work (hand augering requires PM review and documentation).

TIER III: Positive, visual identification/uncovering of the utility or isolation and protection of the utility (via conductor casing or other means) prior to mechanized work is required. Soft/hand digging is required initially for the ground clearance (hand augering requires PM review and documentation).

TIER II: Evaluate need for positive, visual identification and/or isolation and protection of the utility. Vacuum or hand digging is recommended, but not required (hand augering requires PM review and documentation).

TIER I: Evaluate de-energizing utility and performing requirements under LOTO procedures prior to the start of work. If de-energized and LOTO, potential repair contingencies should be planned.

Should the CC strike or damage a de-energized and LOTO line, this shall not be considered either a loss or a near loss event, as the event was planned. In all instances, the work must be pre-cleared in accordance with Appendix C: Critical Zone Development Guide prior to start of activities, unless an MOC is endorsed for alternate actions.

Recommended consequence categories for commonly encountered utilities include:

Higher: Fiber optic cable, major petroleum bearing pipelines, pressurized distribution lines (natural gas, steam, etc.), high voltage electric lines* (>600 volts), main water distribution pipelines/networks servicing the community

Medium: Fuel systems at retail stations (tanks/lines), sanitary or storm water lines, local water distribution lines, low voltage electric lines* (50 to 600 volts)

Lower: Private utilities servicing the site (e.g., phone, water, sewer), extra-low voltage electric lines* (<50 volts)

***NOTE**: high, low, and extra-low voltage classifications vary by region and by overseeing regulatory agency. The guidance provided above is provided for reference only. In all cases, local regulations and professional experience must prevail.

Appendix E: Guidance on Preferred Methods of Clearing the Subsurface

At least one method of clearing the subsurface must be completed. Use the Utility Protection Matrix in Appendix D to appropriately select a method of clearing based on risk.

In all cases, the sampling objectives should be understood such that the sampling objectives are met and sample integrity is maintained. The following represent approaches and specific guidance which may be used to clear the subsurface.

- ***Soft Digging*** Soft digging is a preferred means of utility clearance in the presence of high or medium risk utilities, reference Appendix D: Utility Protection Matrix. Soil should be evacuated by using the vacuum; if required, an accompanying air knife (preferred) or a water lance (less preferred) may be used to break up/loosen the soil for evacuation with the vacuum. The following guidance based upon soils type is provided:
  - Fill, including pea stone: Vacuum lift only, use conductor casing when appropriate
  - Loose, sandy soil: Vacuum lift only, use conductor casing when appropriate
  - Tight dense sandy soils: Vacuum and air knife
  - Dense cohesive soils: Vacuum and water lance
- ***Hand Digging*** Hand digging is a preferred method of utility clearance in the presence of high- or medium-risk utilities, reference Appendix D: Utility Protection Matrix. Soil should be broken up and removed using a shovel or other appropriate hand tool without excessive force.
- ***Hand Augering*** Hand Augers may only be used in the presence of higher or medium risk utilities with PM endorsement. In all cases, the auger is to be turned slowly without excessive force. Rounded edge augers are required. Hand augers should not be used in pea stone/pea gravel where utilities may be present and could potentially be damaged by the hand auger. The abrupt absence of soil recovery in the hand auger could indicate utilities as pea gravel or sand may have spilled out of the auger (exception: native soil conditions which typically result in poor hand auger recoveries)

NOTE: A post-hole digger may be used for soil removal only and should not be used to advance the clearance activity. Other means of advancing the clearance activity is required.

Appendix F: Requirements for Boreholes, Drilling, Excavation, Trenching and Shoring

The following requirements shall define specific ground clearing requirements to reduce the risk of striking known and unknown utilities based upon the type of activity being conducted. When within the Critical Zone, additional requirements may be required based on the distance from the utility and the risk tier, refer to Appendix D: Utility Protection Matrix.

In Critical Zones, the minimum clearance depth shall be to the burial depth of the bottom invert of the deepest utility or to a depth of 8 feet (2.4 meters), whichever is deeper.

In non-critical zones, the minimum clearance depth shall be to 5 feet (1.5 meters) or to 1 foot (0.3 meters) below the frost line (if present), whichever is deeper.

If a ground clearance activity is not defined within this guidance, the CC and E&PS Environmental PM shall develop the requirements based on the project objectives and site constraints. The PM must approve the work execution plan prior to field execution for these instances.

Elevation changes across the site should be factored into the clearance depth determination, regardless of the minimum depths described below.

If possible, ground disturbance activities should be planned such that the activities furthest from any suspected underground improvements are carried out first.

For Borehole Installation Activities via Direct Push or Rotating Equipment:

- In critical zones with USTs the required soft digging depth is to the midpoint of the UST or to 8 feet (2.4 meters), whichever is deeper.
- For direct push applications (CPT, Geoprobe® UVROST, LIF), the borehole clearance diameter shall be at least equal to the diameter of the largest tool being pushed through the subsurface (e.g., tip, rod, sampler, etc.), to the minimum required clearance depth.
- For rotating equipment (e.g., hollow stem augers), the borehole shall be cleared in a manner which best ensure the auger will not damage suspected utilities in or near the flight of the auger. Consider casing the borehole in settings where the crushing of adjacent utilities is possible (e.g., in settings with cobbles, rubble, etc. and utilities which are subject to crush injury, such as fiberglass piping).

For Well Overdrilling Activities:

- Follow the Subsurface ClearanceProcedure unless E&PS Environmental PM endorses otherwise.
- If active utilities are encountered, use alternative well abandonment procedures (e.g., grout in place). If inactive utilities are encountered, evaluation of abandonment and repair of the inactive utilities is required prior to proceeding with the overdrilling activity.

For Horizontal Drilling Activities:

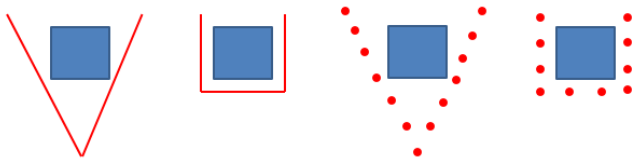
- Use approved clearance methods to visually locate each known or suspected crossed utility which is within 5 feet (1.5 meters) of the path of the horizontal boring.
- Maintain a minimum 2 feet (0.6 meter) clearance to the crossed utility where the horizontal boring crosses above or below a utility.

For Excavation / Trenching/ Shoring Activities:

- The CC must devise a work execution plan such that:
  1. Known or suspected underground structures / utilities will be proactively identified and either (1) protected or (2) de-energized (LOTO) and repair contingencies planned, and
  2. Unknown or unsuspected underground structures / utilities will be proactively identified along the length and width of the excavation at a frequency sufficient to ensure adequate precautions have been applied to the entire work area. (See Work Execution Plan below for specific details.)
- Whenever subsurface structures are exposed, work must cease until precautions (e.g., flags, cross-bracing, stakes, etc.) are taken to ensure that the integrity of those structures is maintained during the trenching/excavation and subsequent backfilling activities.
- A minimum 2-feet (0.6-meter) buffer zone must be maintained around exposed utilities. No mechanical equipment may enter the buffer zone.
- Project Manager's review of the work execution plan must be documented prior to implementation.

Work Execution Plan

- Includes clearing the perimeter of an excavation / trench utilizing a moat or potholing approach. This allows the known utilities to be proactively identified via non-destructive means, and provides adequate protection of the unknown utilities from the work. The extent of the moating and potholing shall be based on site knowledge, potential hazards and surrounding locations (e.g., proximity to residential areas, public, etc.). The moating or potholing approach is described below:
  - Clear the excavation perimeter via an appropriate method (e.g., hand or soft digging). Once adequate depth is reached around the perimeter, heavy equipment may be used to excavate the interior. The perimeter clearance should extend 1 foot (0.3 meter) beyond the depth excavated via heavy machinery up to the non-critical / critical zone requirements. Within 2 feet (0.6 meter) of the known utility(s), the CC or subcontractor shall revert to hand or vacuum clearance (maintaining a minimum 2-feet (0.6-meter) buffer zone around the utility).



Blue = Subsurface work area (e.g. excavation/drilling)
Red = Soft digging

V pattern versus U pattern is shown because of regional preferences/norms

Hand or soft digging Trench versus Hand or soft digging at a frequency sufficient to ensure adequate precautions have been applied

3 sides are all that is typically required for adequate risk reduction

Subsurface Utility Clearance Checklist

Date of Revision – 07/10/2020

Work site set-up and work execution

ACTIVITY	Yes	No	N/A	COMMENTS INCLUDING JUSTIFICATION IF RESPONSE IS NO OR NOT APPLICABLE
Daily site safety meeting conducted, SPSAs performed, JSAs reviewed, appropriate work permits obtained.				
HASP is available and reviewed by site workers / visitors.				
Subsurface Utility Clearance Procedure has been reviewed with all site workers.				
Work area secured; traffic control established as needed. Emergency shut-off switch located. Fire extinguishers / other safety equipment available as needed.				
Utility mark-outs (public / private) clear and visible. Provide Excavator's Stake-Out Reference Number / Request Date / Time.				
Tolerance zone work identified.				
Work execution plan reviewed and adhered to (ground disturbance methods, clearance depths, any special utility protection requirements, or any other execution requirements; especially for Tolerance Zone work).				
Verbal endorsement received from Roux PM for any required field deviations to work execution plan.				

Key Reminders for Execution:

The Subsurface Utility Clearance Protocol should be referenced to determine all requirements while executing subsurface work. The bullet points below are intended as general reminders only and should not be solely relied upon.

- Tolerance zone is defined as two feet plus half of the diameter or half of the greatest dimension (for elliptical sewers, duct banks and other non-cylindrical utilities) of a utility and two feet from the outside of any subsurface structure.
- Install Pre-Clearance exploratory test holes (e.g., hand-dug test holes or vacuum excavation) must be performed for the first five feet below land surface (BLS) at each location prior to conducting mechanized intrusive activities. The size of the pre-clearance exploratory test hole should be at a minimum twice the diameter of any downhole tool or boring device. (Note: Pre-clearance exploratory test holes should be defined in the SOW/proposal provided to the client to prevent project delays and to allow adequate time for PM and PP to evaluate alternative approaches for the project. Alternate approaches will need to be pre-approved by the OM.
- For excavations, all utilities need to be marked and then exposed by hand following the protocols in this program. Pre-clearing for excavations may be performed by the "moat" technique (i.e., soft digging around the perimeter). In these cases, dig in small lifts (<12" for first five feet) using a dedicated spotter.) For Tolerance Zone work, unless otherwise agreed upon with the Utility Operator, work within the tolerance zone requires verification by means of hand-dug test holes to expose the utility. Once structures have been verified a minimum clearance of two feet must be maintained between the utility and any powered equipment.

E&PS Environmental Subsurface Clearance Checklist

Location/Project #:	Date:
EM PM Name:	Consultant:
Project Description:	Ground Disturbance Company:

Subsurface Clearance Procedure should be referenced to determine all requirements while planning and preparing subsurface work

Any items marked N/A must have a comment in the comments section

ALL deviations from the Subsurface Clearance Procedure must be documented with a MOC

	Record Review	Yes	No	N/A
1	Do you have a copy of the most recent scope of work showing disturbance locations?			
2	Have you reviewed available historical site information to identify/verify buried facilities relevant to planned site activities?			
3	Have all (known) pipelines, power lines, and utility lines entering the work site been identified on the site plan?			
	Third Party Requirements	**Yes**	**No**	**N/A**
4	Are site access/permission/off lease agreements required?			
5	Have site access/permission/off lease agreements been acquired?			
6	Have buried facilities been discussed with operator / landowner / occupant?			
	Public/Private Utility Mark Outs	**Yes**	**No**	**N/A**
7	Have all **Public** Utility members/companies, been notified and response received? (public locates, if available in jurisdiction)			
8	Have all (known) **non-Public** Utility facility owners been notified and response received? i.e. Municipality, County, etc.			
9	Has a **Private** Utility Mark-Out been performed by a private locator with the most appropriate technology(ies) as per Appendix A: Public/Private Utility Identification Guide?			
10	Has the equipment been calibrated per manufacturer recommendation?			
11	Has the location on the job site, approximate burial depth, and means of detection been documented for each suspected utility in the Utility Verification section of this form?			
	Site Visit	**Yes**	**No**	**N/A**
12	Has a Site Visit been performed to determine any job hazard which may be present at the job site? Reference Appendix B of Subsurface Clearance Procedure for key considerations.			
13	Has a visual check been done for any signs of new ground disturbances within the proposed working area, such as vegetation color changes or growth, buildings and signs?			
14	Have the locations of all above ground indicators of subsurface utilities/services that may be leading to or from buildings within planned work area been identified?			
15	Have any surface features that might interfere or obstruct utility locates or visual inspection e.g. paving, concrete with rebar, metal fences, debris etc. been removed prior to completing the utility locates to the extent possible and practical?			

	Ground Disturbance Execution Planning	Yes	No	N/A
16	Have all applicable regulations governing ground disturbance been met (OH&S, provincial/ state, federal, etc.)?			
17	Have all applicable local, state/provincial and federal permits been obtained?			
18	Have critical zones been identified on current site plan per Appendix C of Subsurface Clearance Procedure? ***Identify critical zones in comments section and show on site plan.***			
19	Has a work execution plan identifying ground disturbance locations, methods, clearance depths, any special utility protection requirements, or any other execution requirements been developed?			
20	If Lock Out / Tags Outs (LO/TOs) are required, have they been incorporated into Work Execution plan?			
21	Have ground disturbance locations and clearance method(s) been reviewed by EM PM?			
22	Have the ground disturbance locations and clearance method(s) been reviewed with Consultant PM/Site Supervisor?			
23	Have all available sources of information (as-builts, site plans, locates) been reconciled prior to Ground Disturbance?			
24	Any deviations identified during planning stage documented via written deviation record and endorsed by Execution AM?			

Other Site Specific Requirements (refer to numbered items above, as appropriate)	Yes	No	N/A

Comments (refer to numbered items above, as appropriate)

Consultant PM:

Date:

E&PS Environmental Utility Verification Checklist

Date:

Location/Project #:

•Indicate the location on the site plan, approximate burial depth, and means of detecting the utility. If utilities listed below are not believed to be present the space may be left blank.

Utility/Facility	Description of Location Found Onsite	Approximate Depth below Ground Surface	Locating Method
Overhead Utility			
Electrical lines			
Gas lines			
Pipelines			
Steam lines			
Water lines			
Sanitary			
Storm-water			
Sewer lines			
Pressured air-lines			
Tank vent lines			
Fiber Optic lines			
Underground Storage Tanks			
Phone Lines			
Other (describe)			

Completed by: _____ Date: _____

Signature: _____

Crossing Agreement (Canada Only)

Project Goal/Description: Date:

Prime Contractor: Location/Project #

Ground Disturbance Company: ES PM Name:

•Subsurface Clearance Procedure should be referenced to determine all requirements while planning a preparing subsurface work.

•Any items marked N/A must have a comment in the comments section

ALL deviations from the Subsurface Structure Identification Procedure must be documented with a MC

Crossing Agreements (if applicable)

Company	Agreement Number	Contact Name

In Alberta, crossing agreements are required if ground disturbance will take place within a pipeline righ outside of a right-of-way but within 5 m of an ERCB-regulated pipeline

Crossing/ Proximity Agreements	Yes	No
Do you have a copy of the crossing agreements for all third-party facilities within 5 m (distance may vary by jurisdiction) of the dig zone where there is no right-of-way or within the right-of-way, are they current?		
Have third-party facility owners been given notice as stated in the conditions of the crossing agreement?		
Do you have individual consents/approvals along with the line list or crossing list?		
Have **all** surface conditions of the crossing agreements / proximity agreements been met? (may not apply outside Alberta)		
Have you contacted all third party representatives (transfer line or utility owners) and reviewed the scope of work?		
Have you obtained written approval from the licensee if the ground disturbance is within 5m of the center of a regulated pipeline or within the pipeline right of way?		
Is third-party facility owner or representative required to be present when excavating or exposing lines?		
Has the owner of the facility committed to being present and directly supervise mechanical excavation within 0.6 m (distance may vary by jurisdiction) of their facility?		
Have you reviewed the hand exposure method(s) with the buried facility owner and gained written approval?		
Has the third party owner of the facility being crossed inspected the ground disturbance locations before construction started and discussed the scope of work with the site supervisor?		

Has the third party facility owner inspected the locates to verify their accuracy immediately prior to Ground disturbance taking place?		
Have crossing agreements been checked for more stringent mechanical excavation restrictions (> 0.6m) of facilities?		
Have all equipment operators been notified that no mechanical excavation is permitted within (minimum of 0.6 m) or (as per crossing agreement conditions) of facilities?		

Other Comments:

:

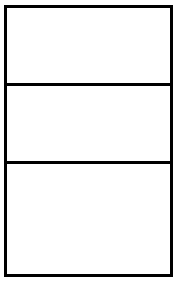
and

)C

Phone #

ıt-of-way or

N/A



Utility Verification/Site Walkthrough Record

Employee Name:_____

Date: _____

Instructions: For each utility suspected at the job site, indicate location on the job site, approximate burial depth, and means of detecting the utility. Leave blank if that utility is not believed to be present.

Utility	Description of Utility Location Identified Onsite	Approx. Depth (bls)	Method / Instrumentation used to determine Utility Location	Utility Owner Response (Date/Time)	Mark Out Indicates (Clear / Conflict)
Electrical Lines					
Gas Lines					
Pipelines					
Steam Lines					
Water Lines					
Sanitary and Stormwater Sewer lines					
Pressured Air-Lines					
Tank Vent Lines					
Fiber Optic Lines					
Underground Storage Tanks					
Phone Lines/ Other					

* bls - below land surface

EXCAVATION

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

This document covers excavation and ground disturbance activities, (i.e. excavation, trenching, boring and drilling).

Excavation activities require compliance with the following applicable Minimum Safety Expectations:

- Confined Space
- Energy Isolation
- Hot Work
- Lifting & Rigging
- Traffic Control
- Working at Heights
- Working Near Moving Equipment

Life Saving Essentials

- Physically verify and mark underground structures/utilities
- Isolate and/or protect underground utilities when required
- Prevent entry into excavations unless absolutely necessary
- Inspect excavations prior to personnel entering
- Install a protective system to protect personnel from a collapse

Planning

Excavation work requires a Competent Person.

Professional Engineers or local equivalent must design protective systems (i.e. shoring) for excavations greater than 20 ft (6 m) in depth. If local regulations specify an alternate depth other than 20 ft (6 m), E&PS will comply with the local depth.

If hydrocarbons or other contaminants are present or expected in the soil/groundwater, prepare air monitoring strategies (hazardous atmosphere and/or breathing zone) and ensure appropriate PPE is used. Consult with your SSHE Advisor or IH Advisor as needed.

If historical information indicates or if unexploded ordnance (UXO) could be present an assessment consistent with local regulations, notification and removal activities must be conducted by certified specialists/experts in full compliance with any local requirements.

Work locations where these requirements cannot be achieved will require a written MOC per our OIMS 7.1 before work begins.

Responsibilities

Competent Person

A Competent Person must be on site at all times that site excavation works are occurring and must be capable to:

- Classify the soil
- Oversee installation of the excavation protective system
- Develop excavation inspection schedule and complete excavation inspections
- Approves/endorses safe setback distance(s) for personnel, equipment, spoils, and other items
- Detect conditions that may result in cave-ins, failures in protective systems, hazardous atmospheres and other hazards and determines what rescue equipment is required to be on site
- Ensures personnel able to use rescue equipment, when needed, are trained and readily available to respond
- Ensure adequate stability of adjacent buildings, walls, or other structures potentially affected by excavation (i.e. bracing, underpinning, etc.)
- Immediately stop work and evacuate the excavation if unexpected conditions are encountered (i.e. hydrocarbons, water accumulation, electrical lines, etc.)

Site Management

- Utilize barriers that will prevent pedestrian and vehicle exposure to the excavation
- Ensure underground utilities are identified and marked
- Secure excavations that remain open and unattended (i.e. fencing, coverings, attendant, etc.)

Working Near Overhead Electrical Lines

When working near overhead electrical lines, the power must be de-energized whenever feasible.

Working near overhead power lines in which the power line is de-energized and visibly grounded, or sufficiently insulated, the following requirements apply:

- A pre-job briefing must be conducted with the work crew and other workers who will be in the area to review the location of the power lines and the steps that have been implemented to prevent encroachment/electrocution

If it is not possible to avoid working inside the Minimum Approach Distance (MAD) as specified in the table below, the following additional requirements apply whether the electrical line is energized or de-energized.

If the Minimum Approach Distance outlined by owner/operator of the electrical line are more stringent than the table below, personnel must comply with the more stringent approach distance.

The consultant/contractor supervisor must ensure that:

- Equipment with booms, lifts, rigging, excavator arms, etc., are set up a minimum clearance of the full height of the equipment plus the distance noted in the table below
- Line voltage is confirmed to determine safe approach distances (contact owner/operator of electrical line to confirm)

A spotter must understand the additional risk of the overhead electrical lines and have a warning device such as an air horn to alert the operator if minimum clearance is compromised.

Minimum Approach Distance requirements for working near overhead electrical lines are as follows but may be superseded by more conservative local or regional standards.

Minimum Approach Distances when Working Near Overhead Electrical Lines

(Based on ASME B30-5; Table 5-3.4.5.1-1)

Voltage (kV)	Distance Between Line and any Part of Heavy Equipment	
Up to and including 50	10 feet	3.1 meters
Over 50 to 200	15 feet	4.6 meters
Over 200 to 350	20 feet	6.1 meters
Over 350 to 500	25 feet	7.6 meters
Over 500 to 750	35 feet	10.7 meters
Over 750 to 1000	45 feet	13.7 meters
Over 1000	As established by the operator of line or registered professional engineer who is a Qualified Person	

Minimum Approach Distance in Transit (no load and boom or mast lowered)

And

Overhead Electrical Lines (based on ASME B30-5; Table 5-3.4.5.1-1)

Signs warning of overhead hazards are in place 23 ft (7m) on each side of the electrical line, when traveling under the lines.

Equipment with booms, lifts, rigging, excavator arms, masts, etc., must be fully lowered to the maximum extent prior to transit.

Voltage (kV)	Distance Between Line and any Part of Heavy Equipment	
Up to and including 0.75	4 feet	1.2 meters
Over 0.75 to 50	6 feet	1.8 meters
Over 50 to 345	10 feet	3.1 meters
Over 350 to 750	16 feet	4.9 meters
Over 750 to 1000	20 feet	6.1 meters
Over 1000	As established by the operator of line or registered professional engineer who is a Qualified Person	

Protecting Underground Structure/Utility

The following requirements define the additional protections for ground disturbance activities when working near underground structures or utilities.

Mitigations must be implemented to prevent the undermining of nearby structures which could collapse.

When ground disturbance activities are within 2 - 5 ft (0.6 - 1.5m) of a higher risk utility per the table below, soft/hand digging is required to positively, visually identify/uncover the utility **or** the utility must be isolated (LOTO) and protected.

If ground disturbance activities are within 2 ft (0.6m) of a higher risk utility and the work cannot be moved to an alternate location, soft/hand digging is required to positively, visually identify/uncover the utility **and** the utility must be isolated (LOTO) and protected.

For lower risk lines per the table below, evaluate the need to positively, visually identify or isolate and protect the utility prior to using mechanized equipment.

For some lower risk lines such as irrigation lines, sprinklers and sensing lines, the Project Manager may endorse excavation and repair rather than physically exposing the line.

Higher risk	Fiber optic cable, petroleum/gas pipeline, distribution pipelines, electric lines (>50 volts), water main pipelines servicing the public, fuel systems at retail stations, sanitary/sewer lines
Lower risk	Private utility services (e.g. phone, water), electric lines 50 volts or less, storm water lines, irrigation lines

For higher risk lines, if information is not available to determine the location, depth, or utility service, soft/hand digging is required to positively, visually identify/uncover the utility until the location, depth or utility service is determined or it is determined the utility is more than 5 ft (1.5m) away from the work area.

Remove enough ground or surface covering (i.e. pavement, brush, debris, etc.) to ensure workers have clear visibility of the work area and subsurface conditions.

Continuously monitor the clearance activity for indicators of underground structures or damage to utilities/structures.

A dig location may be relocated provided that the requirements of this document have been met. Project Manager, Site Management or designee must endorse the revised location.

If refusal/hard surface is encountered during soft digging and the location cannot be relocated, Site Supervision may approve the excavation/ground disturbance work without soft digging **only after notifying** the Project Manager, Site Manager or designee and getting verbal endorsement. Project Manager and Site Supervision must discuss the following:

- Have we cleared the depth of the closest utility?
- What is the closest utility?
- What does the refusal look like? (i.e. red concrete could indicate electrical conduit)

After utilities are positively, visually identified/uncovered and/or isolated and protected, the work may continue using mechanical means (i.e. excavator, drilling, etc.). The underground structures/utilities must remain visible during the work.

Utility Damage

If it is **suspected** that an underground utility or structure may have been struck/damaged.

1. Immediately stop the job
2. Contact the E&PS Project Manager or Site Manager
3. Notify the utility owner

If utility damage occurs:

1. Immediately stop work
2. Safeguard personnel, the public, and the environment
3. Implement Emergency Response and Notification procedures

Project Manager, Site Manager or designee must provide approval to re-commence work activities.

1. Update the Site Plan for any site features not previously identified
2. Determine if the work plan must be revisited

Setback Distances

The Competent Person establishes the safe setback distances for personnel, equipment, excavated materials and other items to prevent collapse/accidental entry of personnel and equipment.

If regulations specify the setback distances for excavation activities (i.e. spoils, equipment, personnel, etc.), those distances, at a minimum, must be followed.

Equipment use is prohibited within 2 ft (0.6m) of the unprotected edge of excavations unless local regulations are more stringent.

Excavated material or other items where there is a hazard of falling or rolling into the excavation is prohibited within 3 ft (1m) from the edge of the excavation unless local regulations are more stringent.

Soil Classification

The Competent Person must follow local soil classification regulations. In the absence of local regulations, the following requirements must be followed.

A soil classification test must be performed to classify soil as Type A or B. If soil is classified as Type C no soil classification test is required. Unclassified soil must be assumed to be Type C.

Soil Classifications

Soil Type	Description
Stable Rock	Granite, Sandstone
Type A	Intact, hard soil such as clay, silty clay, sandy clay, clay loam
Type B	Cohesive soil such as silt, silt loam, sandy loam
Type C	Granular soils such as gravel sand or loamy sand, submerged soil or soil where water is freely seeping

Excavation Protection Systems

If personnel must enter an excavation that is 4 ft (1.2m) or deeper, personnel must be protected from excavation sidewalls collapsing with shoring, sloping, benching, shielding or combination of methods.

Protective system (i.e. shoring) must have the capacity to resist the expected loads on the system and must be in place prior to personnel entering the excavation.

Personnel must be protected from a collapse while installing protective systems.

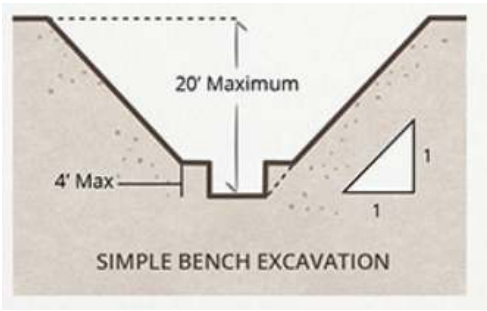
Benching

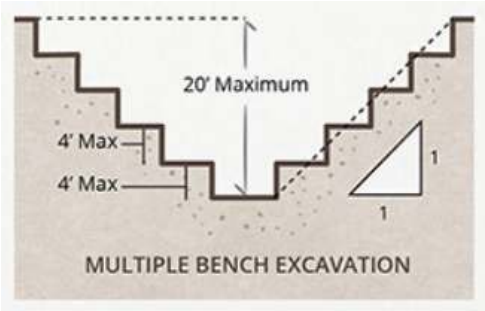
The series of steps must not be steeper than the recommended horizontal to vertical ratio for the soil type (see below).

Benching is not permitted for Type C soil.

The bench height must not exceed 4 ft (1.2m) to a total excavation depth of 20 ft (6m). Subsequent benches must be below the maximum allowable slope degree for that soil type.

Bench for Type B Soil

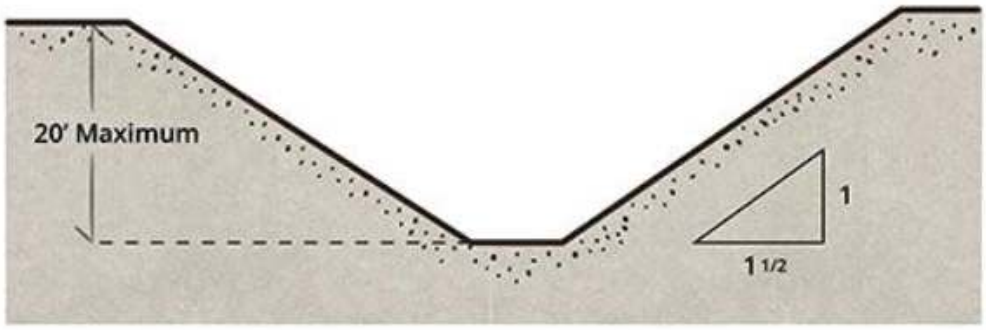




Sloping

The default slope for excavations is 1.5 ft (0.5m) horizontal distance to 1 ft (0.3m) vertical distance. The slope may be adjusted based on soil type.

Simple Slope for Type C Soil



The table below lists the maximum allowable slope ratio for excavations **less than 20 ft (6m)** based on soil type:

Soil Type	Horizontal: Vertical Slope Ratio
Stable Rock (Granite or Sandstone)	N/A – Vertical (90 degrees)
Type A (i.e. clay)	¾ : 1 (53 degrees)
Type B (i.e. silt)	1 : 1 (45 degrees)
Type C (i.e. sand/gravel)	1 ½ : 1 (34 degrees)

Shoring/Shielding

Regulatory requirements that dictate the allowable size and spacing of shoring components must be considered in the design.

To ensure personnel are protected, shoring must be installed and removed specified by the manufacturer specifications or design.

The top (first) strut/jack must be placed approximately 1.5 ft (0.5m) below the surface, then the second strut/jack placed according to the shoring design.

Excavation Inspection

The Competent Person conducts inspections at the start of the shift of excavations, adjacent areas, and protective systems for evidence of possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions.

Excavations must also be inspected after significant rain or snow or other events that could result in collapse or failure of protective systems.

Entering and Exiting an Excavation

Avoid entering excavations when possible. If personnel must enter an excavation, a competent person must supervise the entry.

If hydrocarbons or other site-specific contaminants are present or expected, they must be monitored, and personnel must be protected from respiratory and other health hazards. Contact your SSHE Advisor and/or IH Advisor for specific requirements.

Position stairway, ladder, ramp, or other safe means of exit so individuals do not have to travel more than 25 ft (8m) to exit an excavation.

Ladders must be secured and extend 3 ft (1m) above the surface of the ground.

Isolate and protect all utility lines in the excavation.

Emergency rescue equipment is required to be readily available if a competent person determines, based on the conditions at the job site, that hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation.

No person may be in an excavation:

- While material is being added to or removed from the excavation
- When an underground storage tank or other structure is unsupported or there is the possibility that the unit may roll
- When standing water has or is accumulating
- Until a suitable rescue plan is developed and reviewed with responders prior to entry

Material Loading and Disposal

Prior to loading, communicate to the truck driver the loading procedure and method of checking the load. Secure the load while the driver remains in the cab.

The driver may be allowed to inspect the load and/or cover the load after the area has been secured after the loading equipment must be shut down and/or made safe with boom/arm/bucket on the ground and "show me your hands" to indicate it is safe to approach per Working Near Moving Equipment requirements.

If site specific procedures prevent the driver from being inside the cab while the truck is being loaded, then the driver will position the vehicle and move to a safe area while the truck is loaded.

Trucks must not be moving when the tarp is being raised over the truck to cover the load to prevent the driver from striking overhead lines.

No person is allowed to climb inside of the dump truck trailer or stand on top of the cab.

Prior to loading, communicate to the truck driver the loading procedure and method of inspecting the load.

Functional Guidance

E&PS Environmental

In addition to the requirements identified above, E&PS Environmental will follow the requirements of the pre-clearance method or reconciliation method outlined in OIMS 3.1 Subsurface Clearance procedure.

E&PS Retail Asset Management

In addition to the requirements identified above, E&PS Retail Asset Management will mechanically dig a work area perimeter trench to safely locate any unknown utility lines as outlined in the Higher Risk Checklist for shallow excavation/boring.

Definitions

Competent Person: Individual capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous or dangerous and can take prompt corrective measures to eliminate them.

Excavation: Any man-made cut, cavity, trench, or depression in the Earth's surface.

Ground Disturbance or Subsurface Clearance: Ground disturbance activities at a depth greater than 0.5 ft (15 cm) below ground surface.

Hand Digging: The preferred method of utility clearance in the presence of higher risk utilities. Soil is removed using a shovel or other appropriate hand tool without excessive force.

Setback Distance: The minimum distance from the edge of the excavation where spoils, equipment and materials are prohibited from being placed.

Soft Digging: Soft digging is a preferred means of utility clearance in the presence of higher risk utilities. Soil is removed using a vacuum and if needed an accompanying air knife (preferred) or a water lance (less preferred) may be used to break up/loosen the soil for removal with the vacuum.

Trench: A narrow excavation. In general, the depth is greater than the width.

UXO: Unexploded ordnance are explosive weapons (bombs, bullets, shells, grenades, land mines, naval mines, etc.) that did not explode when they were employed and still pose a risk of detonation, potentially many decades after they were used or discarded.

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document

APPENDIX I

Roux's Corporate Subsurface Utility Clearance Management Program and
ExxonMobil E&PS Minimum Safety Expectations
Subsurface Clearance Procedure

ELECTRICAL SAFE WORK PRACTICES

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

General

E&PS has adopted the Manufacturing Tier 1 Best Practice (T1BP) for Electrical Safety Related Work Practices. The requirements in this document are consistent with the T1BP but are written to enable E&PS to implement the requirements.

References to the Critical Life Saving Measures (CLSM) are provided to assist in cross-referencing to the T1BP.

Adhering to these minimum safety expectations will help ensure that electric shock, arc flash, and other injuries associated from direct or indirect electrical contact are prevented.

These minimum safety expectations do not include requirements for the design and integrity of electrical equipment.

The requirements in this document apply when:

- Using electrical test equipment to test electrical parameters
- Performing live-work, or work within the limited approach boundary of exposed or energized components (see table in the Approach Boundaries section for specific approach boundaries) greater than 50 volts
- Activities with arc flash potential

Whenever possible, equipment must be de-energized and isolated before working on, or in close proximity to energized circuits. See table in the Approach Boundaries section for specific distances of proximity work.

Protecting from Accidental Contact

Guards must be around all live parts operating at more than 50 volts AC or DC (line-to-line or line-to-ground, whichever is greater) unless the part has an insulated covering or the location of the live part minimizes accidental contact.

Guarding of energized parts within a compartment must be maintained during operation and maintenance functions to prevent accidental contact.

When guards are removed from energized equipment, barriers must be installed around the work area to minimize the risk of personnel entering the work area.

Qualified person(s) must remove any conductive materials (i.e. rings, watches, necklaces, etc.) before working on electrical equipment.

De-Energized Work (CLSM 1)

Energy Isolation

Work involving energy isolation must follow E&PS Energy Isolation Minimum Safety Expectations.

Personnel Requirements (CLSM 2)

Only qualified (those trained) and authorized (those given the authority and responsibility) persons who are aware of the hazards associated with the work are permitted to perform work on or near exposed energized parts (50 volts or more).

A qualified person's employer will designate them as qualified personnel. Authorized personnel will be identified through written work procedures. E&PS may request documentation to confirm an individual is has been trained and is qualified.

Qualified persons must be trained in the following:

- The safety-related work practices addressed in this document that are related to their job, including all Lock out/Tag Out of circuits per established Energy Isolation procedures and any hazard analyses related to work being conducted on or in proximity to energized electrical circuits

- The ability to determine the degree and extent of the hazards and the job planning and proper use of personal protective equipment necessary to perform the task safely, including identification of exposed live parts, and the associated nominal voltages
- The proper use of special precautionary techniques, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment
- Emergency procedures to respond to an electrical incident
- Awareness of all potential arc flash hazards identified in the work zone and review the associated hazard analysis with all personnel including unqualified or standby persons that may be present during the task

Unqualified persons who may be at risk of injury due to electric shock or other electrical hazards must also be trained in the following:

- Hazards associated with electricity
- Allowable approach distances for unqualified personnel
- Potential electrical hazards associated with one's respective job assignment

Stand-by Person

A stand-by person must be present when testing energized circuits 50V or greater (AC or DC).

A stand-by person must:

- Be capable of calling for help in the event of an incident

- Be capable of removing the victim from the electrical hazard without endangering themselves or others
- Be capable of ensuring first aid, including Cardio Pulmonary Resuscitation (CPR), is started as soon as possible (either by standby person or emergency response team)
- Watch the person doing the work for any sign of distress (The Standby Person will not perform any work or assist the personnel during the hazardous part of the task)
- Understand the job scope and safety implications of the task to be done
- Keep non-essential persons out of the work area
- Know where and how to de-energize the electrical circuit or equipment if there is any sign of personnel in distress

Standby persons are not required when:

- Test leads are connected, and disconnected, with the circuit de-energized and there is no risk of inadvertent contact with live parts
- The circuit is supplied by a ground fault circuit interrupter (GFCI) with tripping current of 20ma or less
- The connection of the test device is via a plug/socket or terminal with a minimum ip rating of 2x ('finger safe')
- The test device is of the non-contact type, applied to insulated parts only and there is no risk of inadvertent contact with live parts

- Approved by the level of management that can accept a category 2 risk per the Exxon Mobil corporate risk assessment matrix and with specified and approved risk mitigation in place

Testing on Energized Circuits 50v or Greater (CSLM 3)

Testing is defined as the use of approved test devices (i.e. voltmeter, ammeter) to measure electrical parameters. Testing on energized circuits is expected to be an infrequent event and is permitted only when a specific task analysis shows de-energized testing to be impractical and the following requirements met:

- Testing must be conducted by qualified persons using approved test devices and a stand-by person must be present
- All test devices must be rated for the highest voltage level that could be encountered
- Test equipment, devices and leads must be used per manufacturer's instructions and within the approved ratings
- Test equipment must be inspected for defects prior to use and not used if a defect is found
- Test leads must have the minimum practical area of bare metal at the test probe and have finger guards fitted. Pig-tail leads which cannot pull out of the test instrument are strongly advised
- Solenoid type testers and test lamps must not be used
- Clear and safe means of access for test devices must be provided with minimal movement or manipulation of conductors

- Environmental and access conditions must not compromise the integrity of the test devices or PPE (as stated in manufacturer's instructions)
- Voltage rated gloves must be worn when testing on energized circuits. Gloves must be certified to either ASTM D120-95 or IEC 60903 with voltage rating greater than the highest voltage level that could be encountered

Use of Portable Tools & Equipment (CLSM 4)

GFCI Protection (or approved equivalent)

All portable electrical equipment and hand-held electric tools or lights must be powered by one of the following approved methods:

- A GFCI device with maximum tripping current of 30ma or less
- Self-contained, battery-powered equipment
- Safety transformers with a restricted secondary voltage of less than 50 volts AC or DC (phase-to-phase or phase-to-ground, whichever is greater)
- An electrical separation transformer with ungrounded secondary (only a single item of equipment may be fed from each separation transformer) in accordance with IEC 60364-4-41

In enclosed metal vessels or confined spaces, the protective device (GFCI, Safety Transformer, or Separation Transformer) must be located outside of the metal vessel or confined space.

Portable electric equipment and flexible extension cords used in conductive locations (i.e. those inundated with water or other conductive liquids), or in job locations where personnel are likely to contact water or conductive liquids, must be approved for those locations.

Periodic Testing

To ensure electrical and mechanical integrity, hand-held electric tools shall be tested at least once per year including visual inspection, electrical insulation integrity and, where applicable, earth/ground wire continuity. This requirement may be waived provided the following two conditions are met:

1. All hand held electric tools are fed via a GFCI device
2. There is a documented program for testing GFCI devices

Inspection Before Use

Portable equipment and hand-held electric equipment and flexible extension cords must be visually inspected before use for the following:

1. External defects (i.e. loose parts, damage to outer jacket, plug or cord insulation)
2. Evidence of possible internal damage (i.e. pinched or crushed outer jacket)
3. Proper operation of Ground Fault Circuit Interrupter (GFCI)

Live & Proximity Work (50V or higher, AC or DC) (CLSM 5)

Risk Assessment and Approval

Live or proximity work is defined in the table below and is permitted when:

- A task-specific risk assessment (or equivalent) shows de-energization to be impractical, and;
- The specific task has been approved by one level above the site management;
- All specified and approved risk mitigation is confirmed in place prior to commencement of work

Entering the Prohibited Approach Boundary is considered the same as making contact with exposed energized conductors or circuit parts and must be handled with the same restrictions as Live Work.

Live work/proximity work is a very infrequent event and will not be permitted unless it is unreasonable in all the circumstances to work de-energized.

Approach Boundaries

When performing live or proximity work, personnel must comply with the approach boundaries outlined in the table below. All distances are measured from the exposed live part.

	Limited Approach Boundary Unqualified Worker **Proximity Work**	Restricted Approach Boundary Qualified Worker **Proximity Work**	Prohibited Approach Boundary **Live Work**
Less than 300V	3100mm/10ft-0in	Avoid Contact	Avoid Contact
301V to 750V		300mm/1ft-0in	30mm/0ft-1in
751V to 15kV		660mm/2ft-2in	180mm/0ft-7in
Greater than 15kV	Consult NFPA-70E 130.2(c)		

Personal Protective Equipment (PPE)

Each site is responsible for performing a site-specific, equipment-specific PPE analysis and must define requirements for use of personal and other protective equipment to protect against the hazards associated with the work.

A "PPE for Electrical Tasks" Table is provided for reference, however, site specific equipment may require more or less stringent PPE requirements, precautions and procedures.

	Nominal Voltage (AC or DC) (Note 3)			
Task	**50V to 130V**	**131V to 300V**	**301V to 1000V**	**>1000V**
Live Work	A, B, F	A, B, D, F	A, B, D, F	A, B, D, F
Proximity Work	A, B	A, B, D, F	A , B, D, F	A, B, D, F
Potential Testing to Prove 'Dead'	A, E	A, E	A, E	A, D, E, F
Testing/Measurement on *Live* Equipment	A, E	A, D, E, F	A, D, E, F	A, D, E, F
Apply Temporary Grounds or Discharging of Cables	N/A	N/A	A	A
Rack In/Out of Equipment From *Energized* Bus-bars	N/A	N/A	C, D**	C, D**

Code	**PPE and Equipment Description**
A	Voltage Rated Gloves certified to either ASTM D120-95 or IEC 60903 with a voltage rating greater than the highest voltage level that could be encountered. Where arc flash hazards exist with calculated incident energy level > 8 cal/cm2, Class 2 (minimum) Voltage Rated gloves with leather protectors shall be worn.
B	Approved insulated tools and/or insulating barriers, blankets, shields or guards
C	Arc Flash Gloves, ATPV Rated or - Incident Energy ≤8 cal/ cm^2: Leather Gloves Incident Energy > 8 cal/cm^2: Class 2 Voltage Rated Gloves with Leather Protectors

D	Appropriate PPE including Arc Flash PPE where required - **ArcFlash PPE may not be required when racking in or out with approved arc-resistant switchgear. See Note 2.
E	Voltage Rated Test equipment
F	2nd Person Required (subject to limited exceptions for Testing / Measurement (see LOP 3.3)
N/A	Not Applicable

Notes:

1. 'Basic PPE' applicable for all tasks is long sleeved fire retardant shirt/pants or coverall, safety glasses with side shields, safety shoes/boots
2. Hearing protection should be considered when the calculated incident energy exposure is greater than 1.2 cal/cm2 (mandatory in North America)
3. All voltages are represented as the highest exposure voltage for the work being done, whether that is line-to-line or line-to-ground

Insulated Tools

Only approved insulated tools shall be used within the prohibited approach boundary.

Insulated tools shall be used with voltage rated gloves to provide protection from electric shock.

Stand-by Person

A stand-by person must be present during energized (live) work and proximity work (50V or higher, AC or DC). Refer to the Testing on Energized Circuits (50v or Greater) (CLSM 3) for Stand-by Person requirements.

Medical Services and First Aid Support

When a qualified person is performing live work or proximity work, an individual trained in First Aid and CPR must be on site and able to respond immediately.

The stand-by person may meet this requirement provided they are trained in First Aid and CPR.

When two or more qualified persons are performing live work or proximity work, at least two trained individuals in First Aid and CPR must be available (standby persons or emergency response team members).

Capacitors

Capacitors store energy in the form of accumulated electric charge.

A short circuit applied across a charged capacitor can cause a large current flow, resulting in injury from arc flash or electric shock and damage to equipment.

Before attempting any work on capacitors, de-energize the contactor according to the Energy Isolation Minimum Safety Expectations.

As stored energy may still be present wear appropriate PPE, including voltage-rated gloves and arc-flash protection and use insulated tools.

Some capacitor switchgear have automatic discharge circuits, these can be used but must not be relied on for safety. To eliminate stored charge:

- Use a resistor to discharge the capacitor to very low voltage
- Use appropriate resistance and power rating
- After voltage dissipates, short leads together to assure zero voltage. This prevents voltage buildup from relaxing dielectric in capacitor

Protection Against Arc-Flash Hazards (CLSM 6)

Each site/facility must maintain an arc flash hazard analysis where there is an arc flash hazard risk.

Arc flash hazard analysis must:

- Establish incident energy levels at the point of work
- Identify engineered solutions to reduce incident energy to the minimum possible such as:
    - Protective device settings/fuse selection
    - Arc Reduction Maintenance Switches
    - Optical arc detection solutions

- Identify locations where engineered solutions cannot feasibly reduce incident energy to acceptable levels and special operating procedures are required to manage the risk such as:
    - Eliminate, or reduce frequency of, tasks resulting in personnel exposure to live un-insulated parts (i.e. 'Live' work, 'Proximity' work or 'Testing')
    - Reduce the frequency of Rack-in/Rack-out operations
    - Increase the distance between personnel and potential arc sources e.g. use remote racking or longer operating tools when racking in/out breakers
- Determine the arc flash protection boundary. Personnel must wear the designated arc flash PPE within this boundary

Each site must maintain a list of tasks that require arc flash PPE and special operating procedures.

Arc Flash PPE requirements are:

Face/Head Protection:

- An arc flash face-shield must be used when the calculated Incident Energy exposure is greater than 1.2 Cal/cm2. A face-shield, specifically designed for the protection from electric arc and flash hazards must be used

- An arc flash hood (with integral arc flash face-shield) must be used when the calculated Incident Energy exposure is greater than 8 Cal/cm2
- Safety glasses or goggles shall be used under the arc flash face-shield or hood

Body Protection:

- An arc flash suit (coat/pants or coveralls) must be used when the calculated Incident Energy exposure is greater than standard FR clothing ATPV rating
- When selecting the arc flash suit, the ATPV rating (Cal/cm2) of FR clothing may be added to the ATPV rating (cal/cm2) of the arc flash suit provided the total is equal or greater than the calculated incident energy exposure

Hand Protection:

- Protective gloves must be worn to protect against arc flash and electrical shock hazards based on the following table:

Incident Energy Level	**No Electric Shock Hazard present**	**Electric Shock Hazard present**
Is less than or equal to 8 cal/cm^2	Leather gloves designed to protect both hands and wrists from burns	Leather protectors over voltage rated gloves

Is greater than 8 cal/cm2:	Fire retardant gloves with ATPV (Arc Thermal Performance Level) rating greater than the calculated incident energy, or Class 2 (rated to 17 kV) (minimum) rubber insulating gloves with leather protectors	Class 2 (minimum) rubber insulating gloves with leather protectors

ATPV Ratings of Arc Flash PPE must be at least the calculated Incident Energy exposure for the intended task.

Arc Flash Hazard Warning labels must be mounted on or close to electrical equipment that have the potential for an arc flash.

Affected employees must receive training to ensure they clearly understand where and in what circumstances arc flash hazards exist.

Energizing Electrical Equipment (CLSM 7)

Each site must prepare written procedures per the E&PS Energy Isolation Minimum Safety Expectations to protect people and installations from hazards associated with equipment re-energization.

Procedures must include steps for a qualified person to conduct tests and visual inspections to verify that work is complete and all tools, electrical jumpers, shorts, grounds and other devices have been removed.

Lock out/tag out must be removed per E&PS Energy Isolation Minimum Safety Expectations.

Alerting Techniques

Safety signs, safety symbols or accident prevention tags must be used where electrical hazards exist that may endanger personnel.

Barricades must be used in conjunction with safety signs where it is necessary to prevent or limit individual access to work areas exposing individuals to uninsulated energized conductors or circuit parts.

Conductive barriers are prohibited if they could cause an electrical contact hazard.

If signs and barricades do not provide sufficient warning and protection from electrical hazards, an attendant must be stationed to warn and protect employees from entering the area.

Definitions

Arc Flash Hazard Analysis: A method to determine the risk of personal injury as a result of exposure to incident energy from an electrical arc flash. Arc flash hazard analysis requires an assessment of the potential incident energy level to which personnel could be exposed should an arc flash occur. There are various methods for calculation of incident energy but the ExxonMobil preferred approach is as described in IEEE 1584 and applicable amendments. All sites shall calculate arc flash incident energy levels and should do so using the method described in IEEE 1584 and amendments. Incident energy shall be calculated at 100% arcing current for all systems. Due to the unpredictability of arcing currents at lower voltages, incident energy for systems rated <1000V shall be calculated at both the 85% and 100% arcing current level. Due to the inverse nature of protective devices such as fuses or relay curves, a longer operating time at lower arcing current can result in a higher energy exposure. There may be cases where protective device settings are such that the arc fault clearing time is longer than 2 seconds. In these cases, consideration should be given to the likelihood that a person exposed to an arc flash will move away quickly, thereby limiting the maximum exposure time to 2 seconds, unless the physical location precludes a quick escape.

Arc Flash Protection Boundary: The distance from exposed, energized parts at which a person could sustain a just curable (second degree) burn to bare skin as a result of an arcing fault.

De-energized: Switched off from all sources of power. Free from any electrical connection to a source of potential difference and from electric charge.

Energized: Electrically connected to a source of voltage.

Grounded: Connected to the general mass of earth in such a manner as will ensure at all times an immediate discharge of electrical energy without danger.

Incident Energy: The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. Incident energy is measured in joules per centimeter squared (J/cm2) or calories per centimeter squared (cal/cm2).

Isolation: The disconnection and separation of the electrical equipment from every source of electrical energy in such a way that this disconnection and separation is secure.

Limited Approach Boundary: An approach limit at a distance from an exposed live part within which a shock hazard exists. This is generally taken as a point where extra care should be taken for Qualified Persons and where Unqualified Persons require additional guidance and supervision.

Live: See definition for "**Energized**".

Live Work: Any contact with exposed, energized electrical conductors or circuit parts by the hands, feet or other body parts with any equipment, such as tools, regardless

of the personal protective equipment a person is wearing. This includes any work within the Prohibited Approach Boundary. This normally excludes testing activities (See "Testing" Definition below) or use of insulated tools specially designed (and tested) for the purpose (i.e. an insulated fuse puller).

Stand-by: When there is a requirement not to work alone the standby person must meet the following requirements:

- Able to summon help in the event of an accident
- Capable of removing the victim from the electrical hazard without endangering themselves
- Capable of ensuring first aid, including Cardio Pulmonary Resuscitation (CPR), is started as soon as possible (either by standby person or emergency response team)
- Watch the person doing the work for any sign of distress (The Standby Person will not perform any work or assist the personnel during the hazardous part of the task.)
- In addition, it is desirable that the standby person meets the following:
    - Understand the job scope and safety implications of the task to be done
    - Keep non-essential personnel out of the work area
    - Know where and how to de-energize the electrical circuit or equipment if there is any sign of personnel in distress

Qualified Person: One familiar with the construction and operation of the equipment and the hazards involved. "Qualified Persons" are intended to be only those who are well acquainted with and thoroughly conversant in the electric equipment and the electrical hazards involved with the work being performed. This is also considered a "Skilled Person" per European standards.

Unqualified Person: A person who is not a "Qualified Person".

Potential Testing: The act of proving that the equipment to be worked on is de-energized.

Prohibited Approach Boundary: The point where inadvertent contact with exposed energized circuit conductors is highly likely and all work is considered the same as Live Work.

Proximity Work: Proximity work includes any work within the Restricted Approach Boundary but outside of the Prohibited Approach Boundary for Qualified persons or any work within the Limited Approach Boundary, but outside of the Restricted Approach Boundary for Unqualified persons.

Restricted Approach Boundary: An approach limit at a distance from an exposed live part within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to the live part. This is considered Proximity Work for Qualified persons.

Testing: All activities designed to check the operation and condition of an electrical installation. This may involve intentional contact with live conductors using approved test devices and leads.

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document

APPENDIX J

Roux Biological Hazard Awareness Management Program

BIOLOGICAL HAZARD AWARENESS MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/2019**
REVISION NUMBER	:	**3**

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APPENDICES

1. PURPOSE AND APPLICABILITY

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C., and Remedial Engineering (collectively, "Roux") has established a Biological Hazard Awareness Management Program to properly identify and minimize associated risks, utilizing best management practices to provide the appropriate guidance for the protection of all employees from exposure to biological hazards during work activities. This Program focuses on the management of more common biological hazards encountered by Roux staff such as vector borne diseases, venomous wildlife/insects, poisonous plants but also identifies other dangerous wildlife which may be encountered by Roux in various work environments (i.e. wild dogs, bears, and alligators).

The program is applicable to Roux employees and their subcontractors who will be performing activities and/or work in areas which could result in potential contact with biological hazards. The potential contact with biological hazards varies based on geographic location and climatic conditions. Therefore, it is imperative that during the pre-planning of work activities all potential biological hazards and risks are identified, and proper mitigation programs are established for each within the project specific Health and Safety Plan (HASP).

Biological hazards are commonly encountered by Roux employees when conducting routine work activates. The most common and widely expected forms of exposure have historically been associated with TICKS, SPIDERS AND POISIONOUS PLANTS. This management program describes best management practices for these risk scenarios as well as other potential hazards encountered in our work environment. This program is intended to provide general awareness and guidance for management of these other biological hazards which you may encountered including reptiles and mammals. The site-specific HASP should incorporate procedures and project specific hazards mitigation procedures in a greater detail than provide in this Management Program.

Questions pertaining to this program can be addressed by your Office Health & Safety Manager (OHSM) or the Corporate Health & Safety Manager (CHSM). Key definitions pertaining to this program are provided in Appendix A.

2. PROGRAM PROCEDURES

The following sub-sections outline commonly found biological hazards potentially present during typical field activities. Such biological hazards include ticks, mosquitos, venomous spiders, venomous snake's poisonous plants, dogs, alligators, bears and mountain lions. For each hazard a detailed breakdown of identification, project pre-planning and avoidance, proper use of PPE and responses to suspected or known biological exposures are provided. It is understood that there are and will be other potential biological hazards present in the work environment which are not included within this Program. The program is intended to provide examples of biological risk and not intended to cover all potential risks.

2.1 Tick-Borne Disease

This section outlines management practices to reduce potential exposure situations along with the use of personal protective equipment (PPE), insect repellents usage, procedures for inspections of personnel, recommendations for personal showering and the washing and drying of work clothing that has been potentially exposed to a tick environment and the required response to a known or suspected tick bite.

The following diseases are of concern as it relates to ticks and include: Anaplasmosis, Babesiosis, Ehrlichiosis, Lyme Disease, Rocky Mountain Spotted Fever, Southern Tick-Associated Rash Illness, Tick-Borne Relapsing Fever, Tularemia, Colorado tick fever, Alpha-Gal Allergy and Powassan virus.

2.1.1 Project Pre-Planning and Tick Avoidance

Avoidance is the preferred management approach with respect to tick(s). Pre-planning at the beginning of a project is the first step in tick avoidance. Where possible, plan the work to avoid tick-infested areas as described below:

- Avoid brushy, overgrown grassy and wooded habitats, particularly in spring and through fall when ticks are most active.
- Remove leaves, tall grass and brush from areas surrounding work areas (to include residential sites), thereby potentially reducing tick, deer and rodent habitat.
- Consider having a licensed applicator apply tick-toxic chemicals (e.g., Damminix, Dursban, Sevin, etc.) to surrounding work or residential areas to suppress the tick population.
- Consider performing work during dormant seasons or not during active seasons (spring through fall) unless it is not practical or rescheduling may introduce other hazards.

2.1.2 Use of Personal Protective Equipment (PPE)

Where avoidance of tick habitat or clearing of the area is not possible, employees need to wear appropriate PPE and take measures to avoid tick bites. There are two defined PPE approaches which are discussed below, that when properly implemented will provide the required protection from tick bites.

2.1.3 Preferred PPE Method

The preferred approach is the use of permethrin treated clothing and an insect repellent containing n,n-diethyl m-toluamide (DEET) on exposed skin. With the use of permethrin there are critical and time sensitive steps which are required in advance of its proper use. Additional guidelines on permethrin are provided in Appendix B and should be reviewed at least 2 days prior to the scheduled work. The use of permethrin and DEET are further discussed below:

- Using permethrin on outer clothing (including a hat) and shoes to kill ticks on contact as per manufacturer's instructions (requires pre-treatment of clothing 24 hours in advance of the scheduled work).
- Spraying the insect repellents containing DEET on exposed skin just prior to initiation of the work, in accordance with United States Environmental Protection Agency (EPA) guidelines and supplemental information which is provided in Appendix C. DEET should be used on exposed skin only as it may melt or dissolve synthetic fabrics such as polyester or rayon.
- Be sure to tuck your pant legs into your socks and your shirt into your pants.

Should you have any questions or concerns regarding the use of permethrin or DEET please contact the CHSM/OHSM. If you require assistance with obtaining approved repellents contact your OHSM.

2.1.3.1 Alternative PPE Method

An alternative approach to the use of permethrin would be the use of other PPE in conjunction with the application of DEET as discussed above in section 2.1.3 and as discussed below:

- Wearing non-coated Tyvek coveralls over light-colored long-sleeved shirts and pants. Tape ankle openings of coveralls and wrist if wearing gloves.

- Wear a light colored long sleeved shirt and pants and tuck your pant legs into your socks and your shirt into your pants. Socks should be a tight weave fabric to prevent exposure through the material.
- Spraying the insect repellents containing DEET just prior to initiation of the work on exposed skin, in accordance with manufacturer's instructions.

2.1.3.2 Proper Donning and Removal of PPE

The donning of the PPE is to occur prior to entering a potentially tick-infested area. This usually means that the PPE needs to be in place and properly worn before stepping off a paved or concrete area onto a grassy or wooded area.

The PPE needs to remain on with the tucking or taping of pant legs, all closures fastened, etc., until leaving the potentially tick-infested area. Again, this usually means upon return to the previously paved or concrete area. Upon leaving the area, remove the PPE appropriately and bag it (plastic bag) to prevent ticks from traveling and subsequently attaching themselves to your skin.

Workers are to inspect themselves and co-workers frequently during the work and again after exiting the work area.

It is also important to do another thorough examination upon arrival home prior to and during showering to further check for ticks. Areas of the body would include under arms, in/around ears, inside belly button, back of knees, around ankles, in and around your hair, between legs and around your waist. Also, it is recommended that any work clothes be immediately washed and dried at high temperatures.

2.1.4 Responding to Known or Suspected Tick Bites

If an embedded tick is discovered it should be promptly removed with tweezers. Please follow the following steps:

- Grasp the tick by the head or mouthparts where they enter the skin, utilizing a pair of pointed precision tweezers (provided in the on-site first aid kit). Do NOT grasp the tick by the body.
- Pull firmly and in a steady motion directly outward. Don't twist or jerk the tick as this can cause the mouth parts to break off and remain in the skin. If this occurs, remove the mouth-parts with tweezers. If you are unable to remove the mouth easily with clean tweezers leave alone and let skin heal.
- Do NOT apply petroleum jelly, a hot match, alcohol, or any other irritant to the tick to get it to back out of skin.
- Clean the bite area and your hands with antiseptic.

Preserve the tick for analysis (i.e., by placing in a zip lock bag, envelope or jar). Provide the tick to the OHSM; further testing may be required. If testing is warranted based on the circumstances the tick will be sent to an accredited laboratory (e.g. EMSL Analytical, Inc.) to be analyzed to determine if it contains the bacteria capable of causing Lyme disease.

The discovery of a tick embedded in the skin where the tick contact occurred at work will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart.

If you suspect you have been bitten by a tick while on the job and exhibit the following symptoms; circular rash, aches/pains and/or fever/chills contact your OHSM for additional guidance.

2.2 Mosquito-Borne Diseases

Mosquito-borne diseases are spread through the bite of an infected mosquito, such diseases include Zika virus, West Nile Virus, Chikungunya virus, dengue and malaria. In most cases individuals exposed to such diseases will only exhibit mild, short term illness however there is the possibility for severe or long-term illness which can be fatal.

2.2.1 Project Pre-Planning and Mosquito Avoidance

Avoidance is the preferred management approach with respect to mosquitos. Pre-planning at the beginning of a project is the first step. Since mosquitos breed in standing water the preferred method is to avoid such areas with standing water however if unavoidable and possible the following should be done as described below:

- Remove, turn over and/or cover equipment which may harbor standing water.
- Remove tires, buckets, bottles, and barrels that collect water.
- Place drain holes in containers that collect water and cannot be discarded.
- Consider having a licensed applicator apply tick-toxic chemicals (e.g., Damminix, Dursban, Sevin, etc.) to surrounding work or residential areas to suppress the mosquito population.
- Consider performing work during dormant seasons or not during active times (i.e. avoid dusk or dawn) unless it is not practical or rescheduling may introduce other hazards.

2.2.2 Use of Personal Protective Equipment (PPE)

Where avoidance of mosquito habitat or clearing of the area of standing water is not possible, employees must wear appropriate PPE to further mitigate potential mosquito bites. Please reference sections 2.1.3, 2.1.4 and 2.1.5 as PPE requirements outlined in these sections will provide the level of protection necessary to prevent potential mosquito bites.

2.2.3 Responding to Known or Suspected Mosquito Bites

The discovery of a mosquito bite on the skin where it likely occurred at work will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart.

If you suspect you have been bitten by a mosquito while on the job and exhibit the following symptoms; rash, aches/pains and/or fever/chills contact your OHSM for additional guidance.

2.3 Venomous Spiders

Venomous spiders can be found in various regions of North America, of specific concern are black widow and brown recluse spiders. Black widows can be found throughout North America, however are common in the southern and western areas of the United States. While the brown recluse is more commonly found in the midwestern and southern states. Both pose significant hazards due to their bites potency. Black widow spider venom is neurotoxic, which results in pain at the bite area and then spreads to the chest, abdomen, and potentially the entire body. The brown recluse produces severe lesions as the result of

skin necrosis. These spiders can be found in and around wells, brush, outdoor toilets and areas where debris has accumulated. Spiders are typically by nature not aggressive however if trapped or unintentionally contacted they will bite.

- Black widow spiders can be identified by their red/orange/yellow hourglass marking on the underside of their abdomen, which can also present as dot. The body of an adult black widow female is about ½ inch long.
- Brown recluse spiders can be identified as golden brown with a dark violin/fiddle shape located on the top of the leg attachment region of the neck pointing backward toward the abdomen and are approximately ¼ to ¾ inches long.

2.3.1 Project Pre-Planning and Spider Avoidance

Avoidance is the preferred management approach with respect to potential spider contact. Since spiders are commonly found outdoors underneath stones, hollow stumps, rodent burrows, sheds, wells, within undisturbed cluttered areas (even indoors) care needs to be made to encountering areas that cannot be easily seen. If workers are unable to completely avoid potential contact then the following should be done to limit potential exposure:

- Remove well casings with tools, do not place hands in hidden areas that could harbor spider webs.
- Minimize empty spaces between stacked materials in the field.
- Remove leaves, tall grass and brush from areas surrounding work areas (to include residential sites), thereby potentially reducing spider habitat.
- Store apparel and outdoor equipment in tightly closed plastic bags.

2.3.2 Use of Personal Protective Equipment (PPE)

Where avoidance of spider habitats is not possible, employees must wear appropriate PPE to further prevent potential spider bites. Please reference sections 2.1.3, 2.1.4 and 2.1.5 as PPE requirements outlined in these sections will provide the level of protection necessary to minimize potential spider bites. Attention must be made to ensuring proper gloves are worn during intrusive work activities which would place hands in areas that cannot be visually inspected prior to hand placement (i.e. accessing wells).

2.3.3 Responding to Known or Suspected Spider Bites

The discovery of a spider bite on the skin where it likely occurred at work will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care.

If you suspect you have been bitten by a spider while on the job and exhibit the following symptoms listed below contact must be made immediately as urgent professional medical care may be required.

- Black widow bites can be extremely painful or go unnoticed, displaying one/two bite marks with localized swelling, pain eventually progresses to the abdomen and back.
- Brown recluse bites can vary in severity from no pain to very severe, the bite will progress to become reddened within several hours resulting in a systemic reaction with 24-36 hours. Symptoms include restlessness, fever, chills nausea, weakness and joint pain. Tissue at the site of the bite will die due to necrosis over time.

2.3.3.1 First Aid

In addition to contacting the necessary personnel the following first aid measures should be carried out if bitten by a spider.

- Identify the type of spider if able to do so safely preserve the spider (i.e., by placing in a zip lock bag, envelope or jar) as this will be able to be used during identification as this will assist in medical treatment.
- Wash the area immediately with soap and water.
- Apply a cloth dampened with cold water or fill bag with ice and apply to the bite area to reduce swelling.
- Elevate the bite area if possible.
- Do NOT attempt to remove venom from the bite area.

2.4 Venomous Snakes

Venomous snakes can be found throughout the United States and include coral snakes, copperheads, cottonmouths/water moccasins and rattlesnakes. Below please find a table indicating the type of snake, visual description, geographic region and image to assist with identification of snakes in the field.

Type of Snake	Visual Description	U.S. Geographic Region	Visual
Coral Snake	Red, black and yellow. Red bands touch yellow bands. Adults 24 inches long.	Wooded, sandy, or marshy areas of the Southern U.S.	
Copperheads	Vary in color from reddish to golden tan. Colored bands are typically hourglass-shaped. Generally, 18-36 inches long.	Forests, rocky areas, swamps, or near sources of water in eastern states, extending west to Texas	

Type of Snake	Visual Description	U.S. Geographic Region	Visual
Cottonmouths/ Water Moccasins	Adult skin is dark tan, brown, or nearly dark black, with vague black or dark brown crossbands. Juveniles have a bold crossbanded pattern of brown or orange with a yellow tail. Adults 26-35 inches long.	Wetland areas, rivers, lakes, etc., in southeastern states	
Rattle Snake	There are many species, distinct identifier is use of their rattle/tail as a warning when they feel threatened. Size dependent on species can get up to 8 feet long.	Mountains, prairies, deserts, and beaches across U.S.	

2.4.1 Project Pre-Planning and Snake Avoidance

Avoidance is the preferred management approach with respect to snakes. Since snakes are commonly found outdoors underneath stones, hollow stumps, along rivers, swamps, marches, burrows, wells, within undisturbed cluttered areas (even indoors) care needs to be taken when encountering areas that cannot be easily seen. Additional guidance is listed below to assist with mitigating potential contact with snakes:

- Remove well casings with tools, do not place hands in hidden areas that could harbor snakes.
- Minimize empty spaces between stacked materials in the field.
- Remove leaves, tall grass and brush from areas surrounding work areas (to include residential sites), thereby potentially reducing snake habitat.
- Store apparel and outdoor equipment in tightly closed plastic bags.
- Never attempt to handle a snake directly.
- Avoid climbing on rocks or piles of wood and stay away from tall grass and piles of leaves where a snake may be hiding.

2.4.2 Use of Personal Protective Equipment (PPE)

Where avoidance of snake habitat is not possible, employees must wear appropriate PPE and take measures to prevent potential snake bites. Please reference section 2.1.4 as PPE requirements (excluding insecticides) to minimize potential snake bites. Heavy duty boots and pants must be worn as this area of the body will be more prone to potential snake bite. In addition, proper tools and gloves should be used during intrusive work activities which could place hands in areas that cannot be visually inspected prior to hand placement (i.e. accessing wells).

2.4.3 Responding to Known or Suspected Snake Bites

A snake bite will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care. Signs and symptoms of a snake bite can vary considerably based on the type of snake, therefore a general list is provided below:

- A pair of puncture marks at the wound which are swollen and red.
- Severe pain at the site of the bite.
- Nausea and vomiting.
- Labored breathing (potential for breathing to stop).
- Disturbed vision.
- Increase in salivation and sweating.
- Numbness or tingling around the face and/or limbs.

2.4.3.1 First Aid

In addition to contacting the necessary personnel the following first aid measures should be carried out if bitten by a snake.

- Remain still and calm, additional movement and increased heart rate can spread venom throughout the body. Lay or sit down with the bite below the level of the heart.
- Wash the area immediately with soap and water.
- Cover the bite with a clean, dry dressing.

Do NOT do the following:

- Do not try to pick up or entrap the snake for identification purposes.
- Do not wait for symptoms to appear, seek medical attention immediately and notify Roux personnel immediately.
- Do not open the wound further or suck out venom.
- Do not apply ice or immerse the wound in water.
- Do not drink alcohol or caffeinated beverages.

2.5 Bees, Wasps, and Hornets

Bees, wasps, and hornets (stinging insects) can be found throughout the United States and include many difference species. These insects are most abundant and threatening during the warmer months. Stinging insects inflict harm by injecting venom through a stinger. The chemical makeups of their venom differ greatly between species, so a human's reaction to a sting can be variable. In general, wasps and hornets tend to be more aggressive than most bee species, and wasps can sting multiple times, while bees can only sting once.

2.5.1 Project Pre-Planning and Bee, Wasp, and Hornet Avoidance

Avoidance is the preferred management approach with respect to potential bee, wasp, and hornet contact. Stinging insects typical build nests and hives outdoors around sheds, wooden decks, flower beds, within stick-up and flush mount monitoring well casings, roof eaves, and trash cans, so care needs to be taken prior to entering certain work areas. Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and communicate their allergy with the OHSM and project teams prior to conducting field work.

If a work area cannot not be moved away from trigger locations, then the following should be done to limit attraction and potential exposure:

- Avoid excessive smelling perfumes, after shave, and deodorants.
- Property dispose of food waste and trash; excessive food waste can attract bees and wasps.
- Communicate with project team and OHSM any known sting allergies.
- Avoid bright colored clothing and floral patterns (when applicable).
- Remove well casings with tools, and allow adequate time to evaluate the presence of stinging insects prior to reaching into areas that could harbor hives or nests.
- Store apparel and outdoor equipment in tightly closed bins.
- Whenever possible, move work areas away from observed nests and hives.
- If a stinging insect lands on you, keep still or move slowly away. DO NOT SWAT at the insect, this will instigate aggression.

2.5.2 Use of Personal Protective Equipment (PPE)

Where avoidance of bees, wasps, and hornets is not possible, employees must wear appropriate PPE and take measures to prevent stings when encounters cannot be avoided. Gloves, long-sleeved shirts, and pants shall be worn to limit body areas susceptible to stings. Bee and wasp repellent sprays should be kept onsite if significant populations of nests and hives warrant treatment. Be sure to wear proper PPE (eye protection, nitrile gloves) when deploying such repellent sprays.

2.5.3 Responding to Known or Suspected Bee, Wasp, or Hornet Sting

A sting from any bee, wasp, or hornet requires adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. In the case of an employee with known bee or wasp sting allergies, immediate notification to professional emergency is required to ensure proper care. As mentioned in section 2.5, the venom associated with bees, wasps, and hornets can vary between species, as such, human reactions to stings can also vary. This fact can lead to instances with surprising allergic reactions.

Take immediate medical action if any of the following symptoms are observed:

- Severe swelling of the face, lips, or throat.
- Hives or inching in area of the body not affected by the sting.
- Breathing difficulties, such as wheezing or gasping.
- Dizziness.

- Sudden drop in blood pressure.
- Lightheadedness.
- Nausea or vomiting.

2.5.3.1 First Aid

If no severe allergic reactions are observed after a stinging encounter, and immediate professional medical treatment is deemed not warranted, the following personal medical treatment shall be conducted:

1. Remove the stinger by scraping a straight edge object across the wound.
2. Wash area thoroughly with soap.
3. Place ice wrap or washcloth or other suitable covering on the area of the sting for 10 minutes.
4. If needed, apply antihistamine to the affected area.

2.6 Scorpions

Scorpions are typically found in dry, arid desert regions of the southern and south western portions of the United States; however, some species can be found in grasslands, forests, and inside caves. Scorpions are nocturnal, and usually hide during the day and are active at night. During normal work hours, humans will typical encounter scorpions in their docile state often hidden away in dark enclosed features. They typically hide under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground. When threatened, a scorpion can choose to use either its pincers, or its venomous stinger to defend itself. The performance of either the pincers (pinchforce) or the stinger (venom strength) \ can depend on scorpion physical characteristics, like species, size and shape.

2.6.1 Project Pre-Planning and Scorpion Avoidance

General good housekeeping practices are the best way to avoid scorpion contact. When working and living in regions indigenous to scorpions, be sure to update the HASP and JSAs reflecting special conditions, and perform these general control measures to limit scorpion exposure:

- Shake out all clothing, boots, and hats prior to putting them on.
- Visually inspect vehicles prior to entry.
- Keep all equipment storage boxes and vehicles closed overnight.
- Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and communicate their allergy with the OHSM and project teams prior to conducting field work.
- Take caution prior to reaching hands into dark enclosed structures (monitoring well casings, drums, etc.).

2.6.2 Use of Personal Protective Equipment (PPE)

While avoidance is the best practice for dealing with scorpions, PPE is the last line of defense when scorpion encounters do occur. Gloves, long-sleeved shirts and pants shall be worn to limit body areas susceptible to stings. Care shall be taken to ensure all PPE is inspected prior to wear.

2.6.3 Responding to Known or Suspected Scorpion Sting

A scorpion sting requires adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential for proper medical care. Employees with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen), and know how to administer the pen in case of emergency. Typical symptoms of a scorpion sting are as follows:

- A burning at the injection site, with very little swelling or inflammation.
- A positive “tap” test – Extreme pain when the sting site is tapped with a finger.
- Restlessness and convulsions.
- Inability to focus eyes.
- Staggering gait.
- Thick tongue sensation, with slurred speech and drooling.
- Muscle twitches.
- Abdominal pain and cramps.
- Respiratory depression.

2.6.3.1 First Aid

Scorpion stings can potentially be life threatening dependent on the scorpion species and/or personal human allergies. Immediately contact professional emergencies services and a poison control center following a scorpion pinch or sting. Prior to receiving professional medical advice to determine the next response action, the following actions should be taken:

- Apply ice to the sting site.
- DO NOT take any sedative antihistamines, as they can react negatively with the venom.
- Try to remain relaxed and calm.
- If possible, safely capture the scorpion for identification, this way proper anti-venom can be issued.

2.7 Poisonous Plants

The potential for contact with poisonous plants exists when performing fieldwork in a variety of areas although commonly found in undeveloped/wooded areas it can be present in urban environments. Poisonous plants come in a variety of shapes and sizes and have different modes of exposure (i.e. contact, ingestion, inhalation). For our purposes the major area of concern is contact with the sap oil of native poisonous plants which induces an allergic skin reaction. The major categories of native poisonous plants include poison ivy, poison oak and poison sumac.

2.7.1 Poison Ivy

Poison ivy is found across the United States, except California, Alaska and Hawaii. Poison ivy can be classified as eastern or western. Eastern poison ivy is typically a hairy, ropelike vine with three shiny green (red in fall) leaves budding from one small stem, whereas western poison ivy is a low shrub with three leaves that does not form a climbing vine.

2.7.2 Poison Oak

Poison Oak is classified into two categories based on geographic location as either Pacific or Atlantic. Pacific poison oak can be found in California, Nevada, Oregon, Washington and western Canada while Atlantic poison oak can be found in southeast states and as far west as Texas. Poison oak is typically a shrub with leaves of three (like poison ivy) and may have yellow or green flowers and clusters of green-yellow or white berries and pacific poison icy may be vine-like.

2.7.3 Poison Sumac

Poison sumac is present in eastern states and as far west as Texas. Poison sumac comes in the form of a woody shrub that has stems that contains 7-13 leaves arranged in pairs and may have a glossy, pale yellow, or cream-colored berries.

2.7.4 Exposure Types

Poisonous plants such as poison ivy/oak/sumac release oil (urushiol) when the leaf or parts of the plants are bruised, damaged and/or burned. The oil induces an allergic reaction when contact with skin, this exposure generally results in itchy red rash with bumps and/or blisters. Personnel need to take extra care with recognizing poisonous plants to avoid direct contact. There is also the possibility for indirect contact such as contaminating tools, or clothing and touching the contaminated site. Lastly, there is the potential for inhalation of particles containing oil from burning plants; however, this is less likely due to the nature of work performed.

2.7.5 Project Pre-Planning and Poisonous Plant Avoidance

Avoidance is the preferred management approach with respect to poisonous plants. Since poisonous plants are commonly found outdoors and in a variety of geographic locations (i.e. rural, suburban, urban) care needs to be taken when encountering areas which are overgrown especially if unable to clearly identify poisonous plants amongst other vegetation. Additional guidance is listed below to assist with avoidance of potential contact with poisonous plants:

- Avoid overgrown areas in which plants cannot be easily identified.
- After use, clean tools with rubbing alcohol or soap with lots of water. Wear appropriate PPE (i.e. nitrile gloves).
  - Urushiol can remain active on surfaces of objects for up to 5 years.
- Do not burn plants that may be poisonous.

2.7.6 Use of Personal Protective Equipment (PPE)

Where avoidance of poisonous plants is not possible, employees must wear appropriate PPE and take additional measures to prevent contact with poisonous plants. Please reference section 2.1.4 for PPE requirements (excluding insecticides) to minimize potential exposure to poisonous plants. In addition, barrier skin creams, such as lotion containing bentoquatum, can offer additional protection. Application of barrier creams should be administered as per manufacturers recommendations. Additionally, ensure tools and equipment are properly decontaminated in the case of potential contact with poisonous plants. Exposed clothing should be handled with appropriate gloves (i.e. nitrile gloves) and washed separately in hot water with detergent.

2.7.7 Responding to Known or Suspected Poisonous Plant Exposure

Exposure to poisonous plants will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Signs and symptoms of exposure to poisonous plants can vary considerably based on the individual's sensitivity. Below please find general signs and symptoms associated with exposure to poisonous plants:

- Red rash within a few days of contact.
- Possible bumps, patches, streaks, or weeping blisters.
- Swelling and itching at the site.

2.7.7.1 First Aid

In addition to contacting the necessary personnel the following first aid measures should be carried out if exposed to poisonous plants:

- Immediately rinse affected area with rubbing alcohol, specialized poison plant washes and/or degreasing soap/detergent with copious amounts of water. Scrub underneath nails with a brush.
- Apply wet compress, calamine lotion, or over the counter (OTC) hydrocortisone. Follow directions of manufacturer, avoid applying to broken skin or open blisters.
- Take an OTC antihistamine such as diphenhydramine (Benadryl) to alleviate itching. Follow directions of manufacturer.
- Summon professional medical care immediately should someone suffer a severe allergic reaction such as swelling and/or difficulty breathing or has past medical issues surrounding exposure to poisonous plants.

2.8 Other Zoonotic Disease

Zoonotic diseases are caused by infections that shared between animals and people. These can be caused by a range of disease pathogens which include viruses, bacteria, fungi, and parasites. There is a wide list of zoonotic diseases which are prevalent however within this section we will be discussing primarily histoplasmosis and psittacosis.

2.8.1 Histoplasmosis

Histoplasmosis is an infectious disease which is caused by inhalation of Histoplasma capsulatum fungus spores. Instances of potential exposure can include encountering soils enriched with bat or bird excrement containing spores, which could include barnyards, chicken/turkey houses, construction sites and abandoned buildings. This disease is not contagious and cannot be transmitted from an infected to person or animal to someone else. Histoplasmosis primarily affects the lungs and symptoms can vary greatly. This fungus grows in soils throughout the world. The proportion of people infected is higher in central and eastern states. The fungus seems to grow best in soils which have elevated levels of nitrogen.

2.8.2 Psittacosis

Psittacosis is an infectious disease which is caused by inhalation of Chlamydia psittaci bacteria shed through bird excrement. Typically, these secretions dry and small dust particles which includes the bacteria can become airborne. Similar to histoplasmosis, typical areas of potential exposure could include

barnyards, chicken/turkey houses, construction sites and abandoned buildings. This disease is not contagious and cannot be transmitted from an infected to person or animal to someone else. Histoplasmosis primarily affects the lungs and symptoms can vary which include fever and chills, headache, muscle aches and dry cough.

2.8.3 Project Pre-Planning

Avoidance is the preferred management approach with respect to exposure to bird and bat excrement. Since birds and bats are commonly found in a variety of geographic locations (i.e. rural, suburban, urban) care needs to be taken when encountering areas which have large populations of bats or birds. During the project planning phase make sure to take into account potential for colonies of bats or flocks of birds to be present. Should a colony of bats or flock of birds be discovered roosting in a building, immediate action should be taken to exclude the intruders by sealing entry points.

2.8.4 Controlling Aerosolized Dust

Next to avoidance the next best way to prevent potential exposure is to implement work practices and dust control methods that eliminate or reduce dust generation during work activities which may come into contact with impacted soil. For example, instead of dry sweeping or shoveling dusty material, wetting the area with a water spray can significantly reduce the amount of dust aerosolized. Dust mitigation plans shall be specified in the site-specific health and safety plan and/or job safety analysis.

2.8.5 Use of Personal Protective Equipment (PPE)

Where avoidance of soils impacted with bird and bat excrement is not possible, employees must wear appropriate PPE and take additional measures to prevent contact with impacted soils and dusts. Level D personal protective equipment along with disposable clothing and shoe coverings may be appropriate, however refer to your site-specific health and safety plan for further guidance. Additionally, the requirement for a NIOSH approved respirator may be necessary if identified consult with the Corporate Health and Safety Manager for further guidance.

2.8.6 Responding to Known or Suspected Zoonotic Exposure (Bird/Bat Excrement)

Exposure to impacted soil will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Signs and symptoms of exposure to Histoplasma capsulatum fungus spores and Chlamydia psittaci bacteria can vary considerably based on the individual's sensitivity. Below please find general signs and symptoms associated with their exposures.

Histoplasmosis symptoms may appear 3 to 17 days after fungal spores are inhaled. Symptoms can include fever, cough, fatigue, chills, headache, chest pain and body aches. In immune-compromised individuals, histoplasmosis can develop into a long-term lung infection, or spread to other parts of the body such as the brain and spinal cord.

Psittacosis symptoms may appear within 5 to 14 days after exposure to the bacteria. In general, Psittacosis causes mild illnesses with the most common symptoms of headache, muscle aches, dry cough and fever and chills. In extreme cases it may result in pneumonia.

2.9 Additional Wildlife

The following subsections includes information on additional wildlife not previously covered that can be encountered by Roux staff during work activities. The following list is not meant to be all inclusive however provides general guidance and direction on how to avoid and what to do if encountered. These include dogs, alligators, bears and mountain lions. Based on the complexity standard PPE outlined within your project specific HASP shall be worn unless directed otherwise by this program.

2.9.1 Dogs

Wild and domestic dogs can be encountered at many of our worksites; they may express a variety of emotions (i.e. aggressive, playful or frightened). It is important to not approach these animals and keep a safe distance as dogs can be unpredictable.

2.9.1.1 Project Pre-Planning and Dog Avoidance

Avoidance is the preferred management approach with respect to dogs. Since dogs are commonly found in outdoor settings and can cover large territories careful pre-planning is essential to understanding inherent risks of outdoor work areas. Additional guidance is listed below to assist with mitigating potential contact with dogs and ensure not to get bitten:

- Don't run past a dog as it is the dog's instinct to chase and catch you.
- If a dog exhibits aggressive behavior, don't scream. Avoid eye contact and attempt to remain motionless until the dog leaves, and then back away slowly until the dog is out of sight.
- Don't approach a strange dog, especially one that is tethered or confined.
- Always have an out, understand your environment and utilize high ground or place material between yourself and the dog should a dog attack you.

2.9.1.2 Responding to a Dog Bite

Exposure to dog bites will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care.

2.9.2 Alligators

Alligators and crocodiles can be found in various regions of North America. More specifically alligators can be found throughout the southeastern United States while crocodiles inhabit coastal areas such as southern Florida.

2.9.2.1 Project Pre-Planning and Crocodilian Avoidance

Avoidance is the preferred management approach with respect to alligators and crocodiles. Since these reptiles are commonly found in outdoor settings in southeastern United States careful pre-planning is essential to understanding inherent risks of performing work in such locations. Additional guidance is listed below to assist with mitigating potential contact with these reptiles and ensure not to get bitten:

- If seen do not provoke an alligator or crocodile.
- Avoid waters known to be home to alligators or crocodiles.

- Keep at least 30 feet away from an alligator or crocodile.

2.9.2.2 Responding to Alligator Bite

Exposure to bites will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care.

2.9.3 Bears

Bears can be found in various regions of North America. For the purposes of this program the following bears will be addressed which are the American Black Bear and Grizzly/Brown Bear.

American Black Bear

The American Black Bear can be found in the east, along the west coast, Rocky Mountain region and in parts of Alaska. Black bears can also be found in a few small areas in the southwest and southeast.

Grizzly/Brown Bear

The Grizzly/Brown Bear can be found within northwestern portions of the United States, specifically Alaska, Idaho, Montana, Washington, Wyoming, and extending as far south as Yellowstone.

2.9.3.1 Project Pre-Planning and Bear Avoidance

Avoidance is the preferred management approach with respect to bears. Since bears are commonly found in various regions of United States. Careful pre-planning is essential to understanding inherent risks of performing work in such locations. Additional guidance is listed below to assist with mitigating potential bear attacks:

- Keep food storage organized and sealed.
- Never approach a bear or bear cub.
- Wear a bell or other noisemaker.
- Stay away from a bear's food supply.
- Carry bear pepper spray on you.

If encountered by a bear:

- Stay calm, speak in low tones as a scream or fast movement may trigger an attack.
- Travel in groups and make yourself look as large as possible (i.e. move to higher ground).
- Do NOT allow a bear to access food.
- Do NOT drop your pack if carrying.
- If the bear is stationary, move away slowly and sideways.
- Do NOT run, but if bear follows, stop and hold your ground.
- Leave the area or take a detour, or wait until the bear moves away. Always provide the bear an escape route.

If you are attacked by a bear:

- Use bear pepper spray to stop an aggressive, charging or attacking bear. If the bear does not concede use the following steps for each type of bear.
- **Brown/Grizzly Bears:** If you are attacked by a brown/grizzly bear, leave your pack on and **PLAY DEAD**. Lay flat on your stomach with your hands clasped behind your neck. Spread your legs to make it harder for the bear to turn you over. Remain still until the bear leaves the area. Fighting back usually increases the intensity of such attacks. However, if the attack persists, fight back vigorously. Use whatever you have at hand to hit the bear in the face.
- **Black Bears:** If you are attacked by a black bear, **DO NOT PLAY DEAD**. Try to escape to a secure place such as a car or building. If escape is not possible, try to fight back using any object available. Concentrate your kicks and blows on the bear's face and muzzle.

2.9.3.2 Responding to Bear Attacks

Attacks by a bear will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care.

2.9.4 Mountain Lions

Mountain Lions can be found in various regions of North America, more specifically within the United States they are found predominately in Wyoming, California, parts of Texas and the Florida Everglades.

2.9.4.1 Project Pre-Planning and Mountain Lion Avoidance

Avoidance is the preferred management approach with respect to mountain lions. Since mountain lions are found in specific regions of United States careful pre-planning is essential to understanding inherent risks of performing work in such locations. Additional guidance is listed below to assist with mitigating potential mountain lion attacks:

- Do not corner a mountain lion.
- Make yourself look larger (i.e. seek higher ground, place arms overhead).
- Use a loud voice.
- Throw sticks or rocks.
- Carry pepper spray.

If you are attacked by a mountain lion:

- Use pepper spray to stop an aggressive, charging or attacking mountain lion.
- Do NOT run.
- Fight back.
- Protect your neck and head.
- Don’t play dead.

2.9.4.2 Responding to Mountain Lion Attacks

Attacks by a mountain lion will require adherence to the Incident Investigation and Reporting Program with all internal contacts being made through the standard notification protocol of the H&S Injury/Illness Notification Flowchart. Immediate notification to professional emergency services is essential to obtaining prompt medical care.

Appendix A - Definitions

Medical Treatment Treatment for an injury or illness related to Roux work activities that requires professional medical treatment beyond first aid. In the case of a work-related tick bite this includes any prescription including the use of antibiotics in response to the bite. This medical treatment classification will occur even if the antibiotics were prescribed merely for preventative treatment of a work-related tick bite (i.e., a suspected tick bite with no evidence or symptoms of disease).

Work-related Tick Bite A tick bite that occurs while working in a tick-infested work site containing a tick infected area. Any such tick bite would be identified within one day of working in the tick-infested area. There may be additional exceptions to this simple definition; therefore, it is imperative that the OHSM and CHSM be consulted immediately upon discovery of a potential tick bite. (Note: Any tick bite, or condition that develops due to a suspected tick bite, that may be attributable to contact with a tick outside of the work environment which would not be considered a work-related tick bite.)

Vectors Living organisms that can transmit infectious diseases between humans or from animals to humans. Many of these vectors are bloodsucking insects, which ingest disease-producing microorganisms during a blood meal from an infected host (human or animal) and later inject it into a new host during their subsequent blood meal. Ticks are considered a vector.

Appendix B - Permethrin Application Guidance [1]

Permethrin is registered with the EPA for use as an insecticide and repellent. Permethrin-treated clothing repels and kills ticks, chiggers, mosquitoes, and other biting and nuisance arthropods.

Clothing, hats, shoes, bed nets, jackets, and camping gear can be treated with permethrin for added protection. Permethrin should **NOT** be applied directly to the skin. Do **NOT** apply in a way that will allow for product to contact adults, children or pets either through direct contact or through drift. Remove pets and birds and cover fish aquariums before surface applications if using spray.

Ensure application of clothing occurs in a well-ventilated outdoor area protected from wind and lay out entire outfit to be treated. Gloves and safety glasses should be worn during the application process. Apply permethrin to clothing following manufacturer instructions. Once outfit is completely treated hang clothing to air-dry. The manufacturer will specify dry times however to ensure clothing is dried completely, Roux recommends all clothing and other items be treated 24–48 hours in advance of work to allow them to fully dry before handling and wearing.

Permethrin-treated materials retain repellency or insecticidal activity after repeated laundering but should be retreated, as described on the product label, to provide continued protection. Clothing that is pretreated prior to purchase has efficacy through 70 launderings.

Products such as Permanone and Sawyer, Permethrin, Repel, and Ultrathon Permethrin Clothing Treatment are registered with EPA specifically for use by consumers to treat clothing and gear. Alternatively, clothing pretreated with permethrin is commercially available, marketed to consumers in the United States as Insect Shield, BugsAway, or Insect Blocker.

[1] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, “CDC Health information for International Travel 2018 (Yellow Book).”

Appendix C - Insect Repellent Guidance [2]

Always follow label directions and precautions when using insect repellent. When used as directed, products containing DEET are proven safe and effective. To avoid reaction to DEET or other ingredients in insect repellents, always read and follow the directions before use.

Choose a repellent that provides enough protection for time that you will be outdoors. The more active ingredient a repellent contains, the longer time it can protect you from potential bites. For example, 5% DEET will provide mosquito bite protection for one hour in comparison with 24% DEET for up to 5 hours. Studies suggest that concentrations of DEET above approximately 50% do not offer a marked increase in protection time against mosquitoes; DEET efficacy tends to plateau at a concentration of approximately 50%.

Do NOT spray insect repellent on skin that is under clothing. Do NOT apply insect repellent to skin that is already irritated, or to cuts/lacerations. Do NOT spray aerosol or pump products in enclosed areas. Do NOT spray a pump or aerosol product directly on the face. Do NOT apply DEET to clothing.

After returning indoors and before eating, drinking, or smoking, use soap and water to wash skin that has been treated with insect repellent. Reapply repellent when returning outdoors or after eating.

Outdoor workers may need to use sunscreen in conjunction with insect repellent. Repellents that are applied per label instructions may be used with sunscreen with no reduction in repellent activity. However, limited data show a one-third decrease in the sun protection factor (SPF) of sunscreens when DEET containing insect repellents are used after a sunscreen is applied. Products that combine sunscreen and repellent are not recommended, because sunscreen may need to be reapplied more often and in larger amounts than needed for the repellent component to provide protection from biting insects. The best option is to use separate products, applying sunscreen first and then applying the repellent.

[2] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, “CDC Health information for International Travel 2018 (Yellow Book).”

APPENDIX K

ExxonMobil's Loss Prevention System Training Levels

GREF Loss Prevention System (LPS)

LPS Training Level Guide

Contents

Introduction

Our vision is that “Nobody Gets Hurt.” Providing timely, appropriate and effective LPS training is an essential requirement towards this vision.

Scope

This document outlines what LPS training is required for GREF employees and stewardable contractors/consultants.

Employees

Employees that conduct field/facility work receive Standard LPS Training. GREF Managers and Supervisors that are responsible for or oversee field/facility work receive Standard LPS Training and Manager and Supervisor LPS Training. All others receive Basic LPS Training and additional training based on office risks as identified in GREF OIMS (e.g., ergonomics, travel safety, slips, trips and falls). Managers and Supervisors should consult with their SSHE advisor if unsure of the level of training required for their personnel.

Contractors/Consultants

Contractor/Consultant LPS Training requirements are based on the anticipated time an individual will work on a site or project. Contractors/consultants decide what training is required of their office based personnel providing service to ExxonMobil.

Each contractor/consultant that conduct, oversee, or are responsible for field/facility work should be classified under one of three categories that will define their training requirements and scope of LPS use.

Category 1 Contractors/Consultants that conduct are:

- Prime Vendors (Consultant) and General Contractor/Consultant Managers / Supervisors that manage project related activities.
- Sub-Contractor/Consultant Managers and Supervisors may participate in this training but may also fit into Category 2. The Project Management Team should determine the level of training required for Sub-Contractor Managers and Supervisors.
- Category 1 Contractors/Consultants that conduct, oversee, or are responsible for field/facility work will receive Standard LPS Training and Manager and Supervisor LPS Training. Manager and Supervisor LPS Training should be provided within 60 calendar days of the Manager/Supervisor’s assignment.

Category 2 Contractors/Consultants are:

- Contractors/Consultants that are routinely on site or are expected to be on site for more than 6 months in a 12 month period, i.e. dedicated or continuous engagement. Excludes specialty or project personnel that will work at a site or on a project less than 6 months in a 12 month period.
- Category 2 Contractors/Consultants that conduct field/facility work will receive Standard LPS Training. If it is not possible for a contractor/consultant to receive Standard LPS Training prior to starting work, the contractor/consultant should receive Basic LPS Training until Standard LPS Training is available. Standard Training must be provided within 60 calendar days of the individual starting work.

Category 3 Contractors/Consultants are:

- Contractors/Consultants that are expected to work on site or on a project less than 6 months in a 12 month period. This would include project or specialty contractors/consultants working less than 6 months on site or on a project in a 12 month period.
- Category 3 Contractors/Consultants will receive Basic LPS training and participate in some aspects of the LPS process.

Sites can exceed these minimum expectations based on their job scope or other factors.

Basic Training

Overview	Basic Training covers basic LPS tools and concepts that Category 3 Contractors/Consultants will need to understand to safely perform their work activities. Includes a Post-Training Conversation with an individual knowledgeable in LPS. Personnel who are expected to work *less than 6 months in a 12 month period* and office based employees shall receive this training before commencing work at a GREF facility or project. **Note:** Personnel who attend Basic Training and do not receive Standard Training require annual Basic Training.
Prerequisites	None
Audience	Category 3 Contractors/Consultants. Office based employees. Category 1 & 2 Contractors/Consultants conducting, responsible for, or overseeing field/facility work will receive Basic Training until Standard Training can be provided.
Length	30 minutes
Modules	Introduction, LPSA, JLA Use, LPO Observee, Loss/Near Loss
Trainer	Self-study with an individual knowledgeable in LPS

Standard Training

Overview	Standard Training covers LPS tools and processes that longer-term personnel are expected to understand to safely perform their work activities. Personnel who are expected to work *more than 6 month in a 12 month period* shall receive this training within 60 calendar days of commencing work at a GREF facility or project. Basic Training requirements apply until Standard Training is provided.
Prerequisites	None, although individuals can receive Basic Training until Standard training can be provided
Audience	ExxonMobil employees that conduct field/facility work (includes Managers and Supervisors that oversee or are responsible for field/facility work) Category 2 Contractor/Consultant personnel Prime Vendor and General Contractor/Consultant Managers and Supervisors
Length	~4 hours
Modules	Introduction, LPSA, JLA Use & Development, LPO Process, Loss/Near Loss, FRCS Overview, LPS Stewardship Model
Trainer	Certified GREF LPS Site or Core Trainer

Manager/Supervisor Training

Overview	Manager/Supervisor Training includes Factors, Root Cause Solutions (FRCS) tool, the LPS stewardship model and Supervisor / Manager LPS responsibilities. Participants will learn stewardship and will have the opportunity to practice and develop skills during classroom exercises. *ExxonMobil employees*, Prime Vendor and General Contractor/Consultant *personnel* who are expected to manage/supervise field/facility work, should receive the Manager/Supervisor and Standard training modules *within 60 calendar days* of their position assignment at a GREF facility or project.
Prerequisites	Standard Training
Audience	ExxonMobil employees and Category 1 Contractors/Consultants who are responsible for or oversee field/facility activities (Prime Vendor and General Contractors/Consultants manage or supervisor work related to a GREF facility or project).
Length	4 to 6 hours *(8 – 10 hrs. with Standard Training)*
Modules	FRCS, LPSA Discussion, JLA, LPO, L/NL Investigation, Stewardship Model
Trainer	Certified GREF LPS Site or Core Trainer

Contractor Category Tool Use

Tools	Category 1 Contractor	Category 2 Contractor	Category 3 Contractor
LPSA	Required	Required	Required
JLA	Required	Required	Required
LPO	Required	Required	*
NL/LI	Required	Required	*

* EM / Prime Vendor / General Contractor personnel will initiate the activities and the sub-Contractors/Consultants will participate.

Note: For NL / L Category 3 must still report even if unavailable for investigations and / or follow-ups or V&Vs.

Refresher Training

LPS tool use and results are discussed at monthly stewardship meetings and during LPS tool workshops to achieve continuous improvement throughout the year.

GREF Refresher Training needs will be based on the needs identified during monthly stewardship meetings and LPS Field Assessments. Annually, GREF SSHE will assess the needs of the organization and make a recommendation to management on LPS refresher training needs. At a minimum, refresher training will be provided every three years. Content will be based on stewardship and assessments.

Individuals receiving only Basic training will need to receive Basic Training annually.

Variance of LPS Training Requirements

LPS Training provided by others (i.e. ExxonMobil business units, external training centers, LPS Inc.) may meet the requirements identified in this document. Consult with your SSHE advisor to determine if external training is adequate.

Any other deviations from GREF LPS training requirements will require an MOC and approval from GREF Management at the site or project (FM, PM or equivalent).

GREF LPS Training Requirements

LPS Training by Position Responsible for Field/Facility Activities

Position	Basic (30 minutes)	Standard (4 hours)	Manager / Supervisor (4 – 6 hours)
Manager (ExxonMobil or Prime, GC Contractor)		✓	✓
Supervisor (ExxonMobil or Prime, GC Contractor)		✓	✓
Employees conducting Field/Facility Work		✓	
Contractors/Consultants (>6 months in a 12 month period)		✓	
Contractors/Consultants (<6 months in a 12 month period)	✓		

* Local management selects the level of training that sub-contractor Managers and Supervisors will receive (i.e. Standard, or Standard and Manager/Supervisor Training).

APPENDIX L

Roux Short Service Employee Management Program

SHORT SERVICE EMPLOYEE MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**5**

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APPENDICES

1. PURPOSE

This program has been implemented to ensure that Roux and Subcontractor short service employees are identified, appropriately supervised, trained, and managed in order to prevent accidents such as personal injury, injury to others, environmental damage, and/or property damage. This is a requirement for all employees and subcontractors throughout the firm. In addition, there are other requirements specific to ExxonMobil policies for all their projects, which are identified where applicable below.

2. ROLES AND BACKGROUND

Short Service Employee (SSE)

A Roux employee or a Roux subcontractor employee with less than six (6) months continuous service in the same job type or less than six (6) months continuous service with his/her current employer is a Short Service Employee (SSE).

The Roux SSE process was developed and periodically updated to satisfy all expectations included in ExxonMobil's Environmental Services Short Service Worker Guidance. Roux senior management will, at a minimum, perform an annual assessment of the Short Service Employee Management Program to determine its effectiveness and identify improvement opportunities. It should be noted that ExxonMobil refers to SSE as Short Service Workers or SSWs. For all ExxonMobil projects, a SSE is defined as a Roux employee or a Roux subcontractor employee with less than six (6) months of ExxonMobil worksite experience or has not worked on an ExxonMobil worksite in the last two (2) years.

SSEs shall not exceed 50% of Roux's workforce at any job site without prior written approval from the Office Manager (OM) and, when required by client contract or program, approval from the designated client representative.

The SSE process excludes workers not performing physical work onsite, visitors, regulatory agency staff, client employees or affiliates, and members of contractor management staff. In addition, certain elements of this SSE process may not be appropriate for short-duration workers (i.e., specialized workers onsite for a short period of time to perform a very specific task and unlikely to return). If the SSE process is deemed not appropriate, the individual Project Manager will develop a case-specific risk mitigation plan to address these short duration workers or consider subcontracting the task through a long-duration contractor who has an effective SSE program.

Site Safety Mature Person (SSMP)

An SSMP is a worker who is working on an ExxonMobil site that has demonstrated knowledge and skills with regard to site hazards, hazard management, and safe working practices, and is qualified to act as an SSMP. Our "graduation" process includes administration of an LPS® written test followed by a one-on-one interview with a senior safety or project manager of the project team to ensure competence. Graduation to a SSMP typically takes (6) total months of applicable work at ExxonMobil sites. Graduation in less than (6) months requires approval by the ExxonMobil PM.

Mentor

A Mentor is a designated person(s) who is responsible and accountable for guiding and monitoring performance of SSEs in the field. The Mentor cannot be another SSE. The Mentor can be a member of the same working team, but should not be an employee of ExxonMobil or any of its affiliates. The Mentor is a SSMP and has

demonstrated knowledge and skills with regard to site and task-related hazards, hazard management, and safe working practices and is able to communicate with the SSE. The Mentor is trained and knowledgeable of Loss Prevention System (LPS) tools such as LPSAs, LPOs (RPOs) and JLAs (JSAs). The Mentor should have a positive safety attitude and understanding of both ExxonMobil's and Roux's corporate safety cultures. The Mentor should be capable of practicing Safety Leadership skills, but does not necessarily have to be the SSE's Supervisor. The Mentor should have received appropriate training and be qualified for the role by Roux management. The Mentor is expected to either be onsite with the SSE or assign a SSMP to be onsite with the SSE until the SSE graduates and becomes a SSMP. Deviation from a Mentor or SSMP being onsite with the SSE while conducting field operations requires approval by the Project Principal or the Client PM (in the case of ExxonMobil work).

Supervisor

A Supervisor is the designated person(s) who is responsible and accountable for the overall stewardship of the SSE Management Program for each project or office. The Supervisor shall be a senior member of the Roux management team.

3. ORIENTATION, TRAINING, AND CLEARANCE

Pre-Assignment Orientation, Training, and Clearance

An initial First Day employee orientation is required before the SSE can perform any fieldwork. Orientation must be conducted by the OM or the designated Supervisor of the SSE. The initial orientation shall, at a minimum, communicate the following information:

- Even though risks do exist, accidents and injuries are preventable;
- Each worker has a personal responsibility for his or her safety and the safety of others both on and off the job;
- No business objective is so important that it will be pursued at the sacrifice of safety;
- Safe conduct is a condition of employment;
- Work is done well only if it is done safely;
- Roux employees are expected to have the best safety performance;
- Review of Roux's Safety Procedures and Practices;
- General requirements for Personal Protective Equipment;
- Injury reporting and medical follow-up procedures;
- Requirements regarding participation in safety meetings, Safe Performance Self Assessments (SPSAs), pre-job Job Safety Analyses (JSAs), and the Loss Prevention Observation (LPO) / Roux Peer Observation process; and
- Requirements of this SSE Management Program.

Other pre-assignment training (or verification of prior training) is also typically required and will be determined by the OM and Supervisor of the SSE. Examples of this additional training include OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) training, one-one-one Safety and Procedures Review with the Office Health and Safety Manager (OHSM), client-specific training program requirements (i.e., LPS®, railroad

worker safety, etc.), and job skills training requirements specific to immediate job tasks (i.e., various field procedures training, equipment usage, etc.).

Medical clearance and drug testing clearance are also required prior to the performance of field work on some sites.

Project and Site-Specific Orientation and Training

Many Roux projects have different requirements that are client-specific or site-specific in nature. It is the responsibility of the Project Principal (PP) (or Project Manager [PM] if delegated this responsibility by the PP) to ensure the SSE assigned to his/her projects is provided orientation and training with respect to these client and/or site-specific requirements. Minimum site-specific orientation shall include operations overview, review of the site-specific HASP, emergency action plan, facility sign-in and sign-out, hazard identification and reporting, MSDS information and H_2S if applicable. In addition, any restrictions on communications with non-Roux personnel, site access, or operation of site equipment (both Roux and Client owned) should be reviewed.

Client-specific and site-specific orientation topics shall also include work permit training, reporting incidents and hazards, emergency response procedures, appropriate PPE requirements, and general importance and use of LPS® tools (including a client's Core Safety Expectations and consequences).

Additional SSE Training

While classified as an SSE, it is the employee's responsibility to actively seek out and participate in available training opportunities. The SSE will utilize the attached SSE Form to track the completion of training and other experience gained while an SSE. Specific training that is recommended to be completed within the first six (6) months of employment in order for the employee to graduate from SSE status is listed on the SSE Form. Individuals completing the training are required to sign-off on each type of training.

4. NOTIFICATIONS AND RESPONSIBILITIES

The following individuals have responsibilities for notification under this program.

Office Manager (OM) and SSE Supervisor: Have the responsibility of notifying the PP when a SSE employee is assigned to his/her project. They also have the responsibility of confirming field assessments are conducted to verify the effectiveness of the SSE's performance.

SSE: Roux employees who are SSEs are required to identify themselves as such to the Roux PM prior to reporting to the job Site and to provide the PM with an up-to-date copy of his/her Roux SSE Training and Assignments Documentation Form. SSEs are required to wear company- supplied fluorescent green hard hats (or other project-specific distinct identification) when in the field in order to be easily identifiable.

Project Principals (PPs) and Project Managers (PMs): PPs are responsible for notifying the PM when a SSE is assigned to his/her project and for ensuring the requirements of this SSE Management Program are adhered to on their projects. When required by Client contract or program, the Roux PP (or PM if delegated this authority by the PP) shall provide applicable notice to the client's designated representative regarding SSE's being assigned to fieldwork. The notice should be completed in advance using any applicable client SSE notification forms and shall be acknowledged / approved by the client representative prior to the SSE commencing work.

The Roux PM shall notify the Field Manager/Supervisor who will be responsible for field mentoring/training of the SSE on their project and for making sure everyone on the job Site is aware that SSEs are present. All personnel are expected to help the SSE and to explain potential hazards before each job. The Roux PM shall maintain a list of SSE workers, their entry date and date that they complete the SSE process.

The PP and PM shall ensure the requirements of this SSE Program are implemented for all subcontractor employees performing field work on the Firm's projects.

Mentor: The PP (or PM if delegated this authority by the PP) must designate an on-Site Supervisor for the SSE. A Mentor shall be capable of demonstrating safety leadership, will not currently be a SSE, have a positive safety attitude, will be capable of providing effective training / coaching, and will have good communication skills. The Mentor will have a positive safety attitude, will be motivated and is to have good knowledge of client-specific and site-specific safety programs/culture and requirements (e.g., ExxonMobil LPS® program). An SSE may only work under the direct on-Site supervision of the designated Supervisor who, as one of his or her duties, serves as a mentor/trainer in safety for the SSE. The on-Site Supervisor or Mentor must provide close supervision and not allow the SSE to perform any task in which the SSE has not been properly trained. The on-Site Supervisor will review with the SSE any hazards associated with the task and review all emergency equipment and response procedures. The Mentor must actively work with and engage the SSE on a daily basis to provide mentoring and monitoring of the SSE with respect to safe work practices and identification of hazards.

Site-specific Mentor responsibilities shall also include applicable work permit training, reporting of incidents and hazards, emergency response procedures, appropriate PPE requirements, and general importance and use of LPS® tools. At the completion of each field assignment, the on-Site Supervisor/Mentor will complete the applicable section of the employee's SSE form to document the work experience and provide feedback to the Project Manager as well as the OM and Project Principal regarding the SSE's performance and capabilities.

5. SHORT SERVICE EMPLOYEE MANAGEMENT PROGRAM EXCEPTIONS

Any exception to this Short Service Employee Management Program must be approved in writing by the OM and PP and, when required by client contract or program, by the designated client representative. An exception to the on-Site Supervisor / Mentor requirement and 50 percent SSE limitation may be granted for activities typically performed by one Roux employee (e.g., fieldwork oversight, field inspections, etc.). To be eligible for an exception, the employee must have had training and demonstrated prior experience in the specific work area. Furthermore, the PM shall provide additional communications during the course of each day to review safety requirements and work progress to ensure work is being performed safely and in accordance with expectations.

An exception to the 50% SSE limitation may be granted for work that requires increased staffing levels by Roux or Roux subcontractors (e.g., construction projects). The exception request must be submitted in writing, using a form similar to the attached Roux SSE Exception Form, by the contractor, outlining SSE expectations limitations, types of work to be performed, and mitigative measures that will be taken to minimize risks associated with the increased utilization of SSEs. The exception request must be approved by the OM and, when required by client contract or program, approval from the designated client representative.

Exceptions to the Short Service Employee Management Program at ExxonMobil sites must be approved in writing by the ExxonMobil Project Manager.

6. PROGRAM COMPLETION

To be removed from SSE status, the OM and the SSE's Supervisor must be convinced the SSE has a working knowledge of both Roux and any applicable client Safety Policies and has demonstrated safe work practices and behavior. In addition, the SSE must have completed all required initial SSE training (as documented in his/her SSE Form) and have performed all activities without a serious loss incident (i.e., property damage, OSHA-Recordable injury). At that time, if the OM and Supervisor are convinced of the SSE's capabilities, the OM may remove the employee from the Roux SSE process by completing and signing the applicable section of the employee's SSE Form. The signed form will then be forwarded to Human Resources to be included in the employee's personnel file. If the SSE has been actively working on a client site under client-specific SSE requirements, the PM may need to obtain approval from the client representative as well.

If within six (6) months, the SSE is not capable of demonstrating the appropriate level of task, project, or safety knowledge, they shall be restricted from performing field activities until a point in time when they qualify to do so or are to be removed from the site.

For those SSE workers performing work at ExxonMobil worksites, they will have to successfully complete an LPS® assessment and demonstrate sufficient knowledge to complete the SSE requirements and be removed from the SSE process. Prior to being removed from SSE status workers performing work at ExxonMobil worksites will at a minimum complete the following:

- SSE shall participate in creating a minimum of one JSA;
- SSE shall identify and prepare two near loss reports, including participation in the root cause analyses;
- SSE shall perform and communicate a minimum of twenty SPSAs to a peer or manager;
- SSE shall lead a minimum of two toolbox safety meetings; and
- SSE shall participate in two LPOs as observee or observer.

SSEs will also complete a one-on-one interview with their associated Supervisor to confirm that they are ready to complete the program. At ExxonMobil sites, completion of the SSE program in less than six months needs to be approved by the ExxonMobil Project Manager.

7. SUBCONTRACTORS

All subcontractors who supply field personnel to Roux job sites must implement a program that meets or exceeds the expectations described above as well as any additional requirements that may be required on a client or site-specific basis.

Appendix A – Short Service Employee Training and Assignments Documentation Form

I. SSE Information

SSE Name:_____ Current Job Title:_____

Date of Employment:_____ Experience:____Years Current Position Experience:____Years ____Mos.

SSE On-site Mentor(s):_____Designated SSE Supervisor:_____

II. Orientation, Training and Clearance

---------First Day ---------

Requirement	Date Completed	SSE Initial	Mentor Initials	Supervisor Initials
Drug and Alcohol Screening				
OHSA Medical Surveillance Physical Exam				
OSHA 40-Hour HAZWOPER Training				
Roux Corporate Health and Safety Manual Review				
Safety, Policies, and Procedures Orientation with OM or SSE Supervisor (including required PPE)				
LPS® Initial Training				
Emergency Response Procedures Review				
Completion of 20 LPSAs/Safety Assessments				
Completion of 2 LPOs/RPOs (Roux Peer Observations)				
Completion of 2 LI/NLI				
Client Work Permit Procedures				
Client-Specific Training (LPS, LIRR, Amtrak, NJ Transit)				
Defensive Driving (i.e., Smith System)				
Field Notebook				
Subcontractor Oversight				
Field Manager / SHSO				
Lead 2 Toolbox Safety Meetings				
Job Safety Analysis (create 1 new JSA/Modify Site JSA)				

III. Field Assignments (Attach additional sheets for each additional assignment while SSE)

Site	From:	To:	Onsite Mentor	Supervisor

IV. Release from SSE Status

Based upon the SSE's successful completion of the above training and assignments, the SSE's Mentor(s), Supervisor, and OM indicated below have been convinced that the SSE has a working knowledge of both Roux and any applicable Client Safety Policies, and has demonstrated safe work practices and behavior. Additionally, the SSE has completed all applicable SSE training (as documented above) and performed all activities without a serious loss incident (i.e., property damage, OSHA recordable injury). The individual is thereby removed from status as an SSE.

_____ (SSE Mentor(s))

_____ (SSE Supervisor)

_____ (Office Manager)

_____ (Date)

Appendix B – Roux SSE Exception Form

This form is to be filled out and approved by the Roux Office Manager and Project Principal whenever the on-Site Supervisor requirement and/or 50% SSE limitation will not be met on the project.

IV. Variance Information

Variance Justification: (What are the current circumstances and what will be done to ensure an acceptable level of risk?)	
Alternatives to Variance: (If the variance is denied, what are the alternatives to completing the scope of the work? Briefly detail the cost and operational impact of the alternatives.)	

List the steps to be taken to manage the SSE risk to an acceptable level:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

V. Variance Review and Approvals

Variance Expiration Date:_____

Project Principal ☐ Approves ☐ Denies

Signed: _____ Date:_____

Office Manager ☐ Approves ☐ Denies

Signed: _____ Date:_____

Appendix C – Short Service Employee Mentor Documentation Form

I. Mentor Information

Mentor Name: _____ Current Job Title: _____

Date of Employment: _____ Experience: _____ Years Current Position Experience: _____Years _____ Mos.

II. Demonstrated Experience

The mentor of any SSE will have demonstrated the following as endorsed by their supervisor or Office Manager.

Requirement

- Is not a Short Service Employee
- Is LPS® trained and is capable of providing quality review of LPS® tools effectively
- Demonstrates proper usage of SPSAs and actively coaches others
- Has developed multiple JSAs
- Understands emergency response procedures and can explain them to others
- Is proficient in preparing and reviewing work permits
- Understands injury reporting and case management responsibilities and is capable of explaining them to employees and subcontractors
- Has working knowledge of hazard identification, near loss, and loss reporting and has participated in multiple near loss investigations
- Demonstrates the ability to intervene when required during project execution
- Leads Toolbox Safety Meetings as part of project execution

III. Approval of Employee to Participate in SSE Program as a Mentor

Based upon the employee's demonstration of the above attributes, the employee's Supervisor / OM indicated below has been convinced that the employee is capable of being an effective Mentor as part of the SSE Program.

_____ _____

(Supervisor / Office Manager) (Date)

APPENDIX M

Roux's Personal Protective Equipment (PPE) Plan

PERSONAL PROTECTIVE EQUIPMENT MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	**:**	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	**:**	**01/19**
REVISION NUMBER	**:**	**4**

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1. PURPOSE

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has instituted the following program to establish guidelines for the selection of personal protective equipment (PPE) for use by Roux personnel performing field activities in hazardous environments. PPE is not meant to be a substitute for engineering, work practice, and/or administrative controls, but PPE should be used in conjunction with these controls to protect the employees in the work place. Clothing, body coverings, and other accessories designed to prevent worker exposure to workplace hazards are all types of PPE. To ensure adequate PPE employee-owned PPE is evaluated on a case-by-case basis to insure its adequacy, maintenance and sanitation.

2. SCOPE AND APPLICABILITY

These guidelines apply to all PPE selection decisions to be made in implementing the Roux program. The foundations for this program are the numerous Occupational Health and Safety Administration (OSHA) standards related to PPE cited in 29 CFR 1910 Subpart I, 29 CFR 1926 Subpart E, and the hazardous environment work employee protection requirements under the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and 1926.65. To ensure hazard assessments are documented the levels of protection, types of protection and tasks requiring protection are covered in site-specific Health and Safety Plans (HASPs) and Job Safety Analyses (JSAs).

3. PROCEDURES

Due to the varied nature of site activities and the different potential hazards associated with different sites, several aspects must be considered when selecting PPE. The following text describes PPE selection logic and provides guidelines and requirements for the appropriate selection and use of PPE.

3.1 Introduction

To harm the body, chemicals must first gain entrance. The intact skin and the respiratory tract are usually the first body tissues attacked by chemical contaminants. These tissues provide barriers to some chemicals but in many cases, are damaged themselves or are highly permeable by certain chemical compounds. Personal protective equipment therefore is used to minimize or eliminate chemical compounds coming into contact with these first barrier tissues.

The proper selection of equipment is important in preventing exposures. The PM making the selection will have to take several factors into consideration. The level of protection, type and kind of equipment selected depends on the hazardous conditions and in some cases cost, availability, compatibility with other equipment, and performance. An accurate assessment of all these factors must be made before work can be safely carried out.

3.2 Types of PPE

The type and selection of PPE must meet certain general criteria and requirements as required under OSHA 29 CFR 1910.132 and 1926.95. In addition to these general requirements, specific requirements and specifications exist for some types of PPE that form the basis of the protective clothing scheme. Following is a list of the common types of specific PPE and the specific requirements for the PPE type, where applicable:

1. Hard Hats - Regulated by 29 CFR 1910.135 and 1926.100; and, specified in ANSI Z89.1.

2. Face Shields and Safety Glasses - Regulated by 29 CFR 1910.133 and 1926.102; and, specified in ANSI Z87.1.
3. Respiratory Protection - Regulated by 29 CFR 1910.134 and 1926.103.
4. Hand Protection - Not specifically regulated.
5. Foot Protection - Regulated by 29 CFR 1910.136 and 1926.96; and, specified in ANSI Z41.1.
6. Protective Clothing (e.g., fully encapsulated suits, aprons) - Not specifically regulated.

3.3 Protective Clothing Selection Criteria

3.3.1 Chemicals Present

The most important factor in selecting PPE is the determination of what chemicals the employee may be exposed to. On field investigations, the number of chemicals may range from a few to several hundred. The exact chemicals or group of chemicals present at the site (certain groups tend to require similar protection) can be determined by collecting and analyzing samples of the air, soil, water, or other site media. When data are lacking, research into the materials used or stored at the site can be used to infer chemicals possibly on the site.

Once the known or suspected chemicals have been identified, and taking into consideration the type of work to be performed, the most appropriate clothing shall be selected.

Protective garments are made of several different substances for protection against specific chemicals. There is no universal protective material. All will decompose, be permeated by, or otherwise fail to protect under given circumstances. Fortunately, most manufacturers make guides to the use of their products (i.e., Dupont's Tyvek™ Permeation Guide). These guides are usually for gloves and coveralls and typically provide information regarding chemical degradation rates (failure of the material to maintain structural integrity when in contact with the chemical), and may provide information on the permeation rate (whether or not the material allows the chemical to pass through). When permeation tables are available, they shall be used in conjunction with degradation tables to determine the most appropriate protective material.

During most site work, chemicals are usually in mixed combinations and the protective materials are not in continuous contact with pure chemicals for long periods of time; therefore, the selected material may be adequate for the particular chemical and type of work being performed, yet not the "best" protecting material for all site chemicals and activities. Selection shall depend upon the most hazardous chemicals based on their hazards and concentrations. Sometimes layering, using several different layers of protective materials, affords the best protection.

3.3.2 Concentration of the Chemical(s)

One of the major criteria for selecting protective material is the concentration of the chemical(s) in air, liquid, and/or solid state. Airborne and liquid chemical concentrations should be compared to the OSHA standards and/or American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH) guidelines to determine the level of skin or other absorptive surface (e.g., eyes) protection needed. While these standards are not designed specifically for skin exposed directly to the liquid, they may provide skin designations indicative of chemicals known to have significant skin or dermal absorption effects. For example, airborne levels of PCB on-site may be

low because it is not very volatile, so the inhalation hazard may be minimal; however, PCB-containing liquid coming in direct contact with the skin may cause overexposure. Thus, PCB has been assigned a skin designation in both the OSHA and ACGIH exposure limit tables.

3.3.3 Physical State

The characteristics of a chemical may range from nontoxic to extremely toxic depending on its physical state. Inorganic lead in soil would not be considered toxic to site personnel, unless it became airborne, since it is generally not absorbed through the intact skin. Organic lead in a liquid could be readily absorbed. Soil is frequently contaminated with hazardous materials. Concentrations will vary from a few parts per million to nearly one hundred percent. The degree of hazard is dependent on the type of soil and concentration of the chemical. Generally speaking, "dry" soils do not cause a hazard to site personnel if they take minimal precautions such as wearing some type of lightweight gloves.

3.3.4 Length of Exposure

The length of time a material is exposed to a chemical increases the probability of breakthrough. Determinations of actual breakthrough times for short-term exposures indicate that several different materials can be used which would be considered inadequate under long-term exposures. It should be kept in mind that during testing, a pure (100% composition) liquid is usually placed in direct contact with the material producing a worst-case situation.

3.3.5 Abrasion

When selecting protective clothing, the job the employee is engaged in must be taken into consideration. Persons moving drums or performing other manual tasks may require added protection for their hands, lower chest and thighs. The use of leather gloves and a heavy apron over the other normal protective clothing will help prevent damage to the normal PPE and thus reduce worker exposures.

3.3.6 Dexterity

Although protection from skin and inhalation hazards is the primary concern when selecting PPE, the ability to perform the assigned task must be maintained. For example, personnel cannot be expected to perform work that requires fine dexterity if they must wear a thick glove. Therefore, the PPE selection process must consider the task being performed and provide PPE alternatives or techniques that allow dexterity to be maintained while still protecting the worker (e.g., wearing tight latex gloves over more bulky hand protection to increase dexterity).

3.3.7 Ability to Decontaminate

If disposable clothing cannot be used, the ability to decontaminate the materials selected must be taken into consideration. Once a chemical contacts the material, it must be cleaned before it can be reused. If the chemical has completely permeated the material, it is unlikely that the clothing can be adequately decontaminated and the material should be discarded.

3.3.8 Climactic Conditions

The human body works best with few restraints from clothing. Protective clothing adds a burden by adding weight and restricting movement as well as preventing the natural cooling process. In severe situations, a modified work program must be used.

Some materials act differently when they are very hot and very cold. For example, PVC becomes almost brittle in very cold temperatures. If there are any questions about the stability of the protective materials under different conditions, the manufacturer should be contacted.

3.3.9 Work Load

Like climactic conditions, the type of work activity may affect work duration and the ability or personnel to perform certain tasks. Similarly, the amount of protective materials a person wears will affect their ability to perform certain tasks. For example, a person in a total encapsulating suit, even at 72 ^{o}F, cannot work for more than a short period of time without requiring a break.

The work schedule should be adjusted to maintain the health of the employees. Special consideration should be given to the selection of clothing that both protects and adds the least burden when personnel are required to perform strenuous tasks. Excessive bodily stress frequently represents the most significant hazard encountered during field work.

3.4 Types of Protective Materials

1. Cellulose or Paper
2. Natural and Synthetic Fibers
    a. Tyvek™
    b. Nomex™
3. Elastomers
    a. Polyethylene
    b. Saran
    c. Polyvinyl Chloride (PVC)
    d. Neoprene
    e. Butyl Rubber
    f. Viton

3.5 Protection Levels

3.5.1 Level A Protection

Level A protection (a fully encapsulated suit) is used when skin hazards exist or when there is no known data that positively rule out skin and other absorption hazards. Since Level A protection is extremely physiologically and psychologically stressful, the decision to use this protection must be carefully considered. At no time will Level A work be performed without the consent of the OM. The following conditions suggest a need for Level A protection:

- confined facilities where probability of skin contact is high;
- sites containing known skin hazards;
- sites with no established history to rule out skin and other absorption hazards;
- atmosphere immediately dangerous to life and health (IDLH) through the skin absorption route;
- site exhibiting signs of acute mammalian toxicity (e.g., dead animals, illnesses associated with past entry into site by humans);

- sites at which sealed drums of unknown materials must be opened;
- total atmospheric readings on the Photoionization Detector (PID), Flame Ionization Detector (FID), and similar instruments indicate 500 to 1,000 ppm of unidentified substances; and
- extremely hazardous substances (e.g., cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens and infectious substances) are known or suspected to be present and skin contact is possible.

The following items constitute Level A protection:

- open circuit, pressure-demand self-contained breathing apparatus (SCBA);
- totally encapsulated suit;
- gloves, inner (surgical type);
- gloves, outer;
- chemical protective;
- boots, chemical protective, steel toe and shank;
- radiation detector (if applicable); and
- communications.

3.5.2 Level B Protection

Level B protection is utilized when the highest level of respiratory protection is needed but hazardous material exposure to the few unprotected areas of the body is unlikely.

The following conditions suggest a need for Level B protection:

- the type and atmospheric concentration of toxic substances have been identified and they require the highest level of respiratory protection;
- IDLH atmospheres where the substance or concentration in the air does not present a severe skin hazard;
- the type and concentrations of toxic substances do not meet the selection criteria permitting the use of air purifying respirators; and
- it is highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of materials that will affect the skin of personnel.

Personal protective equipment for Level B includes:

- open circuit, pressure-demand SCBA;
- chemical protective clothing:
- overalls and long-sleeve jacket; or
- coveralls;
- gloves, inner (surgical type); gloves, outer, chemical protective;
- boots, chemical protective, steel toe and shank; and
- communications optional.

3.5.3 Level C Protection

Level C protection is utilized when both skin and respiratory hazards are well defined and the criteria for the use of negative pressure respirators have been fulfilled (i.e., known contaminants and contaminant concentrations, acceptable oxygen levels, approved filter/cartridge available, known cartridge service life, etc.). Level C protection may require carrying an emergency escape respirator during certain initial entry and site reconnaissance situations, or when applicable thereafter.

Personal protective equipment for Level C typically includes:

- full facepiece air-purifying respirator;
- emergency escape respirator (optional);
- chemical protective clothing:
  - overalls and long-sleeved jacket; or
  - coveralls;
- gloves, inner (surgical type);
- gloves, outer, chemical protective; and
- boots, chemical protective, steel toe and shank.

3.5.4 Level D Protection

Level D is the basic work uniform. Personal protective equipment for Level D includes:

- coveralls;
- safety boots/shoes;
- eye protection;
- hand protection;
- reflective traffic safety vest (mandatory for traffic areas or railyard);
- hard hat (with face shield is optional); and
- emergency escape respirator is optional.

3.5.5 Level E Protection

Level E protection is used when radioactivity above 10 mr/hr is detected at the site. Personal protective equipment for Level E includes:

- coveralls;
- air purifying respirator;
- time limits on exposure;
- appropriate dermal protection for the type of radiation present; and
- radiation dosage monitoring.

3.5.6 Additional Considerations

Field work will contain a variety of situations due to chemicals in various concentrations and combinations. These situations may be partially ameliorated by following the work practices listed below:

1. Some sort of foot protection is needed on a site. If the ground to be worked on is contaminated with liquid and it is necessary to walk in the chemicals, some sort of protective "booties" can be worn over the boots. This cuts down on decontamination requirements. They are designed with soles to help prevent them from slipping around. If non-liquids are to be encountered, a Tyvek™ bootie could be used. If the ground contains any sharp objects, the advantage of booties is questionable. Boots should be worn with either cotton or wool socks to help absorb the perspiration.
2. If the site situation requires the use of hard hats, chin straps should be used if a person will be stooping over where his/her hat may fall off. Respirator straps should not be placed over the hard hats. This will affect the fit of the respirator.

   Some types of protective materials conduct heat and cold readily. In cold conditions, natural material clothing should be worn under the protective clothing. Protective clothing should be removed prior to allowing a person "to get warm". Applying heat, such as a space heater, to the outside of the protective clothing may drive the contaminants through. In hot weather, under clothing will absorb sweat. It is recommended that workers use all cotton undergarments.
3. Body protection should be worn and taped to prevent anything from running into the top of the boot. Gloves should be worn and taped to prevent substances from entering the top of the glove. Duct tape is preferred, but masking tape can be used. When aprons are used, they should be taped across the back for added protection. However, this should be done in such a way that the person has mobility.
4. Atmospheric conditions such as precipitation, temperature, wind direction, wind velocity, and pressure determine the behavior of contaminants in air or the potential for volatile material getting into the air. These parameters should be considered in determining the need for and the level of protection.
5. A program must be established for periodic monitoring of the air during site operations. Without an air monitoring program, any changes would go undetected and might jeopardize response personnel. Monitoring can be done with various types of air pumps and filtering devices followed by analysis of the filtration media; personnel dosimeters; and periodic walk-throughs by personnel carrying real-time survey instruments.
6. For operations in the exclusion zone, different levels of protection may be selected, and various types of chemical-resistant clothing may be worn. This selection should be based on the job function, reason for being in the area, and the potential for skin contact with, or inhalation of, the chemicals present.
7. Escape masks must be readily available when levels of respiratory protection do not include a SCBA and the possibility of an IDLH atmosphere exists. Their use can be made on a case-by-case basis. Escape masks could be strategically located at the site in areas that have higher possibilities of vapors, gases or particulates.

APPENDIX N

Community Air Monitoring Plan

COMMUNITY AIR MONITORING PROGRAM FOR SUBSURFACE ACTIVITIES

[redacted] Exchange Street, [redacted] Exchange Street, and [redacted] Exchange Street
Rochester, New York

April 5, 2021

Prepared for:

ExxonMobil Environmental and Property Solutions Company

Prepared by:

Roux Associates, Inc.
12 Gill Street, Suite 4700
Woburn, Massachusetts 01801

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Appendices

1.0 INTRODUCTION

Roux Associates, Inc. and Roux Environmental Engineering and Geology D.P.C. (collectively referred to as "Roux") on behalf of ExxonMobil Environmental and Property Solutions Company (ExxonMobil), has prepared the following Community Air Monitoring Plan (CAMP) to ensure the soil sampling and remediation (i.e., excavation) activities (collectively, hereafter referred to as "intrusive activities") to be performed in the backyards of the following three residential properties: [redacted] Exchange Street, [redacted] Exchange Street, and [redacted] Exchange Street (hereafter referred to as the "Site") in Rochester, New York do not adversely affect the Site residents and downwind community, and to preclude or minimize airborne migration of Site contaminants. The proposed soil sampling activities include advancement of soil borings for soil sampling to determine extents of excavation.

Compliance with this CAMP is required during all intrusive activities that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). Intrusive activities include both boring advancement and excavation. This CAMP has been prepared to ensure that intrusive activities do not adversely affect residents, bystanders or workers at the Site and in the area immediately surrounding the Site and to preclude or minimize airborne migration of particulate matter and VOCs.

This CAMP is consistent with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan, which is included as Appendix 1A of the New York State Department of Environmental Conservation (NYSDEC) "DER-10 Technical Guidance of Site Investigation and Remediation" (DER-10), dated May 3, 2010.

2.0 AIR MONITORING PROCEDURES DURING INTRUSIVE ACTIVITIES

Semi-volatile organic compounds (SVOCs), metals and VOCs all may be constituents of concern at the Site. The appropriate method to monitor air for these constituents during intrusive activities is through real-time VOC and air particulate (dust) monitoring. As discussed, the intrusive activities planned at the Site include both soil sampling and excavation requiring continuous monitoring for VOC and dust concentrations. Specific air monitoring procedures required during intrusive activities are described below.

Ground Intrusive Activities

Continuous VOC and particulate monitoring will be required for all ground intrusive activities conducted at the Site including soil boring advancement and excavation. Note that ground intrusive work areas are not expected to be within 20 feet of potentially exposed populations or occupied structures and therefore special requirements CAMP procedures will not be required.

2.1 Wind Direction

Wind direction will be evaluated, at a minimum, at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to determine the positioning of the monitoring equipment in appropriate upwind and downwind locations. Moreover, per NYSDEC's request and Special Requirements CAMP, VOCs and particulates will also be monitored in the direction of the nearest occupied structure in addition to the downwind monitoring location. This monitoring station is in addition to the downwind monitoring station unless the nearest occupied structure is also downwind of the work area. A Site figure will be marked daily to record the wind direction and monitoring equipment locations.

2.2 Volatile Organic Compound Monitoring

During all ground intrusive activities, VOCs will be monitored periodically at the upwind perimeter and continuously at the downwind perimeter and nearest occupied structure stations of the designated work areas. A portable handheld Photoionization Detector (PID) will be used to periodically monitor conditions at upwind locations. Monitoring equipment capable of measuring total VOC concentrations (PID) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at the downwind location and nearest occupied structure location, at a height of approximately 4-5 feet above land surface (i.e., the breathing zone). The audible alarm on the PIDs will be set at 5 parts per million (ppm). Monitoring equipment will be a MiniRAE 2000 portable VOC monitor or similar.

VOC concentrations will be measured at monitoring stations located along the upwind and downwind perimeters of all ground intrusive work areas as well as in the direction of the nearest occupied structure (unless the nearest occupied structure is also downwind of the work area). Locations of both upwind and downwind monitoring stations will be determined based upon the meteorological data collected throughout the workday and are subject to change in response to changes in wind direction and speed. Additionally, the location of the nearest occupied structure will be determined based upon the designated work area for the workday and is subject to change in response to changes in work area.

The following summarizes VOC action levels and the appropriate responses:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or the nearest occupied structure location exceeds 5 ppm above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or the nearest occupied structure location persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities must be halted. While continuing to monitor, the source of vapors must be identified, and corrective actions must be taken to abate emissions. After these steps are performed, work activities can resume, provided the total organic vapor level at the nearest occupied structure location is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down, the source of vapors identified, and corrective measures taken to abate emissions, as described below in **Section 2.2.1**.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review upon request. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

2.2.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind or nearest occupied structure location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during ground intrusive activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- Limiting the excavation size;
- Backfilling portions of the excavation;
- Covering soil stockpiles (if any) with 6-mil polyethylene sheeting;
- Hauling waste materials off-Site in properly covered container;
- Odor masking; and/or
- Pausing operations until the wind conditions change such that VOCs and/or odors due to the work are not migrating toward downwind receptors.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review upon request.

2.3 Particulate Monitoring

Air monitoring for particulates (i.e., dust) will be performed continuously during intrusive activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM10) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations as well as in the direction of the nearest occupied structure (unless the nearest occupied structure is also downwind of the work area), at heights approximately 4-5 feet above land surface (i.e., the breathing zone). Monitoring equipment will be MEI Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter (µg/m3). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 µg/m3 above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind or nearest occupied structure PM_{10} particulate level is 100 µg/m^3 above background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM_{10} particulate levels do not exceed 150 µg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind or nearest occupied structure PM_{10} particulate levels are greater than 150 µg/m^3 above the upwind level, work must be stopped, and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in **Section 2.3.1** below) and other controls are successful in reducing the PM_{10} particulate concentrations to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and available for NYSDEC and NYSDOH personnel to review upon request. If an exceedance of the Action Limits occurs, an Action Limit Report (Appendix A), will be completed.

2.3.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind or nearest occupied structure location exceeds the upwind level by more than 100 µg/m3 at any time during intrusive activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- Spraying water on the equipment;
- Placing/hauling materials in properly tarped containers or vehicles;
- Limiting vehicle/equipment activity and speeds on Site; and/or
- Hydro-seeding of disturbed areas (as needed).

Work may continue with dust suppression techniques provided that downwind or nearest occupied structure PM10 levels are not more than 150 µg/m3 greater than the upwind levels.

There may also be situations where the dust generated by intrusive activities migrates to downwind locations and is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the work area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 µg/m3, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review upon request.

3.0 REFERENCES

NYSDOH, 2010. New York State Department of Health Generic Community Air Monitoring Protocol, May 3, 2010 (also included as Appendix 1A to the Draft Technical Guidance for Site Investigation and Remediation, NYSDEC, May 2010).

APPENDIX A

Action Limit Report

ACTION LIMIT REPORT

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

DOWNWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

UPWIND DATA

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

BACKGROUND CORRECTED LEVELS

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

ACTIONS TAKEN

APPENDIX O

Site's Emergency Action Plan and Incident Response Plan

Emergency Action Plan (EAP)

This EAP covers the actions and procedures that facility personnel will follow when responding to an emergency including information about fire prevention procedures and systems for preventing fires.

Policy Statement

Roux Associates (Roux) will provide its employees and other personnel at the Exchange Street (Property) with a clear plan of action in the event of an emergency. The plan will comply with applicable emergency action regulations. As a result of the hazards at the Property and the conditions under which operations are conducted, the possibility of an emergency exists. An EAP is required by OSHA (29 CFR 1910.120) to be available for use and is included below. A copy of this EAP shall be available in the Support Zone at each work site and as an appendix to the 400 Kingsland Avenue health and safety plan (HASP).

In the event of an emergency situation, such as fire, explosion, significant release of particulates, etc., the EAP will be initiated and all persons in both the restricted and non-restricted areas will evacuate and assemble near the Support Zone or other safe area as identified by the Site Health and Safety Officer (SHSO) and described in this EAP. The SHSO will have the authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. Once the safety of all personnel is confirmed, the fire department and other emergency response groups will be notified by telephone of the emergency. Then, other personnel listed in Table 1 shall be notified. The SHSO or Systems Operation Manager (SOM) will be responsible for ensuring that all spark-producing apparatus has been shut down once the alarm has been sounded and will be responsible for providing access to the facility for first responders, emergency vehicle, and emergency equipment.

Site Emergency Coordinator(s)

The Site Emergency Coordinator(s) shall implement this EAP whenever conditions at the Property warrant such action. The coordinator(s) will be responsible for assuring the evacuation, emergency treatment, emergency transport of Property personnel as necessary, and notification of emergency response units and the appropriate management staff.

Table 1 provides the roles and contact information for the administration of the EAP.

Site Personnel	**Contact Person**	**Contact Information**
Title	Contact	Telephone
Project Principal	Ian Reed	781-569-4030 617-875-9394 (Cell)
Project Manager (PM)	Jim Dick	781-569-4000 617-596-8841 (Cell)
Site Health and Safety Officer (SHSO)	Grace van der Ven	781-569-4043 315-877-5946 (Cell)

Site Personnel	Contact Person	Contact Information
Site Supervisor	Grace van der Ven	781-569-4043 315-877-5946 (Cell)
Office Health and Safety Manager (OHSM)	Anthony Marsocci	781-569-4034 585-721-1196 (Cell)
Office Manager	Nancy Nevins	781-569-4053 617-549-5351 (Cell)
Corporate Health and Safety Manager (CHSM)	Brian Hobbs	631-630-2419 631-807-0193 (Cell)
Client Emergency Contact	Elizabeth Zinkevicz	207-363-8345

Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) will:

- Report emergency to others in the immediate work area.
- Assess the emergency situation and signal the alarm if emergency service will be notified.
- Coordinate an orderly evacuation of personnel.
- Retreat to the designated evacuation assembly area and perform an accurate head count of personnel that reported to the designated area.
- Determine a rescue method to locate missing personnel.
- Secure the emergency area/facility until first responders arrive.
- Provide the fire responders with the necessary information about the facility.
    - Hazard information;
    - Locations of hazard;
    - Site conditions;
    - Evacuation and victims; and
    - What help you need.
- Perform adverse weather assessments and coordinate office emergency closing procedures due to adverse weather.
- Ensure designated evacuation monitors and special needs assistants have received adequate information and training for performing their tasks.

Site Supervisor

The Site Supervisor (SS) will ensure that facility surveillance is maintained, prevent unauthorized entry to the facility, and maintain communications with government enforcement authorities as needed to protect employees and property.

The Site Coordinator must:

- Ensure all employees have evacuated the facility.
- Report any problems to the SHSO at the assembly area.

Emergency Services

Table 2 contains the contact information for emergency services.

In the case of an emergency (i.e. fire or immediate threat to personal or public health), the SOM will immediately contact the appropriate personnel in table below.

Outside Assistance			
Agency	Contact	Telephone	Address/Location
Ambulance/EMS	Rural Metro	911	811 West Ave, Rochester, NY 14611
Police	Rochester Police Department	911	185 Exchange Blvd, Rochester, NY 14614
Fire	Rochester Fire Department	585-428-6739	1261 South Ave, Rochester, NY 14620
AllOne Health		800-350-4511	Phone Only
Hospital	Strong Memorial Hospital	585-275-2100	601 Elmwood Avenue, Rochester, NY
Occupational Medical Care Management	Work Fit Medical	585-426-4990	1160 Chili Ave, Suite 200, Rochester, NY

Plan Review and Update

The EAP will be reviewed annually and updated whenever the following occurs:

- New hazards are identified or existing hazards change;
- There are changes to the facility layout or infrastructure; or
- There are changes to emergency action and evacuation procedures.

Definitions

Exit – the portion of an exit route that is generally separated from other areas to provide a protected way of travel to the exit discharge. An example of an exit is a 2-hour fire resistance-rated enclosed stairway that leads from the fifth floor of an office building to the outside of the building.

Exit Route – a continuous and unobstructed path of exit travel from any point within a workplace to a place of safety (including refuge areas). An exit route consists of three parts: the exit access; the exit; and the exit discharge. (An exit route includes all vertical and horizontal areas along the route.)

Reporting

The types of emergencies to be reported to the SHSO by facility personnel are:

- Medical
- Fire
- Severe weather
- Bomb threat

- Chemical spill
- Extended power loss
- Any violent altercations
- Unauthorized personnel entering the facility
- Other [e.g., terrorist attack, hostage taking]

Evacuation Procedures

Withdrawal Upwind: The work party will continually note general wind directions while on-site. Upon noting the conditions warranting movement away from the work site, the crew will move to established assembly area (i.e., Exchange Street Entrance) or upwind at a distance of approximately 100 feet or farther, as indicated by the SHSO. When access to the Property is restricted and escape possibly hindered, the crew may be instructed to evacuate the Property rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes.

Property Evacuation: Upon determination of conditions warranting Property evacuation, the work party will proceed to assembly area (i.e., Exchange Street Entrance) or upwind of the work site and notify the SHSO and SOM of Property conditions. If the hazard is thought to be toxic gas personnel will evacuate to a safe distance. The advisability and type of further response action will be coordinated and carried out by the SHSO, the SOM, the PM, and the ExxonMobil Project Manager.

After personnel are evacuated and have reached the assembly area, the monitors will conduct a thorough head count of all personnel. The name(s) of any missing persons and suspected locations for unaccounted or injured people will be immediately communicated to the SHSO.

Potential or Actual Fire or Explosion

If the potential for a fire exists or if an actual fire or explosion occurs, the following procedure will be implemented:

- Immediately evacuate the Property as described above
- Notify fire and security

  Fire Department **911**
  Police Department **911**

- Notify ExxonMobil Project Manager, SHSO and/or SOM

Environmental Incident (Release or Spread of Contamination)

If possible, the spread of contamination should be controlled or stopped. The SHSO must contact the Roux Site Project Manager(s) and the ExxonMobil Project Manager. The SHSO and SOM are responsible for contacting the appropriate personnel and/or authorities. If a significant release has occurred, the SHSO and SOM or their designees should contact the National Response Center and other appropriate groups. Those groups will alert National or Regional Response Teams as necessary. Following these emergency calls, the remaining personnel listed in the Table 2 shall be notified, if necessary.

Personal Injury

If on-site personnel require emergency medical treatment, the following steps will be taken:

a. Notify the Fire Department or Ambulance service and request an ambulance or transport the victim to the hospital or first care occupational health clinic, as appropriate, and make the necessary calls per the Incident Response Plan (See HASP Appendix O.2). The route to the first care occupational health clinic is depicted on HASP Figure 5 and the route to the hospital is provided on HASP Figure 6.

b. Decontaminate to the extent possible prior to administration of first aid or movement to emergency facilities.

c. First aid will be provided by emergency medical services (EMS) or by on-site personnel trained in first aid, CPR, and blood borne pathogens, if available.

d. In addition to filling out the ExxonMobil Near Loss/Loss Report, if a Roux employee is involved in a vehicle accident, the employee must also complete the Acord form (see HASP Appendix R).

Overt Personnel Exposure

If an overt exposure to toxic materials occurs, the exposed person shall be treated at the Site as follows.

➢ Skin Contact:	Wash/rinse affected area thoroughly with copious amounts of soap and water, and then provide appropriate medical attention. Utilizing eyewash, eyes should be rinsed for at least fifteen (15) minutes upon chemical contamination.
➢ Inhalation:	Move to fresh air and/or, if necessary, decontaminate and transport to the hospital.
➢ Ingestion:	Decontaminate and transport to emergency medical facility.
➢ Puncture Wound or Laceration:	Decontaminate and transport to emergency medical facility. SHSO will provide medical data sheets to medical personnel as requested.

Adverse Weather Conditions

In the event of adverse weather conditions, the SHSO will determine if work can continue without compromising the health and safety of any field workers. Some of the items to be considered prior to determining if work should continue are:

- Heavy rainfall;
- High wind;
- Thunderstorm/Lightning – Stop working immediately and wait until 15 minutes after last lightning strike;
- Potential for heat stress;
- Potential for cold stress and cold-related injuries;
- Limited visibility;
- Potential for electrical storms;
- Potential for malfunction of health and safety monitoring equipment or gear; and
- Potential for accidents.

Tornado

A tornado is a violently rotating column of air extending between, and in contact with, a cloud and the surface of the earth. Tornadoes are generally spawned by thunderstorms, though they have been known to occur without the presence of lightning. The stronger tornadoes attain an awe-inspiring intensity, with wind speeds that exceed 200 mph and in extreme cases may approach 300 mph. They are responsible for the destruction of homes with the most significant damage occurring to mobile homes, cars, and other objects in their paths.

Tornado wind speeds are estimated after the fact based on the damage they produce. Tornadoes are categorized on a scale of 0 (weakest) to 5 (strongest) according to the Enhanced Fujita Scale.

The United States has the highest incidence of tornadoes worldwide, with more than 1,000 occurring every year. This is due to the unique geography that brings together polar air from Canada, tropical air from the Gulf of Mexico, and dry air from the Southwest to clash in the middle of the country, producing thunderstorms and the tornadoes they spawn. This specific area rarely sees tornadoes; however, a weak one was confirmed in September 2010 in a section of Brooklyn, New York.

Tornadoes can come one at a time, or in clusters, and they can vary greatly in length, width, direction of travel, and speed. They can leave a path 50 yards wide or over a mile wide. They may touchdown for only a matter of seconds or remain in contact with the ground for over an hour. Paths of damage and destruction have been up to ten miles long or more. Some tornadoes have been traced over 200 miles.

Tornado Definitions

The two definitions used with tornadoes are tornado watch and tornado warning. Each is defined below.

A. Tornado Watch

A tornado watch is issued when there is the possibility of a tornado forming because of favorable weather conditions. The watch is issued for a specified area.

B. Tornado Warning

A tornado warning is issued after the actual sighting of a tornado. Like a tornado watch, a tornado warning is issued for a specified area.

Tornado Emergency Actions

- When a warning is issued by sirens or other means, seek inside shelter. Consider sheltering in the following:
    - Small interior rooms on the lowest floor and without windows;
    - Hallways on the lowest floor away from doors and windows (note: avoid hallways with outside entrances at both ends; they may become dangerous wind tunnels if the doors blow open); or
    - Rooms constructed with reinforced concrete, brick, or blocks with no windows.
- Stay away from outside walls and windows.
- Use arms to protect head and neck.
- Remain sheltered until the tornado threat is announced to be over.

Stay Tuned for Storm Warnings

- Listen to local radio and TV stations for updated storm information.
- Know what tornado WATCHES and WARNINGS mean.
- A tornado WATCH means a tornado is possible in your area.
- A tornado WARNING means a tornado has been sighted and may be headed for your area.
- Go to safety immediately.
- Tornado WATCHES and WARNINGS are issued by the county.
- When a tornado WATCH is issued listen to local radio and TV stations for further updates.

Be Alert to Changing Weather Conditions

- Blowing debris or the sound of an approaching tornado may alert you.
- Many people say it sounds like a freight train.

When a Tornado WARNING is Issued

- If you are inside, go to the safe place you picked to protect yourself from glass and other flying objects.
- The tornado may be approaching your area.
- If you are outside, hurry to the basement of a nearby sturdy building or lie flat in a ditch or low-lying area.
- If you are in a vehicle, get out immediately and head for safety (as above).

After the Tornado Passes

- Watch out for fallen power lines and do not venture into the damaged area.
- Listen to the radio for information and instructions.
- Use a flashlight to inspect your building for damage (avoid using candles or matches).

The Hurricane Threat – Definitions and Categories

The National Hurricane Center near Miami, Florida constantly monitors the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico looking for tropical disturbances. These disturbances develop in open ocean areas and move across the seas. If wind speeds within such disturbances reach 39 miles per hour and move in a circular pattern in a counter-clockwise direction, they are categorized as tropical storms. Tropical storms that continue to grow are designated hurricanes when their wind speeds exceed 74 miles per hour. Hurricanes generally occur between June 1st and November 30th. Hurricanes generate a series of threats to lives and property. The most obvious is the threat posed to buildings, equipment, and people by the high winds which characterize such storms. Another serious threat to life and property comes from the storm surge, which occurs in coastal areas. Storm surges consist of huge domes of water and storm driven waves, which are pushed inland ahead of a hurricane. Tides of three to ten feet above normal are common, but the storm surge may rise twenty feet or more in large hurricanes. Waves come ashore with great force, far beyond the reach of normal surf. In relatively flat areas, the storm surge may push many miles inland. Hurricanes often generate heavy rainfall, which can cause severe flooding over wide areas. Hurricanes also may spawn deadly tornadoes. Flooding and tornadoes may affect areas well inland. The National Weather Service rates hurricanes by their intensity, using a scale of one to five. The scale, which is outlined below, categorizes storms according to their sustained winds; the storm surges produced, and expected damage.

Category One — Winds of 74 to 95 mph, storm surge of 4 to 5 feet above normal tide. Damage to shrubbery, trees, poorly constructed signs, and unanchored mobile homes. Low lying coastal roads inundated.

Category Two — Winds of 96 to 110 mph, storm surge of 9 to 12 feet above normal tide. Some damage to roofing materials of buildings, some wind and door damage. Major damage to exposed trailers/mobile homes. Coastal roads and low lying escape routes made impassable by rising water 2 to 4 hours before arrival of hurricane.

Category Three — Winds of 111 to 130 mph, storm surge 9 to 12 feet above normal tide. Large trees blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Trailers/mobile homes destroyed. Serious flooding at the coast; many small structures destroyed; large structures damaged by waves and debris.

Category Four — Winds of 131 to 155 mph, storm surge 13 to 18 feet above normal tide. Shrubs and trees blown down, all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs of many small residences. Complete destruction of trailers/mobile homes. Flat terrain 10 feet or less above sea level flooded inland as far as six miles. Major damage to lower floors of structures near shore.

Category Five — Winds greater than 155 mph, storm surge greater than 18 feet above normal tide. Shrubs and trees blown down; considerable damage to roofs of buildings. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Some complete building failures. Complete destruction of trailers/mobile homes. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.

The damage expected from various categories of storms outlined above is typical; actual damage caused by a storm will vary depending on building code compliance, condition of structures, zoning restrictions, and a number of other factors.

A **"Hurricane Watch"** means a hurricane has become a threat to coastal areas. Residents and businesses in those areas should monitor the situation and be prepared to take precautionary action promptly if a hurricane warning is issued.

A **"Hurricane Warning"** indicates that hurricane force winds, dangerously high water, and rough seas are expected in a specific coastal area within 24 hours and precautionary actions should begin immediately.

A hurricane's intensity, speed, and direction can change rapidly, so the threat to particular areas of the coast may also change quickly. It is essential that people in coastal areas regularly monitor radio and television newscasts for information and instructions whenever a hurricane is potentially coming up the east coast of the United States.

Site Evaluation

Where to Get Information

Each jurisdiction within the state is required to have an emergency manager. This may be the chief elected official (the mayor or county judge), who is by law the emergency management director, or a coordinator appointed by the director to oversee emergency management. Check with the Borough to determine the name and phone number of the emergency manager.

Emergency management offices may be listed in the telephone book under emergency management, emergency operations, or similar titles; sometimes they are listed under the fire department or the police department. Emergency management offices are also listed on the Internet.

Coastal areas which could be affected by hurricanes are categorized into two zones:

1. **Evacuation zones** are coastal areas in which there is a danger from both strong winds and storm surge. Take note that if your business is located in an evacuation zone, you need to plan for both high wind and high water.
2. **Contingency zones** are areas which can be affected by high winds from major hurricanes; some of these zones extend well inland.

Know the Vulnerability of the Site

Geographical information and infrastructure knowledge will be of great benefit.

1. Know the elevation above sea level – The elevation is the major factor in determining vulnerability to storm surge (tidal flooding) or flooding by area streams and waterways. The local emergency management office has hurricane planning materials which outline areas which are likely to be affected by storm surge in various categories of hurricanes. The National Weather Service can supply information on flood stages for area waterways. If vulnerable to flooding, develop plans to evacuate during a hurricane.
2. Know the condition of the buildings – Inspect the buildings and foundations to determine if the structures could withstand the forces of hurricane winds and waves. If the buildings and their foundations are not structurally able to withstand severe wind and water, then plan to evacuate them completely during a hurricane – it is probably not safe for any person to remain in the buildings.

Know Evacuation Routes

1. Depending on the severity of a hurricane and its projected path, local officials may recommend the evacuation of people in evacuation zones only or for people in both evacuation and contingency zones. If the Site is located in an evacuation or contingency zone, it may have to be evacuated.
2. Obtain information on the specific evacuation routes that should be used from the local emergency management office. Get an estimate of travel times on those routes and potential problem areas (traffic bottlenecks, low areas that might flood, etc.).

General Hurricane Preparedness

Develop basic hurricane awareness. Plan to protect facilities and employees. Suggested pre-hurricane season planning activities are outlined below. Sources for further information regarding hurricane preparedness are listed in Attachment 1.

A. Employee Preparation
    1. Determine which Site personnel are needed to carry out hurricane preparations and who can be reasonably expected to be available. Some employees may need to assist their own families or relatives in evacuating from threatened areas. Regularly update the list of employee phone numbers and ensure each supervisor has a copy.
    2. Use this simple **written plan,** which incorporates a set of Hurricane Task Assignments for personnel. Inputs regarding the tasks to be accomplished should be solicited from all work crews at the Site.
        a) Outline the specific tasks which must be performed to protect the Site during a hurricane watch and a hurricane warning, how they will be accomplished, and who will perform them. See the sample format for Hurricane Task Assignments in Attachment 2.
        b) Develop teams for many tasks – a team to board up, a team to secure exterior equipment, and so forth. Personnel who will be performing unfamiliar tasks may need training in these tasks and the use of any equipment that may be required to accomplish those tasks.
    3. Conduct a training session – Familiarization training should be conducted at the beginning of every hurricane season – and during the season if there is high staff turnover. Update team assignments as needed.
B. Site Preparation
    1. If the Site is in a storm surge inundation zone or appears to be unsafe for occupancy during high winds, completely evacuate it. Identify essential business records that should be removed from the facility and determine where to take them. Back up computer records on disk or tape and move these with other essential records.
    2. Review a list of major equipment and furnishings to determine which items need to be protected or removed and record to do it. The basic choice is to try to protect your equipment and furnishings in-place or move them out of the area which is at risk. In either case, determine what

equipment and manpower will be needed to relocate these items. If the plan is to protect equipment in-place, move it to well protected interior rooms on floors above the level of potential flooding.

3. Identify outside equipment and furnishings which could be blown loose and may become deadly missiles in hurricane winds. Determine where they will be stored or how they will be secured in-place. Among the items to be secured are any available outside trash cans, signs, tools/equipment, etc.
4. Strongly anchor any portable storage buildings.
5. Ensure rooftop equipment such as exhaust fans, wind turbines, and air conditioning units are securely fastened or strapped down to the roof deck.
6. If a roof has a gravel covering, remove loose gravel to preclude damage to unprotected windows by stones being blow off the roof.
7. Ensure that Property workers know how to turn off the electrical power, water, gas, and other utility services, if applicable.

C. Equipment

1. Obtain several battery-operated radios and spare batteries to ensure receipt of emergency information. Have at least one radio on site which can receive National Oceanic & Atmospheric Administration (NOAA) weather radio frequencies. Weather radios with a tone alert capability are a very effective way of receiving reports of significant changes in weather conditions.
2. Procure sufficient flashlights and other battery powered lights to allow essential work to be conducted in the event of power outage. Ensure a good supply of fresh batteries is on hand.
3. Compile a disaster supply kit and have it ready for emergencies with contents such as: foods (canned goods, non-perishable, ready to eat), water (one gallon per person, per day), manual can opener and other eating utensils, personal hygiene items such as soap, deodorant, shampoo, toothbrush and toothpaste, toilet paper, first aid kit, fire protection equipment or fire extinguisher, rainwear, PPE, and blankets.
4. Have the necessary tools to board up windows and brace doors. The first priority in protecting structures will be to keep the wind out. Wind pressure and windblown debris can break windows and blow in doors. Large picture windows, skylights, French doors, inward opening doors, and garage doors are particularly vulnerable. Such tools as a circular or hand saw, a drill with appropriate bits, a hammer or nail gun, hand or power-driven screwdriver, and a wrench may be needed. Nails will be sufficient on wood-framed windows and doors but screws or bolts and washers are necessary for metal-framed windows and doors.
5. Have an ample supply of brooms, squeegees, mops, and absorbents to remove water.
6. Ensure the emergency generator is operational. The power may go out before a hurricane comes ashore and may be out for an extended period. The generator should provide the capability to maintain lighting, recharge batter powered equipment and power pumps and tools which may be needed for expedient repairs after the hurricane passes

D. Recommended Supplies

1. Plywood (preferably 5/8-inch-thick exterior type) to cover large windows and glass doors which can be blown in by hurricane force winds. Obtain plywood before a storm arrives and precut it to size, mark each panel to identify where it goes and store it until needed.
2. Sufficient lumber to brace inward opening exterior doors and roll up doors on the inside. Boards should be 2X4s or larger
3. Waterproof tape (duct tape or filament tape) to help protect the smaller windows from powerful wind gusts and flying debris. Apply tape in a criss-cross pattern.
4. Tie-down material (rope or chain) for outside furnishings and equipment that can’t be moved.

5. Heavy duty plastic sheeting (4 mil thickness or greater), furring strips, and a nail or staple gun to be used to make expedient roof and window repairs. Plastic sheeting can also be used to cover and protect equipment in the event of roof damage or leaks.
6. A supply of sandbags may be helpful in preventing intrusion of water through doorways into low-lying sections of buildings. Sandbagging can be very time consuming. It takes two people about an hour to fill and place 100 sandbags creating a wall only a foot high and 20 feet long.
7. Stockpile the emergency supplies before they are needed. Many of the listed items rapidly disappear from retail outlets when a hurricane threatens.

When a Hurricane WATCH is Issued

A hurricane watch is issued by the National Weather Service when hurricane conditions pose a possible threat to coastal areas.

A. Implement precautionary activities. Refer to your Hurricane Task Assignments (Attachment 2) for a hurricane watch and begin pre-planned activities to prepare the Site and personnel for the threat of a hurricane.

B. Suggested Actions:

1. Monitor radio and television newscasts for further information.
2. Check and verify adequacy of essential emergency equipment and supplies.
3. Begin to secure or store exterior equipment
4. Assemble equipment and materials to protect windows and other glass by boarding up or taping, and to protect vulnerable doors by bracing.
5. Fill Vehicle fuel tanks and obtain fuel for the emergency generator, if you have one. Fuel may not be available during hurricane evacuation activities.
6. Begin storing water in containers for emergency use or obtain supplies of bottled or canned water.
7. Update the list of all business records that may need to be removed or protected, and computer data that will need to be backed up.

When a Hurricane WARNING Is Issued

A hurricane warning is issued by the National Weather Service when a hurricane is expected to make landfall in a coastal area **within 24 hours**. If in an evacuation zone, evacuate promptly when hurricane warnings are issued. If in a hurricane contingency zone, local officials may recommend evacuation during major (Category 3 or greater) hurricanes. **Remember that hurricane evacuation routes can be closed by high winds and water many hours before a hurricane hits**.

A. Implement Protective Actions – Refer to your hurricane task assignments (Attachment 2) for a hurricane warning and begin pre-planned activities to protect the Site and personnel from the threat of a hurricane.
B. Suggested Actions when Evacuation is recommended. If evacuation of your area is recommended by local officials, perform the below suggested actions:
    1. Shut down operations.
    2. Relocate vital business records and valuables to a safe location out of the area being evacuated. Back up computerized records and protect the backup copy.

3. Relocate expensive equipment out of the area or move it to the most heavily constructed interior area of the facility. In areas which could be subject to surge flooding, move equipment to floors above the possible surge level. Cover vulnerable equipment which cannot be moved with plastic sheeting to minimize damage in the event of roof leaks or broken windows.
4. Where possible, move furnishings away from exterior windows and doors and get as many items as possible off the floor.
5. Brace inward opening exterior doors and any roll-up doors.
6. Close, lock, and board up large windows and glass doors. Board up or tape over smaller windows. Lower blinds and close curtains to help hold back flying debris.
7. Turn off electricity, gas, water, and other utility services.
8. Ensure all personnel have departed the facility before evacuation routes become impassable due to flooding or high winds.

C. Appropriate Action if Evacuation is not recommended. If local officials do not recommend evacuation of your area, the Site may still experience high winds and heavy rain generated by a hurricane. Suggested Actions if Evacuation is NOT Recommended are provided below:

1. Take appropriate protective measures to reduce the vulnerability of wind damage and heavy rain using the checklist in paragraph B above as a guide.
2. Have Site personnel on standby and materials for expedient repairs readily available.
3. Prepare for a possible loss of utilities for up to 72 hours. This means having battery-powered lights, a battery-powered radio, a supply of potable water and, if possible, an emergency generator.

During the Hurricane

A. Sheltering. If the Site is not an evacuation area but is still expected to receive some storm effects, the following guidance should be used in sheltering during the passage of the storm.

1. Use interior rooms and corridors. Avoid using basements if there is a chance of flooding. Avoid sheltering people in large open rooms which do not have interior supports, such as auditoriums.
2. In multi-story buildings, shelter people in lower floors and avoid corner rooms.
3. Avoid areas near exterior windows and glass doors, unless the glass I protected by shutters. Check with Legal to determine potential liability before using the Site as a hurricane shelter.

B. Other Precautions

1. Periodically conduct an internal check of buildings for roof damage, window breakage, broken pipes, and structural damage.
2. Ensure that those being sheltered remain indoors during the hurricane. If the eye of the hurricane passes over the Site, do not be fooled by the period of temporary calm, which occurs. When the eye of the hurricane has passed, storm winds will return from the opposite direction.
3. Continue to monitor the radio or television for hurricane condition updates and emergency information.

After the Hurricane

A. Reentering Evacuated Areas

1. If the Site is evacuated, there may be difficulty returning quickly because roads may be damaged, blocked by debris, or flooded in low lying areas.

2. Access to storm-damaged areas may be limited by local law enforcement personnel to keep people out of areas with dangerous conditions, facilitate rescue and recovery work, and limit access to unoccupied properties.
3. Initially, entry to storm-damaged areas may be limited to search and rescue personnel, law enforcement personnel, firefighters, utility crews, and road clearing teams. Once it is reasonably safe, the Site owner and essential employees will be cleared to enter the area, but they may be required to have a permit or pass, or be included on an access list maintained by the Borough. Contact the local emergency management office to determine the procedures for returning to storm-damaged areas.
4. Listen to the radio or television for instructions before attempting to return to the Site.

B. Checking the Site

1. Look for obvious structural damage to buildings and their foundations. If significant structural damage is observed, do not attempt to enter the affected building.
2. Check for downed or dangling electrical power lines and broken sewer or water pipes on your property. Stay away from damaged power lines and broken sewer lines. Do not take lanterns, torches, or any kind of open flame into a damaged building – there may be leaking gas or other flammable materials present. If damage to power, water, or wastewater equipment is observed, report it to the utility company.
3. Make sure the electrical outlets and appliances throughout the Site are dry and free of water before turning the power back on. If there is any doubt about the condition of wiring or appliances, have an electrician check them to make sure there are no short circuits.

C. Secure the Site. Looting of damaged facilities is possible. Normally, the presence of the owner, employees, or security guards on the property will discourage looting.

D. Safety Precautions

1. Do not drink water from the water system until local officials advise you that it is safe from contamination. Use bottled water, emergency water supplies or boil tap water before drinking it.
2. Take extra precautions to prevent fire – Inoperative water systems, low water pressure, and the disruption of other services may make firefighting extremely difficult.
3. Wear required PPE when walking through debris with the appropriate gloves when moving it.
4. Be aware that snakes, poisonous insects, and other animals instinctively move to higher ground to escape floodwaters. They may have taken refuge on the Site.
5. Guard against spoil food. Food in refrigerators can spoil If power is off only a few hours. Freezers will keep food safe to eat for several days if the freezer door is not opened after the power goes off. Do no refreeze food once it begins to thaw.

E. Recovery Actions

4. Report damage to the insurance company, as required by all policies. If buildings are uninhabitable, paint insurer's name and point of contact information (Roux contact name, alternate address, and the phone number to be used) on a wall or large board so the adjuster can find the Roux contact.
5. Document damage to any building and its contents with Photographs or video. Do not make extensive repairs until a claims adjuster inspects the damage. However, try to make expedient repair to prevent more damage or looting. For example, cover broken windows and holes in the roof or walls to prevent further weather damage.
6. If possible, be present when the insurance adjuster inspects the Site.

7. Repair damage to automatic sprinkler/alarm systems as soon as possible in order to get fire protection equipment back in service.
8. Contact local building inspection officials to determine permit requirements and rebuilding guidelines after a disaster. Repair agreements should include the contractor's license number, specify starting and ending date, and provide an exact description of the work to be performed. It is recommended not to fully prepay for repair work, but rather reserve some portion of payment until the work is completed. Maintain accurate records of all repairs and save receipts for repair work.

Shelter in Place

In the event of an off-site hazardous chemical release or other event that makes an evacuation of the facility dangerous or impossible, employees will take shelter in 400 Kingsland Avenue (located directly south of the Property).

Critical Operations

The SOM will identify any critical operations or processes that must be shut down or inactivated before an evacuation is completed and will designate the operations and the personnel who will implement the shutdown or inactivation. No personnel shall remain on-site after implementation of the shutdown or inactivation.

Recordkeeping

A record of EAP training for employees will be maintained for one (1) year via an updatable database stored on Roux network and maintained by the SHSO.

HURRICANE TASK ASSIGNMENTS

Date: _____

( ) Hurricane Watch ( ) Hurricane Warning

Employee Name: _____

Position: _____

Hurricane Duties and Location:

_____

_____

_____

_____

Equipment Required:

_____

_____

_____

_____

FOR FURTHER INFORMATION ON
HURRICANE PREPAREDNESS

Your local emergency management office can order the following publications, which provide additional information on hurricanes:

Against the Wind: Protecting Your Home From Hurricane Wind Damage. FEMA pamphlet 247.

Are You Ready? Your Guide to Disaster Preparedness. FEMA pamphlet H-34.

Emergency Preparedness Checklist. FEMA pamphlet L-154.

Hurricane-Floods: Safety Tips for Coastal and Inland Flooding. FEMA pamphlet L-107.

Hurricane: It's Not Just Another Storm. Texas Division of Emergency Management pamphlet DEM-8A.

Hurricane Awareness: Action Guidelines for School Children. FEMA pamphlet.

Hurricane Awareness: Action Guidelines for Senior Citizens. FEMA pamphlet.

Hurricane Precautions. Texas Division of Emergency Management pamphlet DEM-7. Available in Spanish as pamphlet DEM-2.

Hurricane Warning: A Booklet for Boys and Girls. Texas Division of Emergency Management pamphlet DEM-55.

Hurricane: Safety Tips for Hurricanes. FEMA pamphlet L-105.

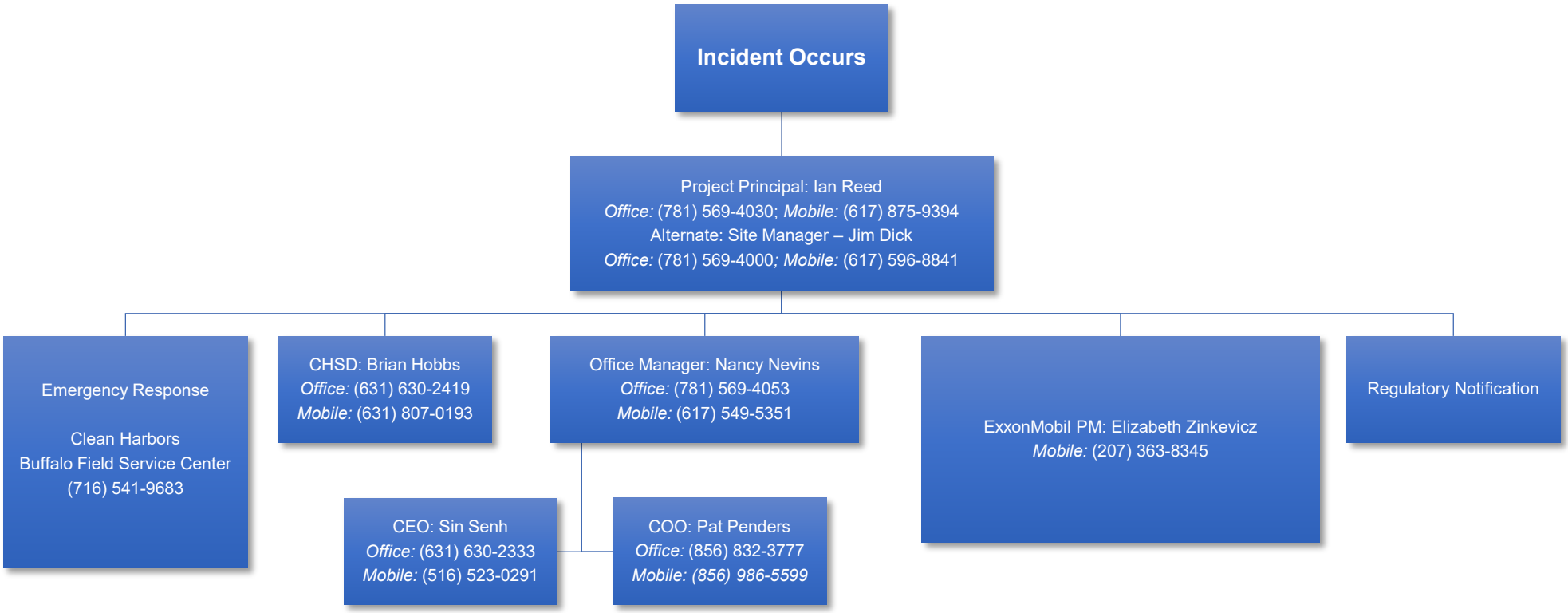
Useful Internet Sites.

Federal Emergency Management Agency – Tropical Storm Watch page. **http://www.fema.gov.**

National Hurricane Center. **http://nhc.noaa.gov.**

NWS Weather Offices.

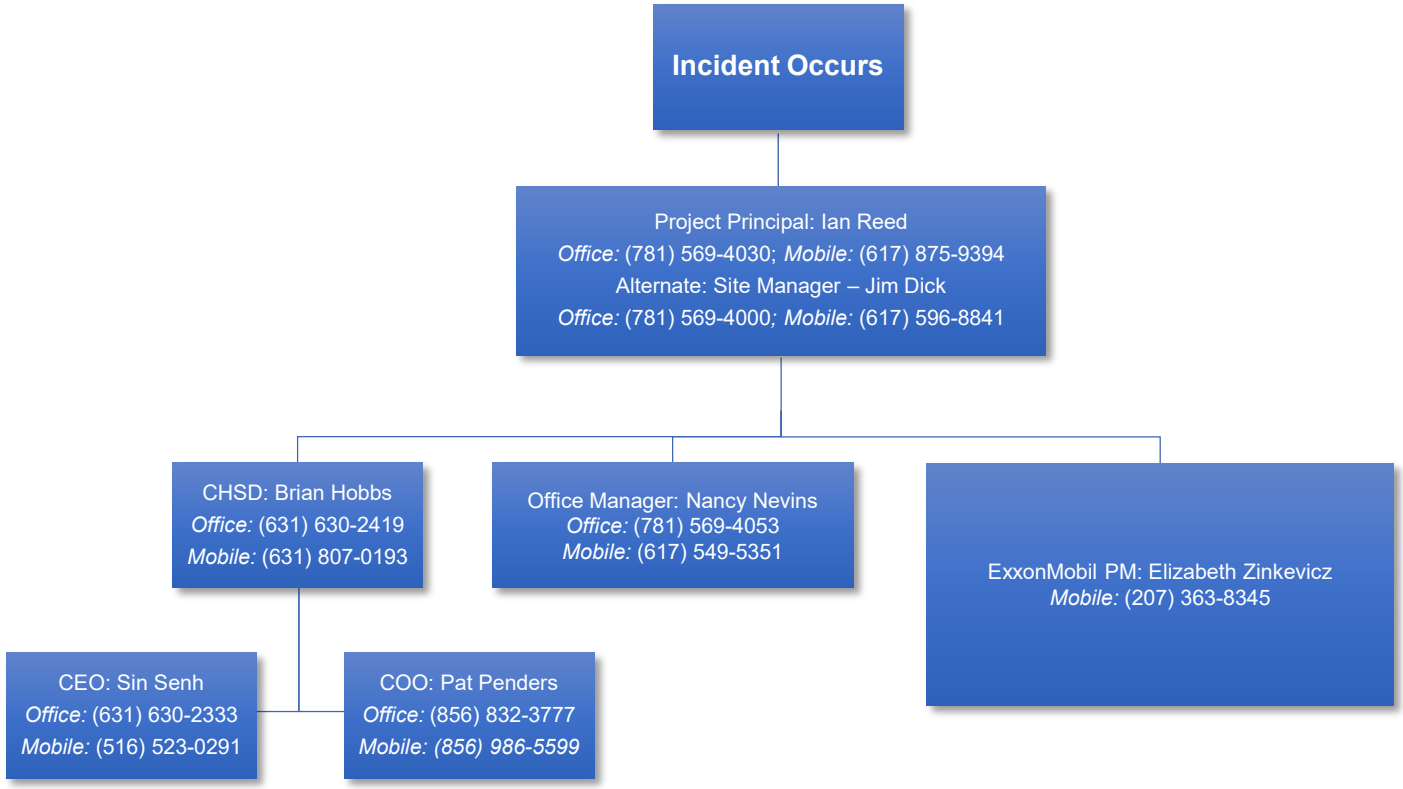
Incident Response Chart: Spill or Property Damage



1. PP or SM coordinate emergency response contractor(s)
2. SM schedule additional personnel to support if needed
3. Conduct Necessary Follow-up Work
4. SHSO, OHSM, and SM conduct investigation
5. Initial Incident Report (draft LI) provided to CHSD, PP, and OM within 24 hours
6. Initial Incident Report (draft LI) provided to ExxonMobil PM (written or verbal summary) within 24 hours
7. Follow up report provided to CHSD, PP, and OM within 1 week
8. Finalize LI Report and submit to ExxonMobil within 15 business days

ROUX

Incident Response Chart: Injury



1. SHSO and CHSD conduct care management for injured party
2. SHSO, OHSM, and Site Manager conduct investigation
3. Initial Incident Report (draft LI) provided to CHSD, PP, and OM within 24 hours
4. Initial Incident Report (draft LI) provided to ExxonMobil PM (written or verbal summary) within 24 hours
5. Follow up report provided to CHSD, PP, and OM within 1 week
6. Finalize LI Report within 15 business days

APPENDIX P

ExxonMobil Near Loss and Loss Investigation Forms

EXXONMOBIL ENVIRONMENTAL SERVICES (EMES)
LOSS REPORT FORM
IMPORTANT INSTRUCTIONS

All fatality, lost time, restricted work-related incidents and medical treatment cases will be reported verbally, within minutes of the incident (if possible) upon notification to AM, RM and RSA. These incidents should be preliminarily documented using the 16 Point Investigation Form after consultation with the Law Department if applicable. Target completion within 24 hours.

This Loss Report Form (including completed Parts 1, 2, 3 and appropriate Loss Consequence Details section(s)) should be submitted upon completion of the investigation and finalization of classification. Target completion within fifteen (15) business days unless adequate or complete information is not available.

Law Department Involvement:

With respect to incidents that:

- involve severe injury or death of a person,
- involve substantial damage to property of others, or
- may result in claims, litigation, or a governmental enforcement action against Exxon Mobil Corp. or its affiliates.

guidance from your ExxonMobil (EM) Business Unit attorney must be sought prior to completing this form or the 16 Point Investigation Form, even as a preliminary draft, or initiating an investigation. In addition to the incident types noted above, consult with the Law Department on any other legal questions you may have, as appropriate.

NOTE: Contractor supervisor should contact their designated ExxonMobil contact to notify them of these types of incidents.

Potential Environmental Incidents:

Please consult with your GREF SSH&E Advisor and appropriate environmental contacts prior to completing this form or initiating an investigation of a potential environmental incident.

Data Privacy:

Do not include the injured party's name on this form. Use generic terms such as "injured party" or "IP".

For injury or illness occurring in a country with comprehensive Data Privacy laws, consent should be obtained (if not previously provided) from the following using the appropriate Global Real Estate & Facilities (GREF) Consent form:

- Witnesses and third parties prior to including their personal information on this form
- The injured party, prior to including information about him / her on the form (e.g. injury, treatment), if this is being requested by functional supervisors who are out-of-country and, therefore, will result in information transfer cross-border which removes in-country protection warranting consent by the data subject

Please consult with the Data Privacy Office and/or local Law Department, as necessary.

NOTE: The country where the individual currently resides determines which laws apply to their personal information.

Countries with comprehensive Data Privacy laws can be found through this link: Data Privacy Countries

Root Cause Analysis and Solutions:

Selection of root causes and solutions in this form reflects the analysis of the investigation team and is not meant to be a legally binding conclusion as to the root cause and/or solution.

Corporate Recordable/Reportable Reference Table

The below table includes the most common types of GREF SSH&E Loss incidents. This IS NOT a complete list, but allows a general understanding of the incident types that are considered ExxonMobil (EM) Corporate Recordable. Use of the below table DOES NOT substitute for engaging the GREF SSH&E Advisor or appropriate environmental contacts and use of the Exxon Mobil Corporation Incident, Injury and Hazard Loss Reporting Guide (IIHL Guide); Exxon Mobil Corporation Environmental Performance Indicators (EPI) Manual; and/or ExxonMobil Passenger & Service Vehicle Safety Management Guide (PVMG) in determining an incident's corporate recording/reporting requirements.

The term "company property" is defined as any owned or leased items, objects or intellectual work product with a monetary value to the Corporation.

SAFETY – Corporate Recordable	SECURITY – Corporate Recordable	ENVIRONMENTAL – Corporate Reportable
(reference IIHL Part I)	**(reference IIHL Part II)**	**(reference EPI Manual)**
• Fatality • Lost Time Injury/Illness (LTI) • Restricted Work Injury/Illness (RWI) • Medical Treatment Injury/Illness (MTI)	• Arson: if involved company property and EM cost ≥ $100K USD or AHL/PHL 3+ or IRAT 400+ • Assault: if results in AHL/PHL 3+ to employee or stewardable contractor • Homicide (employee or stewardable contractor) • Kidnapping: actual kidnapping of employee or stewardable contractor • Public Disturbance/Activism: (directed against EM or interrupts company operations) cost ≥ $100K USD • Robbery: (taking of company property with use of force, threat or violence): AHL/PHL 3+ or EM cost ≥ $100K USD • Sabotage: (action intended to adversely affect normal operations) if involved company property and EM cost ≥ $100K USD or AHL/PHL 3+ or IRAT 400+ • Theft: (taking of company property without permission): EM cost ≥ $100K USD • Threat: (verbal, written or physical expression of intent to inflict injury or damage): PHL 3+ • Vandalism: (acts intended to damage or destroy company property): EM cost ≥ $100K USD or AHL/PHL 3+ or IRAT 400+	• Oil Spills: if oil released to environment is ≥ 1 bbl • Chemical Spills: if chemical released to environment is ≥ 1 bbl • Chemical or light hydrocarbon releases to air: if (1) ≥ 2 tonnes of chemical or light hydrocarbon released per any 24-hour period OR (2) release results in a site request that public protective measures be taken • Failure to meet numeric environmental protection limits (e.g. exceeding discharge permit limit) • Fines/Penalties > $2 Million USD
(reference IIHL Part III)		
• Fire/Explosion (if related to process safety)		
(reference IIHL Part IV)		
• Property Damage: if EM cost ≥ $5M USD		

SAFETY – Not Corporate Recordable	SECURITY – Not Corporate Recordable	ENVIRONMENTAL – Not Corporate Reportable
(reference IIHL Part I or PVMG)	**(reference IIHL Part II)**	**(reference EPI Manual)**
• First Aid Injury/Illness • No Treatment Injury/Illness • Fire/Explosion (if not related to process safety) • Motor Vehicle Accidents (MVA) (unless results meet other corporate recordable/reportable requirements)	• Arson: if EM cost < $100K USD • Assault: if results in AHL/PHL 1-2 to employee or stewardable contractor • Kidnapping: attempt kidnapping of employee or stewardable contractor • Public Disturbance/Activism: (directed against EM or interrupts company operations) if EM cost < $100K USD • Robbery: (taking of company property with use of force, threat or violence): AHL/PHL 1-2 or if EM cost < $100k USD • Sabotage: if EM cost < $100K USD or AHL/PHL 1-2 or IRAT < 400+ • Theft: if EM cost < $100K USD • Trespassing: (Unauthorized access to Company property for the purpose of committing a crime against person or property) w/wo criminal intent • Vandalism: if EM cost < $100K USD or AHL/PHL 1-2 or IRAT < 400+	• Oil Spills: if oil released to environment is < 1 bbl • Chemical Spills: if chemical released to environment is < 1 bbl • Chemical or light hydrocarbon releases to air: if (1) < 2 tonnes of chemical or light hydrocarbon released per any 24-hour period OR (2) release does not result in a site request that public protective measures be taken • Fines/Penalties > $100K USD
(reference IIHL Part IV)		
• Property Damage: if EM cost < $5M USD		

EMES LOSS REPORT FORM

IMPACT Incident ID: _____(include after ID number assigned in IMPACT)

IMPORTANT: Do not include any personal non-work related medical information on this form

☐ Final Report Date (Target <15 days) (MM/DD/YYYY):

PART 1: ADMINISTRATIVE INFORMATION

Project ID Number/Name:

Country:	**State/Province:**	**City:**	**Project Site Name:**

EXECUTION:			**RETAIL ASSET MANAGEMENT:**	
EUROPE/AP:	***CANADA:***	***US:***	1. ☐ Europe	1. ☐ Development
1. ☐ EAME Central	1. ☐ Upstream & Demolition	1. ☐ Mid-Atlantic	2. ☐ Asia/Pacific	
2. ☐ EAME North/South	2. ☐ Downstream	2. ☐ North		
3. ☐ Asia/Pacific		3. ☐ South		
		4. ☐ West		
		5. ☐ Americas South		

PART 2: LOSS DETAILS

LOSS TYPE - What happened? - Select all that apply (1–7).
For each loss type selected, this Word document will automatically add the required consequence fields to be completed on the last pages.

☐ 1. Fire/Explosion ☐ 3. Security (e.g. theft, trespassing, vandalism) ☐ 5. Transportation of Personnel (vehicle accident) ☐ 7. Business Interruption
☐ 2. Injury/Illness ☐ 4. Environmental (spill, permit exceedance, etc.) ☐ 6. Property/Equipment Damage

Injury/Illness Classification: ☐ Fatality ☐ Lost Time ☐ Restricted Work ☐ Medical Treatment ☐ First Aid ☐ No Treatment

Location: ☐ 1. GREF Managed ☐ 2. Business Line Managed ☐ 3. Third Party/Public Road **Specific Location** (at site):

Date Occurred (MM/DD/YYYY)**:**	**Time Occurred** (hour : minute, AM or PM)**:**
Date Reported (MM/DD/YYYY)**:**	**Time Reported** (hour : minute, AM or PM)**:**

EMES Regional Manager:	**EMES Area Manager:**	**EMES Project Manager:**

WHAT HAPPENED? Provide brief description of the incident. Provide facts only, no speculation or opinion. Do not include individuals' or company names.
(NOTE: For IMPACT entry, this information must be in English.)

Summary (1–2 sentences)**:**

Incident Details (Brief factual details of what, where, when)

Photos, Sketches, etc.: Ensure photos, sketches, etc. are not personally identifiable unless written consent has been obtained:

Immediate Corrective Actions Taken (including description of any treatment provided)**:**

LOSS INVOLVED:

EM Employee: ☐ **1. Yes** ☐ **2. No**	**Was a post-incident alcohol or drug test conducted?** ☐ **Yes** ☐ **No** ☐ **N/A**	**SHORT SERVICE WORKER:** ☐ Yes ☐ No

Contractor Company Name:	**Subcontractor Company Name:**

EVENT LEADING TO INJURY/ILLNESS – Select the most appropriate one

Choose an item.	**Other (Please describe)**	Click here to enter text.

WITNESSES DIRECTLY INVOLVED IN INCIDENT (where applicable, obtain consent using GREF template prior to including names/information):

Name	**Address/Company**	**Phone Number**

JOB TASK - Select the most appropriate one (primary job associated with incident-related work activity, avoid "Other" if possible)

☐ 1. Asbestos/Lead Work
☐ 2. Cleaning/Housekeeping
☐ 3. Construction/Installation
☐ 4. Crane Operations/Rigging/Lifting
☐ 5. Demolition/Removal
☐ 6. Drilling/Workover/Workline
☐ 7. Earthmoving/Excavation/Trenching/Backfill
☐ 8. Energy Isolation/Control
☐ 9. Gauging/Sampling
☐ 10. Vegetation Control/Landscaping
☐ 11. Loading/Unloading
☐ 12. Mobile Rem/Vac Event
☐ 13. O&M (Remediation System)
☐ 14. Subsurface Clearance
☐ 15. Surveying
☐ 16. Walking/Moving Between Locations
☐ 17. Other (specify): Click here to enter text.

Hurt Level (If Loss has Injury/Illness Component): If actual hurt level 2+ or potential hurt level final 3+ complete investigation with your SSHE Advisor

Did an actual hurt occur? ☐ **Yes** ☐ **No** **What is the actual hurt level? (0-5):** **What is the potential hurt level final? (0-5):**
Effective Barriers:

Ineffective Barriers:

Event Leading to (Potential) Hurt

- ☐ 1. Breaking Containment / Releases
- ☐ 2. Confined Space Entry
- ☐ 3. Energy Isolation
- ☐ 4. Equipment / Material Failure
- ☐ 5. Excavation
- ☐ 6. Lifting & Hoisting – Dropped Object
- ☐ 7. Lifting & Hoisting – Uncontrolled Movement
- ☐ 8. Manual Handling
- ☐ 9. Slips, Trips, and Falls
- ☐ 10. Transportation
- ☐ 11. Working at Height – Dropped Object
- ☐ 12. Working at Height – Fall Exposure
- ☐ 13. Working near Moving Equipment
- ☐ 14. Working with Tools
- ☐ 15. **Other (specify):** Click here to enter text.

Examples of hurt levels include: Level 0 – Object removed by flushing, general soreness, slips with no bruising/swelling; Level 1 – Minor cuts/bruises/sprains/strains, Mild hearing loss/corneal abrasions; Level 2 – Bone fractures, significant laceration, moderate hearing/vision loss; Level 3 – Amputation/severe disfigurement, total loss of organ/vision/hearing; Level 4 – Single fatality; Level 5 – Multiple fatality

Examples of Effective Barriers: Exclusion zones, heavy equipment spotters, fall protection equipment, gas testing confined space entry / retrieval equipment, locks and tags for LO/TO, excavation sloping inspections by competent person, equipment guards, salt and sand for icy conditions, PPE

Life Saving Action:

Is this a Violation of the Life Saving Actions? ☐ **Yes** ☐ **No** **What Violation?** Choose an item. **What action was taken at the site?** Choose an item.

PART 3: LOSS INVESTIGATION FINDINGS AND REPORT QUALITY REVIEW

SSHE Advisor must be included in investigation for potential hurt level (PHL) 3+ or actual hurt level (AHL) 2+

Date investigation started (MM/DD/YYYY):

Factors, Root Causes, and Solution (FRCS): Complete FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs) occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form. Attach your completed FRCS Worksheet. If Factors 1-7 do not apply to the incident, write "External Cause" in the Factor column below and leave the remaining fields blank.

DESCRIPTION OF UNDESIRABLE BEHAVIOR/CONDITION
(Questionable Item Equivalent)

1.

2.

FACTOR(S) AND SOLUTION(S): HOW TO REDUCE POSSIBILITY OF INCIDENT RECURRING
Selection of factors and solutions reflects the analysis of investigation team and is not meant to be a legally binding conclusion as to the Root Cause and/or solution.

Behavior/ Condition #	Factor # (1/line)	Related OIMS System # (Corporate Recordable & PHL3+)	Solution(s) (must match Factors) (For IMPACT entry, solutions must be in English.)	Name of Person Responsible for Completion	Completion Target Date (MM/DD/YYYY)	Completion Actual Date (MM/DD/YYYY)	V&V Date (MM/DD/YYYY)

INVESTIGATION TEAM	QUALITY REVIEWER(S)
Job Title	**Job Title**

VERIFICATION AND VALIDATION (V&V) COMMENTS
Describe how the solution was verified and validated at the workplace.

1. V&V #	2. Job Title	3. Comments

EMES LOSS REPORT FORM

IMPACT Incident ID: ___(include after ID number assigned in IMPACT)

IMPORTANT: Do not include any personal non-work related medical information on this form

☐ Final Report Date (Target <15 days) (MM/DD/YYYY):

LOSS CONSEQUENCE DETAILS

The following sections serve to document the actual consequences of a Loss Incident and should be completed only after loss consequences have been identified and finalized and any investigation(s), including any governmental investigation(s), have been completed. Consult with the ExxonMobil Law Department as needed and include this form with the final Loss Report.

FIRE OR EXPLOSION CONSEQUENCE

Third Party (non-contractor) involved in incident: ☐ Yes ☐ No | **Explosion:** ☐ Yes ☐ No

IGNITION SOURCE - Select all that apply

☐ Arson	☐ Compression Ignition	☐ Friction Overheating	☐ Open Flame (Furnace, etc.)	☐ Spread from Outside Sources
☐ Auto Ignition	☐ Electrical Equipment	☐ Friction Spark	☐ Other Overheating	☐ Static
☐ Blasting	☐ Engine	☐ Hot Line or Equipment	☐ Sabotage	☐ Unknown
☐ Chemical Reaction	☐ Explosion	☐ Lightning	☐ Smoking	☐ Vandalism
☐ Collision, Traffic Accident	☐ Fire	☐ Match, Cigarette Lighter (not smoking)	☐ Spontaneous Ignition/Pyrophorics	☐ Welding, Cutting, Brazing

Description:

FINANCIAL COST

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate):	**Actual Incident Cost (in U.S. Dollars):**
Date:	**Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

☐ Fines/Penalties	☐ Replacement/Repair	☐ Response-Other
☐ Replacement of Cargo, Stock, Material	☐ Response-Containment/Clean-Up	☐ Other Direct Costs

INJURY OR ILLNESS CONSEQUENCE

Injury/Illness Recordability ☐ Non-Recordable ☐ Recordable ☐ Off the Job

Third Party (non-contractor) involved in incident: ☐ Yes ☐ No | **Regulatory Agency Reportable:** ☐ Yes ☐ No

Patient's Employer

Reassignment ☐ No reassignment ☐ Temporarily reassigned ☐ Permanently reassigned

Describe Injury/Illness. Include treatment and any licensed health care professional instructions or work restrictions. Provide facts only, no speculation or opinion.

☐ **Treatment required** | **Treatment Date** (MM/DD/YYYY)**:** | **Treatment Time** (hour : minute, AM or PM)**:**

Treatment Location: ☐Self Treatment ☐On-Site First Responder ☐On-Site Nurse ☐On-Site Doctor ☐Off-Site Doctor ☐Emergency Room

FIRST AID TREATMENT PROVIDED - Select all that apply

- ☐ NONE
- ☐ Administrating tetanus immunization
- ☐ Any non-rigid means of support (e.g., wraps)
- ☐ Cleaning/flushing/soaking wounds on skin surface
- ☐ Drilling fingernail/toenail (to relieve pressure) or draining fluid from blister
- ☐ Drinking fluids for relief of heat stress
- ☐ Massages (not physical therapy/chiropractic treatment)
- ☐ Non-prescription medication at non-prescription strength
- ☐ Removing foreign bodies from eye by irrigation or cotton swab
- ☐ Removing splinters or foreign material from areas other than eye by simple means (e.g., tweezers)
- ☐ Using wound coverings (e.g., bandages, gauze pads), butterfly bandages or steri-strips
- ☐ Using eye patches
- ☐ Using finger guards
- ☐ Using hot or cold therapy (e.g., compresses)
- ☐ Using temporary immobilization devices during transport

INJURY/ILLNESS TYPE - Select all that apply

- ☐ Airborne Diseases (Flu, TB)
- ☐ Amputation, Avulsion
- ☐ Bruise, Contusion
- ☐ Burn - Chemical
- ☐ Burn - Thermal or Electrical
- ☐ Concussion, Unconscious
- ☐ Crush
- ☐ Cut/Scrape/Puncture
- ☐ Diarrheal Diseases
- ☐ Dislocate
- ☐ Dust Disease of the Lung
- ☐ Exposure to Blood/Infectious Materials
- ☐ Food Poisoning
- ☐ Foreign Object in Eye
- ☐ Fracture
- ☐ Hernia, Rupture
- ☐ Heat Stress, Exhaustion, Sunstroke
- ☐ Hypothermia
- ☐ Irritation
- ☐ Needle Stick
- ☐ Poisoning - Acute
- ☐ Sprain, Strain
- ☐ Sting, Bite
- ☐ Physical Agents-Radiation, etc.
- ☐ Repeat Trauma-Carpal Tunnel Syndrome
- ☐ Repeat Trauma-Other Disorder
- ☐ Respiratory-Toxic Agents
- ☐ Skin Disease or Disorder
- ☐ Unknown, Uncertain
- ☐ Other:

BODY PART AFFECTED - Select all that apply

- ☐ Arm-Elbow
- ☐ Arm-Forearm
- ☐ Arm-Upper Arm
- ☐ Central Nervous
- ☐ Circulatory/Blood
- ☐ Foot-Ankle
- ☐ Foot-Toes
- ☐ Foot-Top/Bottom
- ☐ Hand-Fingers
- ☐ Hand-Palm/Top
- ☐ Hand-Wrist
- ☐ Head-Ear
- ☐ Head-Face
- ☐ Head-Jaw
- ☐ Head-Neck
- ☐ Head-Nose
- ☐ Head-Scalp
- ☐ Head-Skull
- ☐ Head-Tongue
- ☐ Head-Tooth/Teeth
- ☐ Leg-Calf/Shin
- ☐ Leg-Knee
- ☐ Leg-Thigh
- ☐ Respiratory
- ☐ Torso-Abdomen/Groin
- ☐ Torso-Back/Spine
- ☐ Torso-Chest
- ☐ Torso-Hip
- ☐ Torso-Internal Organs
- ☐ Torso-Ribs
- ☐ Torso-Shoulder
- ☐ Urinary
- ☐ Other:

BODY POSITION AFFECTED: ☐ Anterior ☐ Bilateral ☐ Lateral ☐ Left ☐ Medial ☐ Non-Applicable ☐ Posterior ☐ Right ☐ Unknown

OBJECT THAT CAUSED INJURY/ILLNESS:

EVENT LEADING TO INJURY/ILLNESS - Select the most appropriate one

Body Position/Force:
1. ☐ Line of Fire
2. ☐ Overexertion, Strain
3. ☐ Struck Against Object
4. ☐ Struck By Object
5. ☐ Personal Energy
6. ☐ Repetitive Strain Injury (RSI)
7. ☐ **Buried**
8. ☐ **Caught In, Under, Between**

Chemical Exposure:
9. ☐ Inhalation
10. ☐ Ingestion
11. ☐ Physical Contact

Contact By:
12. ☐ Animal, Insect, Plant
13. ☐ Blood/Potentially Infectious Materials
14. ☐ Electricity
15. ☐ Noise
16. ☐ Other Physical Agents
17. ☐ Radiation
18. ☐ Temperature Extremes
19. ☐ **Drowning**

Falls:
20. ☐ Fall, From Elevation
21. ☐ Fall, Same Level
22. ☐ Slip or Trip Without Fall
23. ☐ **Food Consumption**
24. ☐ Suffocate/Asphyxiate (Lack of Oxygen)
25. ☐ Transportation Incident
26. ☐ **Other** (describe)**:**

TIME INJURED/ILL PERSON ON JOB SITE: ☐ ≤3 months ☐ >3 months to <6 months ☐ ≥6 months to <1 year ☐ ≥1 to <3 years ☐ ≥3 years

LOST TIME or RESTRICTED WORK (as prescribed by a licensed health care professional)	**Start Date of Lost/Restricted Work** (MM/DD/YYYY)**:**	**Estimated Days Lost/Restricted:**	**Actual Days Lost/Restricted:**

SECURITY CONSEQUENCE

SECURITY CATEGORY

- ☐ Arson
- ☐ Assault (employee or stewardable contractor)
- ☐ Homicide (employee or stewardable contractor)
- ☐ Information Loss
- ☐ Kidnapping – Kidnapping (employee or stewardable contractor)
- ☐ Kidnapping – Express Kidnapping (employee or stewardable contractor)
- ☐ Kidnapping – For Ransom (employee or stewardable contractor)
- ☐ Public Disturbance – Public Disturbance
- ☐ Public Disturbance – Activism
- ☐ Robbery (taking of property with use of force, threat or violence)
- ☐ Sabotage (action intended to adversely affect normal operations)
- ☐ Surveillance (unauthorized observation of company personnel or assets)
- ☐ Theft – Theft (taking of property without permission)
- ☐ Theft – Burglary (Theft of company property involving forceful, unauthorized entry into a building or structure.)
- ☐ Threat (expression of intent to inflict injury or damage)
- ☐ Trespassing (unauthorized intrusion/invasion of company property)
- ☐ Vandalism (acts intended to damage or destroy property)

Reportability: ☐ Corporate Recordable ☐ BL Recordable ☐ Non-Stewardable

Security Event Details:

FINANCIAL COST

Include only direct cost to ExxonMobil per IIHL guide Part II

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate):	**Actual Incident Cost (in U.S. Dollars):**
Date:	**Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

- ☐ Fines/Penalties
- ☐ Replacement of Cargo, Stock, Material
- ☐ Replacement/Repair
- ☐ Response-Containment/Clean-Up
- ☐ Response-Other
- ☐ Other Direct Costs

ENVIRONMENTAL CONSEQUENCE

Date Discovered (MM/DD/YYYY)**:** **Time Discovered** (hour : minute, AM or PM)**:**

Regulatory Agency Reportable: ☐ Yes ☐ No

(If agency reportable, or potential for third party damage or claims, consult with EM Environmental & Safety Law prior to completing this section.)

CONSEQUENCE - Select the most appropriate one

- ☐ Corporate Reportable Environmental Compliance (e.g. exceedance of numerical limit in permit or consent order, fine/penalty ≥ $100K)
- ☐ Chemical/Light Hydrocarbon Spill
- ☐ Historical Soil/Groundwater Contamination
- ☐ Oil Spill
- ☐ Other Environmental Compliance

PRIMARY MEDIUM RELEASED TO - Select the most appropriate one

- ☐ Air
- ☐ Soil (includes rocks, gravel, snow, etc.)
- ☐ Other
- ☐ Subsurface/Groundwater
- ☐ Surface Water - Offshore
- ☐ Surface Water - Onshore

EVENT LEADING TO SPILL OR RELEASE - Select the most appropriate one

- ☐ Accidental Damage
- ☐ Adverse Weather
- ☐ Equipment Failure
- ☐ Fire/Explosion
- ☐ Fouling
- ☐ Frozen, Cold Temperature
- ☐ General Power Failure
- ☐ Improper installation/construction
- ☐ Inadequate/Lack of Maintenance
- ☐ Instrument/Control System Failure
- ☐ Leak - Line/Piping
- ☐ Leak - Other
- ☐ Leak - Tank
- ☐ Maintenance Error
- ☐ Malfunction
- ☐ Material or Welding Defect
- ☐ Natural Disaster
- ☐ No/Deficient Work Procedure
- ☐ Outside Operating Envelope
- ☐ Overfill/Overpressure
- ☐ Pipeline Failure
- ☐ Procedure - Failure to Follow
- ☐ Process Upset
- ☐ Startup/Shutdown
- ☐ Structural Deficiency/Damage
- ☐ Tank Failure
- ☐ Third Party Cause
- ☐ Transportation Accident
- ☐ Wear
- ☐ Other: _____

Name of Material/Chemical Released:	**Volume/Level Released including Units (e.g., barrels, gallons, kilograms, pounds, PPM, etc.):**

(U.S. Only) Number of EPA Reportable Quantities (RQs) associated with incident:

Excursion Count (instances of failure to meet numeric environmental protection limits, e.g., exceeding discharge permit limits):

FINANCIAL COST

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate):	**Actual Incident Cost (in U.S. Dollars):**
Date:	**Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

- ☐ Fines/Penalties
- ☐ Replacement of Cargo, Stock, Material
- ☐ Replacement/Repair
- ☐ Response-Containment/Clean-Up
- ☐ Response-Other
- ☐ Other Direct Costs

TRANSPORTATION OF PERSONNEL CONSEQUENCE
(passenger vehicle related)

COMPLETE THE FOLLOWING FOR THE GREF-RELATED VEHICLE (NOTE: U.S.-based operations and affiliates must also meet PVMG 6.1.3 ExxonMobil Risk Management Accident Reporting Procedures)

Transportation Note:

Primary Transportation Mode: ☐ Delivery Vehicle ☐ Non-Delivery Vehicle ☐ Passenger Vehicle

Accident Type - Select the most appropriate one

☐ Collision - Backing	☐ Engine Failure	☐ Hit and Run	☐ Side Impact
☐ Collision - General	☐ Explosion	☐ Mechanical	☐ Side-Swipe
☐ Collision - Head On	☐ Fire	☐ Object Fell On/Thrown	☐ Sinking
☐ Collision - Rear End	☐ Firearms/Shot At	☐ Properly Parked	☐ Stranding/Grounding
			☐ Other:_____

Route Condition - Select all that apply

☐ Curve and Downgrade	☐ Dry	☐ Oil/Chemical Covered	☐ Straight and Hillcrest
☐ Curve and Hillcrest	☐ Flooding	☐ Rutted/Washboard	☐ Straight and Level
☐ Curve and Level	☐ High Winds	☐ Snow/Slush	☐ Straight and Upgrade
☐ Curve and Upgrade	☐ Icy	☐ Straight and Downgrade	☐ Wet

VEHICLE INFORMATION

VEHICLE OWNERSHIP: ☐ Contractor-Spot ☐ Contractor-Term ☐ Company Vehicle ☐ Personal Vehicle ☐ Pool Car/Truck ☐ Rental

Vehicle Unit/Number (if applicable): **License Plate Number:** **Vehicle Type (e.g., car, truck, van):**

Performing Primary Duty?: ☐ Yes ☐ No **Driving Experience:** **Years** **Months**

FINANCIAL COST

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate): **Actual Incident Cost (in U.S. Dollars):**

Date: **Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

☐ Fines/Penalties	☐ Replacement/Repair	☐ Response-Other
☐ Replacement of Cargo, Stock, Material	☐ Response-Containment/Clean-Up	☐ Other Direct Costs

PROPERTY OR EQUIPMENT DAMAGE CONSEQUENCE

Owner of Damaged Property/Equipment: ☐ Company ☐ Contractor ☐ Local Community ☐ Personal ☐ Third Party

Description of Property/Equipment Damage:

FINANCIAL COST

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate): **Actual Incident Cost (in U.S. Dollars):**

Date: **Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

☐ Fines/Penalties	☐ Replacement/Repair	☐ Response-Other
☐ Replacement of Cargo, Stock, Material	☐ Response-Containment/Clean-Up	☐ Other Direct Costs

BUSINESS INTERRUPTION CONSEQUENCE

Description of Property/Equipment Damage:

Duration of Interruption: **Hours**

FINANCIAL COST

ExxonMobil Ownership % of Actual Cost (include "0" if appropriate): **Actual Incident Cost (in U.S. Dollars):**

Date: **Type:** ☐ Direct ☐ Indirect

INCIDENT COST CATEGORY - Select the most appropriate one

☐ Fines/Penalties	☐ Replacement/Repair	☐ Response-Other
☐ Replacement of Cargo, Stock, Material	☐ Response-Containment/Clean-Up	☐ Other Direct Costs

Factors, Root Causes, Solutions™ (FRCS)

List questionable item or NLI/LI equivalent of questionable item:

To determine root cause(s) of losses, near losses and questionable items & develop solutions to prevent recurrence, answer ALL of the following questions.

Factor 1
Is there adequate documentation explaining how to do this task? — if conscious decision not to have documentation, verify decision and continue to Factor 2.

YES

NO

Why doesn't adequate documentation exist for this task?
Identify root cause(s).

Solution(s): Explain who will develop procedure, JLA, or SWP for this task (who writes, reviews, & approves, due date, etc.).

Verify there is a procedure, JLA & any pertinent SWP for this task.

Factor 2
If tools are needed for task, are they available, operable, safely maintained & is there proper workplace design?

YES

NO

Why aren't tools available, operable, safely maintained and/or why isn't there proper workplace design?
Identify root cause(s).

Solution(s): Explain specifically how tools will be made available, operable, safely maintained for task (who makes available, due date, etc.) and/or how workplace design will be made proper (who is responsible, due date, etc.).

Have person explain specifically what tools/equipment are needed and how they are accessed.

Factor 3
Has your supervisor consistently told you to do this task, as well as ALL tasks, according to procedures or acceptable practices?

YES

NO

Why didn't this face-to-face communication occur consistently?
Identify root cause(s).

Solution(s): Explain how FLS will consistently communicate face-to-face with person to do this task, as well as ALL tasks, according to procedures or acceptable practices.

Have person give an example of how this face-to-face communication occurred/occurs consistently.

Factor
Are you familiar with task documentation & do you know how to do task according to documentation or acceptable practices?

YES

NO

Why doesn't person know how to do task according to documentation or acceptable practices?
Identify root cause(s).

Solution(s): Explain how person will be shown how to do task according to documentation or acceptable practices (who will show person, due date, etc.).

Have person verbalize how to do task according to documentation or acceptable practices.

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Revise

OR

Factors, Root Causes, Solutions™ (FRCS)

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Factor
Have you ever done this task before & not followed procedures or acceptable practices?

NO → **Factor 6**
Did you not follow procedures or acceptable practices because you have an easier, faster, or "better" way of doing this task?

NO → **Factor 7**
Has your FLS, Manager or peer observed you not following procedures or acceptable practices for this task & not said anything to you?

NO

YES → Did anything go wrong?

- NO → Root cause is: Person did not follow procedures or acceptable practices for this task on other occasions & there were no negative consequences.
  - What part of the procedure or acceptable practice was not followed?
  - Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way just because he/she did it in past & no incident occurred.
- YES → Root cause is: Person did not follow procedures or acceptable practices for this task on other occasions.
  - What part of the procedure or acceptable practice was not followed?
  - Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way.

YES → Root cause is: Person did not follow procedures or acceptable practices for this task because he/she has easier, faster or "better" way of doing task.
- What part of the procedure or acceptable practice was not followed?
- Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way just because he/she has an easier, faster, or "better" way to do task.

YES → Root cause is: FLS, Manager or peer observed person not following procedures or acceptable practices for this task & tolerated it.
- What part of the procedure or acceptable practice was not followed?
- Solution(s): Describe how SLM will show FLS how to build right workplace culture & send right message via effective — LPSA stewardship, V&V solutions, LPO feedback sessions & monthly LPS stewardship sessions.

EMES NEAR LOSS REPORT FORM

IMPACT Incident ID: _____(include after ID number assigned in IMPACT)

IMPORTANT: Do not include any personal non-work related medical information on this form

☐ Final Report Date (Target <15 days) (MM/DD/YYYY):

PART 1: ADMINISTRATIVE INFORMATION

Project ID Number/Name: LE3200763972

Country: USA	**State/Province:** New York	**City:** Brooklyn	**Project Site Name:** Brooklyn

EXECUTION:			**RETAIL ASSET MANAGEMENT:**	
EUROPE/AP:	***CANADA:***	***US:***	1. ☐ Europe	1. ☐ Development
1. ☐ EAME Central	1. ☐ Upstream & Demolition	1. ☐ Mid-Atlantic	2. ☐ Asia/Pacific	
2. ☐ EAME North/South	2. ☐ Downstream	2. ☒ North		
3. ☐ Asia/Pacific		3. ☐ South		
		4. ☐ West		
		5. ☐ Americas South		

PART 2: NEAR LOSS DETAILS

Near Loss Type: What could have happened? Select all that apply (1-7).

☐ 1. Fire/Explosion ☐ 3. Environmental (spill, permit exceedance, etc.) ☐ 5. Property/Equipment Damage ☐ 7. Averted Security Incident
☐ 2. Injury/Illness ☐ 4. Transportation of Personnel (vehicle accident) ☐ 6. Business Interruption ☐ 8. Security Findings

Location: ☐ 1. GREF Managed ☐ 2. Business Line Managed ☐ 3. Third Party/Public Road	**Specific Location** (at site):
Date Occurred (MM/DD/YYYY):	**Time Occurred** (hour : minute, AM or PM):
Date Reported (MM/DD/YYYY):	**Time Reported** (hour : minute, AM or PM:

EMES Regional Manager:	**EMES Area Manager:**	**EMES Project Manager:**

WHAT HAPPENED? Provide brief description of the incident. Provide facts only, no speculation or opinion. Do not include individuals' or company names.
NOTE: For IMPACT entry, this information must be in English.

Summary (1–2 sentences)**:**

Incident Details (Brief factual details of what, where, when)

Photos, Sketches, etc.: Ensure photos, sketches, etc. are not personally identifiable unless written consent has been obtained.**:**

Immediate Corrective Actions Taken (including description of any treatment provided)**:**

JOB TASK - Select the most appropriate one (primary job associated with incident-related work activity, avoid "Not in List" if possible)

☐ 1. Asbestos/Lead Work	☐ 5. Demolition/Removal	☐ 9. Gauging/Sampling	☐ 13. O&M (Remediation System)
☐ 2. Cleaning/Housekeeping	☐ 6. Drilling/Workover/Workline	☐ 10. Vegetation Control/Landscaping	☐ 14. Subsurface Clearance
☐ 3. Construction/Installation	☐ 7. Earthmoving/Excavation/Trenching/Backfill	☐ 11. Loading/Unloading	☐ 15. Surveying
☐ 4. Crane Operations/Rigging/Lifting	☐ 8. Energy Isolation/Control	☐ 12. Mobile Rem/Vac Event	☐ 16. Walking/Moving Between Locations
			☐ 17. Other (specify):

EVENT LEADING TO INJURY/ILLNESS – Select the most appropriate one

Other (Please describe to right)	**Other (Please describe)** Click here to enter text.

NEAR LOSS INVOLVED:

EM Employee: ☐ Yes ☐ No	**Was a post-incident alcohol or drug test conducted?** ☐ Yes ☐ No ☐ N/A	**SHORT SERVICE WORKER:** ☐ Yes ☐ No
Contractor Company Name:		**Subcontractor Company Name:**

Hurt Level (If Near Loss has Injury/Illness Component):

What is the potential hurt level final? (0-5):
Effective Barriers:

Ineffective Barriers:

Event Leading to (Potential) Hurt for PHL3+:

- ☐ 1. Breaking Containment / Releases
- ☐ 2. Confined Space Entry
- ☐ 3. Energy Isolation
- ☐ 4. Equipment / Material Failure
- ☐ 5. Excavation
- ☐ 6. Lifting & Hoisting – Dropped Object
- ☐ 7. Lifting & Hoisting – Uncontrolled Movement
- ☐ 8. Manual Handling
- ☐ 9. Slips, Trips, and Falls
- ☐ 10. Transportation
- ☐ 11. Working at Height – Dropped Object
- ☐ 12. Working at Height – Fall Exposure
- ☐ 13. Working Near Moving Equipment
- ☐ 14. Working with Tools
- ☐ 15. **Other (specify):** Click here to enter text.

If potential hurt level final 3+ complete Part 3 with your SSHE Advisor

Examples of hurt levels include: Level 0 – Object removed by flushing, general soreness, slips with no bruising/swelling; Level 1 – Minor cuts/bruises/sprains/strains, Mild hearing loss/corneal abrasions; Level 2 – Bone fractures, significant laceration, moderate hearing/vision loss; Level 3 – Amputation/severe disfigurement, total loss of organ/vision/hearing; Level 4 – Single fatality; Level 5 – Multiple fatality

Examples of Effective Barriers: Exclusion zones, heavy equipment spotters, fall protection equipment, gas testing confined space entry / retrieval equipment, locks and tags for LO/TO, excavation sloping inspections by competent person, equipment guards, salt and sand for icy conditions, PPE

Life Saving Action:

Is this a Violation of the Life Saving Actions? ☐ **Yes** ☐ **No** **What Violation?** Choose an item. **What action was taken at the site?** Choose an item.

PART 3: NEAR LOSS INVESTIGATION FINDINGS AND REPORT QUALITY REVIEW

Date investigation started (MM/DD/YYYY):

Factors, Root Causes, and Solution (FRCS): Complete FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs) occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form. Attach your completed FRCS Worksheet. If Factors 1-7 do not apply to the incident, write "External Cause" in the Factor column below and leave the remaining fields blank.

DESCRIPTION OF UNDESIRABLE BEHAVIOR/CONDITION
(Questionable Item Equivalent)

1.

2.

FACTOR(S) AND SOLUTION(S): HOW TO REDUCE POSSIBILITY OF INCIDENT RECURRING
Selection of factors and solutions reflects the analysis of investigation team and is not meant to be a legally binding conclusion as to the Root Cause and/or solution.

Behavior/ Condition#	**Factor #** (1/line)	**Related OIMS System #** (Corporate Recordable & PHL3+)	**Solution(s)** (must match Factor #) **(For IMPACT entry, solutions must be in English.)**	**Name of Person Responsible for Completion**	**Completion Target Date (MM/DD/YYYY)**	**Completion Actual Date (MM/DD/YYYY)**	**V&V Date (MM/DD/YYYY)**

INVESTIGATION TEAM	**QUALITY REVIEWER(S)**
Job Title	**Job Title**

VERIFICATION AND VALIDATION (V&V) COMMENTS
Describe how the solution was verified and validated at the workplace.

1. V&V #	**2. Job Title**	**3. Comments**

Factors, Root Causes, Solutions™ (FRCS)

List questionable item or NLI/LI equivalent of questionable item:

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Factor 1
Is there adequate documentation explaining how to do this task? — if conscious decision not to have documentation, verify decision and continue to Factor 2.

YES

NO

Why doesn't adequate documentation exist for this task?
Identify root cause(s).

Solution(s): Explain who will develop procedure, JLA, or SWP for this task (who writes, reviews, & approves, due date, etc.).

Verify there is a procedure, JLA & any pertinent SWP for this task.

Factor 2
If tools are needed for task, are they available, operable, safely maintained & is there proper workplace design?

YES

NO

Why aren't tools available, operable, safely maintained and/or why isn't there proper workplace design?
Identify root cause(s).

Solution(s): Explain specifically how tools will be made available, operable, safely maintained for task (who makes available, due date, etc.) and/or how workplace design will be made proper (who is responsible, due date, etc.).

Have person explain specifically what tools/equipment are needed and how they are accessed.

Factor 3
Has your supervisor consistently told you to do this task, as well as ALL tasks, according to procedures or acceptable practices?

YES

NO

Why didn't this face-to-face communication occur consistently?
Identify root cause(s).

Solution(s): Explain how FLS will consistently communicate face-to-face with person to do this task, as well as ALL tasks, according to procedures or acceptable practices.

Have person give an example of how this face-to-face communication occurred/occurs consistently.

Factor
Are you familiar with task documentation & do you know how to do task according to documentation or acceptable practices?

YES

NO

Why doesn't person know how to do task according to documentation or acceptable practices?
Identify root cause(s).

Solution(s): Explain how person will be shown how to do task according to documentation or acceptable practices (who will show person, due date, etc.).

Have person verbalize how to do task according to documentation or acceptable practices.

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Continue to Factor 2.

Continue to Factor 3.

Continue to Factor 4.

Continue to Factor 5 on next page.

Factors, Root Causes, Solutions™ (FRCS)

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Factor
Have you ever done this task before & not followed procedures or acceptable practices?

NO → **Factor 6**
Did you not follow procedures or acceptable practices because you have an easier, faster, or "better" way of doing this task?

NO → **Factor 7**
Has your FLS, Manager or peer observed you not following procedures or acceptable practices for this task & not said anything to you?

NO

YES

Did anything go wrong?

NO

Root cause is: Person did not follow procedures or acceptable practices for this task on other occasions & there were no negative consequences.

What part of the procedure or acceptable practice was not followed?

Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way just because he/she did it in past & no incident occurred.

YES

Root cause is: Person did not follow procedures or acceptable practices for this task on other occasions.

What part of the procedure or acceptable practice was not followed?

Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way.

YES

Root cause is: Person did not follow procedures or acceptable practices for this task because he/she has easier, faster or "better" way of doing task.

What part of the procedure or acceptable practice was not followed?

Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way just because he/she has an easier, faster, or "better" way to do task.

YES

Root cause is: FLS, Manager or peer observed person not following procedures or acceptable practices for this task & tolerated it.

What part of the procedure or acceptable practice was not followed?

Solution(s): Describe how SLM will show FLS how to build right workplace culture & send right message via effective — LPSA stewardship, V&V solutions, LPO feedback sessions & monthly LPS stewardship sessions.

Continue to Factor 6. **Continue to Factor 6.** **Continue to Factor 7.**

Send completed LPO form to:
global-remediation-IMPACT@exxonmobil.com

EMES Field
LOSS PREVENTION OBSERVATION (LPO) FORM

LPS

1. FACILITY/PROJECT SITE NAME:	2. CITY/STATE/COUNTRY:	3. OBSERVATION DATE (MM/DD/YY):	4. OBSERVATION TIME: 1. ☐ AM 2. ☐ PM	5. CLASSIFICATION: 1. ☐ Peer to Peer 2. ☐ Supervisor to Job Expert

6. OBSERVER'S NAME:	7. OBSERVER'S TITLE:	8. OBSERVER'S COMPANY:
9. OBSERVEE'S TITLE:	**10. OBSERVEE'S COMPANY:**	**11. NAME of EMES Project Manager/cPM:**

EXECUTION:			RETAIL ASSET MANAGEMENT:	
EUROPE/AP:	***CANADA:***	***US:***		
1. ☐ EAME Central	1. ☐ Upstream & Demolition	1. ☐ Mid-Atlantic	1. ☐ Europe	1. ☐ Development
2. ☐ EAME North/South	2. ☐ Downstream	2. ☐ North	2. ☐ Asia/Pacific	
3. ☐ Asia/Pacific		3. ☐ South		
		4. ☐ West		
		5. ☐ Americas South		

JOB TASK OBSERVED - Select the most appropriate one (primary job associated with activity observed, avoid "Other" if possible)

☐ 1. Asbestos/Lead Work	☐ 5. Demolition/Removal	☐ 9. Gauging/Sampling	☐ 13. O&M (Remediation System)
☐ 2. Cleaning/Housekeeping	☐ 6. Drilling/Workover/Workline	☐ 10. Vegetation Control/Landscaping	☐ 14. Subsurface Clearance
☐ 3. Construction/Installation	☐ 7. Earthmoving/Excavation/Trenching/Backfill	☐ 11. Loading/Unloading	☐ 15. Surveying
☐ 4. Crane Operations/Rigging/ Lifting	☐ 8. Energy Isolation/Control	☐ 12. Mobile Rem/Vac Event	☐ 16. Walking/Moving Between Locations
			☐ 17. Other (specify):

Brief Description of Task Observed and Work Area Conditions (e.g., weather, traffic, confining, etc.)

Positive Comments
(provide five or six specific examples of the most significant correct behaviors/conditions observed)

Feedback Session
(facilitated by the direct supervisor at the work location on the same day as the LPO)

1. Feedback Session Conducted By:	2. Observee's Supervisor:	3. Feedback Session Date (MM/DD/YYYY):	4. Feedback Session Time (hour : minute, AM or PM):

Solution(s) Developed with FRCS
Complete and attach FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form.

1. CHECKLIST LINE #	2. FACTOR #	3. SOLUTION(S) (must match Factor)	4. NAME OF PERSON RESPONSIBLE	5. Target Completion Date (MM/DD/YYYY)	6. Actual Completion Date (MM/DD/YYYY)	7. V&V Date (MM/DD/YYYY)

8. Supervisor Quality Check:	9. Title/ Company:	10. Date:

V&V Comments (**Verification**: Have solutions been implemented? **Validation**: Have solutions been effective?)
(describe how the solution was verified and validated at the workplace/verification and validation of tool solutions takes place at the same time)

1. V&V #	2. Job Title	3. Comments

Send completed LPO form to:
global-remediation-IMPACT@exxonmobil.com

EMES Field
LOSS PREVENTION OBSERVATION (LPO) FORM

LPS

PERSONAL PROTECTIVE EQUIPMENT (IMPACT # in parenthesis)	CORRECT (Write number of times line item observed as performed/addressed in accordance with safe work standards)	QUESTIONABLE	COMMENTS (Write comments for all Questionable Items, significant Correct actions and "Other)
1. (00101) Hearing protection (e.g., ear plugs, ear muffs)			
2. (00102) Head protection (e.g., hard hat)			
3. (00103) Eye/face protection (e.g., safety glasses, face shield)			
4. (00104) Hand protection			
5. (00105) Foot protection			
6. (00107) Respiratory protection			
7. (00108) Fall protection (e.g., full body harness/lanyard/lifeline)			
8. (00106) Protective Clothing (e.g. safety vest, high visibility/ fire-retardant clothing, rain/slicker suit)			
9. (00114) Other (Specify):			
BODY USE & POSITIONING	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
10. (00201) Correct when lifting, pushing, pulling, reaching or bending			
11. (00203) Around pinch/scrape point-sharp objects and moving equipment (line-of-fire?)			
12. (00204) When mounting/dismounting (e.g., uses 3-point stance)			
13. (00215) Other; Specify:			
WORK ENVIRONMENT	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
14. (00331) Work/walk surface free of trip/fall obstructions and slip hazards			
15. (00306) Housekeeping/storage (e.g., of tools and equipment)			
16. (00307) Work area defined and secured (e.g., warning devices, barricades, cones, flags)			
17. (00311) Safety Shutdown devices (e.g., available, identified, tested?)			
18. (01701) Storage and disposal of sample and waste materials			
19. (00327) Other; Specify:			
OPERATING PROCEDURES- GENERAL	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
20. (00401) LPSA/job plan/pre-job inspect			
21. (00409) Work permit/authorization to work (e.g. hot/cold work, LOTO, confined space entry, excavation)			
22. (00414) JLA/procedures followed			
23. (00416) Checks area for hazards			
24. (00420) Interfaces with other functions (awareness of other activities/personnel on site)			
25. (00454) Subsurface structures identified			
26. (00456) Other; Specify:			
TOOLS/EQUIPMENT	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
27. (01505) Hand Tool Selection, Condition & Use			
28. (01506) Power Tool Selection, Condition & Use			
29. (01507) Equipment Selection, Condition & Use			
30. (01555) Other; Specify:			
TOTAL	[illegible]	[illegible]	**% CORRECT/SAFE :** [illegible] / [(TOTAL CORRECT ÷ (TOTAL CORRECT + TOTAL QUESTIONABLE) × 100]

Factors, Root Causes, Solutions™ (FRCS)

List questionable item or NLI/LI equivalent of questionable item:

Loss Prevention System™
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To determine root cause(s) of losses, near losses and questionable items & develop solutions to prevent recurrence, answer ALL of the following questions.

Factor 1
Is there adequate documentation explaining how to do this task? — if conscious decision not to have documentation, verify decision and continue to Factor 2.

YES → Verify there is a procedure, JLA & any pertinent SWP for this task.

NO → Why doesn't adequate documentation exist for this task?
Identify root cause(s).

Solution(s): Explain who will develop procedure, JLA, or SWP for this task (who writes, reviews, & approves, due date, etc.).

Factor 2
If tools are needed for task, are they available, operable, safely maintained & is there proper workplace design?

YES → Have person explain specifically what tools/equipment are needed and how they are accessed.

NO → Why aren't tools available, operable, safely maintained and/or why isn't there proper workplace design?
Identify root cause(s).

Solution(s): Explain specifically how tools will be made available, operable, safely maintained for task (who makes available, due date, etc.) and/or how workplace design will be made proper (who is responsible, due date, etc.).

Factor 3
Has your supervisor consistently told you to do this task, as well as ALL tasks, according to procedures or acceptable practices?

YES → Have person give an example of how this face-to-face communication occurred/occurs consistently.

NO → Why didn't this face-to-face communication occur consistently?
Identify root cause(s).

Solution(s): Explain how FLS will consistently communicate face-to-face with person to do this task, as well as ALL tasks, according to procedures or acceptable practices.

Factor 4
Are you familiar with task documentation & do you know how to do task according to documentation or acceptable practices?

YES → Have person verbalize how to do task according to documentation or acceptable practices.

NO → Why doesn't person know how to do task according to documentation or acceptable practices?
Identify root cause(s).

Solution(s): Explain how person will be shown how to do task according to documentation or acceptable practices (who will show person, due date, etc.).

Continue to Factor 2. **Continue to Factor 3.** **Continue to Factor 4.** **Continue to Factor 5 on next page.**

Factors, Root Causes, Solutions™ (FRCS)

Loss Prevention System™
An integrated process to maximize business performance

Factor 5
Have you ever done this task before & not followed procedures or acceptable practices?

NO → **Factor 6**
Did you not follow procedures or acceptable practices because you have an easier, faster, or "better" way of doing this task?

NO → **Factor 7**
Has your FLS, Manager or peer observed you not following procedures or acceptable practices for this task & not said anything to you?

NO

YES

Did anything go wrong?

NO

Root cause is: Person did not follow procedures or acceptable practices for this task on other occasions & there were no negative consequences.

What part of the procedure or acceptable practice was not followed?

Solution(s): Write down what person said would happen (what consequences would be) if he/she continues to perform task this way just because he/she did it in past & no incident occurred.

Continue to Factor 6.

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Continue to Factor 6.

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What part of the procedure or acceptable practice was not followed?

Solution(s): Describe how SLM will show FLS how to build right workplace culture & send right message via effective — LPSA stewardship, V&V solutions, LPO feedback sessions & monthly LPS stewardship sessions.

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NO → Why aren't tools available, operable, safely maintained and/or why isn't there proper workplace design?
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Factor 3
Has your supervisor consistently told you to do this task, as well as ALL tasks, according to procedures or acceptable practices?

YES → Have person give an example of how this face-to-face communication occurred/occurs consistently.

NO → Why didn't this face-to-face communication occur consistently?
Identify root cause(s).

Solution(s): Explain how FLS will consistently communicate face-to-face with person to do this task, as well as ALL tasks, according to procedures or acceptable practices.

Factor 4
Are you familiar with task documentation & do you know how to do task according to documentation or acceptable practices?

YES → Have person verbalize how to do task according to documentation or acceptable practices.

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Did anything go wrong?

NO

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Send completed LPO form to:
global-remediation-IMPACT@exxonmobil.com

EMES Driving Light Vehicle (Passenger/Service)
LOSS PREVENTION OBSERVATION (LPO) FORM

LPS

1. FACILITY/PROJECT SITE NAME:	2. CITY/STATE/COUNTRY:	3. OBSERVATION DATE (MM/DD/YY):	4. OBSERVATION TIME: 1.☐AM 2.☐PM	5. CLASSIFICATION: 1.☐ Peer to Peer 2.☐ Supervisor to Job Expert

6. OBSERVER'S NAME:	7. OBSERVER'S TITLE:	8. OBSERVER'S COMPANY:

9. OBSERVEE'S TITLE:	10. OBSERVEE'S COMPANY:	11. NAME of EMES Project Manager/cPM:

EXECUTION:			RETAIL ASSET MANAGEMENT:	
EUROPE/AP:	***CANADA:***	***US:***		
1. ☐ EAME Central	1. ☐ Upstream & Demolition	1. ☐ Mid-Atlantic	1. ☐ Europe	1. ☐ Development
2. ☐ EAME North/South	2. ☐ Downstream Programs	2. ☐ North	2. ☐ Asia/Pacific	
3. ☐ Asia/Pacific		3. ☐ South		
		4. ☐ West		
		5. ☐ Americas South		

Task Observed

1. ☐ Transportation - Personnel

Brief Description of Task Observed and Work Area Conditions

Positive Comments

(provide five or six specific examples of the most significant correct behaviors/conditions observed)

Feedback Session

(facilitated by the direct supervisor at the work location on the same day as the LPO)

1. Feedback Session Conducted By:	2. Observee's Supervisor:	3. Feedback Session Date (MM/DD/YYYY):	4. Feedback Session Time (hour : minute, AM or PM):

Solution(s) Developed with FRCS

Complete and attach FRCS form and answer all 7 factor questions. If answering NO to Factors 1 – 4 identify root cause(s) and explain why QIs) occurred. If answering YES to Factors 5 – 7 circle the root cause(s). Transfer the solutions guidance that addresses each root cause from the FRCS form to this form.

1. CHECKLIST LINE #	2. FACTOR #	3. SOLUTION(S) (must match Factor)	4. NAME OF PERSON RESPONSIBLE	5. Target Completion Date (MM/DD/YYYY)	6. Actual Completion Date (MM/DD/YYYY)	7. V&V Date (MM/DD/YYYY)

8. Supervisor Quality Check:	9. Title/ Company:	10. Date:

V&V Comments (**Verification**: Have solutions been implemented? **Validation**: Have solutions been effective?)

(describe how the solution was verified and validated at the workplace/verification and validation of tool solutions takes place at the same time)

1. V&V #	2. Job Title	3. Comments

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EMES Driving Light Vehicle (Passenger/Service)
LOSS PREVENTION OBSERVATION (LPO) FORM

LPS

GENERAL (IMPACT # in parenthesis) *Vehicle and Safety Check (1500 - Tools/Equip.)*	**CORRECT** (Write number of times line item observed as performed/addressed in accordance with safe work standards)	**QUESTIONABLE**	**COMMENTS** (Write comments for all Questionable Items, significant Correct actions and "Other")
1. (1512) Wipers and washer/clean windows/mirrors			
2. (1513) Tires for inflation and tread			
3. (1514) Registration/insurance/last maintenance report			
4. (1515) Horn/lights operation/instrument panel			
5. (1516) Body damage/overall vehicle appearance			
6. (1517) Under vehicle check for leaks/obstructions			
7. (1518) Secure loose items			
8. (1519) Adjust seat/head rest/mirrors			
9. (0109) Seat belts (lap and shoulder) (0100 - PPE)			
If long journey	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
10. (0884) Journey plan (route, breaks and schedule)			
11. (1520) Check fluid levels			
12. (1521) Triangles/first aid kit/jack/spare			
DRIVING (0800 - Operating Procedures-Driving) *Attitude*	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
13. (0801) Attentive driving			
14. (0802) Yields right-of-way and allows other vehicles to merge, change lanes, turn, etc.			
15. (0804) Respects pedestrians, cyclists, other drivers			
16. (0805) Maintains cushion of safety around vehicle; front, sides and rear			
General Driving Habits	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
17. (0807) Two hands on wheel at 9 and 3 o'clock position			
18. (0808) Skill in handling distractions (cellular, beeper)			
19. (0809) Assesses changing traffic conditions avoiding quick unexpected stops or hard braking			
20. (0810) Uses turn signals			
21. (0812) Following distance is appropriate (4-sec. rule)			
22. (0814) Appropriate speed for driving conditions			
23. (0817) Before backing up, looks behind vehicle/checks for traffic, pedestrians, parked vehicles			
Scanning	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
24. (0820) Scans the road ahead (15 sec.) and anticipates actions of others to avoid sudden swerves, stops, lane changes, tight merges, etc.			
25. (0821) Stays out of other drivers blind spots			
26. (0822) Checks mirrors every 5 to 8 sec. and stays out of other drivers' blind spots (0821)			
27. (0825) Checks for hazards on the road (e.g., animals, debris, road conditions)			
28. (0826) Reads and obeys traffic signals			
Slowing/Stopping	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
29. (0827) Makes complete stop at signals, at a safe distance; allows front vehicle to move before accelerating			
30. (0830) Scans intersection left and right/anticipates intent of other vehicles before reaching "point of no return"			
31. (0831) Adjusts speed/covers brakes safely			
Merging/Passing/Lane Changes	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
32. (0833) Uses signals, checks blind spots, leaves adequate space			
33. (0836) Maintains space between vehicle in front, scans immediate and adjacent lanes before merging			
Parking/Parking Lot	**CORRECT**	**QUESTIONABLE**	**COMMENTS**
34. (0843) Obeys signs and uses signals in parking lot			
35. (0844) Maintains proper speed inside the lot			
36. (0845) Ensures vehicle is legally/properly parked			
37. (0846) Sets parking brake and secures vehicle			
TOTAL	[illegible]	[illegible]	**% CORRECT/SAFE :** [illegible] [(TOTAL CORRECT÷ (TOTAL CORRECT + TOTAL QUESTIONABLE) × 100]

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APPENDIX Q

Acord Automobile Loss Form

AUTOMOBILE LOSS NOTICE

DATE (MM/DD/YYYY)

AGENCY	PHONE (A/C, No, Ext): 215-567-6300	COMPANY	NAIC CODE:	MISCELLANEOUS INFO (Site & location code)
The Graham Company The Graham Building One Penn Square West Philadelphia, PA 19102		LM Insurance Corporation		
FAX (A/C, No): 215-599-9175		POLICY NUMBER: AS5251292501030	POLICY TYPE:	REFERENCE NUMBER: / CAT #:
E-MAIL ADDRESS: CLICK HERE TO SUBMIT TO THE GRAHAM COMPANY		EFFECTIVE DATE: 9/21/2020	EXPIRATION DATE: 09/21/2021	DATE OF ACCIDENT AND TIME: ☐ AM ☐ PM
CODE:	SUB CODE:			PREVIOUSLY REPORTED: ☐ YES ☒ NO
AGENCY CUSTOMER ID: Mallory M. Stanko, Esquire, Claims Consultant				

INSURED

NAME AND ADDRESS

Roux Associates, Inc.
209 Shafter Street
Islandia, NY 11749

SOC SEC # OR FEIN:

RESIDENCE PHONE (A/C, No):

BUSINESS PHONE (A/C, No, Ext):

CELL PHONE (A/C, No):

E-MAIL ADDRESS:

CONTACT

☐ CONTACT INSURED

NAME AND ADDRESS

Cindy Albanese, Paralegal

WHEN TO CONTACT: 9:00 a.m. to 5:00 p.m.

WHERE TO CONTACT: Business

RESIDENCE PHONE (A/C, No):

BUSINESS PHONE (A/C, No, Ext): 631-232-2376

CELL PHONE (A/C, No):

E-MAIL ADDRESS: calbanese@rouxinc.com

LOSS

LOCATION OF ACCIDENT (Include city & state):

AUTHORITY CONTACTED:

REPORT #:

VIOLATIONS/CITATIONS

DESCRIPTION OF ACCIDENT (Use separate sheet, if necessary)

POLICY INFORMATION

BODILY INJURY (Per Person)	BODILY INJURY (Per Accident)	PROPERTY DAMAGE	SINGLE LIMIT	MEDICAL PAYMENT	OTC DEDUCTIBLE	OTHER COVERAGE & DEDUCTIBLES (UM, no-fault, towing, etc.)
			$1,000,000		$1,000	Rental Reimbursement $60 for 60 Days Towing $50 PPV
LOSS PAYEE					COLLISION DED: $1,000	

UMBRELLA/EXCESS ☐ UMBRELLA ☐ EXCESS CARRIER: LIMITS: AGGR PER CLAIM/OCC SIR/DED

INSURED VEHICLE

VEH #	YEAR	MAKE:	BODY TYPE:	PLATE NUMBER	STATE
		MODEL:	V.I.N.:		

OWNER'S NAME & ADDRESS

RESIDENCE PHONE (A/C, No):

BUSINESS PHONE (A/C, No, Ext):

DRIVER'S NAME & ADDRESS

☐ (Check if same as owner)

RESIDENCE PHONE (A/C, No):

BUSINESS PHONE (A/C, No, Ext):

RELATION TO INSURED (Employee, family, etc.)	DATE OF BIRTH	DRIVER'S LICENSE NUMBER	STATE	PURPOSE OF USE	USED WITH PERMISSION?
					☐ YES ☐ NO

DESCRIBE DAMAGE

ESTIMATE AMOUNT	WHERE CAN VEHICLE BE SEEN?	WHEN CAN VEH BE SEEN?	OTHER INSURANCE ON VEHICLE

PROPERTY DAMAGED **VEHICLE?** ☐ YES ☐ NO **YR:** **MAKE:** **MODEL:** **PLATE #:**

DESCRIBE PROPERTY (Other Than Vehicle)	**OTHER VEH/PROP INS?** ☐ YES ☐ NO	**COMPANY OR AGENCY NAME:** **POLICY #:**
OWNER'S NAME & ADDRESS		**RESIDENCE PHONE (A/C, No):** **BUSINESS PHONE (A/C, No, Ext):**
OTHER DRIVER'S NAME & ADDRESS ☐ (Check if same as owner)		**RESIDENCE PHONE (A/C, No):** **BUSINESS PHONE (A/C, No, Ext):**
DESCRIBE DAMAGE		
ESTIMATE AMOUNT	**WHERE CAN DAMAGE BE SEEN?**	

INJURED

NAME & ADDRESS	PHONE (A/C, No)	PED	INS VEH	OTH VEH	AGE	EXTENT OF INJURY
		☐	☐	☐		
		☐	☐	☐		
		☐	☐	☐		
		☐	☐	☐		

WITNESSES OR PASSENGERS

NAME & ADDRESS	PHONE (A/C, No)	INS VEH	OTH VEH	OTHER (Specify)
		☐	☐	
		☐	☐	
		☐	☐	

REPORTED BY		**REPORTED TO**	
SIGNATURE OF INSURED	**DATE (MM/DD/YYYY)**	**SIGNATURE OF PRODUCER**	**DATE (MM/DD/YYYY)**

REMARKS (Include Adjuster Assigned)

ALL RESERVATIONS OF RIGHTS/DENIAL LETTERS MUST BE SENT TO THE GRAHAM COMPANY FIRST.

ALL FIRST PARTY DRAFTS MUST BE SENT DIRECTLY TO THE GRAHAM COMPANY.

Applicable in Arizona

For your protection, Arizona law requires the following statement to appear on this form. Any person who knowingly presents a false or fraudulent claim for payment of a loss is subject to criminal and civil penalties.

Applicable in Arkansas, Delaware, District of Columbia, Kentucky, Louisiana, Maine, Michigan, New Jersey, New Mexico, North Dakota, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington and West Virginia

Any person who knowingly and with intent to defraud any insurance company or another person, files a statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact, material thereto, commits a fraudulent insurance act, which is a crime, subject to criminal prosecution and civil penalties. In DC, LA, ME, TN, VA and WA, insurance benefits may also be denied.

Applicable in California

For your protection, California law requires the following to appear on this form: Any person who knowingly presents a false or fraudulent claim for payment of a loss is guilty of a crime and may be subject to fines and confinement in state prison.

Applicable in Colorado

It is unlawful to knowingly provide false, incomplete, or misleading facts or information to an insurance company for the purpose of defrauding or attempting to defraud the company. Penalties may include imprisonment, fines, denial of insurance, and civil damages. Any insurance company or agent of an insurance company who knowingly provides false, incomplete, or misleading facts or information to a policy holder or claimant for the purpose of defrauding or attempting to defraud the policy holder or claimant with regard to a settlement or award payable from insurance proceeds shall be reported to the Colorado Division of Insurance within the Department of Regulatory Agencies.

Applicable in Florida and Idaho

Any person who knowingly and with the intent to injure, defraud, or deceive any insurance company files a statement of claim containing any false, incomplete or misleading information is guilty of a felony.*

* In Florida - Third Degree Felony

Applicable in Hawaii

For your protection, Hawaii law requires you to be informed that presenting a fraudulent claim for payment of a loss or benefit is a crime punishable by fines or imprisonment, or both.

Applicable in Indiana

A person who knowingly and with intent to defraud an insurer files a statement of claim containing any false, incomplete, or misleading information commits a felony.

Applicable in Minnesota

A person who files a claim with intent to defraud or helps commit a fraud against an insurer is guilty of a crime.

Applicable in Nevada

Pursuant to NRS 686A.291, any person who knowingly and willfully files a statement of claim that contains any false, incomplete or misleading information concerning a material fact is guilty of a felony.

Applicable in New Hampshire

Any person who, with purpose to injure, defraud or deceive any insurance company, files a statement of claim containing any false, incomplete or misleading information is subject to prosecution and punishment for insurance fraud, as provided in RSA 638:20.

Applicable in New York

Any person who knowingly and with intent to defraud any insurance company or other person files an application for commercial insurance or a statement of claim for any commercial or personal insurance benefits containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, and any person who in connection with such application or claim knowingly makes or knowingly assists, abets, solicits or conspires with another to make a false report of the theft, destruction, damage or conversion of any motor vehicle to a law enforcement agency, the Department of Motor Vehicles or an insurance company, commits a fraudulent insurance act, which is a crime, and shall also be subject to a civil penalty not to exceed five thousand dollars and the value of the subject motor vehicle or stated claim for each violation.

Applicable in Ohio

Any person who, with intent to defraud or knowing that he/she is facilitating a fraud against an insurer, submits an application or files a claim containing a false or deceptive statement is guilty of insurance fraud.

Applicable in Oklahoma

WARNING: Any person who knowingly and with intent to injure, defraud or deceive any insurer, makes any claim for the proceeds of an insurance policy containing any false, incomplete or misleading information is guilty of a felony.

APPENDIX R

ExxonMobil E&PS Incident “Go Book”

Incident Go Book

OVERVIEW

This E&PS Incident Go Book is a collection of standards and guidelines to provide effective and immediate case management.

The overall objective of this document is to provide a quick reference to contractor companies in identifying the most important information and forms to be used during the case management process.

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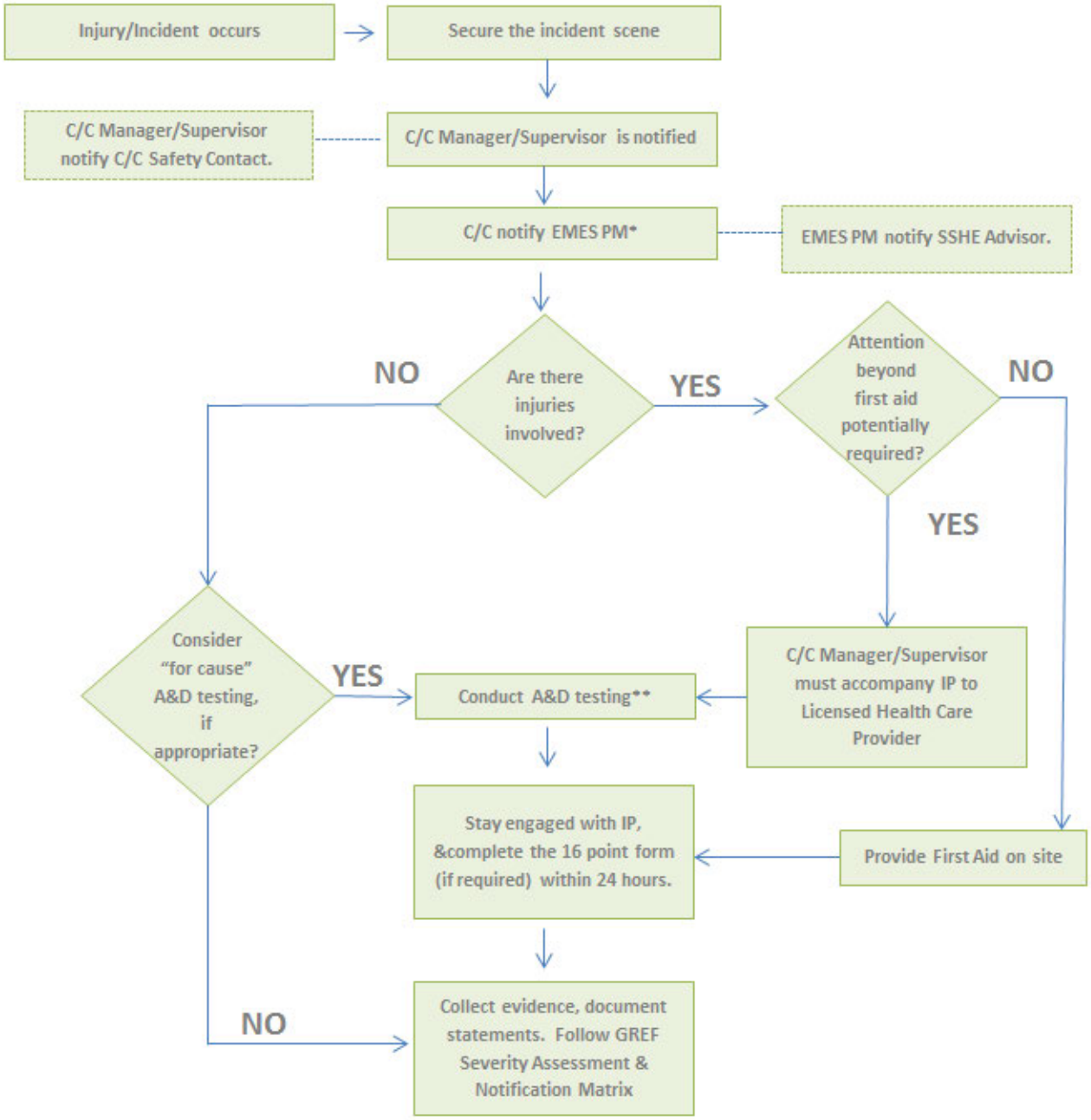
INCIDENT RESPONSE FLOWCHART



* PM will determine additional management requirements for notification, investigation, reporting and request resources if required.

** See Alcohol and Drug Use Policy Guidelines.

2 Immediate Care

SUPERVISOR CARE MANAGEMENT CHECKLIST

This checklist can be used to provide guidance during a safety incident requiring an injured person to be taken to a medical clinic.

Supervisor Care Management Checklist	
1	Investigate ***all*** reports of injuries and illnesses (including ergonomics, pain or discomfort, sprains, muscle strains/pulls).
2	Ensure site environment is safe and secure.
3	Get ***prompt***, ***adequate*** and ***appropriate*** medical care for the injured person (IP).
4	Accompany the IP to a medicine and occupational health's (MOH's) or contractor's designated medical facility (contractor supervisors to accompany their workers).
5	Support the worker during this stressful and confusing time.
5a	Does IP have any known pre-existing conditions or allergies identified or likely?
5b	Reinforce the availability of restricted work opportunities.
5c	When at the clinic (with consent of the injured person) document medical provider instructions, ask clarifying questions and make the doctor aware of the availability of restricted work options
5d	Follow all medical information privacy laws.
5e	Remain with the IP until released and with your manager's approval.
5f	Test for alcohol and drugs, if appropriate and consistent with local laws, human resources (HR) and management procedures
6	Contact SSH&E advisor by phone, as soon as possible.
7	Contact functional manager. Follow unit's incident notification matrix based on incident severity.
8	Contractor's supervisors to inform ExxonMobil managers of incidents on ExxonMobil premises.
9	All contact should be via phone and follow-up with email (if available); escalate as required to make certain verbal ExxonMobil contact has occurred (no voice mail message).
10	If the IP is treated at an urgent care facility, contact MOH or contractor's designated medical facility as soon as possible to schedule a follow-up exam.
11	Inform IPs that if they need/want further medical assessments they are to keep the supervisor and MOH informed. Contractor IPs should know to keep their company management informed and be engaged with that company's occupation medical clinic.
12	Conduct incident investigation and root cause analysis per site behavior-based safety system and take photographs of the site and equipment if appropriate.
13	Report the incident in IMPACT.
14	Maintain ongoing communications with the IP and management.

Return to Work	
1	A "return to work" evaluation by MOH or contractor's equivalent medical facility needs to be completed BEFORE return-to-work (if applicable).
2	Outline work activities per any medical recommendations.
3	Monitor worker compliance of follow-up medical treatments and work restrictions.
4	Document completion of medical treatments and/or removal of restrictions.

2 Immediate Care

IIHL 14 FIRST AIDS

The following is a complete list of all treatments considered first aid.

	First Aid Treatments
1.	Using a nonprescription medication at nonprescription strength (for medications available in both prescription and non-prescription strengths, a recommendation by a physician or other licensed health care professional to use the non-prescription medication at prescription strength is considered medical treatment for record keeping purposes)
2.	Administering tetanus immunizations (Other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment)
3.	Cleaning, flushing or soaking wounds on the surface of the skin
4.	Using wound coverings such as bandages, Band-Aids™, gauze pads, etc., or using butterfly bandages or Steri-Strips™ (other wound closing devices such as sutures, staples, tapes/glues, etc., are considered medical treatment)
5.	Using hot or cold therapy (e.g., compresses, soaking, whirlpools)
6.	Using any non-rigid means of support, such elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for record keeping purposes)
7.	Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.)
8.	Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister
9.	Using eye patches
10.	Removing foreign bodies from the eye using only irrigation or a cotton swab
11.	Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means (procedures involving the excision of the outer layer of the skin are considered medical treatment)
12.	Using finger guards
13.	Using massages (physical therapy or chiropractic treatment is considered medical treatment)

2 Immediate Care

14.

Drinking fluids for relief of heat stress

E&PS RECORDABILITY IIHL

Effective 1 Jan 2012 - 31 Dec 2015 (Rev 3.A)

First Aids and Medical Treatments (Prescription Medications)

PRESCRIPTION MEDICATION In the case of prescription medications, medical treatment occurs when a prescription is issued (even if the employee does not fill the prescription or take the medication).

- The single dosages that are considered prescription strength for four common over-the-counter drugs are:
  - Ibuprofen (such as Advil™) - Greater than 467 mg
  - Diphenhydramine (such as Benadryl™) - Greater than 50 mg
  - Naproxen Sodium (such as Aleve™) - Greater than 220 mg
  - Ketoprofen (such as Orudus KT™) - Greater than 25mg
- To determine the prescription-strength dosages for other drugs that are available in prescription and non-prescription formulations, consult the U. S. Food and Drug Administration website at: http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm
- If a LHCP provides prescription samples in lieu of prescription recommendation or script, the samples are to be recorded as a prescription.

Medical Treatment Includes: (RECORDABLE)

- All work-related ***needle stick injuries*** and cuts from shard objects that are contaminated with another person's blood or other potentially infectious material must be recorded.
- Cases involving work-related ***hearing loss.***
- Occupational exposure to anyone with a known case of active followed by a tuberculosis infection as evidenced by a positive skin test or diagnosis by a physician or other LHCP.
- Other incidents as defined under medical treatment (such as employee performing Heimlich maneuver, CPR or using AED.
- Vaccines: Hepatitis B, Rabies.
- Wound closing devices: sutures, stables, tapes/ glue.
- Rigid devices used to immobilize / support parts of the body.
- Procedures used to remove the outer layer of skin.
- Physical therapy.
- Chiropractic treatment.

Medical Treatment DOES NOT include: (Not recordable)

- Visits to a physician or other LHCP solely for observation or counseling.
- The conduct of diagnostic procedures, such as x-rays and blood tests, including the administration of prescription medications used solely for diagnostic purposes (e.g., eye drops to dilate pupils.)
- Delivery of Oxygen when it is administered solely as a precautionary measure to an employee that did not exhibit signs or symptoms of illness or injury.

QUESTIONNAIRE FOR ALCOHOL AND DRUG (A&D) TESTING

Test for alcohol and drugs, if appropriate and consistent with local laws, human resources (HR) and management procedures. This questionnaire should be used to document and confirm whether a Contractor should have a post-incident alcohol and drug test.

1. Immediately after a work-related incident occurs, the responsible Contractor supervisor should confirm whether the performance of one or more contract personnel contributed to the incident.
2. The responsible Contractor supervisor should complete the Contractor Alcohol and Drug Post-Incident Form (Attachment 1) to determine whether the Contractor(s) should be A&D tested.
3. The Contractor Alcohol and Drug Post-Incident Form (Attachment 1), if properly filled out, leads the supervisor to the proper actions as follows:
    a. Questions 1, 2, and 3 determine if this is a significant incident.
        i. If it is not significant ("No" is answered to Questions 1, 2, and 3), NO alcohol and drug test is required. The form does not need to be completed.
        ii. If it is significant, go to Question 4.
    b. Question 4 asks if a Contractor was directly or indirectly involved.
        i. If "No," then alcohol and drug testing is NOT required. No further action is required.
        ii. If "Yes," then Alcohol and Drug testing is required.
    c. The responsible Contractor supervisor is required to perform the following five steps **PRIOR TO RELEASING** an individual for A&D testing:
        1. Identify all Contractors involved in the incident.
        2. Each Contractor involved should be informed by his or her Contractor supervisor that a drug and alcohol test is required by ExxonMobil.
        3. Any individual(s) sent for testing must sign the alcohol and drug testing consent form. Each Contractor firm should have a consent form available and printed on company letterhead available.
        4. Remove individual's badge and deliver to site/facility security or an ExxonMobil contact.
        5. Send individual to testing facility per Contractor firm's Alcohol and Drug testing procedure.
    d. Sign the form and send to the ExxonMobil EMES Project Manager for review.

ATTACHMENT 1

Contractor Alcohol and Drug Post-Incident Form

Incident Date Click here to enter text.

Contractor Company Click here to enter text.

Site/Facility Click here to enter text.

IMPACT Incident Number (if known) Click here to enter text.

Please answer the following questions regarding the incident.

1. Did this incident require medical treatment beyond first aid? ○ Yes ○ No

2. Did this incident result in property damage greater than $5,000? ○ Yes ○ No

3. Was this incident considered a potential serious injury or fatality (SIF, an incident that had the potential for serious personal injury, significant property damage and/or environmental damage)? ○ Yes ○ No

If "No" is answered to ALL of the above three questions, then STOP. Do not complete Question 4. ***NO alcohol and drug testing required.***

NOTE: *If "Yes" is answered to Questions 1, 2* **or** *3, proceed to Question 4.*

4. Did the performance of a contractor directly or indirectly contribute to this incident? ○ Yes ○ No

If "No" is answered to Question 4, then ***no alcohol and drug testing required.***

NOTE: *If "Yes" is answered to Question 4, a contractor Alcohol and Drug test* ***IS REQUIRED*** *by the Company. Contractor(s) contributing to the incident must sign a consent form. Badge(s) must be removed and delivered to Security and Contractor(s) must be escorted out of the facility.*

Date badges(s) taken, pending alcohol and drug test results.

Date Click here to enter text. Temporary Custodian of badge(s) Click here to enter text.

If badges were not taken, explain why Click here to enter text.

Originated by Contract Supervisor or equivalent	Reviewed by EMES PM or equivalent

4 Post Incident/Return to Work

Name (Please Print)	Click here to enter text.	Name (Please Print)	Click here to enter text.
Signature/Date	Click here to enter text.	Signature/Date	Click here to enter text.

4 Post Incident/Return to Work

The SSH&E Supervisor or equivalent personnel of the contractor company is responsible for completing the Initial Incident Notification Form (16-point form). The information should be emailed to the EMES Project Manager. The Initial Incident Notification Form is only required for corporate reportable incidents.

Use the following guidelines for employees or contractors returning to work:

- If the healthcare provider indicates restrictions, supervisor must make sure the healthcare provider is aware of available light duty.
- A clear understanding of limitations is obtained before returning the injured or ill person to the workplace to make certain the person is not placed at risk for additional injury or complications.
- Contract company medical provider will provide assistance in understanding the extent of injuries and physical limitations relative to work responsibilities.

For ExxonMobil employees only:

ExxonMobil MOH, with input from the healthcare provider as applicable, will provide information regarding appropriate treatment for the injured or ill person.

4 Post Incident/Return to Work

INITIAL INCIDENT NOTIFICATION FORM (16-POINT FORM)

		Notification distributed to:	Click here to enter text.
Business Unit:	Click here to enter text.	Regional Business Unit:	Click here to enter text.
		Regional SSH&E Contact:	Click here to enter text.
Country:	Click here to enter text.	Regional Public Affairs Contact:	Click here to enter text.

1	Date of Incident:	Click here to enter text.	Time of Incident:	Click here to enter text.
2	Location of Incident:	Click here to enter text.		
3	Brief Account of Incident/Type of Incident:	Click here to enter text.		
4	Damage Control Measures Initiated:	Click here to enter text.		
5	Treatment Provided:	Click here to enter text.		
6	Drug and Alcohol testing for cause initiated:	Click here to enter text.		
		Number of Injuries	Number of Fatalities	Click here to enter text.
7a	ExxonMobil:	Number.	Number.	Click here to enter text.
7b	Contractor:	Number.	Number.	Click here to enter text.
7c	Third Party:	Number.	Number.	Click here to enter text.
8	Business impact/damage/loss company facilities:	Click here to enter text.		
9	Business impact/damage/loss contractor facilities:	Click here to enter text.		
10	Business impact/damage/loss third party facilities:	Click here to enter text.		
11	Effect on Company Operations:	Click here to enter text.		
12	External agencies involved/contacted:	Click here to enter text.		
13	Media coverage:	Click here to enter text.		
14	Equipment checks performed:	Click here to enter text.		
15	Affiliate investigation initiated:	Click here to enter text.		
16	Preliminary conclusions regarding the cause of the incident/corrective measures being implemented:	Click here to enter text.		
	Exxon Mobil person in charge of response/investigation:	Click here to enter text.		
	What assistance has been requested:	Click here to enter text.		
	Additional comments:	Click here to enter text.		
	Date:	Click here to enter text.	Time:	Click here to enter text.
	Prepared by:	Click here to enter text.	Reviewed by:	Click here to enter text.
	Contact number for Notifier:	Click here to enter text.		

4 Post Incident/Return to Work

WORK LIMITATIONS/RETURN TO WORK FORM

Name Click here to enter text.

Company Click here to enter text.

Location Click here to enter text.

Work Phone Click here to enter text. Cell Phone Click here to enter text.

Supervisor Click here to enter text. Today's Date Click here to enter text.

☐ Return to Work (Note: If checked skip to signature line.)

The limitations checked below are: ☐ Permanent ☐ Temporary

☐ Bending
☐ Climbing Stairs
☐ Climbing Structures/Ladders
☐ Drive/Operate Heavy Equipment
☐ Driving Company Vehicle
☐ Exposure to Temperature Extremes
☐ Kneeling/Crawling
☐ Lift/Push/Pull/Carry over Click to enter text
☐ Overhead Work
☐ Overtime
☐ Prolonged Walking or Standing
☐ Shift Work
☐ Use of: Click to enter text
☐ Work above Ground Level
☐ Work around Moving Machinery
☐ Work Alone

☐ Other: Click here to enter text.

(Please, do not include any medical information)

COMMENTS:

Click here to enter text.

Name of contract company supervisor: Click here to enter text.

Signature Click here to enter text. Date Click here to enter text.

Name of ExxonMobil contact supervisor: Click here to enter text.

Signature Click here to enter text. Date Click here to enter text.

APPENDIX S

Roux Daily Tailgate Health and Safety Meeting Log

DAILY TAILGATE HEALTH & SAFETY MEETING LOG

Job Name _____ Date(s) _____

Job # _____ Client Site # _____

Activities Planned _____

_____

_____

JSAs Utilized	Roux PM Reviewer

Potential Hazards	Mitigative Measures
LPO Scheduled for:	

Meeting Attended by:		Date	Date	Date	Date	Date
Name	Company					

Initials

NOTE: THIS IS A TWO-SIDED FORM; PLEASE COMPLETE BOTH SIDES

DAILY SITE SAFETY CHECKLIST

Job Name _____ **Date(s)** _____

Job # _____ **Client Site #** _____

Weather _____

•"On the Job" interactive meeting held before work starts	•Provide details of work planned for the day
•Conducted at least once per day	•Review the Job Safety Analysis (JSA) and work hazards
•Involves everyone working at the Site	•Required PPE for the planned work
•Should familiarize everyone with work area & vicinity	•SPSAs are discussed
•Work permit procedures	•HASP is reviewed
•Emergency access/exits & "rally" point	•Ensure safety equipment is on Site
•Emergency contacts/phone #s, hospital route	•Test required safety equipment (such as emergency stop controls)
•Should be interactive	•Can also include inspection of tools and equipment to be used

Instructions: Please use form for up to five consecutive days. Write in date, place checkmark to indicate item has been completed, then initial at bottom of column to verify.

#	CHECKLIST ITEM	DATE				
1	The HASP (including emergency phone #s) has been reviewed & signed by Roux staff & subcontractors.					
2	Personnel are LPS and OSHA-40 (as applicable) trained and SSE are identified and have an on-site mentor.					
3	Emergency meeting point known, First Care facility and ER identified.					
4	Applicable JSAs have been identified and approved by Roux management.					
5	Roux personnel & subcontractors have discussed hazards associated with Site-specific work.					
6	Any potential slips, trips or fall hazards have been identified.					
7	All workers have appropriate PPE, including long sleeves and have signed in for the day (2nd Page).					
8	No person on-Site has the appearance of being under the influence of motor skill altering substances and are familiar with D&A policy.					
9	Critical equipment on-Site is noted and is in safe working order.					
10	Site control has been established and exclusion zone is identified (using safety cones or barricades to mark out work area).					
11	Appropriate permits has been obtained and potential ignition sources were identified if applicable for Hot Permits					
12	If applicable, all third party permits to construct are on hand and access is permissible.					
13	Lock Out / Tag Out procedures have been followed where applicable, for electric and water.					
14	Electrical power operated tools shall be properly grounded and used with a GFCI.					
15	Traffic Safety Control measures have been put in place where applicable.					
16	All vessels containing flammable/corrosive material are labeled and MSDSs are available for all chemicals.					
17	Subsurface work : Drilling, trenching, etc. conducted according to required Protocol, including pre-field preparations, utility mark-out and "hand" clearing					
18	Excavated soils are properly stored; excavations are properly shored/sloped and barricaded.					
19	Good housekeeping procedures are meet; food and beverages are consumed outside of the work area.					
20	A first aid kit, eye wash bottle/station, and fire extinguishers are available for use.					
21	No smoking signs are visibly posted in areas of potential flammable vapors.					
Initial at right to verify that these actions have taken place						

Comments and Exceptions _____

NOTE: THIS IS A TWO-SIDED FORM; PLEASE COMPLETE BOTH SIDES

APPENDIX T

Roux's Fleet Safety Management Program

FLEET SAFETY
MANAGEMENT PROGRAM

CORPORATE HEALTH AND SAFETY MANAGER	:	**Brian Hobbs, CIH, CSP**
EFFECTIVE DATE	:	**01/19**
REVISION NUMBER	:	**0**

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APPENDICES

1. PURPOSE, AND APPLICABILITY

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has developed a Fleet Safety Management Program (FSMP) for employees when operating Roux owned/leased/rented motor vehicles (vehicles). The FSMP defines procedures and responsibilities of the employees with respect to vehicle driver qualifications and training requirements, fleet maintenance and accident reporting and investigations. A discussion of vehicle usage rules is also provided. The goal of the management program is to prevent injuries and to reduce property damage.

It is the responsibility of all employees to comply with this program. Most of our employees drive to either project job sites or our client locations on a regular basis. For this reason, it is important to recognize that driving represents a hazardous situation for our employees.

Roux endeavors to provide safe, reliable and properly maintained vehicles to drivers. Roux employees are not required to drive company vehicles if they are not qualified or do not feel comfortable doing so and should decline to operate a company owned/rented vehicle for business purposes in those circumstances.

It is each driver's responsibility to ensure the vehicle selected for the task is suitable for the activity to be conducted and adhere to all the firms safely requirements as defined in the Corporate Health and Safety manual. Roux personnel must adhere to all federal, state and local laws governing vehicle operation.

The CHSM is responsible for conducting vehicle accident, damage or thief investigations including coordinating with the Office Manager (OM) and our internal Legal Department (Legal Department). The Legal Department will be responsible for communication and interactions with the firm's insurance carrier.

The sections below discuss driver qualifications and training, vehicle maintenance and accident investigating and reporting and vehicle usage rules.

2. DRIVER QUALIFACATIONS, TRAINING AND EVALUATION

2.1 Driver Qualification

All drivers who operate vehicles under this program must be pre-approved through the driver qualification process. The qualification process begins with the new employee orientation and onboarding process. Only drivers with a valid and current driver license will be qualified to operate the vehicles. The Human Resource Department (HR) will conduct a verification process to ensure each new hire has a valid driver's license and a copy is obtained during the employee on-boarding process and when expired. As a condition of their continued employment, motor vehicle reports will be run at a minimum on an annual basis. Tickets and moving motor vehicle violations are to be reported to the OHSM and OM within 24 hours of receipt. Additionally, employees shall notify the OHSM and OM of any license suspension immediately and shall not operate a company vehicle.

2.2 Driver Training

Driver training and vehicle orientation is required for all employees who wish to operate a vehicle. The driving training will at a minimum consist of the following:

1. Orientation: Before a new hire operates a company owned/leased vehicle for business purposes, an orientation specific to the vehicle and conditions of use will be conducted. The orientation will include:
    a. Review of this FLEET SAFETY MANAGEMENT PROGRAM with specific emphasis on safety rules, and operation of the vehicle and accident investigation and reporting.

b. Discussion of operational maintenance requirements of the specific vehicle to be used and related driver responsibilities will also be discussed.

c. Accident response and procedures; securing vehicle, obtaining external emergency service assistance, police reports, and contacting appropriate Roux personnel.

d. Question and Answer Session.

2. Vehicle Instruction Training: (VIT) will be completed by the Office Manager (OM) or and/or their designee. The OM or designee will review:

   a. Safety devices (e.g., location of first aid kits, fire extinguisher use);

   b. Pre-use inspection of vehicles and completion of forms;

   c. Pre-Operational maintenance requirements;

   d. Employee injury prevention practices;

   e. Cargo loading and securing procedures;

   f. Route selection criteria; and

   g. Conducing a test drive of company owned vehicle (understand difference between truck and personal vehicle) with the employee.

3. Defensive Driving: Semi-annual training in the Smith System Five Keys® of defensive driving will be offered to all employees and will be required for all drivers of company owned/rented vehicles. Drivers are to attend both classroom and over-the-road (OTR) training sessions as scheduled if they are required to drive company owned/rented vehicles for business purposes. Records of the training will be maintained within the corporate training database.

4. Periodic Training: To include Hazards of Winter Driving, Distracted Driving, etc., will be provided via video, flyer or Lunch & Learns for all drivers presented with such hazards. These will be completed annually or on an as needed basis. Needs will be identified by drivers, Office Health and Safety Managers (OHSMs) and/or the CHSM.

2.3 Driver Evaluation

Drivers will be observed when opportunities allow two or more people to travel together. When driving performance is questioned because of observations, Lessons Learned Reports, Near Loss Reports, Accident Report Forms, or Loss Reports, additional Smith System Five Keys® OTR training may be provided. The Roux Driving Peer Observation Form, found in our Health and Safety Manual and through our digital application database will be used to provide OTR driver evaluations.

3. VEHICLE SELECTION, INSPECTION AND MAINTENANCE REQUIREMENTS

Vehicle selection and usage needs to match the objectives of the task to be completed. Roux will purchase, or lease vehicles designed for their intended use. Purchasing or leasing of any new vehicle will be managed through the OM.

Drivers are required to conduct a daily pre-check of the vehicles in accordance with a vehicle sign out form. In the case of vehicles which are driven daily at project specific sites a visual inspection will be made prior to use and additional site-specific inspections performed as dictated by site usage and requirements.

For company rented or leased vehicles used for only sales or client meetings the driver, PRIOR TO OPERATING THE VEHICLE will conduct a vehicle assessment of the physical condition, mileage, etc. of the vehicle. A vehicle sign-out sheet is not required for this purpose. Other procedures described in the program do apply to rental car usage for sales/client meetings.

The OM and/or their designee is responsible for ensuring that company owned vehicles receive routine or periodic maintenance inspections and repairs. All records shall be maintained for the duration of ownership of the vehicle at the office. Maintenance shall be performed in accordance with the Manufacturers' recommendations, schedules and procedures for each vehicle or class of vehicle.

Vehicle maintenance can take the form of three distinct programs: preventative maintenance, demand maintenance and crisis maintenance and are discussed below.

- Preventative maintenance (Pre-M) is performed on a mileage or time basis. A review of the manufacturer's specifications and recommendations for periodic preventative maintenance shall be incorporated into the preventative maintenance program. Typical Pre-M includes oil/filter changes, lubrication, tightening of belts and components, engine tune-ups, brake work, tire rotation, hose inspection/replacement and radiator maintenance.
- Demand maintenance is performed when the need arises. Some vehicle parts are replaced when they fail (e.g. light bulbs, gauges, wiring, etc.). Other items involve vehicle components that are worn based on information provided in a vehicle condition report (e.g. worn tires, engines, transmissions, joints, bushing, batteries, etc.).
- Crisis maintenance involves a vehicle breakdown while on the road. In a crisis maintenance situation, the employee shall move the vehicle out of traffic flow if safely able to do so and notify emergency services (911) immediately along with the OM and OHSM for further guidance. In the event towing services are required (i.e. vehicle is unsafe/unable to drive) coordinate with the OM to confirm where the vehicle will be taken. In some cases, depending on the accident location it will be towed to a specific lot, work to obtain the necessary information on the lot location to provide to OM and OHSM for further follow up.

All company owned vehicles shall be maintained by qualified vendors with the appropriate facilities and service equipment necessary to perform required tasks. Facilities will be vetted through the OM, and CHSM.

All maintenance work and state inspections completed will be documented in a vehicle file at the office. Copies of such records will be provided to the Legal Department who is responsible for maintaining a Corporate Fleet Maintenance Record. The Corporate Fleet Maintenance Record shall include all vehicle specific information, receipts, maintenance reports, certificates of insurance, state inspection and registration documentation.

The Accounting and Legal Department will obtain and distribute vehicle registrations and Certificates of Insurance for all company-owned vehicles to the OM or their designee.

4. ACCIDENT INVESTIGATION

The following procedures and guidance are intended to assist with completing forms, documentation and investigations. The Roux Accident Report form is to be used and is found in our Health and Safety Plans, our Health and Safety Manual, and available on Clarity®.

Incident reporting kits will be kept in the glove box of every company owned vehicle. This shall include an incident report form with pen/pencil. Pictures shall be taken with employee's mobile device if the circumstances are safe to do so.

Initial drafts of the accident investigation forms are to be completed within 24 hours for all incidents.

IN THE EVENT OF AN ACCIDENT:

1. If involved in a minor accident (e.g. scrape or ding, cracked headlight, small dent in body, etc.), move vehicle out of traffic flow. If vehicle is unsafe to move or not capable of moving turn off vehicle and remove keys.
2. Call emergency services (911) if there is anyone injured in the accident or there is significant property damage. Render care if necessary and appropriately trained. Notify OM and OHSM and complete accident report with police.
3. OM/OHSM to call CHSM. CHSM will make other corporate notifications.
4. Obtain key driver information if other vehicles are involved which would include; their license number, insurance company names with policy number, as well as the names and addresses of injured persons and witnesses If driving a company vehicle, provide name of company, license number, name of insurance and policy number to other drivers. If driving a personally owned vehicle (POV), do not include company name.
5. In the event towing services are required (i.e. vehicle is unsafe/unable to drive) coordinate with the OM to confirm where the vehicle will be taken. In some cases, depending on the accident location it will be towed to a specific lot, work to obtain the necessary information on the lot location to provide to OM and OHSM for further follow up.
6. Prior to vehicle being towed remove any belongings and/or equipment within the vehicle. Coordinate with the OM and OHSM to obtain any necessary car services from your location.
7. If driving a company owned/leased/rented vehicle complete an accident investigation form. Fill in all applicable blanks. If driving a personal vehicle communicate with the OM/OHSM to determine work-relatedness and whether an accident form is required.
8. Forward copy of the accident investigation to OHSM/OM (and PM, if project-related) for finalization with the CHSM.

IN THE EVENT OF THEFT OR DAMAGE TO VEHICLE (NOT WITNESSED):

1. If you did not witness the damage or theft to the company owned/rented vehicle, you must notify the local police department immediately.
2. Immediately notify the OM and OHSM.
3. If a company owned/rented vehicle, complete an accident investigation form. Fill in all applicable blanks. If a personal vehicle, communicate with the OM/OHSM to determine work-relatedness and whether an accident form is required.

ACCIDENT INVESTIGATION REPORTS

Accident Investigations will be reviewed by the OM and CHSM along with the Legal Department. Causes of accidents should not be oversimplified. Some items to be considered when establishing accident cause and related corrective actions include:

1. Driver Condition
2. Adverse Driving Condition

3. Road Conditions
4. Cargo Requirements
5. Scheduling (hours behind the wheel)
6. Vehicle Maintenance
7. Driver Training
8. Other Vehicle Issues

Accident investigation results will be discussed with employees during periodic H&S meetings.

Accident Investigation Don'ts:

a. Do not let the end determine the cause
b. Do not oversimplify the cause
c. Remember that most direct causes have contributory causes. For example, the wet road may be the direct cause of the accident but worn tires may have contributed to it.
d. Obtain as much information as possible.
e. Do not leave corrective action section blank. Include anything that you feel will prevent recurrence. Management will determine the feasibility of implementation of controls.

5. VEHICLE USE RULES

We consider no phase of operations or administration more important than accident prevention. Below please find a listing of vehicle use rules as it applies to driving on company business.

1. Use of mobile devices is strictly forbidden while actively driving. (See Appendix A- Mobile Device Use Policy for Drivers)
2. Driving while under the influence of drugs or alcohol is strictly forbidden.
3. Drivers will perform a daily vehicle safety inspection (See Appendix B-Pre-Trip).
4. Wheels of all trucks, construction vehicles and trailers are to be chocked during ALL loading/unloading. Refer to Appendix C Motorized Vehicles and Mobile Equipment Wheel Chocking Program.
5. Use of company vehicles are a privilege; treat them as if they were your own.
6. All persons who drive company vehicles will be required to be qualified via our vehicle orientation and Smith System Driving training. Drivers will follow all applicable State, Federal and local regulations.
7. Drivers will immediately report any unsafe conditions including maintenance problems or vehicle problems to their OHSM and OM. Any vehicle with a problem which could affect its safe operation will not be driven until the condition is corrected.
8. No racks or external luggage devices will be permitted without the approval of the OM
9. Cargo tie-downs or covers are to be used at all times. The driver is responsible for inspecting all loads prior to driving.
10. Accidents are to be reported IMMEDIATELY to the OHSM and the OM. Accident investigation forms are to be initiated by the driver at the scene of the accident.
11. NEVER ADMIT FAULT at an accident scene. Be cordial and polite.
12. Tickets and moving motor vehicle violations are to be reported to the OHSM and OM immediately.

Appendix A- Mobile Device Use Policy for Drivers

Roux is committed to providing a safe work environment for all our employees. In addition, we strive to prevent injury to third parties while our employees are performing work-related activities.

Using cellular phones, computers, messaging devices, or any other mobile electronic device while operating a motor vehicle is a critical safety concern. As research has shown, such devices significantly distract drivers. Distracted driving increases the likelihood that a crash will occur.

This policy is intended to control the circumstances under which an employee can utilize a cell phone or other remote device while operating a motor vehicle on company business, regardless of whether the vehicle is company-owned or employee-owned.

Roux requires all drivers on company business and drivers operating a company-owned vehicle for personal use to adhere to the following policy parameters while operating the motor vehicle:

- Employees must comply with federal, state and local laws and regulations that may exist to control usage of mobile devices while operating a motor vehicle.
- If it is necessary to answer or place a cellular phone call at any time while operating a motor vehicle, the employee will safely drive his or her vehicle to an off-road location where the vehicle can be stopped without risk to the employee or any third party.
- When pulling over safely is not an option, all mobile phone use must be hands free. Any phone not equipped for hands free operation will not be used while operating a motor vehicle. Focusing on the driving task should be the driver's priority.
- Drivers will not send or review received text messages or emails, either on a company-owned or personally-owned device.
- Drivers will not operate any other mobile device, including but not limited to a Personal Digital Assistant (PDA), converged device, pocket PC, binaural headset-based audio device, such as an iPod or laptop computer, either in a company owned or personally owned vehicle while on company business.
- Navigation systems will be programmed before the trip is started, not while the motor vehicle is in operation.

Any employee who fails to adhere to this policy may be subject to disciplinary action, including, for example, written warning and/or subsequent restrictions on using a vehicle for company business. Employee safety is a priority at Roux, and your adherence to these guidelines will help us maintain the personal safety of our employees as well as that of our fellow drivers on the road.

Appendix B – Vehicle Sign Out Form Template

SIGN OUT: VEHICLE USED (Please Check)

☐ **(YEAR-XXX) – (MAKEXXXX) – (MODELXXXX)**
☐ **(YEAR-XXX) – (MAKEXXXX) – (MODELXXXX)**

Date: _____ Responsible Driver: _____

Time: _____ Fuel Tank: F ¾ ½ <½

Mileage: _____

Project Number and Name: _____

Checklist:

Oil/Coolant Level:	☐ OK ☐ Not OK	Emergency Brake:	☐ OK ☐ Not OK
Windshield/Mirrors:	☐ OK ☐ Not OK	Doors/Windows:	☐ OK ☐ Not OK
Tires:	☐ OK ☐ Not OK	Gauges/Switches:	☐ OK ☐ Not OK
Lights/Signals:	☐ OK ☐ Not OK	Horn:	☐ OK ☐ Not OK
Wiper Fluid:	☐ OK ☐ Not OK	Seat Belts:	☐ OK ☐ Not OK
Leaks:	☐ OK ☐ Not OK	First Aid Kit:	☐ OK ☐ Not OK
Fire Extinguisher:	☐ OK ☐ Not OK		

Physical Appearance (including cleanliness, dents, marks, etc.):

_____

_____

IN:

Date: Fuel Tank: F ¾ ½ <½

Time: _____

Mileage: _____ **BE SURE TANK IS FULL!**

Any problems? _____

Signature: _____

Appendix C - Motorized Vehicles and Mobile Equipment Wheel Chocking Program

1. PURPOSE AND BACKGROUND

Roux Associates, Inc. and its affiliated companies, Roux Environmental Engineering and Geology, D.P.C, and Remedial Engineering (collectively, "Roux") has developed the following program to establish a uniform approach to address hazards associated with the unintended movement of cars, trucks, construction vehicles, and/or vehicle trailers while stopped, during loading, unloading, or other related activities. This program is intended to provide protection to vehicle/mobile equipment operators, their passengers, pedestrians and forklift operators through good parking practices and the effective use of wheel chocks.

Construction accident studies continue to reveal "rollaway" vehicle accidents as a common occurrence. These most often occur when the driver leaves the vehicle believing the vehicle transmission is in either Neutral or Park position and that the brakes have been set. The vehicle then rolls away and, in most instances, stops only after encountering some obstacle. Vehicular and other property damage are the result with the potential to include serious personal injuries and death.

2. SCOPE AND APPLICABILITY

This program applies to the following:

A. All company owned, operated, leased, or contracted motorized vehicles and mobile equipment.

B. All projects managed or supervised by Roux.

C. All Roux company and subsidiary company employees and personnel operating motorized vehicles and mobile equipment.

D. All contractor and sub-contractor personnel performing work for and/or on behalf of Roux.

E. Leased equipment and lessor's operating personnel.

F. Personally owned vehicles.

3. PROCEDURE GUIDELINES

A. Cars, SUVs, Pickups and Light Trucks

Park on level ground. Before exiting the vehicle, make sure the automatic transmission is in PARK with the emergency brake set. Check the brake twice.

B. All Other Motor Vehicles

- Park on level ground. Before exiting the vehicle, make sure the automatic transmission is in PARK with the emergency brake set. Check the brake twice.
- Do not leave a vehicle running without an operator seated in the driver's seat.
- When stopped or parked on slopes/inclines, chock your wheels. When chocking, use specially designed wheel chocks of the appropriate size and material to securely hold the vehicle. Don't use lumber, cinder blocks, rocks, or other makeshift items to chock. Where applicable, lower hydraulic rams and check the security of the connection between the trailer and the vehicle.
- Ensure chocks are easy to find. Store chocks inside trucks, other mobile equipment, and trailers.
- Place "Chock Your Wheels" stickers above the wheels as reminders.
- To properly chock a freestanding vehicle, place chocks on the left and right rear axle wheels. It is safest to chock both the front and back wheels on both sides of a vehicle. Some vehicle wheels may also need to be chocked at the front and back of each tire.

- Where trailers are loaded or unloaded at docks, ensure that trailers are firmly placed against the loading dock edges and prevent rollaways by using chocks. Positioning of chocks is important. Place chocks on the left and right wheels that are closest to the loading dock. This placement allows a forklift to push down on the trailer wheels and seat them more firmly against the chock. If only the front axle is chocked, a forklift could push the trailer forward and loosen the chock or cause the wheel to jump the chock. The driver, dock workers, and forklift drivers share the responsibility to ensure that the truck and trailer wheels are properly chocked.
- Use extra caution when driving a forklift into a trailer from the dock edge. If the trailer rolls away from the dock edge, the forklift could fall into the gap, resulting in the potential for severe injuries or death. Never drive a forklift into a trailer until you make sure that the wheels are properly chocked. Ensure that the trailer floor is in good condition and that it can support the weight of the forklift and its load.
- Include wheel chocking in hazard assessments and other procedures. Project and job site hazard assessments shall consider energy releases from motorized vehicles and mobile equipment on all Roux projects and work sites. Site-specific health and safety plans (HASP's) and Job Safety Analyses (JSA's) shall address wheel chocking requirements. Lockout/Tagout programs and procedures shall include applications for wheel chocking.

4. TYPICAL WHEEL CHOCKING APPLICATIONS

1. When performing maintenance on passenger cars, pickups, and light duty trucks, including the changing of flat tires.
2. While performing maintenance on wheeled earth-moving equipment, such as dump trucks, front end loaders, backhoes and other excavating equipment.
3. Parked auxiliary wheeled equipment whether performing maintenance or in stationary position, to include:
    a. Portable air compressors that have been disconnected from the vehicle.
    b. Portable water pumps.
    c. Portable air-moving equipment.
    d. Soil screening equipment.
    e. Wheeled drilling equipment including Geoprobes.
    f. Truck-mounted welding and cutting equipment.
    g. Truck-mounted masts and cranes.
4. Chock truck/trailer while loading/unloading pipe onto a pipe trailer or to a truck-attached bed.
5. Chock truck/trailer while loading/unloading wheeled heavy equipment (i.e., backhoe, track hoe, dozer, and forklift) from a lowboy truck trailer onto ground or when loading onto trailer.
6. Chock and secure wheel and truck mobile equipment while such equipment is being transported by trailer.
7. Chock trailer when being disconnected from truck.
8. NON-VEHICULAR APPLICATIONS: Ensure pipe is properly chocked on pipe rack; ensure 55-gallon drums on horizontal drum racks are chocked; ensure loads are blocked to prevent shifting and falling.

5. HYBRID VEHICLES

What is critical to be aware of with hybrid vehicles is that with the engine shut off, there is no sound coming from the engine compartment or the electric motor. With a hybrid vehicle, a silent car is no guarantee of a safe car. Consider that it is in "sleep mode." Make sure you are aware of this before the vehicle "wakes up" and catches you by surprise!

Chocking the wheels is critical for safety around a hybrid vehicle. Fortunately, Toyota and Honda engineers have designed an indicator light to show the status of the vehicle and its potential to drive away. Under certain conditions, when the Honda Insight stops, such as in traffic or as a result of a vehicle crash, it goes into the Auto Idle-Stop mode. A small green Auto Stop LED light at the base of the tachometer in the instrument panel illuminates. This indicates that the engine is not moving at all, and reminds the driver and others, such as emergency responders, that the car is still in the “on” mode.

APPENDIX U

ExxonMobil E&PS Personal Security Procedure

PROCEDURE 5.2.4 PERSONAL SECURITY

This Procedure meets EMES OIMS System 5.2 requirement for identifying and mitigating personal security risks at EMES project sites.

Procedures

5.2.4.1 Personal Security Mitigation

This Procedure applies when there is the potential for personal security issues (e.g., assault, robbery, threat, kidnapping, etc.) when personnel are working under any of the following circumstances:

- Project site located in a higher crime area or a history of security incidents
- Working outside of regular cellular telephone service
- Idle property with potential for trespasser(s) to shelter in buildings/structures and assault personnel
- Working at night

1. **(CC)** Where available, research local crime statistics from governmental or public sources to determine if project site is located in a higher crime area.
2. **(CC)** If one or more of the circumstances above exist, complete a Personal Security Assessment. The Personal Security Checklist, or similar data gathering process can be used to assess the potential for personal security issues (e.g., assault, robbery, threat, kidnapping, etc.). This can be conducted for an individual site or a group of sites with similar conditions.
3. **(CC)** Define specific mitigating actions for any risks identified during the assessment to reduce the probability of a security incident. Mitigating action may include a communication plan between field personnel and office personnel.
4. **(CC)** Document the mitigating actions and communication plan in the HASP.
5. **(CC)** Review the mitigating actions with field personnel.

5.2.4.2 Armed Guards

1. (All) Armed guards require management pre-approval. Contact your Regional Safety Advisor (RSA) for assistance with the approval process (RSA to contact the GREF Security Contact).
Note: Armed Security requests are completed using the *Authorization form* which is completed by Global Security. Requests require Global Functional Manager approval, and then approval by the GSC President and GSC SSHE Manager. Armed off-duty law enforcement providing traffic control, not related to Company physical security does not require pre-approval. Global Security Advisor must be notified.

References

Personal Security Checklist
Armed Security Authorization Form

Site Visit Security Assessment Checklist

DATE:	NAME OF FACILITY(IES):
ExxonMobil Employee NAME AND ADDRESS:	
APPLICABLE CIRCUMSTANCES: ❑ Working Alone ❑ High Crime Area ❑ Isolated Site ❑ Idle Site w/Unoccupied Structures ❑ Working at Night ❑ Site with History of Security Incidents ❑ Other _____	

Yes	No	N/A	
❑	❑	❑	Is the work site protected with perimeter fencing?
❑	❑	❑	Is the work area within a secure building?
❑	❑	❑	Is the visibility of the work site sufficient to discourage trespassers? (For instance, is the site entrance visible from the street and free of plants/shrubs/trees or other obstructions?
❑	❑	❑	Is work area lighting sufficient?
❑	❑	❑	Is there a security system and/or security patrols at the work area?
❑	❑	❑	Are signs posted to notify the public about the security system?
❑	❑	❑	Does the security system include: ✠ Video surveillance/cameras ❑ Personal alarm pendants
❑	❑	❑	Do workers have a procedure for contacting others capable of responding if they need immediate help?
❑	❑	❑	Does the procedure involve one or more of the following? ❑ Buddy System ❑ Radio Contact with Designated Person ✠ Cellular telephone ❑ Satellite telephone
❑	❑	❑	Is communication equipment inspected regularly? (for example, are batteries fully charged?)
❑	❑	❑	Are workers required to advise someone when they leave, to provide a travel plan and an estimated time of return?
❑	❑	❑	Do workers have a procedure which requires them to check-in at scheduled times?
❑	❑	❑	Is there an "overdue" procedure to initiate searches for workers who fail to check-in on time?
❑	❑	❑	Are agreements in place with nearby businesses to maintain regular visual and/or telephone contact with workers on the site?
❑	❑	❑	Are emergency telephone numbers (police, fire brigade, contractor's office, etc.) readily accessible by the workers?
❑	❑	❑	Are emergency telephone numbers confirmed at least quarterly?
❑	❑	❑	Do workers schedule rest periods when their job requires driving alone?
❑	❑	❑	Do workers carry emergency/survival kits when traveling in isolated areas or severe weather conditions?
❑	❑	❑	If working alone, has the worker been trained to work alone safely? Is he/she aware of the increased risk of conducting hazardous work alone?
❑	❑	❑	Are workers aware of strategies to discourage robberies and assaults?
❑	❑	❑	Are workers trained on how to behave during a robbery attempt or threat situation?
❑	❑	❑	Is the knowledge tested at the end of the training?

Personal Security Assessment Checklist

Instructions: Complete this checklist to assess and mitigate personal security risks. The ***Personal Security*** portion is designed to identify potential risks from assault, robbery, threat or kidnapping. The ***Lone Worker*** portion is designed to identify potential risks when personnel are working alone or in isolated locations. If Lone Workers are working alone **and** there is a potential for assault, robbery, threat or kidnapping, complete both sections of this checklist.

DATE:	**NAME OF FACILITY(IES):**
NAME OF INDIVIDUAL COMPLETING THE ASSESSMENT:	
COMPANY NAME:	

Personal Security (Assess personal security risks associated with assault, robbery, threat, kidnapping.)

Yes	No	N/A	
❑	❑	❑	Is visibility of the work site sufficient to discourage trespassers? (For instance, is the site entrance visible from the street and free of plants/shrubs/trees or other obstructions).
❑	❑	❑	Is work area lighting sufficient?
❑	❑	❑	Is there a security system and/or security patrols for the work area?
❑	❑	❑	Is there a procedure for contacting others capable of responding if help is needed?
❑	❑	❑	Are agreements in place with nearby businesses to maintain regular visual and/or telephone contact with workers on the site?
❑	❑	❑	Are emergency numbers (police, fire, contractor's office, etc.) readily accessible?
❑	❑	❑	Are workers aware of strategies to discourage robberies and assaults and how to behave during an robbery/assault?

Lone Worker (Assess personal safety risks when personnel are working alone or in isolated locations.)

Yes	No	N/A	
❑	❑	❑	Do workers have a procedure for contacting others capable of responding if they need immediate help?
❑	❑	❑	Does the procedure involve one or more of the following? ❑ Buddy System ❑ Cellular telephone ❑ Radio Contact with Designated Person ❑ Satellite telephone
❑	❑	❑	Is communication equipment inspected regularly?
❑	❑	❑	Are workers required to advise someone when they arrive or leave the site; to provide a travel plan and an estimated time of return?
❑	❑	❑	Do workers have a procedure to follow when they arrive on site alone?
❑	❑	❑	Do workers have a procedure which requires them to check-in at scheduled times?
❑	❑	❑	Is there an "overdue" procedure to initiate searches for workers who fail to check-in on time?
❑	❑	❑	Are agreements in place with nearby businesses to maintain regular visual and/or telephone contact with workers on the site?
❑	❑	❑	Are emergency telephone numbers (police, fire brigade, contractor's office, etc.) readily accessible by the workers?
❑	❑	❑	Do workers schedule rest periods when their job requires driving alone?
❑	❑	❑	Do workers carry emergency/survival kits when traveling in isolated areas or severe weather conditions?
❑	❑	❑	If working alone, has the worker been trained to work alone safely? Is he/she aware of the increased risk of conducting hazardous work alone?

Mitigation Steps

Review any questions with a "No" answer and document mitigation steps that will be implemented to reduce security risks.

Mitigation Step	Person Responsible	Date Completed

APPENDIX V

Roux Procedures and ExxonMobil E&PS Minimum Safety Expectations
Confined Space

ENVIRONMENTAL CONSULTING & MANAGEMENT
ROUX ASSOCIATES INC
209 Shafter Street
Islandia, New York 11749
TEL 631-232-2600 FAX 631-232-9898

MEMORANDUM

TO: New York Technical Staff

FROM: Drew Baris and Brian Morrissey

CC: Office Managers

DATE: September 8, 2005

RE: Safety Considerations for Work at Remediation System Vaults and Manholes

We have conducted a safety review of activities performed at several remediation sites managed by Roux Associates with regards to working in and around potential confined spaces such as vaults and manholes. The attached document provides recommended procedures for evaluating potential hazards for spaces that will be entered by Roux Associates personnel or subcontractors. The objectives of preparing and distributing this document are to assist project managers and field staff in:

- Performing all work activities in accordance with OSHA standards and guidance documents;
- Identifying potential hazards;
- Properly classifying and labeling permit-required confined spaces; and
- Implementing proper procedures to temporarily reclassify the confined space as "Non-Permit Required Confined Space" if the hazards are eliminated for each entry event

All technical staff should review the attached document, especially with regards to potential hazardous atmospheres. Project managers should implement the recommended procedures and practices when appropriate based on site-specific conditions, required field tasks, and potential hazards. If changes to current operations and maintenance activities are warranted, the site-specific HASP should be updated to reflect these changes.

If you have any questions or wish to discuss these issues, please contact Drew or Brian.

SAFETY CONSIDERATIONS FOR SITE-SPECIFIC WORK ACTIVITIES AT REMEDIATION SYSTEM VAULTS AND MANHOLES

I. INTRODUCTION

Roux Associates, Inc. has reviewed applicable Occupational Safety & Health Administration (OSHA) Standards and Interpretive Guidance regarding confined spaces and associated hazards. This document presents a summary of OSHA requirements for, and definitions relative to, confined spaces. These guidelines have been developed to implement an approach for determining if a vault or manhole needs to be classified and labeled as "Permit-Required Confined Space". In addition, a review of critical safety considerations for work at vaults and manholes is presented.

II. OSHA STANDARDS AND DEFINITIONS

OSHA Standard 29 CFR 1910.146 includes requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces. Some key definitions provided in this standard are included below:

- A **confined space** has limited or restricted means of entry or exit, is large enough for an employee to enter and perform assigned work, and is not designed for continuous occupancy by the employee. These spaces may include, but are not limited to, underground vaults, tanks, storage bins, pits and diked areas, vessels, and silos.

- A **permit-required confined space** is one that meets the definition of a confined space and has one or more of these characteristics: (1) contains or has the potential to contain a hazardous atmosphere, (2) contains a material that has the potential for engulfing an entrant, (3) has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section, and/or (4) contains any other recognized serious safety or health hazards.

- **Hazardous atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness. Hazardous atmospheres encountered in confined spaces can be divided into four distinct categories: Flammable, Toxic, Irritant and/or Corrosive, and Asphyxiating.

- **Immediately dangerous to life or health (IDLH)** means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

OSHA guidance indicates that the definition of "Hazardous atmosphere" is not based on the Permissible Exposure Limit (PEL); OSHA PELs are based on an 8-hour time weighted average exposure. OSHA's guidance on "Hazardous atmosphere" is based on the conditions that contain elevated or depleted oxygen levels, approach explosive conditions (i.e., low explosive limit – LEL) or other conditions that are approaching IDLH air concentration values used by the National Institute for Occupational Safety and Health (NIOSH), or other concentrations which causes acute, short-term incapacitation, which would prevent self rescue (i.e., a concentration which could result in loss of consciousness or disorientation in a short period of time).

A discussion on confined space hazards can be found at:

http://www.osha.gov/SLTC/smallbusiness/sec12.html

III. CLASSIFICATION OF VAULTS

Determination if the vault is a confined space

Initially, the vault or manhole needs to be evaluated to determine if it meets the three criteria to be defined as "confined space" as defined by CFR 1910.146(b) which are:

1. Large enough to be bodily entered,
2. limited means of entry or exit, and
3. is not designed for continuous employee occupancy.

The typical remediation vault found at sites managed by Roux Associates personnel are large enough for a person to enter. The design normally does not include heating, lights, or ventilation (except for natural ventilation when the cover is open) as would be required for continuous occupancy. Available guidance indicates that a small space in which an entrant cannot be trapped (e.g., chest freezer 30 inches high) is not a confined space because the entrant could easily step out; however, a roll-off container (4 to 5 feet high) without internal stairs is a confined space. A parallel regulation, 1926.21(b)(6)(ii), which regulates confined spaces for

construction work, states that confined spaces include open top vaults more than 4-feet deep. This regulation is consistent with OSHA's published interpretations of 1910.146. Based on these OSHA guidelines, Roux Associates personnel should use the following criteria to determine if an open-top vault or manhole is a confined space:

- If the depth of the vault in question exceeds 42 inches and can be bodily entered, it is appropriate to conservatively determine that it meets criteria 1 and is, therefore, considered a confined space.

- Shallow vaults (i.e., depth ≤ 42 inches) where personnel can easily step out are not considered confined spaces.

Does the confined space have a known or potential hazard?

At numerous sites, remediation system vaults are used for the removal and pumping of separate phase petroleum product, which contains toxic volatile and semi-volatile compounds. Vapors from the recovery wells could result in the accumulation of vapors above IDLH-based exposure limits in the vaults. Flammable petroleum (i.e., with a flash point lower than 100°F, such as gasoline) could result in the accumulation of flammable vapors in the vault. The biological degradation of separate phase petroleum product is known to also consume oxygen and can lead to a low oxygen concentration in the subsurface, which could result in an oxygen deficient atmosphere in the vaults.

Methane is commonly found in the subsurface at petroleum-contaminated sites. It is generated by biological methanogenic decomposition in anaerobic zones rich in organic matter (such as NAPL source areas) and can be trapped by low permeability soil layers and structures (vaults, slabs, paving, etc.), and accumulate in the top of capped well casings. Methane presents an acute hazard potential due to asphyxiation in highly confined situations where it displaces oxygen. It is not a chronic or toxic concern at low levels like benzene and other hydrocarbon compounds. Methane degrades aerobically and dissipates in unconfined conditions very rapidly.

Therefore, confined spaces such as a recovery wellhead vault, which are connected to sources of flammable separate phase petroleum product, are considered to have a potential to contain a hazardous atmosphere. Such vaults should be classified as permit-required confined spaces.

Remediation system vaults that are only associated with combustible separate phase petroleum (i.e., with a flash point above 100°F, such as diesel fuel or heating oil) or dissolved phase groundwater contamination (i.e., no free-phase product is present) need to be evaluated on a case-by-case basis for potential hazards. In addition to petroleum related hazards, the accumulation of other organic material in the vault or subsurface may also result in the depletion of oxygen and a buildup of methane or hydrogen sulfide gas. Until the evaluation has been completed and documented, these vaults should be treated as permit-required confined spaces. The evaluation to de-list a vault should include three elements:

1. evaluation of groundwater and separate phase petroleum analytical data for the vault to assess for the potential to generate a hazardous atmosphere;

2. evaluation of the physical characteristics of the vault and the site features in the vicinity of the vault that could cause or eliminate the potential for a hazardous atmosphere (e.g., size, depth, and condition of vault, piping seals on vault penetrations, nearby sewer or utility lines, product tanks, etc.)

3. atmospheric testing for at least four successive entry events to assess for oxygen content, flammable gases or vapors, and potential toxic air contaminants.

If the results of the evaluation indicate there is no potential for the vault to contain a hazardous atmosphere per the 1910.146 definition, the vault can be considered for delisting.

IV. LABELING AND SIGNAGE FOR PERMIT-REQUIRED CONFINED SPACES

Appropriate labels or signs are required for vaults or manholes that have been determined to be permit-required confined spaces. OSHA requires the employer to inform exposed employees of the existence, location, and danger posed by the spaces. This can be accomplished by posting danger signs. The following language would satisfy the requirements for such a sign:

DANGER--PERMIT REQUIRED-CONFINED SPACE--
AUTHORIZED ENTRANTS ONLY

If workers are not to enter and work in permit spaces, effective measures must be implemented to prevent entrance to the permit spaces.

V. TEMPORARY RECLASSIFICATION OF A VAULT AS A NON-PERMIT REQUIRED CONFINED SPACE

Under 29 CFR 1910.146 (c) (7), a permit-required confined space may be temporarily reclassified if the hazards are eliminated for each entry event. Elimination of the hazards through ventilation must be verified and documented with use of a multi-gas detector. The internal atmosphere of the space must be tested first for oxygen content, second for flammable gases and vapors, and third for potential toxic air contaminants before any worker enters.

The procedures for temporary reclassification should be described in the site's Health and Safety Plan (HASP) and Job Safety Analysis (JSA) and must be followed by the entrant for each entry event. A checklist form should be filled out prior to entering the vault to document the reclassification of the area prior to each entry and to guide the personnel through the process. Copies of the checklist form must be maintained in an appropriate and readily accessible location.

Once an area has been reclassified, it may be entered using normal operating procedures. Each time a vault is entered, it must be reclassified to allow access. If the hazard cannot be removed, the vault continues to be classified as a permit-required confined space and will not be entered by Roux Associates' field personnel without prior notification of the project manager and Roux Associates' Corporate Health and Safety Director, and not without following full confined space entry procedures. Note that this would be an unusual event since our experience at operating remedial sites has typically shown that we have been able to achieve a non-hazardous atmosphere prior to performing work in well vaults under most conditions.

The determination of the vault's status and entry permitting exemption should be conducted using the Permit-Required Confined Space Decision Flow Chart (29 CFR 1910.146 Appendix A, attached) and the following as guidance:

- 29 CFR 1910.146, Occupational Safety and Health Standards, General Environmental Controls "Permit-Required Confined Spaces"
- 29 CFR 1926.21, Safety and Health Regulations for Construction "Safety Training and Education"

- OSHA Interpretive guidance regarding 1910.146 and 1926.21, as available on the OSHA web site: www.OSHA.gov.

Major steps in the decision flow chart are described below.

Can the hazard be eliminated?

Since the hazard in typical remediation vaults is a potential atmospheric hazard, it may not be possible to eliminate the potential hazard. An accumulation of site-specific information, either existing or to be collected during future vault work, could be used to demonstrate that this potentially hazardous atmosphere does not exist and subsequently change the vault's classification to a Non-Permit Confined Space.

Can the hazards be made safe through ventilation?

Since the potential hazards are limited to atmospheric hazards, sufficient ventilation could eliminate the hazard (oxygen concentrations can be brought to normal, flammable gases and petroleum vapors can be reduced to acceptable levels). Therefore, in accordance with 1910.146(c)(5), permit procedures do not need to be followed if the entry is conducted following the procedures described in that section (continuous ventilation and air monitoring). The procedures described in 1910.146(c)(5) should be included in the JSA for vault entry. Compliance requires complete adherence with the JSA and completion of the tasks described in the order that they are described in the JSA. See Appendix B for Roux Associates' recommended procedure for vault entry utilizing temporary re-classification as a non-permit required confined space.

Note: If the hazards cannot be eliminated, personnel should not enter the space until approval is received from the project manager and Roux Associates' Corporate Health and Safety Director. Authorized entrants who plan to work in permit-required confined spaces must comply with all OSHA requirements. This includes, but is not limited to, receiving proper training, obtaining an entry permit signed by a supervisor, utilizing appropriate respiratory protection and safety equipment, communicating with the standby person (attendant) who must remain outside the

permit space during entry operations unless relieved by another authorized attendant, and have ready access to rescue and emergency equipment.

VI. SUMMARY

All vaults and manholes at remediation sites that will be entered by Roux Associates personnel or subcontractors should be evaluated for potential hazards and classified in accordance with OSHA standards and guidance documents. Confined spaces such as a recovery wellhead vault, which are connected to sources of flammable separate phase petroleum product are presumed to have a potential to contain a hazardous atmosphere. Such vaults should be classified as permit-required confined spaces and labeled accordingly. Vaults and manholes that are not connected to sources of flammable separate phase petroleum product need to be further evaluated on a case-by-case basis to determine if they have a potential hazardous atmosphere. Until such evaluation is completed and documented, any remediation vault that needs to be entered by Roux Associates or subcontractor personnel should be considered to be a permit-required confined space.

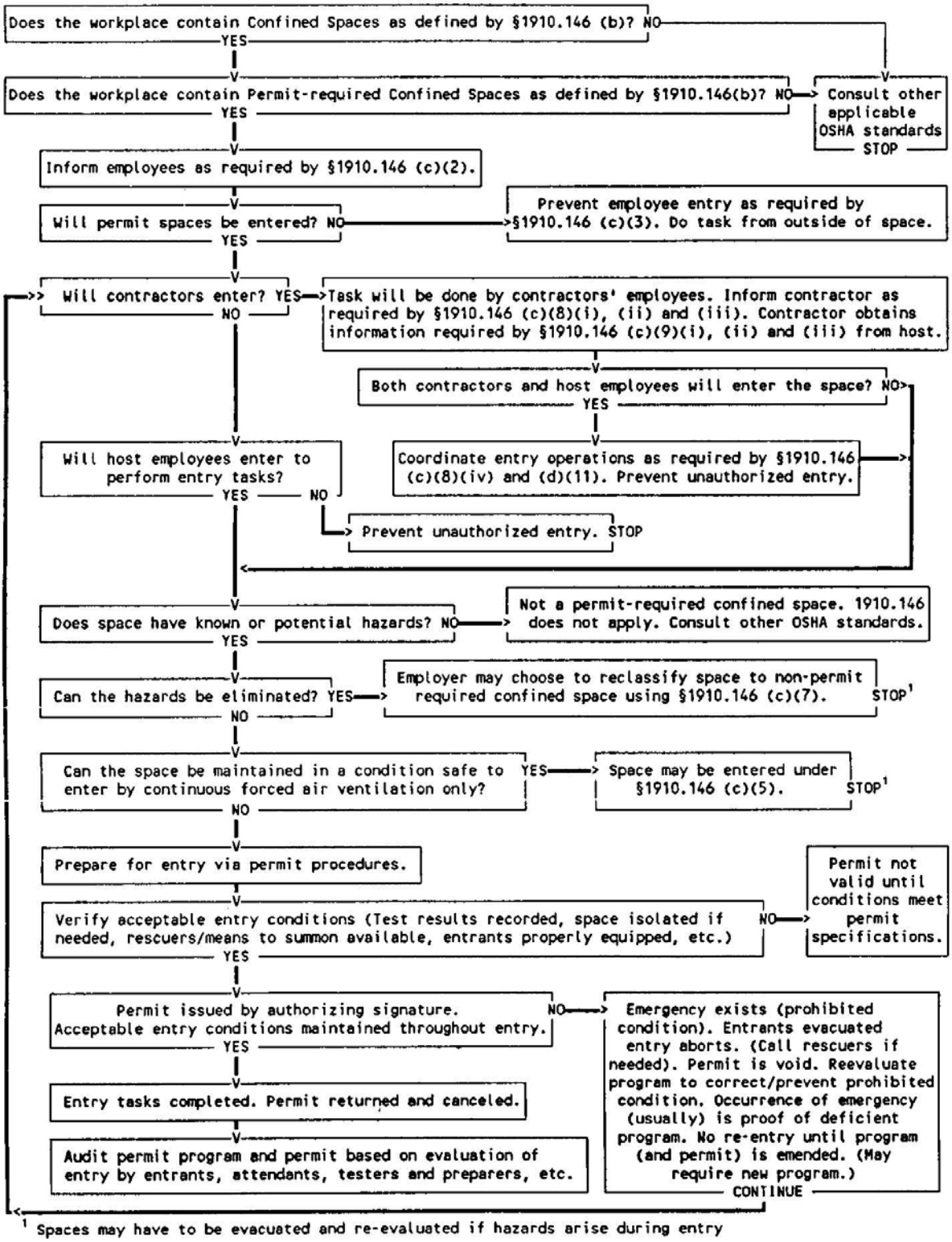
A permit-required confined space may be temporarily reclassified if the hazards are eliminated for each entry event. When hazards cannot be eliminated, only trained and authorized personnel should enter permit-required confined spaces and only after receiving specific approval of the project manager and Roux Associates' Corporate Health and Safety Director.

Prior to worker entry into confined spaces with a potential to contain a hazardous atmosphere, the internal atmosphere of the space must be tested sequentially with appropriate monitoring equipment for the following parameters:

1. Oxygen content
2. Flammable gases and vapors
3. Potential toxic air contaminants

The results of all internal atmosphere monitoring must be fully documented. The records should be kept in a readily accessible location at the work site. Records should not be stored in the vaults.

PERMIT-REQUIRED CONFINED SPACE DECISION FLOW CHART



ROUX ASSOCIATES' RECOMMENDED PROCEDURE FOR VAULT ENTRY UTILIZING TEMPORARY RE-CLASSIFICATION AS A NON-PERMIT REQUIRED CONFINED SPACE

Work in vaults designated as "permit-required confined spaces" shall be performed in accordance with the following steps:

1. Document the date and time of vault entry, as well as the personnel entering the vault and the planned activity.

2. Review the appropriate JSA and review the confined space decision-making flow chart, which should be available in a nearby accessible location such as a recovery well house.

3. Verify that the vault is properly labeled, the work area is secured with 48-inch safety cones, and all personnel are wearing the proper PPE.

4. If electrical work is being performed within the vault, proper lock-out, tag-out procedures must be followed.

5. Screen the vault with a multi-gas meter ensuring that atmosphere within the vault is within the acceptable ranges:

    a. O_2 % is between 19.5 and 23.5%

    b. VOCs are less than 5 ppm or alternate level as provided in the Site-Specific Health and Safety Plan that is based on the specific chemicals of concern.

    c. LEL is less than 5%

6. If the vault atmosphere conditions are not within these ranges, the area is considered a permit-required confined space area and cannot be entered until the hazards have been eliminated.

    a. The vault will be ventilated using natural ventilation or a portable ventilator until the acceptable atmosphere conditions have been reached and all hazards are eliminated.

    b. If it is not possible to eliminate the hazardous conditions within the vault, the vault will not be entered until the matter is discussed with the project manager and Roux Associates' Corporate Health and Safety Director.

7. If the vault atmosphere conditions are within the safe ranges, the area can be temporarily reclassified as a non-permit required confined space area. Work can be conducted within the vault following normal operational procedures.

    a. If working within the vault for an extended period of time, the atmosphere should be screened frequently.

    b. If at any time hazardous conditions are present with the vault, the vault is classified once again as a permit-required confined space area, and will not be entered without prior notification of the project manager and Roux Associates' Corporate Health and Safety Director.

8. Roux Associates personnel will complete the checklist, stored near the work area, which documents these requirements; each time they enter a vault.

CONFINED SPACE

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Life Saving Essentials

- Confined spaces are identified and safeguarded from unauthorized personnel
- Entry, exit and emergency rescue plans are in place and understood
- Gas testing performed as required

Confined Space Requirements

Confined space is an enclosed or partially enclosed space/structure that:

- Is not designed for continuous occupancy; and
- Has an opening large enough for one's torso and head to pass either intentionally or unintentionally; and
- Has limited or restricted means of entry and exit

Hazards associated with confined spaces and the tasks to be performed within the space must be identified and controlled before entry can occur. The following hazards must be considered:

- Atmospheric contaminants (contaminated air/gases/fumes)
- Oxygen deficiency/oxygen enrichment
- Hazardous and toxic substances
- Radiation sources/Naturally Occurring Radioactive Material (NORM)
- Access/egress hazards/restrictions
- Unstable structures inside the space
- Energized equipment/mechanical hazards inside
- Heat/cold stress
- Biologicals – plants, animals, insects
- Noise
- Engulfment (surrounded by materials, liquids or fumes)
- Traps
- Gas cylinders/hoses/utilities
- Flammables/combustibles that are lining tank/vessel walls, trapped behind scale, or packed beds

Establish / Maintain Safe Confined Space:
Test and monitor atmosphere

- Combustible dusts/debris

Below are examples of confined spaces that may be present at E&PS Facilities and Projects:

- Elevator pits, sumps, vaults, air handling units, sewer systems, tanks, vessels and excavations not properly sloped greater than 4 ft. (1.2m)
- Residual process fluids and solids must be removed from the confined space and the interior cleaned (i.e. steamed, washed, rinsed, etc.). If any residual material remains in the confined space and entry is required, consult your SSHE Advisor
- Confined spaces must be physically isolated from all sources of potentially hazardous materials. Disconnection and blinding/blocking (i.e. inserting a solid flange in piping) needs to be as close as possible to the permit space. An MOC is required if physical isolation cannot be achieved
- Energy sources (electrical, radiation, nuclear, and mechanical) that could impact the confined space must be de-energized, locked out or removed, and tested to confirm zero energy state

All confined spaces must be identified and safeguarded to prevent unauthorized personnel from entering the space.

Personal Responsibilities

E&PS and/or Contractor/Consultant Management must:

- Follow the minimum safety expectations contained within this document
- Ensure personnel are trained in confined space procedures
- Identify and communicate potential confined space hazards to contractors and personnel

Entry Supervisor/Attendant (Hazard Watch)/Entrant must:

- Be familiar with the structure and configuration of the confined space
- Understand and recognize hazards that may be encountered during entry, including other hazards not identified by gas testing (i.e. engulfment, structural weaknesses, etc.)
- Receive training and understand:
    - Their roles and responsibilities
    - Confined space entry requirements/procedures
    - Proper equipment use (i.e. PPE, supplied air, rescue equipment, gas testing, etc.)
    - Recognizing the signs, symptoms, and consequences of exposure to hazards

In addition,

Entrant must:

- Be authorized by the Entry Supervisor to enter confined spaces
- Establish and maintain communication with the Attendant
- Alert the Attendant when any warning sign or symptom of exposure is detected
- Immediately exit the confined space when the Attendant or Entry Supervisor gives an order to evacuate

Attendant (Hazard Watch) must:

- Be dedicated exclusively to attendant related activities
- Be present at the point of entry to monitor worker condition, control and warn personnel of potential hazards or emergency conditions that could affect their safety
- Remain outside the confined space during entry operations until relieved by another Attendant
- Establish and maintain communication with Entrants and maintain Entrant headcount
- Monitor activities inside and outside the confined space
- Monitor the air supply for air-line respiratory protection and the source of fresh air for ventilation
- Warn unauthorized persons that they must stay away from the confined space or must exit immediately if they have entered the space
- Inform Entrants and the Entry Supervisor if unauthorized persons have entered the permit space
- Summon rescue or other emergency services when it is determined an Entrant needs assistance to escape the confined space
- Be prepared to perform non-entry rescues as specified by the rescue procedure and Entry Supervisor

Entry Supervisor must:

- Authorize every entrant prior to entering the confined space
- Verify rescue services are available and that the means for summoning them are operable
- Ensure removal of unauthorized persons who enter or attempt to enter the space during entry operations
- Ensure entry operations remain consistent with any permit requirements

NOTE: The Attendant role can be fulfilled by the Entry Supervisor, provided that the individual has the required training.

Confined Space Emergency Response

Each site where confined space entry will occur must have a Confined Space Rescue Plan and the plan must be communicated and understood by the Entry Team and Rescue team prior to work starting. The rescue plan must include/identify:

- Notifications necessary to activate the emergency response
- Rescue personnel must be present and/or available
- Personnel trained in confined space rescue, including the use of Supplied Air Respirator (SARs) or Self-Contained Breathing Apparatus (SCBA) and with appropriate refresher drills
- Equipment to assist the retrieval of an injured person from a Confined Space
- List of hazards that might be present in the space
- First aid medical response
- Medical evacuation
- Managing rescue for specific circumstances, (i.e. engulfment scenarios)

The type of rescue (self-rescue, non-entry rescue and entry rescue) must be based on the type of confined space to be entered, number of entrants, egress routes, work being performed and the hazards of the specific confined space.

If a non-entry rescue can be performed safely, entrants must wear a full body harness attached to a lanyard or retrieval line to assist in retrieval.

During a confined space entry, the site must have confined space emergency rescue resources available as prescribed in the Emergency Response plan.

Outside emergency rescue personnel (i.e. local fire department) or on-site rescue personnel may be used to meet this requirement.

Entry into a confined space with an Immediate Dangerous to Life and Health (IDLH) atmosphere requires additional risk assessment and must have trained rescue personnel on site.

Gas Testing Requirements

Persons performing gas testing for confined space must be trained and competent to perform the gas testing.

Prior to entry into a confined space, the internal confined space atmosphere must be gas tested with direct-read or portable gas detector instrument(s) for oxygen, hazardous atmosphere and hazardous substances to determine if additional protective measures are required.

The minimum required gas tests are oxygen (O2), lower explosive limits (LEL), Total Hydrocarbons and any other hazardous substance in the space.

Gas testing must be representative for the entire area of the confined space being entered.

Gas monitoring devices must have an audible alarm or be otherwise monitored to ensure that the confined space atmosphere does not exceed the allowable limits for safe entry.

Gas testing to determine the presence of potential contaminants must be performed with any ventilation systems off for a period of time before starting the tests to allow for more stable readings and to provide a measure of potential exposure in the event of a ventilation system failure.

If personal gas monitors are worn, alarming must initiate job stoppage for potential LEL, oxygen or toxics.

Gas test instruments must have current calibration in accordance with manufacturers' instructions. Each instrument must be tested (bump tested) with a calibration gas prior to its use.

If gas testing determines the atmosphere is hazardous then continuous gas testing must be conducted. Continuous monitoring results shall be monitored by personnel and recorded every 2 hours.

Whenever work has stopped for more than 30 minutes in any confined space, an additional gas test shall be performed and recorded prior to continuing work.

Reaching into an enclosed space for the purpose of conducting gas testing is permitted provided:

1. Gas tests performed outside the entrance of the space do not show a hazardous atmosphere, **and**
2. The person conducting the gas tests assumes a position that precludes breathing the atmosphere of the enclosed space.

If the gas tester needs to enter the confined space to conduct accurate initial gas testing, the gas tester MUST use appropriate PPE (i.e. SCBA, intrinsically safe devices, etc.) **and** have a standby in place.

***NOTE**: A nitrogen-enriched environment, which depletes oxygen, can be detected only with special instruments. High concentrations of N2 become particularly dangerous because workers may not be able to recognize physical or mental symptoms of overexposure, leading to asphyxiation. In addition, N2 when mixed with hydrocarbons can create an explosive atmosphere. If a nitrogen-enriched environment is suspected, suspend work until the area can be confirmed safe.

The confined space must meet safe atmospheric testing limits before entry is permitted without respiratory protection. Personnel entering a confined space must wear appropriate respiratory protection based on the Confined Space Entry Respirator Selection Guide.

Confined Space Entry Respirator Selection Guide

(NOTE: region-specific concentration limits may be lower; consult MOH Occupational Exposure Limits)

Type of Chemical/Gas (1)	Monitoring Method (2)	Exposure Limits (3)	No Respirator Equipment Required	Air Purifying Respirator Max Use Level		SCBA or Supplied Air Required Max Use Level	
	Units	Values	Ranges	Half Mask	Full Mask	SCBA	Supplied Air (5)
Oxygen	A (%)		19.5% to 23.5%	19.5% to 23.5%	19.5% to 23.5%	<19.5% or >23.5% (4)	<19.5% or >23.5% (4)
LEL	A (% LEL)		(6)	(6)	(6)	> 5 %	> 5%
Benzene	B or C (determine)	0.5 ppm (1.0 ppm STEL)	<0.5 ppm	>0.5 ppm	>5.0 ppm	500 ppm	>500 ppm
Hydrogen Sulfide (H2S)	A (ppm)	5 ppm (10 ppm STEL)	≤5 ppm	(7)	(7)	>5 ppm	>5 ppm

FOOTNOTES:

(1) Type of gas: if other chemicals or gas are present, refer to appropriate SDS

(2) Monitoring Method:
A = Multi-Gas Monitor
B = Detector Tube (Drager and/or Gastec/Sensydine)
C = Special Gas Detector

(3) Permissible Exposure Limit (PEL) 8-hour time weighted average or ExxonMobil Occupational Exposure Limit (OEL) unless otherwise stated. No respirator is required if measured concentration is below the exposure limit

(4) This level constitutes an Immediately Dangerous to Life or Health (IDLH) atmosphere. For entry into unknown or IDLH atmospheres, ExxonMobil E&PS Management approval must be obtained before entry

(5) Equipped with 5-minute escape air bottles

(6) Not applicable to respirator protection. Rely on oxygen and specific contaminants (Benzene, Butadiene)

(7) There is no air-purifying respirator available that protects against H2S. Use SCBA or Supplied Air

Entry into confined spaces shall not be allowed if combustible gas concentration exceed 5% of the LEL.

Excavations

Confined space entry for excavations and secondary containment systems (i.e. dikes) require a means of safe egress (i.e. ladders) at a minimum of every 25 ft (7.5m).

Entry into excavations that meet Confined Space definition must also follow the Excavation Minimum Safety Expectations.

Definitions

Confined Space: A confined space meets all of the following requirements:

1. Is not designed for continuous occupancy
2. Has an opening large enough for one's torso and head to pass either intentionally or unintentionally
3. Has limited or restricted means of entry and exit

Entry: Any part of a person's body passing through the boundary of any Confined Space.

Entry Supervisor: Is the person (such as the specialized contractor foreman or crew-chief) responsible for determining if acceptable entry conditions are present, for authorizing entry and overseeing entry operations and for terminating entry as required.

IDLH (Immediately Dangerous to Life and Health): An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

LEL (Lower Explosive Limit): The lowest concentration (air-fuel mixture) at which a gas can ignite is called lower explosive limit (LEL).

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document

APPENDIX W

ExxonMobil E&PS Minimum Safety Expectations – Energy Isolation

ENERGY ISOLATION

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Energy Isolation Minimum Safety Expectations will prevent injuries from exposure to hazardous energy and includes requirements for isolating, clearing and securing energy sources.

Energy Isolation activities require compliance with the following applicable Minimum Safety Expectations:

- Opening Process Equipment

Life Saving Action Essentials

- Identify all energy sources
- Lock and tag all energy sources
- Verify energy isolation by confirming zero energy state before starting work
- Earth, ground, bond, if applicable

Isolate Energized Systems:
Lock out, tag out, confirm zero energy state

Energy Isolation Requirements

Energy Isolation must be used to isolate machine, equipment or a system from all potentially hazardous energy (i.e. electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.) before starting work such as installation, repair or maintenance activities.

Energy Isolation must be performed only by Authorized Persons who are responsible for applying the securing devices to energy isolating devices in preparation for the work.

Affected personnel must be notified by the Authorized Person of the application and before removal of securing devices.

The Authorized Person must confirm that the procedure has been implemented and physically demonstrate energy isolation to the Affected Persons.

Activities involving energy isolation require Lockout/Tagout (LO/TO) written procedures (see exceptions).

Procedures must include steps for the following, as applicable:

- Planning and preparation including the sequence of critical steps in the shutdown and isolation including:
    - Type and location of energy isolation devices (EID) (valves, blinds, physical disconnection points, mechanical energy isolation devices/electrical isolations) and testing requirements
    - Location of all process openings (if applicable). Personnel must use Figure 2.1 Energy Isolation Decision Tree to determine process isolation requirements
    - Location of process energy verification points (EVP) and associated pathway valves for verifying energy state for blind installation and removal and other process opening locations

  NOTE: All EIDs must be proven using the method and criteria contained in Table 2.2, 2.3 and 2.4

- PPE required during energy isolation/equipment isolation
- Machine, equipment, system shutdown
- Machine, equipment, system isolation as close as practical to the work
- Steps to address removal of equipment contents, residual material and/or relieving stored energy (purging, draining, depressurizing, discharging). If work will involve opening process equipment (OPE), see Opening Process Equipment Minimum Safety Expectation
- Confirm zero energy state by verifying isolation which must include:
    - An independent field verification from a second individual that will confirm the equipment or system is isolated
    - Demonstrating volt meter/induction meter is functioning properly on a known source for electrical energy
    - Physically locate and confirm isolation by:
        - Testing potential at the point of work
        - Verifying isolation points, opening locations and EVPs are consistent with the procedure

- Ensuring EIDs meet requirements in Table 2
- Attempting to operate the equipment, if practical (e.g. switches, valves, outlet/socket, energy verification points) and/or verification from an operator in a control room (if applicable)
- Tracing process lines connected to each opening to confirm all potential sources of energy or material are isolated

Where work is performed remotely and independent verification is not practical, approval must be obtained from Supervisor and documented.

Independent verification is not required if there is less than three energy isolating devices within the immediate control of individual performing the service or maintenance work.

Exceptions

Simple isolation must follow LO/TO requirements, however, written LO/TO procedures are not required when:

- The machine or equipment has no potential for stored or residual energy or accumulation of stored energy after shutdown that could endanger personnel, **and**
- The machine or equipment has a single energy source that can be readily identified, isolated and locked and tagged

  or

- Equipment is powered by a cord and plug

Potential Testing Equipment

Testing must be conducted by the Authorized Person.

Voltage rated gloves must be worn when testing on energized circuits.

Equipment must:

- Be designed specifically for the purpose of potential testing
- Be a direct contact device
- Be rated for the highest voltage level that could be encountered
- Incorporate in-line fuses
- Inspected prior to use

Solenoid type testers and test lamps must not be used.

Drain, Depressurize, Discharge, Clean

Process Energy

Equipment must be drained, depressurized, energy discharged, and equipment cleaned to the extent the equipment configuration allows.

Hazard Class 1 and 2 materials and Hazard Class 3 flammable material at elevation must be drained to a closed containment system. If a closed system is not available use an OPE Standby person.

Refer to Table 3. Material and Physical Property Hazard Class matrix to assign a Hazard Class to materials.

For Hazard Class 1 and 2 materials, purge and/or flush to displace/remove material.

Where contact with the residual material is a risk to personnel, equipment must be cleaned to remove/neutralize residual materials after clearing/purging.

Drain/Vent and/or purge/flush ensuring:

- Each flow path in the system is cleaned
- Provisions are made for cleaning or managing residual material in dead legs
- For hazard class 3 and 4 material, draining and depressurizing to a liquid-free state is adequate

Mechanical Energy

Energy sources associated with mechanical devices or moving parts (i.e. tension in springs, pressure in hydraulic or pneumatic systems, rotating fan blades and equipment under stress, etc.) must be released or blocked.

Radioactive Energy

Radiation energy must be isolated (shielded) or removed.

Electrical Energy

Stored and generated (induced) electrical energy must be released (discharge capacitors and apply earthing/grounding/bonding, if applicable, on all circuits equal to or greater than 1000v to prevent electrical energy from accumulating).

Proving Process Isolation Effectiveness

The effectiveness of the isolation, draining, depressurizing and de-energization must be proven using the EVP(s) and methods in Tables 2.2, 2.3 and 2.4.

As isolation progresses, an EID tag must be applied on the EID.

EVPs and pathway valves must be proven clear and tagged with an EVP tag and action taken to unplug the EVP pathway when indicated.

Opening locations must be tagged with OPE tags.

Inability to prove effective isolation must be discussed and mitigated before work continues.

Securing Energy Isolation for Duration of Work

EIDs must be secured to prevent them from being returned to an energized state. Removal for temporary re-energization is allowed per **Testing/Positioning** section.

Securing devices must be applied per Table 2.

When work continues beyond a work shift, LO/TO device(s) may remain in place when the Authorized Person(s) are expected to return on subsequent shifts.

Bleeder and open flanges (including bleeders of double block and bleed assemblies), behind single block valves in Hazards Class 2 and 3 material service must be closed when the job is not attended for more than 2 hours. Work behind a single block valve in Hazard Class 1 material service must be continuous, and bleeders and open flanges must be closed immediately when work stops.

A process must be in place that documents and tracks the status of energy isolation (i.e. log) and results in affected personnel knowing energy conditions. The process must include:

- Date of Isolation and anticipated return to service date
- Name of Authorized Person
- Description of isolated equipment
- If applicable, Isolation Certificate Number or Permit Number

Prior to recommencing work on equipment, machines or system, each individual must ensure that each LO/TO device is secure.

Securing Devices and Tags

If an energy isolating device is capable of being locked out, the device must be locked. A tag must also be applied with each lock.

Each Authorized and Affected Person must have exclusive control of their securing device.

Securing devices must be designed for the purpose of LO/TO and substantial enough to prevent inadvertent removal without the use of excessive force.

Lockout locks are the standard securing device used to control hazardous energy.

Securing devices must be removed by the Authorized Person or Affected Person that applied the device or someone designated by the Authorized Person or Affected Person.

When the Authorized or Affected Person who applied the device is not available, the device may be removed with the following actions:

- Confirm the Authorized or Affected Person who applied the device is not at the facility and all reasonable efforts have been made to contact the person that their device is going to be removed
- Contact the person's supervisor to verify the work is complete
- Inspect the system or equipment to ensure it is safe to reinstate/re-energize
- Any valid isolation (LO/TO) permits are cancelled
- Inform the Authorized or Affected Person who applied the device upon their return to the facility that their device was removed

Tags must be weather resistant and substantial enough to prevent inadvertent or accidental removal.

All tags must include individual that applied the tag, date applied and mobile phone number in addition to the information in the table below.

Table 1. Tag Requirements

Type of Tag	Application Requirement	Minimum Information Required
Energy Isolation Device (EID) Tag	For physical disconnects install the EID tag at the disconnection on the side of the equipment that is being worked	"Warning – Energy Isolation Device – Do Not Operate" or "Energy Control – Do Not Operate"
Securing Device Tag	Can be inherent to the device by stamping or engraving. Can be combined with the EID tag for process isolation	Identification of Individual or Group owning the Securing Device
Opening Process Equipment (OPE) Location Tag	Attached to the flange, personnel access way or cover plate to be opened or affixed to the physical location of non-bolted openings. For pipe cuts, the cut location needs to be marked on the pipe itself in conjunction with OPE tag	"Opening Location" or similar wording
Energy Verification Point (EVP) Tag	An EVP tag must be applied at the bleeder valve of a double block and bleed assembly. Applied to the location of the equipment where hazardous energy and material exposure is tested to verify de-energized or depressurized and drained, and any valve in the energy verification pathway	"Energy Verification Point" Indicate whether it is a valve in the pathway to EVP bleeders or the EVP bleeder itself (checkbox)

Testing or Positioning

In situations in which securing devices must be temporarily removed to test or position the equipment, the following sequence of actions must be followed:

- Obtain approval from the Authorized Person
- Communicate to Affected personnel
- Clear the machine or equipment of tools, materials
- Replace any covers, guards, or reinstate interlocks if applicable
- Remove the securing devices and tags
- Energize and proceed with testing or positioning
- Restore equipment to normal operations (see below), or
- De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance
- Confirm zero energy state by verifying isolation as described above

Restoring Equipment to Normal Operations

- Communicate to Affected Personnel that the energy is to be restored
- Clear the machine or equipment of tools, materials
- Replace any covers, guards, or reinstate interlocks if applicable
- Remove the lockout and tagout devices and re-energize equipment
- Test that the equipment is operating, if applicable

Group LO/TO Requirements

- Group LO/TO may be used if the keys of the locks used on the energy isolating devices are placed in a lockbox and each Affected Person applies their personal lock to the lockbox
- A Primary Authorized Person must be designated as the person responsibility for coordinating the Group LO/TO. This individual must ensure that all steps of the LO/TO procedure are complied with, including all other steps involved with the Group LO/TO procedures
- The Primary Authorized Person should be identified on the Work Permit or in the LO/TO procedure

Periodic Evaluation

Affected and Authorized Persons ability to perform and comply with these minimum expectations is evaluated periodically by Management through observations, assessments and audits.

Training

Affected Personnel must complete training to recognize hazards associated with energy control and energy isolation applications.

Training must address the following elements:

- Purpose of energy isolation
- Potential hazards
- Energy isolation process/procedures
- Affected Personnel roles and responsibilities

Authorized Personnel must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Refresher training must be provided when:

- There is a change in the minimum safety expectations
- Periodic inspection identifies deviations or inadequacies in energy control procedures or personnel knowledge
- Local regulations require, a site requirement is specified or within every 5 years

Training records must be maintained by the Authorized and Affected Person's employer and made available to E&PS upon request.

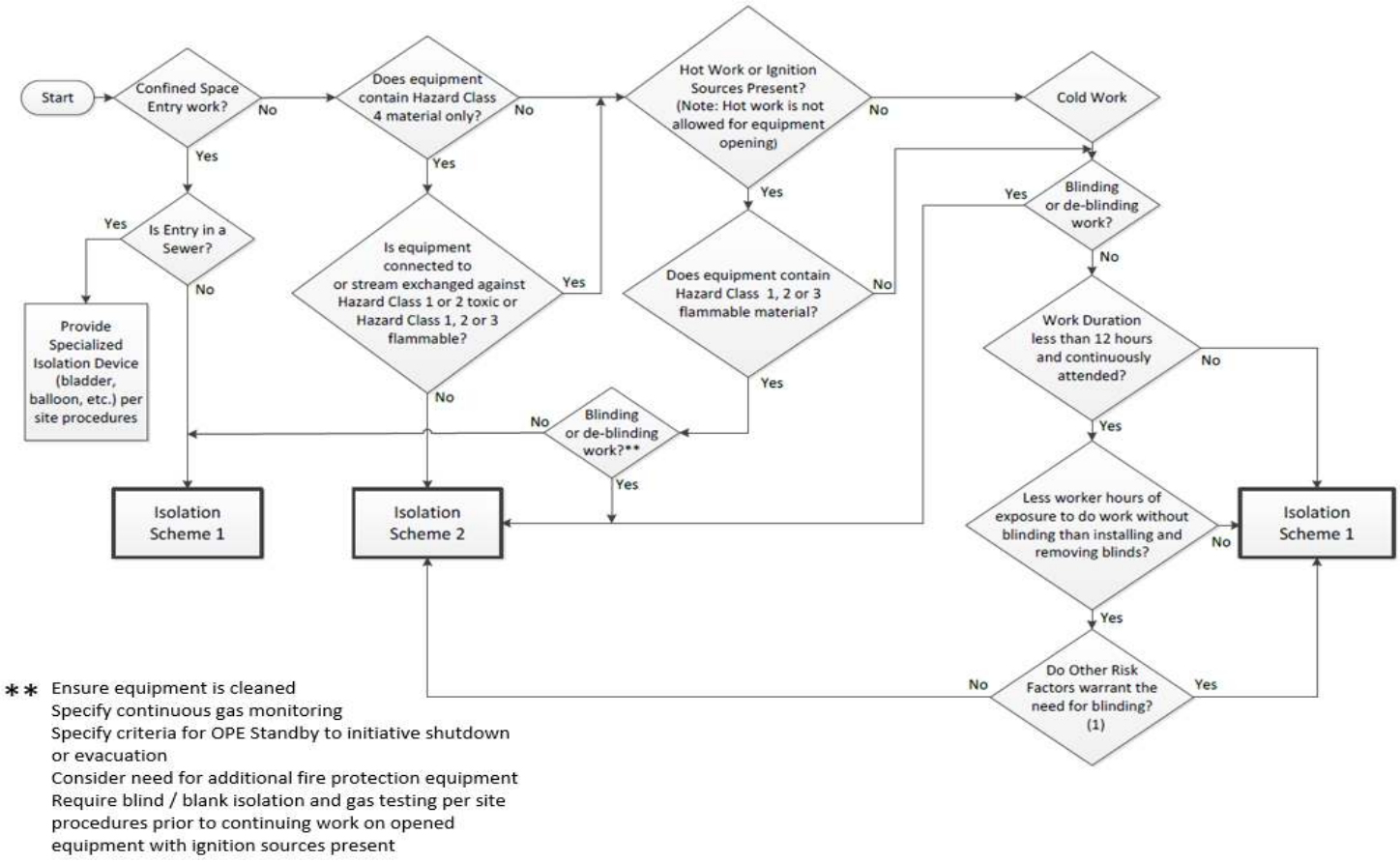
Table 2. Approved EIDs and Securement Methods

The tables below specify the devices that can and cannot be used for isolation of energy (per types of energy and work) and includes the minimum requirements that have to be included in site energy isolation procedures.

Steps:

1. Determine the Process Isolation Scheme required based on the work activity (task) to be performed using Figure 2.1
2. Determine the suitable **process** isolation devices, securement devices and energy verification from Tables 2.1 and 2.2
3. Determine the suitable isolation devices, securement devices and energy verification for **electrical and other energy sources** from Tables 2.3 and 2.4.

Figure 2.1 Energy Isolation Decision Tree



(1) Other Risk Factors may include: motive force for equipment driver; potential accumulation of hazardous materials; exposure of personnel not part of the work group; variable upstream process conditions; working at height; restricted work area and/or egress

Table 2.1 Process Isolation Schemes and Requirements

Isolation Type	EIDs	Additional Requirements
Isolation Scheme 1	**Allowed** • Blinds or Physical disconnection with blind flange, cap or plug on live process side • Mechanized Blind systems	
	Allowed with Additional Requirements • Double Block and Bleed assemblies	• Not allowed for Confined Space Entry • Only allowed if no alternative using blinds or physical disconnection (for example, welded piping system) • Justification and approval required • Process only – not acceptable for motive energy • Gate, plug, globe or ball valves • Distance between block valves no longer than 25 ft (7.5m) • If an air, hydraulic or electrically operated valve is used in a DB&B system, procedures must include control measures to ensure that valves cannot move while used for isolation • Bleeder is at low point of circuit between block valves, is fully open during the execution of work, and discharges to a safe location
	Not Allowed • Single block valve • Twin seal valves	
Isolation Scheme 2	**Allowed** • Double block and bleed assembly (preferred) • If double block and bleed not available, manually operated twin seal valve or single Gate Valve • If no manually operated twin seal valve or gate valve available, manually operated Plug, Globe or Ball Valve	
	Allowed with Additional Requirements • Air, hydraulic or electrically operated gate, plug, globe or ball valves	• Only permitted if an allowable EID cannot be identified. (applicable to all valve types listed) • Procedures must define the additional control measures to ensure that valves cannot move while used for isolation. This can include disconnection of hydraulic or instrument air lines and/or relieving residual energy associated with the valve motor (for example, instrument air pots) • Hydraulic driven valves with position control locking systems only
Continued on next page...	**Dampers or duct guillotines**	• 5 psig maximum pressure • Dampers allowable for Hazard Class 4 material service • Duct guillotines allowable for Hazard Class 3 and 4 material service

...Continuation from previous page	**Butterfly Valve**	• Not allowed for Hazard Class 1 or 2 material isolation
	3 way valve	• Not allowed for Hazard Class 1 material isolation • Not allowed for Hazard Class 2 without an EVP
	Not Allowed • Control valves with minimum stops • Non-return or check valves • Air-to-close valves • Hydraulically driven valves without position control locking system • Pressure relief valves/devices	

Table 2.2 Process EID Securement and Proving Requirements

EID	Securing Device(s)	Energy Verification Method (apply EVP tag per Table 1)
Blind or equipment disconnection	Fully bolted blanks and/or blind flanges or tightly screwed caps or plugs suitable for the process pressures to which they may be exposed	Method: Visual Inspection (Blinds shall be uniquely distinguishable in the field from spacers and orifices by use of one or more visual cues. Bleeder blinds shall be marked to indicate the vented side of the blind) Criteria: Blinds/Blanks in place, fully bolted
Mechanized Blind systems	Securement with tie wrap, lock and chain, per device design	Method: Visual Inspection Criteria: Blind set per design and operating mechanism secured
Double Block and Bleed Valve Assembly	Block valves: Valves owned by one Work Group: • Metal, nylon tie wraps or equivalent • Lockable steel cable If outside of the exclusive control of the work group owning the equipment being worked • Cable or chain secured with lockout locks, with keys owned exclusively by Authorized Person and Affected Person(s) Note: An isolation device is outside the exclusive control of the work group if the Authorized Person is not part of the work group	Method: Per Figure 2.2 Criteria: Energy verification per Figure 2.2
Single Block Valve	Block valves: Valves controlled by one Work Group: • Metal, nylon tie wraps or equivalent • Lockable steel cable For any valve outside of the exclusive control of the Work Group of the equipment being worked: • Cable or chain secured with lockout locks, with keys owned exclusively by Authorized Person and Affected Person(s) Note: An isolation device is outside the exclusive control of the work group if the Authorized Person is not part of the work group	Method: Opening of Energy Verification Point bleeder representative of the valve Criteria: No fluid discharge after draining/depressurizing

Figure 2.2 – Energy Verification for Double Block and Bleed Isolation

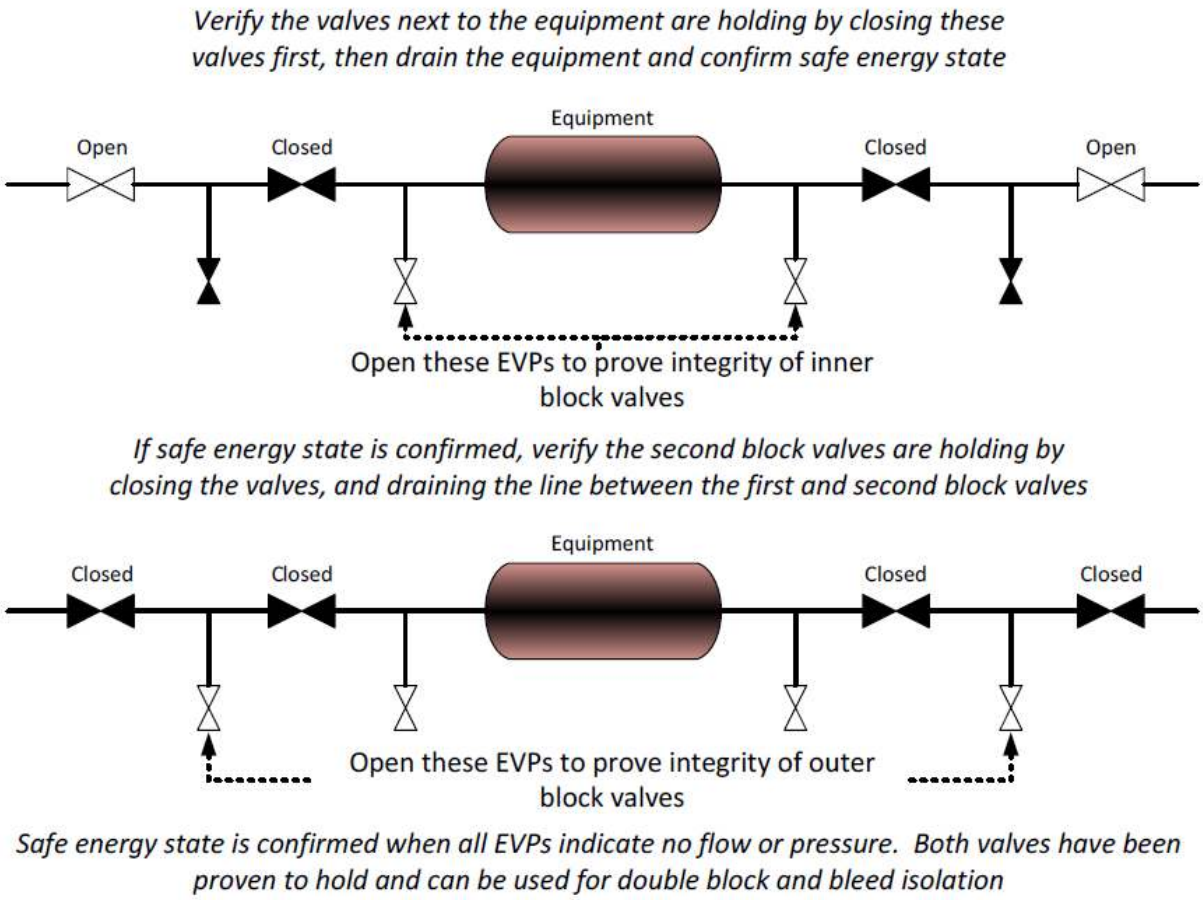


Table 2.3 – Electrical Isolation, Securement and Control Requirements

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	**Securing Device for Worker Protection**		
E1. Electrical Energy Isolation to Control Mechanical Energy	**Power Circuit**	Group Lock If an electrical EID is not capable of being locked-out with a lock, the site must develop a procedure to use alternative securing devices or apply a Tag Only system	Personal Lock or Group Lock	Each EID requires a Tag Each lock must be tagged.	See Table 2.3A for energy isolation verification requirements and criteria, and additional safeguards to prevent inadvertent automatic equipment re-energization

Table 2.3A – Energy Verification Requirements, Criteria and Electrical Isolation Safeguards

Energy Source/Work Type	Energy Verification Method/Criteria – Apply EVP Tag per Table 1
E1. Electrical Energy Isolation to Control Mechanical Energy	**<u>Manual Control</u> (no automatic or permissive controls)** **Method to prove Energy Isolation:** Press start button/operate start switch. **Additional Requirements**: o Latched stop signal: ▪ Disable motor control circuit by depressing and restricting****** stop button in stop position • Where stop button cannot be depressed on stop position, identify alternatives to disable motor control circuit. Options include: o Modify control station so stop can be pinned/restricted in stop position o Use a procedure for restricting (via tagging or other means) operation of the start/stop o Use mechanical blocking o Pulsed stop signal: • Where stop signal is treated pulsed, identify alternatives to disable motor control circuit o Modify control station so stop becomes latched signal o Procedure for restricting (via tagging or other means) operation of the start button o Mechanical blocking **<u>Automatic Control</u> (motor control circuit containing permissives, interlocks and/or automatic controls)** For automatic motor control circuits with Hand-Off-Auto (HOA) and Hand by-passes all permissive / automatic control and Off disables control circuit: **Method to prove Energy Isolation:** Press start button with HOA in "hand" position **Additional Requirements:** Move HOA to off position and restrict movement • Where HOA does not exist or HOA does not by-pass all permissive / automatic controls in Hand position **or** for automatic control circuits without an HOA that will disable the control circuit: o Use site established alternative procedure to disable motor control circuit. Following are examples (not an inclusive list of alternatives): ▪ Modify control circuit with HOA such that Hand position bypasses permissives and automatic controls and off position disables motor control circuit ▪ Procedure for proving EI and disabling motor control circuit with appropriate approval ▪ Mechanical blocking **Energy Verification Criteria:** Equipment does not start. **Restricting is a means to prevent the movement from the position that disables the control circuit. Locking is not required

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	**Securing Device for Worker Protection**		
E2. Electrical Energy Isolation for Electrical Work	**Power Circuit** Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1 AND Electrical Safety Minimum Safety Expectations implemented by a Qualified and Authorized Person per the Electrical Safety Minimum Safety Expectations
	Control Circuit Opening electrical breaker, opening switch or removing fuse at the most upstream electrical disconnect location which provides for the individual isolation of the equipment	Same as Table 2.3 – E1	Same as Table 2.3 –E1	Same as Table 2.3 –E1	Electrical Safety Minimum Safety Expectations implemented by a Qualified and Authorized Person per the Electrical Safety Minimum Safety Expectations
E3. Battery/UPS Systems	**Preferred –** - Transfer switch in 'OFF' position **Allowed – With Justification** - Wiring disconnect **Prohibited** - Any EID not considered in categories above including devices that are not properly engineered or rated for an intended application	Lockout lock (secures the switch in the off position) Insulated wiring termination	Individual lockout lock or group lock. Secure the switch or the unique key Securing Device (using lock box or multi-hasps where necessary) Disconnected wiring	EID Tag on switch. Securing Device or on disconnected wiring termination Worker Protection Securing Device Tag Disconnected Wiring – EID Tag	Voltage measurement and grounding per Electrical Safety Minimum Safety Expectations

Table 2.4 – Isolation, Securement and Control Requirements for Other Energy Sources

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	Securing Device for Worker Protection		
Mechanical Energy Sources					
M1. Rotational and Linear Motion	Allowable - Rope - Metal or nylon chain; lockable steel cable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required) - Uncouple driver	Rope securely tied off Chain or cable locked with lockout lock Lock device or pin as per design Block or clamp in place to prevent movement	No additional Securing Device required.	EID Tag	Confirm secured against movement
M2. Gravitational energy and potential energy including jammed equipment with forces in single direction	Allowable - Rope - Metal or nylon chain; lockable steel cable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required)	Rope securely tied off Chain or cable locked with lockout lock Lock device or pin as per design Block or clamp in place to prevent movement	No additional Securing Device required.	EID Tag	Confirm secured against movement
M3. Potential Energy including jammed equipment with forces in more than one direction (springs)	Allowable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required)	Lock device or pin per design	No additional Securing Device required.	EID Tag	Confirm zero movement

Radiation Energy Sources					
R1. Radioactive Source	Allowable - Shutter or Shielding as per equipment design - Remove source and store appropriately. (EID tag can then be removed)	Padlock as per equipment design Secure storage location	No additional Securing Device required.	EID Tag	Measure radioactive, ensure below required value (consult IH Advisor)

Table 3 – Material and Physical Property Hazard Class Matrix

Intended use:
These tables provide a means to assign a Hazard Class based on the material and physical properties. Throughout this document there are requirements for specific Hazard Classes. See the notes below the tables for additional guidance on how to determine Material and Physical Hazard Classes.

Material Properties

CATEGORY	**Hazard Class 1 Material** (Dangerous - Acutely Fatal)	**Hazard Class 2 Material** (Hazardous)	**Hazard Class 3 Material** (Potentially Hazardous)	**Hazard Class 4 Material** (Innocuous)
Toxic(*)	>3 x IDLH	3 x IDLH to IDLH Asphyxiating Gases (CSE)	IDLH to STEL; Asphyxiating Gases (OPE)	Below STEL
Flammable	Hydrocarbon Above Autoignition Temperature (AIT); Liquified and supercritical flammable gases	Pressurized Gases; Flammable liquids; Combustible liquids @<8°C/15°F below or above flash point	Combustible Liquids @>8°C/15°F below flash point	Non-combustible liquids
Reactive	Air/Water Reactives (i.e. Alkyls)' Liquid Oxygen	Pyrophorics		Not air/water reactive, flammable or combustible
Corrosive	Aerosolizing Highly corrosive (HF)	Other corrosives - (i.e. Sulfuric acid, caustic)	Irritants	Non-corrosive and non-irritating

Physical Properties

	Hazard Class 1	Hazard Class 2	Hazard Class 3	Hazard Class 4
Pressure	>7000 kPa 1000psi	1500 to 7000 kPa 200 to 1000psi	350 to 1500 kPa 50 to <200 psi	<350 kPa/50 psi
Temperature - Liquid State	>260°C/500°F	93 - 260 °C 200 - 500 °F	60 - 93 °C 140 - 200 °F	Ambient to 60°C/140°F
Temperature - Vapor State	>420°C/800°F	205 - 425 °C 400 - 800 °F	60 - 205 °C 140 - 400 °F	Ambient to 60°C/140°F

NOTES:
(*) The Material Hazard Class of a hydrocarbon is determined by its flammability. Hydrocarbon IDLH values are not used to determine their Material Hazard Class.

The Material Hazard Class of Steam is 4 (water). Steam poses physical hazards, based on its temperature and pressure.

The SDS can be used to obtain IDLH Data for toxics and flash points and auto-ignition temperatures for determining Material Hazard Classes.

Physical property Hazard Class determination is based on the pressure and temperature on the "process" side of the block valve until a blind has been installed.

Fluid temperature to use for Flammable Hazard Class and Temperature Hazard Class determination:

- For fully blinded or proven double block and bleed isolated systems, the temperature of the fluid within the isolation blinds/Double Block & Bleeds shall be used to determine Flammability/Temperature Hazard Class of the material.
- For single block valve isolated systems, the highest temperature of the fluid on the process side of a block valve shall be used to determine the Flammability/Temperature Hazard Class of the material.

When more than one material is present, the highest flammable Hazard Class shall be used as the Hazard Class. For example, when the flushing material is different from the process material.

Definitions

Affected Person: A person who has completed the required training and is **affected** by energy isolation, (i.e. operator or technician completing the work) but not **authorized** to de-energize equipment. An Affected Person may also be an Authorized Person if they meet the requirements of an Authorized Person. Affected Persons exclude office workers, third parties such as customers and members of the public.

Authorized Person: A person who has completed the required energy isolation training (general and procedure-specific) and is **authorized** to perform energy isolation on energy isolation points.

Cold Work: Activities that will not generate ignition sources.

Containment: Facilities or devices used to collect residual product from equipment being opened and prevent uncontrolled release of material.

Energizing Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to electrical circuit breaker, disconnect or isolation switch; manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, miniature circuit breaker (MCB) or fuse, fully bolted blanks and/or blind flanges, block valves.

Energy Verification Point: Location with appropriate devices (for example, switch or bleeder valve) used to confirm the effectiveness of one or more EIDs to isolate the equipment/circuit from energy sources.

Energy Verification Method: The procedure or steps used in conjunction with EVPs to confirm isolation or safe energy state.

Group Lockout: When service and/or maintenance is performed by a **group or groups** (i.e. electrical and mechanical) of workers, one lock is placed on the energy isolating device and that key is placed in a lock box. Each authorized or affected person would place their lock on the lock box. This achieves the same level of protection as a personal lockout.

Lockout: The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: Any device that uses positive means, such as a lock, blank flanges and bolted slip blinds, to hold an energy-isolating device in a safe position, thereby preventing the energizing of machinery or equipment.

Securing Device: A fastening device or an attachment which prevents movement of an Energy Isolation Device from its desired position and prevents operation on the equipment being controlled until the device has been removed.

Tag: A prominent warning device that can be securely fastened to an energy-isolating device to convey relevant information that the machine or equipment to which it is attached may not be operated until the tag is removed.

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document

APPENDIX X

ExxonMobil E&PS Minimum Safety Expectations – Hot Work

HOT WORK

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Life Saving Essentials

- Remove/Control flammable sources
- Assign a Fire Watch
- Conduct gas testing as required

Risks associated with contaminants that may require respiratory protection are not addressed in this document. Refer to the Medicine and Occupational Health (MOH) Global Health Practice on Respiratory protection and/or consult your SSHE Advisor.

Risks associated with hazardous energy must be managed using the Energy Isolation Minimum Safety Expectations.

Hot Work Requirements

Work that involves an ignition source only (no flammable or combustible materials) can be completed provided the work area can be controlled and remains free of potential fuel sources.

The work areas must be controlled to prevent unauthorized people from entering the area.

When hot work is performed on:

- Structures (i.e. product dispensers, tanks, etc.) They must be cleaned to remove all potential fuel sources and residue and certified gas free prior to hot work
- Overhead locations must include a suitable method for catching hot metal, sparks, etc. must be provided where these materials could cause a fire or other safety hazard to the area below

If potential fuel sources (unsaturated soil containing hydrocarbons is not considered a fuel source) are within 35 ft (10m) of the hot work activities and cannot be controlled, perform a risk assessment per OIMS 2.1.

Prevent Hot Work Explosions / Fires:
Remove flammable materials; gas test

Explosion proof equipment must be utilized when completing activities in an area where there is the potential for a hazardous atmosphere. Explosion proof equipment is identified with a symbol indicating it is explosion proof.

International symbol shown; local symbol may vary.

Prior to starting work ensure:

- Conditions at job site are safe for the scheduled work
- The proper gas tests have been performed and continuous monitoring requirements are understood prior to beginning work
- All required safety items are in place and communicated to the work team including, but not limited to, fire extinguishers, fire blankets, water sprays, and spark containment
- Sewer openings/flammable liquids/combustible materials in the area that could affect safe hot work (minimum of 35 ft (10m) from the hot work) have been covered/removed to prevent fires/explosions
- Equipment is grounded when using equipment that is capable of producing an arc

Fire Watch Requirements

A Fire Watch is required and must:

- Be at the job site during the entire hot work operation
- Have adequate fire-extinguishing equipment readily available (minimum one fully-charged, sealed and inspected dry chemical fire extinguisher meeting local regulations) and be trained in its use
- Inspect fire-extinguishing equipment and ensure it is in safe working order
- Observe the hot work and watch for fires in all exposed areas
- Extinguish fires within the capacity of the equipment available
- Warn personnel performing hot work of any fire conditions
- Keep people out of and warn of hazards associated within the hot work location (i.e. Hot metal, burn hazards, etc.)
- Have available means of intrinsically-safe outside communication

Maintain a fire watch at least a half hour after completion of work to detect and extinguish possible fires.

Prevent Hot Work Explosions / Fires:
Remove flammable materials; gas test

Gas Testing Requirements

Where there is the potential for a hazardous atmosphere, an initial gas test (oxygen and gas) must be performed and documented.

Initial test must be performed within two hours of work beginning.

The gas testing strategy will be based on the distance of the hot work to the potential fuel source and/or the potential for a hazardous atmosphere. The individual responsible for overseeing the work, with input from the work team, must determine the gas testing strategy (location of detectors and periodic versus continuous).

Continuous monitoring within 3 ft (1m) (as reasonably practical) of the ignition source is required where a potential hazardous atmosphere exists until the area is certified gas/vapor free.

Continuous monitoring is always required under these conditions:

- Working with active vessels that are impacted by changing ambient temperatures and may create a hazardous atmosphere
- Removing or disturbing sediment/sludge (examples include vessels, drums, tanks, piping, etc.) that may create a hazardous atmosphere
- Drilling or excavating in areas of known hydrocarbon-saturated soils (pooling liquid)
- Working in a confined space that meets supplement definition, see Confined Space Work guidance
- If atmospheric conditions are unclear

Document continuous or periodic monitoring prior to beginning work.

Whenever there is a reason to suspect that atmospheric conditions have changed or work has stopped longer than 30 minutes, an additional gas test must be performed and recorded prior to continuing work.

Gas detection guidelines:

- Oxygen:
  - 23.5% maximum for hot work
  - 19.5% minimum for hot work
- Lower Explosive Limit (LEL):
  - 5% maximum LEL for hot work. Some sites (i.e. active refineries/terminals) may establish a limit of 0% until the source is determined

Hot work will not be permitted if gas monitoring/tests indicate an LEL greater than 5%.

Hot work will be prohibited in confined spaces with a hazardous atmosphere until the hazardous atmosphere can be eliminated.

Prevent Hot Work Explosions / Fires: Remove flammable materials; gas test

Gas Testing Personnel

Trained gas testers must:

- Perform gas monitoring/tests using direct read instruments and determine if gas test readings are within allowable limits for the scope of work to be performed
- Ensure that all gas-testing equipment is in proper working order:
    - Gas testing equipment must be calibrated and tested per manufacturer's specifications with calibration daily verified in field prior to use (bump test)

Definitions

Combustible/Flammable: A substance or material that can catch fire and burn.

Continuous Monitoring: The work site is continuously tested using a direct read or portable gas detector. Readings are documented every two hours.

Fuel source: A flammable or combustible material.

Hazardous Atmosphere: An atmosphere that may expose workers to the risk of fire, explosion from one or more of the following:

- Flammable gas, vapor, or mist in excess of 5% LEL
- Oxygen concentration below 19.5 percent or above 23.5 percent

Hot work: Welding, brazing, cutting, soldering, torches, chipping operations or the use of spark producing tools such as drilling or grinding.

Ignition source: Any fire or spark producing activity, component or piece of equipment. Ignition sources include, but are not limited to, welding; grinding; saw-cutting concrete; non-explosion proof power tools and other electronic or electrical equipment; internal combustion engines; and heavy equipment (including diesel powered) operation.

Gas Test: A test performed to detect the presence of a hazardous atmosphere.

Periodic Monitoring: Repeat gas tests are carried out at specified intervals (may be based on time or by progression in work activity) using a gas detector and testing results are recorded. In addition to the specified intervals, periodic gas tests are typically performed after meal breaks, any break 30 minutes or greater or where the work site conditions may have changed.

Prevent Hot Work Explosions / Fires: Remove flammable materials; gas test

Revision Log

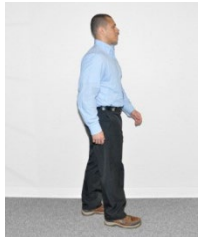
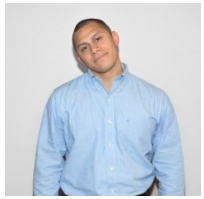
Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document

Prevent Hot Work Explosions / Fires:
Remove flammable materials; gas test

APPENDIX Y

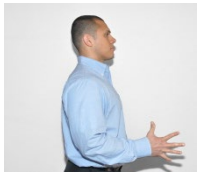
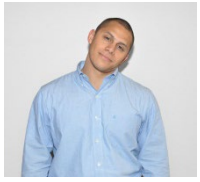
ExxonMobil Field and Office Ergonomics Program

Warm-up Description

Warm-up	Description	Repetition or Length	Comments
Walking on the Spot 	▪ Walking in place for a better part of the 5 minutes warm-up period	▪ 3 minutes total, including the time required to walk to the site	▪ Walking on the spot should be performed in conjunction with the "Fist-to-Fan" warm-up exercise ▪ Walking to the jobsite should be included in total walking time
Neck Circles 	▪ Rotate the head about the neck 5 times in each direction. Repeat the circling once for a total of 10 rotations in each direction	▪ 5 rotations in one direction followed by 5 rotations in the opposite direction ▪ Repeat once	▪ This exercise is not designed to require maximal effort and the neck range of motion should not be taken to extremes
Arm Circles 	▪ With arms raised out to the side, rotate them about the shoulder 10 times in each direction	▪ 5 rotations in one direction followed by 5 rotations in the opposite direction ▪ Repeat once	▪ The diameter of the circling should be approximately 2 feet and can be varied if preferred by the individual
Fist-to-Fan 	▪ Make a fist with each hand with nearly maximal force ▪ After 2 seconds, open (i.e. fan) each hand maximally for 2 seconds then shake out each hand.	▪ Perform a total of 10 hand fist-to-fan movements, 2 seconds for opening, 2 seconds for closing	▪ The employee should perform the fist-to-fan sequence with both hands simultaneously and repeat 5 times

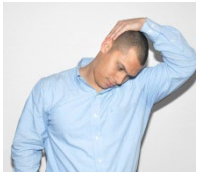
ExxonMobil Stretching Guide ▪ Environmental Services

Stretching Description

Stretch Type	Description	Repetition or Length	Comments
Wrist Flexor/Extensors 	▪ With the palm facing upwards (flexors) or downwards (extensors), use the opposite hand to pull down or up on the fingers	▪ Hold for 20 seconds ▪ Perform once per arm	▪ Employees who input data into a computer using a keyboard should not perform the wrist flexor stretch
Palm 	▪ With arms at one's side, bend the elbows so that the forearms are parallel with the ground. Fan the fingers away from each other as far as manually possible	▪ Hold for 10 seconds ▪ Perform once per hand simultaneously	▪ The palm of the hand can be facing any direction during this stretch
Posterior Shoulder 	▪ Raise both arms out to the side and with palms facing forward bring both arms backward so that a stretch is felt across the front of the chest	▪ Hold for 20 seconds. ▪ Perform once	▪ Perform this stretch without assistance of a wall If a stretch is not felt, bending the elbows will allow for the arms to be positioned further backwards
Chest Stretch 	▪ Raise both arms out to the side and with palms facing forward bring both arms backward so that a stretch is felt across the front of the chest	▪ Hold for 20 seconds. ▪ Perform once	▪ Perform this stretch without assistance of a wall . If a stretch is not felt, bending the elbows will allow for the arms to be positioned further backwards
Side Neck Flexors 	▪ Starting with the head and neck positioned normally, slowly bend the neck to the side ▪ A mild stretch should be felt along the side of the neck in the opposite direction of the stretch	▪ Hold for 20 seconds ▪ Perform once.	▪ Ensure that the neck and head are the only body segments moving and that the shoulders stay stationary

ExxonMobil Stretching Guide ▪ Environmental Services

Stretching Description

Stretch Type	Description	Repetition or Length	Comments
Neck Flexors 	▪ Starting with the head and neck positioned normally, extend the head backwards so that the chin moves upward	▪ Hold for 20 seconds ▪ Perform once	▪ This stretch should be performed in sequence with the Side Neck Flexor Stretch ▪ If no stretch is felt, protrude the chin outward
Neck Rotators 	▪ Start with the head and neck positioned normally, gently pull the head towards the opposite armpit. ▪ A stretch should be felt along the back of one side of the neck	▪ Hold for 20 seconds ▪ Perform once per side	▪ If no stretch is felt, position the arm that is not pulling the head behind the back
Lumbar Extension 	▪ Place the hands over the buttocks next to the hips and push the hips forward until a mild pressure is felt in the lower back	▪ Hold for 20 seconds ▪ Perform twice	▪ This posture should be started standing upright and tall
Standing Lunge 	▪ Take a step forward with hands on hips. Bend the front knee and keep the back foot flat on the ground. A stretch should be felt behind the back lower leg and front of hip	▪ Hold for 20 seconds ▪ Perform once	▪ If a stretch is not felt, straighten the back knee; ensure that that the low back stays neutral as the motion should be accomplished by the hips and legs

What is Ergonomics?

Ergonomics is a continuous improvement process to set up the work environment for what people do well and against what people don't do well.

What is the Impact?

If job task demands and work environment are designed to meet human performance capabilities, the results are:

- Reductions in musculoskeletal disorders (MSDs)
- Fewer injury costs
- Increased productivity
- Enhanced process stability and product quality

What are MSDs?

Musculoskeletal disorders affect the muscles, nerves, tendons, ligaments, or spinal discs that are the result of months and years of exposure to ergonomic risk factors. MSDs are not instantaneous injuries like slips and falls; they are injuries that occur over time.

How do MSDs Occur?

MSDs occur when there is more incoming trauma on the body than the natural healing process can absorb.

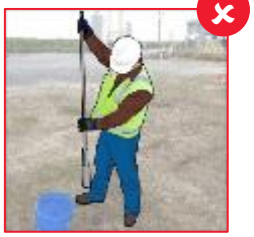
The Primary Ergonomic Risk Factors

- Awkward postures
- High forces
- Extreme frequencies

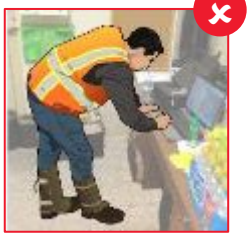
Hit List – The Hit List is a simple observational tool used to quickly identify ergonomic issues.

Elbows Out

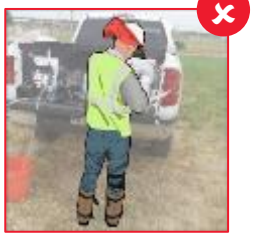
Shoulders Too High/Too Low



Butts Up



Twist and Shout



Overreaching

Awkward Legs

AVOID

Lifting Techniques – Follow these basic guidelines when lifting.

Lifting Best Practices – Behavior or work practices that positively impact ergonomic risk, efficiency, and/or productivity.

- Use a two-person lift whenever objects weigh > 45lb
- Grab handles to improve coupling, when available
- Avoid back twisting, especially while bending
- Remove anything that does not belong in the lifting area or that is not needed
- Do not push objects away from nearby storage locations unless necessary
- Always handle equipment with two hands
- Label shelves and product boxes, always placing items where they belong
- Keep origin of heavy and frequently used items within the comfort zone, 38" to 49" above the standing surface
- Keep the item close to the body during the entire lift to prevent overreaching
- Test the weight before lifting it

Push/Pull Techniques

Preferred

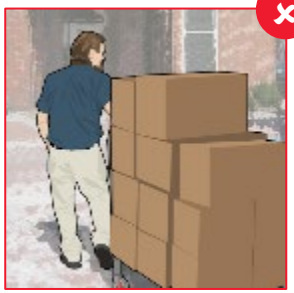
Center the load on the cart

Preferred

Push, don't pull the cart

Unacceptable

Unacceptable



Carrying Techniques

Preferred

Keep the load close

Preferred

Stay in-line with the spine

Unacceptable

Unacceptable

Push/Pull Best Practices

- When possible, push carts with the swiveled casters at the end that is pushed
- Make multiple trips with lighter loads when possible
- Load heavier products on larger casters whenever possible or evenly distribute heavier products
- Perform scheduled caster maintenance on carts
- Casters should be pneumatic or rubber, 8" in diameter, and at least 2.5" wide

Carrying Best Practices

- Keep the object as close to your body as possible
- Use a two-person carry when objects weigh > 45lb
- Constantly maintain three (3) points of contact on the object: one hand on either side and making contact with the midsection
- Keep the load in-line with the spine and do not twist
- Make sure a clear path to your destination is provided before carrying any load

Ergonomics Guide

A Elbows Out

B Shoulders Too High / Too Low

C Butts Up

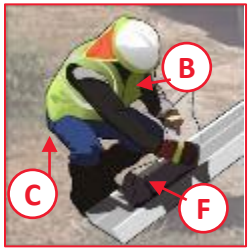
D Twist and Shout

E Overreaching

F Awkward Legs

Sonic Drilling

Common Situations



Potential Issues

- 40-lb grout bags are carried too far
- 80-lb grout and cement bags are carried too far
- Heaviest casing storage height is too low, 18”
- Reach when aligning casing in drill is too high, 89”
- 40-lb grout bag pouring heights are too low
- Heavy cement is mixed by hand using a tarp and carried too far

Good Work Practices

- Park truck closer to destinations to reduce carry distances
- Raise grout retrieval height with empty pallets
- Deliver grout pallet to platform with forklift
- Place heaviest casings with 38” and 49” above standing surface
- Limit casing reaching heights to below shoulder
- Utilize a taller funnel and rest bag on its edge
- Utilize a portable cement mixer
- Mix cement closer to the well to reduce carry distances

Well Soil Sampling

Common Situations

Potential Issues

- Core sample bagging and retrieval heights are too low
- Tarp folding and cleaning heights are too low on the ground
- 39-lb soil samples lowered to low

Good Work Practices

- Elevate the bottom of the chute or install a stop to raise bag retrieval
- Raise casing height to allow bags to be filled between 38” and 49”
- Locate tarp atop of collapsible tables to raise working heights
- Sweep off debris from tarp on table with a push broom

A Elbows Out

B Shoulders Too High / Too Low

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Soft Digging

Common Situations

Potential Issues

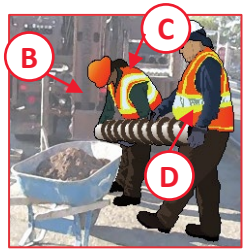
- Air Lance handling height is too low, often at ground level
- 25-lb vacuum hose lacks handles
- 50-lb pavement replacement bags are carried too far
- Jackhammer exposes operator to whole body vibration
- Beating hoses requires repetitive force
- Sample testing height is too low and too far away

Good Work Practices

- Store pavement replacement bags in Vac Truck to reduce carry distance
- Attach 3’ head on air lance during digging to increase hand working heights
- Replace hose material to prevent soil from clogging
- Utilize vibration dampening materials to reduce impact of jackhammer
- Provide a small stool to sit on
- Utilize sawhorse to support vacuum hose weight
- Provide a small collapsible table for testing samples
- Utilize movable handles to provide stronger grips

Auger Drilling

Common Situations



Potential Issues

- 72-lb auger stems are frequently lifted and carried long distances
- 38-lb drill heads result in awkward pinch grips
- Auger sample tubes require high force to open
- Drill control panel is too high, 79"

Good Work Practices

- Investigate utilizing hoist on drill truck to move Auger stems
- Provide removable handles to carry drill head
- Lower height of control panel
- Provide handles for shovel and wheelbarrow

A Elbows Out

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Hand Augering

Common Situations

Potential Issues

- Excessive auger turning and lift forces, 20 lb to 90 lb
- High hand auger handling heights
- Low auger sanitizing heights
- Buckets are located too low
- Low depth measuring heights

Good Work Practices

- Provide a hand auger with interchangeable heads that match the soil type, or provide a powered auger
- Limit auger handling heights to below the shoulder when lifting out samples
- Provide a stool to sit on or a kneel pad
- Provide a small collapsible table to store sample bucket on
- Indicate depth on auger to eliminate depth measurement rod use

Well Gauging

Common Situations

Potential Issues

- Low gauging hand working heights, 3” above the ground
- Low well lid opening heights, 4” above the ground
- Far reach distance to depth probe, 20” forward
- Well interior is dark with limited lighting
- Far reach distance into truck, 35”

Good Work Practices

- Stand when gauging as much as possible
- Provide screwdriver with a longer handle to open lid
- Keep all reaches to the reel within 16” from the worker
- Provide all workers with flashlights
- Store frequently accessed items in the trunk within a 16” reach; less frequent items within a 22” reach

Ergonomics Guide

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Ground Water Sampling

Common Situations

Potential Issues

- Low flush mount well hand working heights
- Low well lid opening height, 4”
- >25-lb sampling equipment is double handled when sorted and stored on the ground
- Far equipment carrying distance
- Low sample bottle filling heights
- High material retrieval height from truck wall
- Keyboard is used while standing
- No writing surface in truck

Good Work Practices

- Park truck closer to destinations to reduce carry distances
- Pull out sleeve while standing
- Provide a stool to sit on or a kneel pad
- Provide longer-handled screwdriver
- Request vendor to ship equipment in kits
- Request vendor to label boxes of equipment to reduce equipment search time
- Park truck closer to equipment trailer to reduce carry distances
- Provide a shallower pail and locate it on tail gate during sampling
- Fill sample bottles while standing
- Provide an office chair
- Perform as much paper work in the trailer as possible

Soil Analysis

Common Situations

Potential Issues

- Low soil sample hand working heights on the ground
- Far reach distance into truck, 38”
- Laptop located on lap when typing in truck

Good Work Practices

- Provide collapsible tables to raise soil hand working heights to between 38” and 47” above the ground
- Provide a stool to sit on or a kneel pad
- Store frequently accessed items within a 16” reach, less frequent items within a 22” reach
- Provide a steering wheel laptop holder

APPENDIX Z

ExxonMobil E&PS Minimum Safety Expectations – Energy Isolation

ENERGY ISOLATION

Nothing specified in these guidelines should be construed to suggest conducting work in a manner contrary to strict compliance with national, regional and local regulations and/or more stringent contractor or site-specific requirements.

Risk assessments may determine a need to do more than the minimum requirements outlined in this document.

Any deviations from the minimum requirements should be documented using OIMS Procedure 7.1.1 Management of Change (MOC) – Non-Personnel.

Any individual on site has the responsibility to stop work if it is unclear how to do the work or if an unsafe condition/behavior is observed.

Energy Isolation Minimum Safety Expectations will prevent injuries from exposure to hazardous energy and includes requirements for isolating, clearing and securing energy sources.

Energy Isolation activities require compliance with the following applicable Minimum Safety Expectations:

- Opening Process Equipment

Life Saving Action Essentials

- Identify all energy sources
- Lock and tag all energy sources
- Verify energy isolation by confirming zero energy state before starting work
- Earth, ground, bond, if applicable

Isolate Energized Systems:
Lock out, tag out, confirm zero energy state

Energy Isolation Requirements

Energy Isolation must be used to isolate machine, equipment or a system from all potentially hazardous energy (i.e. electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.) before starting work such as installation, repair or maintenance activities.

Energy Isolation must be performed only by Authorized Persons who are responsible for applying the securing devices to energy isolating devices in preparation for the work.

Affected personnel must be notified by the Authorized Person of the application and before removal of securing devices.

The Authorized Person must confirm that the procedure has been implemented and physically demonstrate energy isolation to the Affected Persons.

Activities involving energy isolation require Lockout/Tagout (LO/TO) written procedures (see exceptions).

Procedures must include steps for the following, as applicable:

- Planning and preparation including the sequence of critical steps in the shutdown and isolation including:
    - Type and location of energy isolation devices (EID) (valves, blinds, physical disconnection points, mechanical energy isolation devices/electrical isolations) and testing requirements
    - Location of all process openings (if applicable). Personnel must use Figure 2.1 Energy Isolation Decision Tree to determine process isolation requirements
    - Location of process energy verification points (EVP) and associated pathway valves for verifying energy state for blind installation and removal and other process opening locations

  NOTE: All EIDs must be proven using the method and criteria contained in Table 2.2, 2.3 and 2.4

- PPE required during energy isolation/equipment isolation
- Machine, equipment, system shutdown
- Machine, equipment, system isolation as close as practical to the work
- Steps to address removal of equipment contents, residual material and/or relieving stored energy (purging, draining, depressurizing, discharging). If work will involve opening process equipment (OPE), see Opening Process Equipment Minimum Safety Expectation
- Confirm zero energy state by verifying isolation which must include:
    - An independent field verification from a second individual that will confirm the equipment or system is isolated
    - Demonstrating volt meter/induction meter is functioning properly on a known source for electrical energy
    - Physically locate and confirm isolation by:
        - Testing potential at the point of work
        - Verifying isolation points, opening locations and EVPs are consistent with the procedure

- Ensuring EIDs meet requirements in Table 2
- Attempting to operate the equipment, if practical (e.g. switches, valves, outlet/socket, energy verification points) and/or verification from an operator in a control room (if applicable)
- Tracing process lines connected to each opening to confirm all potential sources of energy or material are isolated

Where work is performed remotely and independent verification is not practical, approval must be obtained from Supervisor and documented.

Independent verification is not required if there is less than three energy isolating devices within the immediate control of individual performing the service or maintenance work.

Exceptions

Simple isolation must follow LO/TO requirements, however, written LO/TO procedures are not required when:

- The machine or equipment has no potential for stored or residual energy or accumulation of stored energy after shutdown that could endanger personnel, **and**
- The machine or equipment has a single energy source that can be readily identified, isolated and locked and tagged

  or

- Equipment is powered by a cord and plug

Potential Testing Equipment

Testing must be conducted by the Authorized Person.

Voltage rated gloves must be worn when testing on energized circuits.

Equipment must:

- Be designed specifically for the purpose of potential testing
- Be a direct contact device
- Be rated for the highest voltage level that could be encountered
- Incorporate in-line fuses
- Inspected prior to use

Solenoid type testers and test lamps must not be used.

Drain, Depressurize, Discharge, Clean

Process Energy

Equipment must be drained, depressurized, energy discharged, and equipment cleaned to the extent the equipment configuration allows.

Hazard Class 1 and 2 materials and Hazard Class 3 flammable material at elevation must be drained to a closed containment system. If a closed system is not available use an OPE Standby person.

Refer to Table 3. Material and Physical Property Hazard Class matrix to assign a Hazard Class to materials.

For Hazard Class 1 and 2 materials, purge and/or flush to displace/remove material.

Where contact with the residual material is a risk to personnel, equipment must be cleaned to remove/neutralize residual materials after clearing/purging.

Drain/Vent and/or purge/flush ensuring:

- Each flow path in the system is cleaned
- Provisions are made for cleaning or managing residual material in dead legs
- For hazard class 3 and 4 material, draining and depressurizing to a liquid-free state is adequate

Mechanical Energy

Energy sources associated with mechanical devices or moving parts (i.e. tension in springs, pressure in hydraulic or pneumatic systems, rotating fan blades and equipment under stress, etc.) must be released or blocked.

Radioactive Energy

Radiation energy must be isolated (shielded) or removed.

Electrical Energy

Stored and generated (induced) electrical energy must be released (discharge capacitors and apply earthing/grounding/bonding, if applicable, on all circuits equal to or greater than 1000v to prevent electrical energy from accumulating).

Proving Process Isolation Effectiveness

The effectiveness of the isolation, draining, depressurizing and de-energization must be proven using the EVP(s) and methods in Tables 2.2, 2.3 and 2.4.

As isolation progresses, an EID tag must be applied on the EID.

EVPs and pathway valves must be proven clear and tagged with an EVP tag and action taken to unplug the EVP pathway when indicated.

Opening locations must be tagged with OPE tags.

Inability to prove effective isolation must be discussed and mitigated before work continues.

Securing Energy Isolation for Duration of Work

EIDs must be secured to prevent them from being returned to an energized state. Removal for temporary re-energization is allowed per **Testing/Positioning** section.

Securing devices must be applied per Table 2.

When work continues beyond a work shift, LO/TO device(s) may remain in place when the Authorized Person(s) are expected to return on subsequent shifts.

Bleeder and open flanges (including bleeders of double block and bleed assemblies), behind single block valves in Hazards Class 2 and 3 material service must be closed when the job is not attended for more than 2 hours. Work behind a single block valve in Hazard Class 1 material service must be continuous, and bleeders and open flanges must be closed immediately when work stops.

A process must be in place that documents and tracks the status of energy isolation (i.e. log) and results in affected personnel knowing energy conditions. The process must include:

- Date of Isolation and anticipated return to service date
- Name of Authorized Person
- Description of isolated equipment
- If applicable, Isolation Certificate Number or Permit Number

Prior to recommencing work on equipment, machines or system, each individual must ensure that each LO/TO device is secure.

Securing Devices and Tags

If an energy isolating device is capable of being locked out, the device must be locked. A tag must also be applied with each lock.

Each Authorized and Affected Person must have exclusive control of their securing device.

Securing devices must be designed for the purpose of LO/TO and substantial enough to prevent inadvertent removal without the use of excessive force.

Lockout locks are the standard securing device used to control hazardous energy.

Securing devices must be removed by the Authorized Person or Affected Person that applied the device or someone designated by the Authorized Person or Affected Person.

When the Authorized or Affected Person who applied the device is not available, the device may be removed with the following actions:

- Confirm the Authorized or Affected Person who applied the device is not at the facility and all reasonable efforts have been made to contact the person that their device is going to be removed
- Contact the person's supervisor to verify the work is complete
- Inspect the system or equipment to ensure it is safe to reinstate/re-energize
- Any valid isolation (LO/TO) permits are cancelled
- Inform the Authorized or Affected Person who applied the device upon their return to the facility that their device was removed

Tags must be weather resistant and substantial enough to prevent inadvertent or accidental removal.

All tags must include individual that applied the tag, date applied and mobile phone number in addition to the information in the table below.

Table 1. Tag Requirements

Type of Tag	Application Requirement	Minimum Information Required
Energy Isolation Device (EID) Tag	For physical disconnects install the EID tag at the disconnection on the side of the equipment that is being worked	"Warning – Energy Isolation Device – Do Not Operate" or "Energy Control – Do Not Operate"
Securing Device Tag	Can be inherent to the device by stamping or engraving. Can be combined with the EID tag for process isolation	Identification of Individual or Group owning the Securing Device
Opening Process Equipment (OPE) Location Tag	Attached to the flange, personnel access way or cover plate to be opened or affixed to the physical location of non-bolted openings. For pipe cuts, the cut location needs to be marked on the pipe itself in conjunction with OPE tag	"Opening Location" or similar wording
Energy Verification Point (EVP) Tag	An EVP tag must be applied at the bleeder valve of a double block and bleed assembly. Applied to the location of the equipment where hazardous energy and material exposure is tested to verify de-energized or depressurized and drained, and any valve in the energy verification pathway	"Energy Verification Point" Indicate whether it is a valve in the pathway to EVP bleeders or the EVP bleeder itself (checkbox)

Testing or Positioning

In situations in which securing devices must be temporarily removed to test or position the equipment, the following sequence of actions must be followed:

- Obtain approval from the Authorized Person
- Communicate to Affected personnel
- Clear the machine or equipment of tools, materials
- Replace any covers, guards, or reinstate interlocks if applicable
- Remove the securing devices and tags
- Energize and proceed with testing or positioning
- Restore equipment to normal operations (see below), or
- De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance
- Confirm zero energy state by verifying isolation as described above

Restoring Equipment to Normal Operations

- Communicate to Affected Personnel that the energy is to be restored
- Clear the machine or equipment of tools, materials
- Replace any covers, guards, or reinstate interlocks if applicable
- Remove the lockout and tagout devices and re-energize equipment
- Test that the equipment is operating, if applicable

Group LO/TO Requirements

- Group LO/TO may be used if the keys of the locks used on the energy isolating devices are placed in a lockbox and each Affected Person applies their personal lock to the lockbox
- A Primary Authorized Person must be designated as the person responsibility for coordinating the Group LO/TO. This individual must ensure that all steps of the LO/TO procedure are complied with, including all other steps involved with the Group LO/TO procedures
- The Primary Authorized Person should be identified on the Work Permit or in the LO/TO procedure

Periodic Evaluation

Affected and Authorized Persons ability to perform and comply with these minimum expectations is evaluated periodically by Management through observations, assessments and audits.

Training

Affected Personnel must complete training to recognize hazards associated with energy control and energy isolation applications.

Training must address the following elements:

- Purpose of energy isolation
- Potential hazards
- Energy isolation process/procedures
- Affected Personnel roles and responsibilities

Authorized Personnel must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Refresher training must be provided when:

- There is a change in the minimum safety expectations
- Periodic inspection identifies deviations or inadequacies in energy control procedures or personnel knowledge
- Local regulations require, a site requirement is specified or within every 5 years

Training records must be maintained by the Authorized and Affected Person's employer and made available to E&PS upon request.

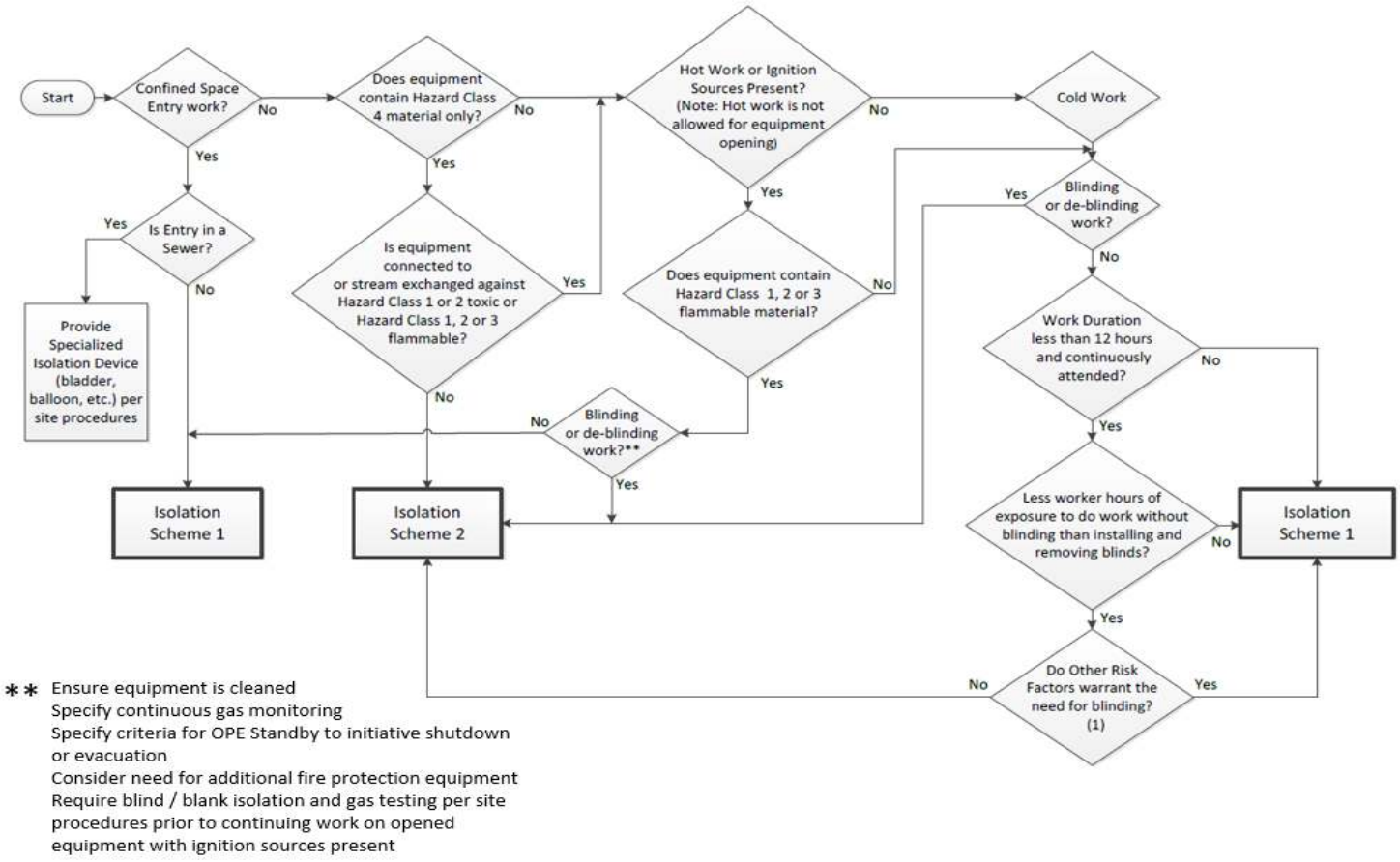
Table 2. Approved EIDs and Securement Methods

The tables below specify the devices that can and cannot be used for isolation of energy (per types of energy and work) and includes the minimum requirements that have to be included in site energy isolation procedures.

Steps:

1. Determine the Process Isolation Scheme required based on the work activity (task) to be performed using Figure 2.1
2. Determine the suitable **process** isolation devices, securement devices and energy verification from Tables 2.1 and 2.2
3. Determine the suitable isolation devices, securement devices and energy verification for **electrical and other energy sources** from Tables 2.3 and 2.4.

Figure 2.1 Energy Isolation Decision Tree



(1) Other Risk Factors may include: motive force for equipment driver; potential accumulation of hazardous materials; exposure of personnel not part of the work group; variable upstream process conditions; working at height; restricted work area and/or egress

Table 2.1 Process Isolation Schemes and Requirements

Isolation Type	EIDs	Additional Requirements
Isolation Scheme 1	**Allowed** • Blinds or Physical disconnection with blind flange, cap or plug on live process side • Mechanized Blind systems	
	Allowed with Additional Requirements • Double Block and Bleed assemblies	• Not allowed for Confined Space Entry • Only allowed if no alternative using blinds or physical disconnection (for example, welded piping system) • Justification and approval required • Process only – not acceptable for motive energy • Gate, plug, globe or ball valves • Distance between block valves no longer than 25 ft (7.5m) • If an air, hydraulic or electrically operated valve is used in a DB&B system, procedures must include control measures to ensure that valves cannot move while used for isolation • Bleeder is at low point of circuit between block valves, is fully open during the execution of work, and discharges to a safe location
	Not Allowed • Single block valve • Twin seal valves	
Isolation Scheme 2	**Allowed** • Double block and bleed assembly (preferred) • If double block and bleed not available, manually operated twin seal valve or single Gate Valve • If no manually operated twin seal valve or gate valve available, manually operated Plug, Globe or Ball Valve	
	Allowed with Additional Requirements • Air, hydraulic or electrically operated gate, plug, globe or ball valves	• Only permitted if an allowable EID cannot be identified. (applicable to all valve types listed) • Procedures must define the additional control measures to ensure that valves cannot move while used for isolation. This can include disconnection of hydraulic or instrument air lines and/or relieving residual energy associated with the valve motor (for example, instrument air pots) • Hydraulic driven valves with position control locking systems only
Continued on next page...	**Dampers or duct guillotines**	• 5 psig maximum pressure • Dampers allowable for Hazard Class 4 material service • Duct guillotines allowable for Hazard Class 3 and 4 material service

...Continuation from previous page	**Butterfly Valve**	• Not allowed for Hazard Class 1 or 2 material isolation
	3 way valve	• Not allowed for Hazard Class 1 material isolation • Not allowed for Hazard Class 2 without an EVP
	Not Allowed • Control valves with minimum stops • Non-return or check valves • Air-to-close valves • Hydraulically driven valves without position control locking system • Pressure relief valves/devices	

Table 2.2 Process EID Securement and Proving Requirements

EID	Securing Device(s)	Energy Verification Method (apply EVP tag per Table 1)
Blind or equipment disconnection	Fully bolted blanks and/or blind flanges or tightly screwed caps or plugs suitable for the process pressures to which they may be exposed	Method: Visual Inspection (Blinds shall be uniquely distinguishable in the field from spacers and orifices by use of one or more visual cues. Bleeder blinds shall be marked to indicate the vented side of the blind) Criteria: Blinds/Blanks in place, fully bolted
Mechanized Blind systems	Securement with tie wrap, lock and chain, per device design	Method: Visual Inspection Criteria: Blind set per design and operating mechanism secured
Double Block and Bleed Valve Assembly	Block valves: Valves owned by one Work Group: • Metal, nylon tie wraps or equivalent • Lockable steel cable If outside of the exclusive control of the work group owning the equipment being worked • Cable or chain secured with lockout locks, with keys owned exclusively by Authorized Person and Affected Person(s) Note: An isolation device is outside the exclusive control of the work group if the Authorized Person is not part of the work group	Method: Per Figure 2.2 Criteria: Energy verification per Figure 2.2
Single Block Valve	Block valves: Valves controlled by one Work Group: • Metal, nylon tie wraps or equivalent • Lockable steel cable For any valve outside of the exclusive control of the Work Group of the equipment being worked: • Cable or chain secured with lockout locks, with keys owned exclusively by Authorized Person and Affected Person(s) Note: An isolation device is outside the exclusive control of the work group if the Authorized Person is not part of the work group	Method: Opening of Energy Verification Point bleeder representative of the valve Criteria: No fluid discharge after draining/depressurizing

Figure 2.2 – Energy Verification for Double Block and Bleed Isolation

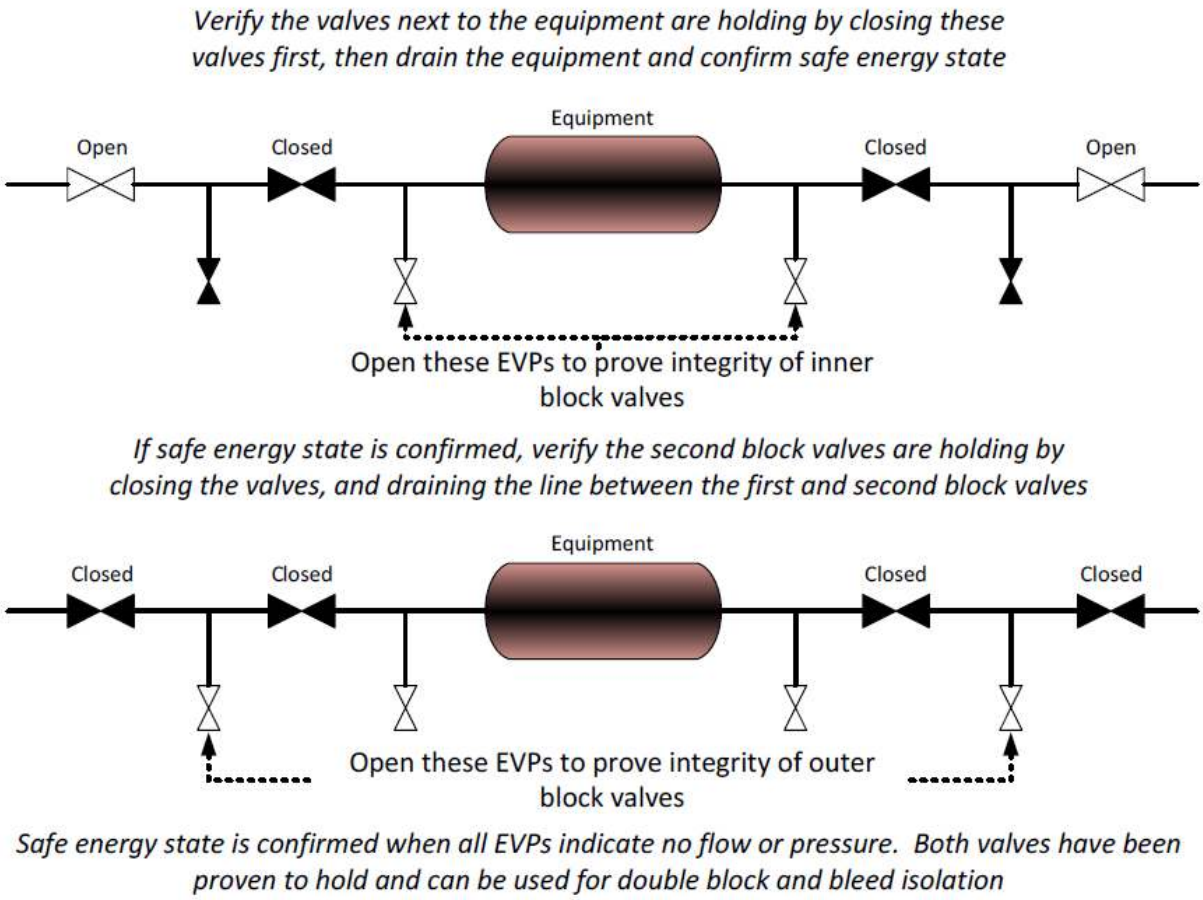


Table 2.3 – Electrical Isolation, Securement and Control Requirements

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	**Securing Device for Worker Protection**		
E1. Electrical Energy Isolation to Control Mechanical Energy	**Power Circuit**	Group Lock If an electrical EID is not capable of being locked-out with a lock, the site must develop a procedure to use alternative securing devices or apply a Tag Only system	Personal Lock or Group Lock	Each EID requires a Tag Each lock must be tagged.	See Table 2.3A for energy isolation verification requirements and criteria, and additional safeguards to prevent inadvertent automatic equipment re-energization

Table 2.3A – Energy Verification Requirements, Criteria and Electrical Isolation Safeguards

Energy Source/Work Type	Energy Verification Method/Criteria – Apply EVP Tag per Table 1
E1. Electrical Energy Isolation to Control Mechanical Energy	**<u>Manual Control</u> (no automatic or permissive controls)** **Method to prove Energy Isolation:** Press start button/operate start switch. **Additional Requirements**: o Latched stop signal: ▪ Disable motor control circuit by depressing and restricting****** stop button in stop position • Where stop button cannot be depressed on stop position, identify alternatives to disable motor control circuit. Options include: o Modify control station so stop can be pinned/restricted in stop position o Use a procedure for restricting (via tagging or other means) operation of the start/stop o Use mechanical blocking o Pulsed stop signal: • Where stop signal is treated pulsed, identify alternatives to disable motor control circuit o Modify control station so stop becomes latched signal o Procedure for restricting (via tagging or other means) operation of the start button o Mechanical blocking **<u>Automatic Control</u> (motor control circuit containing permissives, interlocks and/or automatic controls)** For automatic motor control circuits with Hand-Off-Auto (HOA) and Hand by-passes all permissive / automatic control and Off disables control circuit: **Method to prove Energy Isolation:** Press start button with HOA in "hand" position **Additional Requirements:** Move HOA to off position and restrict movement • Where HOA does not exist or HOA does not by-pass all permissive / automatic controls in Hand position **or** for automatic control circuits without an HOA that will disable the control circuit: o Use site established alternative procedure to disable motor control circuit. Following are examples (not an inclusive list of alternatives): ▪ Modify control circuit with HOA such that Hand position bypasses permissives and automatic controls and off position disables motor control circuit ▪ Procedure for proving EI and disabling motor control circuit with appropriate approval ▪ Mechanical blocking **Energy Verification Criteria:** Equipment does not start. **Restricting is a means to prevent the movement from the position that disables the control circuit. Locking is not required

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	**Securing Device for Worker Protection**		
E2. Electrical Energy Isolation for Electrical Work	**Power Circuit** Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1	Same as Table 2.3 – E1 AND Electrical Safety Minimum Safety Expectations implemented by a Qualified and Authorized Person per the Electrical Safety Minimum Safety Expectations
	Control Circuit Opening electrical breaker, opening switch or removing fuse at the most upstream electrical disconnect location which provides for the individual isolation of the equipment	Same as Table 2.3 – E1	Same as Table 2.3 –E1	Same as Table 2.3 –E1	Electrical Safety Minimum Safety Expectations implemented by a Qualified and Authorized Person per the Electrical Safety Minimum Safety Expectations
E3. Battery/UPS Systems	**Preferred –** - Transfer switch in 'OFF' position **Allowed – With Justification** - Wiring disconnect **Prohibited** - Any EID not considered in categories above including devices that are not properly engineered or rated for an intended application	Lockout lock (secures the switch in the off position) Insulated wiring termination	Individual lockout lock or group lock. Secure the switch or the unique key Securing Device (using lock box or multi-hasps where necessary) Disconnected wiring	EID Tag on switch. Securing Device or on disconnected wiring termination Worker Protection Securing Device Tag Disconnected Wiring – EID Tag	Voltage measurement and grounding per Electrical Safety Minimum Safety Expectations

Table 2.4 – Isolation, Securement and Control Requirements for Other Energy Sources

Energy Source/Work Type	EID Required	Securing Devices		Tags	Energy Verification Method/Criteria
		Isolation Device (first on last off)	Securing Device for Worker Protection		
Mechanical Energy Sources					
M1. Rotational and Linear Motion	Allowable - Rope - Metal or nylon chain; lockable steel cable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required) - Uncouple driver	Rope securely tied off Chain or cable locked with lockout lock Lock device or pin as per design Block or clamp in place to prevent movement	No additional Securing Device required.	EID Tag	Confirm secured against movement
M2. Gravitational energy and potential energy including jammed equipment with forces in single direction	Allowable - Rope - Metal or nylon chain; lockable steel cable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required)	Rope securely tied off Chain or cable locked with lockout lock Lock device or pin as per design Block or clamp in place to prevent movement	No additional Securing Device required.	EID Tag	Confirm secured against movement
M3. Potential Energy including jammed equipment with forces in more than one direction (springs)	Allowable - Blocking device or pin (Consider relieving (residual) potential energy as soon as practical. EID management as per table is then no longer required)	Lock device or pin per design	No additional Securing Device required.	EID Tag	Confirm zero movement

Radiation Energy Sources					
R1. Radioactive Source	Allowable - Shutter or Shielding as per equipment design - Remove source and store appropriately. (EID tag can then be removed)	Padlock as per equipment design Secure storage location	No additional Securing Device required.	EID Tag	Measure radioactive, ensure below required value (consult IH Advisor)

Table 3 – Material and Physical Property Hazard Class Matrix

Intended use:
These tables provide a means to assign a Hazard Class based on the material and physical properties. Throughout this document there are requirements for specific Hazard Classes. See the notes below the tables for additional guidance on how to determine Material and Physical Hazard Classes.

Material Properties

CATEGORY	**Hazard Class 1 Material** (Dangerous - Acutely Fatal)	**Hazard Class 2 Material** (Hazardous)	**Hazard Class 3 Material** (Potentially Hazardous)	**Hazard Class 4 Material** (Innocuous)
Toxic(*)	>3 x IDLH	3 x IDLH to IDLH Asphyxiating Gases (CSE)	IDLH to STEL; Asphyxiating Gases (OPE)	Below STEL
Flammable	Hydrocarbon Above Autoignition Temperature (AIT); Liquified and supercritical flammable gases	Pressurized Gases; Flammable liquids; Combustible liquids @<8°C/15°F below or above flash point	Combustible Liquids @>8°C/15°F below flash point	Non-combustible liquids
Reactive	Air/Water Reactives (i.e. Alkyls)' Liquid Oxygen	Pyrophorics		Not air/water reactive, flammable or combustible
Corrosive	Aerosolizing Highly corrosive (HF)	Other corrosives - (i.e. Sulfuric acid, caustic)	Irritants	Non-corrosive and non-irritating

Physical Properties

	Hazard Class 1	Hazard Class 2	Hazard Class 3	Hazard Class 4
Pressure	>7000 kPa 1000psi	1500 to 7000 kPa 200 to 1000psi	350 to 1500 kPa 50 to <200 psi	<350 kPa/50 psi
Temperature - Liquid State	>260°C/500°F	93 - 260 °C 200 - 500 °F	60 - 93 °C 140 - 200 °F	Ambient to 60°C/140°F
Temperature - Vapor State	>420°C/800°F	205 - 425 °C 400 - 800 °F	60 - 205 °C 140 - 400 °F	Ambient to 60°C/140°F

NOTES:
(*) The Material Hazard Class of a hydrocarbon is determined by its flammability. Hydrocarbon IDLH values are not used to determine their Material Hazard Class.

The Material Hazard Class of Steam is 4 (water). Steam poses physical hazards, based on its temperature and pressure.

The SDS can be used to obtain IDLH Data for toxics and flash points and auto-ignition temperatures for determining Material Hazard Classes.

Physical property Hazard Class determination is based on the pressure and temperature on the "process" side of the block valve until a blind has been installed.

Fluid temperature to use for Flammable Hazard Class and Temperature Hazard Class determination:

- For fully blinded or proven double block and bleed isolated systems, the temperature of the fluid within the isolation blinds/Double Block & Bleeds shall be used to determine Flammability/Temperature Hazard Class of the material.
- For single block valve isolated systems, the highest temperature of the fluid on the process side of a block valve shall be used to determine the Flammability/Temperature Hazard Class of the material.

When more than one material is present, the highest flammable Hazard Class shall be used as the Hazard Class. For example, when the flushing material is different from the process material.

Definitions

Affected Person: A person who has completed the required training and is **affected** by energy isolation, (i.e. operator or technician completing the work) but not **authorized** to de-energize equipment. An Affected Person may also be an Authorized Person if they meet the requirements of an Authorized Person. Affected Persons exclude office workers, third parties such as customers and members of the public.

Authorized Person: A person who has completed the required energy isolation training (general and procedure-specific) and is **authorized** to perform energy isolation on energy isolation points.

Cold Work: Activities that will not generate ignition sources.

Containment: Facilities or devices used to collect residual product from equipment being opened and prevent uncontrolled release of material.

Energizing Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to electrical circuit breaker, disconnect or isolation switch; manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, miniature circuit breaker (MCB) or fuse, fully bolted blanks and/or blind flanges, block valves.

Energy Verification Point: Location with appropriate devices (for example, switch or bleeder valve) used to confirm the effectiveness of one or more EIDs to isolate the equipment/circuit from energy sources.

Energy Verification Method: The procedure or steps used in conjunction with EVPs to confirm isolation or safe energy state.

Group Lockout: When service and/or maintenance is performed by a **group or groups** (i.e. electrical and mechanical) of workers, one lock is placed on the energy isolating device and that key is placed in a lock box. Each authorized or affected person would place their lock on the lock box. This achieves the same level of protection as a personal lockout.

Lockout: The placement of a lockout device on an energy-isolating device, in accordance with an established procedure, ensuring that the energy-isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: Any device that uses positive means, such as a lock, blank flanges and bolted slip blinds, to hold an energy-isolating device in a safe position, thereby preventing the energizing of machinery or equipment.

Securing Device: A fastening device or an attachment which prevents movement of an Energy Isolation Device from its desired position and prevents operation on the equipment being controlled until the device has been removed.

Tag: A prominent warning device that can be securely fastened to an energy-isolating device to convey relevant information that the machine or equipment to which it is attached may not be operated until the tag is removed.

Revision Log

Release Date	Revision Number	Description	Location / Page Number
April, 2019	-	Initial Release	
June, 2019	1.1	Removed references to work permits pending updates to E&PS Work Permit / OIMS Harmonization initiative.	Entire Document