April 15, 2014

REMEDIAL ACTION WORK PLAN

Powers Chemco Site
a.k.a. Columbia Ribbon and
Manufacturing Company Site
71 Charles Street
Glen Cove, New York
Site No. 1-30-028

Prepared for:

KONICA MINOLTA HOLDINGS U.S.A., INC.
71 Charles Street
Glen Cove, New York

Remedial Engineering, P.C.
Environmental Engineers

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CERTIFICATION

I, Omar Ramotar, P.E., am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for the Former Columbia Ribbon and Carbon Company Disposal Site (Site Code 1-30-028) located at 71 Charles Street, Glen Cove, New York (the Site).

I certify that this Remedial Action Work Plan (RAWP) 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) and that all activities will be performed in full accordance with the DER-approved work plan and any DER-approved modifications.

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State, and local laws.

I certify that this RAWP has a plan for import of all soils and other material from off-Site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vector suppression plan and that such plan is sufficient to control dust, odors and vectors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

Omar Ramotar, P.E.	April 15, 2014	
NYS Professional Engineer #077995	Date	Signature

LIST OF KEY ACRONYMS

Acronym	Definition
CAMP	Community Air Monitoring Plan
DER	Division of Environmental Remediation
DO	Dissolved Oxygen
FER	Final Engineering Report
FS	Feasibility Study
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
HUS	Konica Minolta Holdings U.S.A., Inc.
ISCO	*In situ* Chemical Oxidation
MSDS	Material Safety Data Sheet
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	Oxidation-Reduction Potential
OSHA	Occupational Safety and Health Administration
PADMP	Performance Analysis Design Modification Plan
PCBs	Polychlorinated Biphenyls
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation Recovery Act
ROD	Record of Decision
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SOE	Support of Excavation
SVOCs	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

Roux Associates, Inc., and Remedial Engineering, P.C., (collectively, Roux Associates), on behalf of Konica Minolta Holdings U.S.A., Inc. (HUS), have prepared this Remedial Action Work Plan (RAWP) to address residual contamination in soil and groundwater at the Powers Chemco Site in accordance with the March 2014 ROD Amendment beneath a portion of the North Parking Lot area ("North Lot") of the Former Columbia Ribbon and Carbon Company Disposal Site (Site Code 1-30-028 [a.k.a Powers Chemco Site]) located at 71 Charles Street, Glen Cove, New York (Figure 1) and the contiguous off-site area located immediately north of the North Lot fence line.

This RAWP has been prepared in accordance with New York State Department of Environmental Conservation (NYSDEC) procedures in DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010 (NYSDEC, 2010), and complies with all applicable Federal, State and local laws, regulations and requirements.

1.1 Scope of the RAWP

The recent environmental investigations were designed to determine the extent of the residual soil and groundwater impacts at the Site. Specifically, the recent remedial investigation (RI) was designed to delineate the nature and extent of the source(s) of the residual contamination impacting groundwater beneath the North Lot portion of the Site. A Feasibility Study (FS) prepared by Roux Associates dated April 1, 2013 (Roux Associates, 2013a) selected excavation and off-site disposal followed by *in situ* chemical oxidation (ISCO) treatment of remaining impacted groundwater following excavation as the preferred remedy.

The Remedial Action (RA) will consist of the excavation and off-site disposal of approximately 10,000 cubic yards (16,000 tons) of contaminated subsurface soils exceeding the 6NYCRR375-6 protection of groundwater or the restricted residential soil cleanup objectives (SCOs). Dewatering of contaminated groundwater to facilitate excavation is necessary due to the shallow depth of groundwater and is expected to remove most of the more significantly contaminated groundwater. Extracted groundwater will be treated to meet appropriate discharge requirements prior to disposal. In situ chemical oxidation (ISCO) will be utilized to address the remaining contaminated groundwater using RegenOx or other *in situ* chemical oxidation technology after the soil

excavations are backfilled with clean fill that meets the requirements of Part 375-6.7(d). RegenOx is an advanced *in situ* chemical oxidation technology designed to treat organic contaminants. Application of ISCO will be used to address the area of impacted soils located off-site between the northern perimeter of the excavation and "The Place", since it is infeasible to excavate due to the overhead power lines and a gas line in the vicinity.

The RAWP is organized as follows:

Section 2: Site Background

Section 3: RA Scope of Work

Section 4: RA Implementation Schedule

Section 5: References

2.0 SITE BACKGROUND

Relevant Site background information is presented in this section. For a more complete description and a Site history, please refer to the "Historical Remediation and Data Review Report, April 2010, Konica Minolta."

2.1 Site Description

The Powers Chemco Site, also known as the former Columbia Ribbon and Carbon Manufacturing Company Site, is a vacant, 1.4 acre property located within the 15 acre Konica Minolta property in the City of Glen Cove, Nassau County. The site is bounded to the south and east by the former Konica Minolta facility, to the west by Li Tungsten Parcel B (USEPA Superfund site) and to the north by a public roadway (The Place). All buildings on the adjacent 13.6 acre former Konica Minolta facility were demolished in the past year. Figure 2 shows the site boundary within the larger property.

The 1.4 acre site served as an employee parking lot when the Konica Minolta facility (former Powers Chemco) was operating. To the north and east of the site, the properties are predominantly residential. To the south and west of the site is an industrial corridor that includes five other inactive hazardous waste disposal sites (i.e., State Superfund sites) and one Environmental Restoration Program site. The site is approximately 1,200 feet north and 60 feet above the eastern end of Glen Cove creek, which empties into Hempstead Harbor. The topography of the site is relatively flat. An inactive remedial treatment plant is still present at the site. Current Zoning/Use(s): The property is zoned for MW-3 Mixed Use Waterfront and includes residential, restricted residential, and .industrial use and is currently vacant.

2.2 Site History

Powers Chemco, Inc., a manufacturer of photographic equipment and supplies, purchased this site from Columbia Ribbon and Carbon Manufacturing Co. (Columbia) for use as a parking lot in 1979. In 1983, Powers Chemco discovered the subsurface contamination while excavating. For an undetermined period prior to 1979, Columbia had disposed of wastes from the production of blue printing inks, carbon paper and typing ribbon in open pits behind their manufacturing buildings. Reportedly, wastes from 55-gallon drums were dumped into the open pits. The drums

were then crushed and added to the pits before burial. An aerial photograph taken between 1950 and 1960 showed the location of two or three of these pits. Additionally, wastes were pumped through a two-inch galvanized pipe from the Columbia plant directly into the pits. The hazardous and industrial wastes disposed of in the area include, but were not necessarily limited to toluene, ethylbenzene, ethyl acetate, and other residues from the formulation of printing inks. In the fall of 1987, Powers Chemco, Inc. was renamed Chemco Technologies, Inc., which was subsequently purchased and renamed Konica Imaging U.S.A., Inc. The owner name has changed several times since then, and in December 2011 the property was transferred to Konica Minolta Holdings U.S.A., Inc.

2.2.1 Initial Remedial Investigation and Remediation

To determine the nature and extent of the contamination, in 1983 Chemco hired Fred C. Hart Associates (FCHA) to perform a Site investigation. The investigation was conducted during the period November 30, 1983 to February 3, 1984 and produced the report entitled, "Investigation and Hydrogeologic Assessment of the Former Columbia Ribbon and Carbon Company Waste Disposal Site," dated April 1984. The report concluded that the Site contained approximately 6,000 cubic yards of grossly contaminated soils, waste sludge, rags, filters, and other debris along with approximately 100 drums.

Based upon the conclusions of the report, Chemco presented to the NYSDEC an interim remedial plan for the removal and disposal of the buried wastes and heavily contaminated soils at the site. The NYSDEC approved the plan and entered into a voluntary Order on Consent with Chemco on June 8, 1984 to implement the removal action.

Chemco retained Associated Chemical and Environmental Services (ACES) as the contractor to perform the removal action in accordance with the approved interim remedial plan. FCHA acted as the project manager and coordinator. Representatives from the NYSDEC and the Nassau County Health Department witnessed the work.

Excavation began on June 19, 1984 and continued through August 1984. Fifteen overlapping trenches were excavated. The extent of the excavations was determined by the visual observation

of heavily contaminated soils and wastes. A total of 4,645 tons of contaminated soils and debris along with 267 mostly empty drums were transported off-site under manifests to the Fondessy Enterprises Landfill in Oregon, Ohio. The average depth of the excavations was five feet. Excavations did not extend into saturated soils.

The results of the removal action were summarized in a FCHA report dated September 28, 1984 entitled, "Engineer's Certification Report: Removal of Drums and Contaminated Soils from the Former Columbia Ribbon and Carbon Co. Site." After reviewing additional information submitted in support of the report, the NYSDEC accepted the certification in April 1985.

2.2.2 Supplemental Hydrogeologic Investigation and Remediation

A second field investigation was carried out during early 1986 to more carefully assess the potential for contaminant migration from the site and define the vertical and horizontal extent of groundwater contamination. The work was carried out under a second Order on Consent with the NYSDEC dated January 16, 1986. The November 1986 report entitled, "Supplemental Hydrogeologic Investigation of the Former Columbia Ribbon and Carbon Company Waste Disposal Site," concluded that the contaminants are confined in a shallow sand and gravel unit and are concentrated in the immediate area of the disposal site.

The initial and supplemental investigations were used along with information from the removal action as the basis for defining the nature and extent of the contamination at the site. Chemco then developed a Remedial Investigation/Feasibility Study (RI/FS) work plan to examine alternatives for remediating the site. The RI/FS work plan called for the installation of two additional groundwater monitoring wells; one to replace a damaged well and one for use in a pump test to gather information on the yield and other characteristics of the sand and gravel unit. Additionally, the work plan identified a series of remedial alternatives to be evaluated in the feasibility study.

The agreement to perform the RI/FS was incorporated into a third Order on Consent signed April 4, 1988. The work was performed over the summer of 1988 and the first draft of the RI/FS Report was submitted in September 1988. The NYSDEC disapproved the first draft in May 1989. The second draft was submitted in March 1990, which was also disapproved in May 1990.

The third draft was submitted February 1, 1991. During the development of the RI/FS Report, Powers Chemco, Inc. was renamed to Chemco Technologies, Inc., which was subsequently purchased and renamed Konica Imaging U.S.A., Inc.

In 1992, the NYSDEC approved the results of the pilot study and the remediation system was constructed. The remediation system consisted of a groundwater pump and treatment system and an air sparge/soil vapor extraction system. System operation began in November 1994 and continued until August 1996 when the system was temporarily shut down. The system was restarted in February 1997 and continued until November 1999 when it was again temporarily shut down. Confirmatory sampling showed that permanent shutdown of the system was appropriate and in accordance with the Performance Analysis Design Modification Plan (PADMP) that had been developed for the Site.

Post-shutdown monitoring of the wells on the perimeter of the site was conducted from June 2003 until March 2004 and showed that groundwater concentrations were within the NYS Class GA Groundwater Quality Standards.

Additional groundwater sampling in the interior area of the Site (the remediation area) was requested by NYSDEC and showed that VOCs, primarily toluene, remained in soil and groundwater beneath Konica Minolta property, North of R-SB9 and L-SB26, west of L-SB19 and 20, south of R-SB2 and South East of the fence line. The offsite contamination had not yet been clearly characterized.

In 2004, NYSDEC requested that Konica Minolta develop a remedial plan to address the remaining contamination, perform a soil gas survey, and additional soil sampling in the remediation area.

In 2005, a soil gas survey was conducted on-site. The VOC's detected in groundwater were also present in the soil gas samples. Levels of VOCs decreased significantly from the source area to the perimeter soil gas locations. The highest concentration of total VOCs (7,316 micrograms per cubic meter [$\mu g/m^3$]) was detected in soil gas sample SG-06. The soil gas samples collected

within the source area also revealed the presence of low levels of chlorinated VOC's, predominantly perchloroethylene (PCE), trichloroethylene (TCE) and vinyl chloride (VC), at concentrations between 6 $\mu g/m^3$ and 121 $\mu g/m^3$.

In 2007, a soil vapor intrusion (SVI) investigation was conducted at seven residences located on the north side of The Place. Toluene was detected from 1.1 $\mu g/m^3$ to 8.8 $\mu g/m^3$ range in all seven sub-slab soil vapor samples. The benzene, toluene, ethylbenzene and xylene (BTEX) concentrations in sub-slab vapor ranged from 2.21 $\mu g/m^3$ to 18.97 $\mu g/m^3$. Acetone concentrations in sub-slab vapor ranged from non-detect to 1,100 $\mu g/m^3$. MEK concentrations in sub-slab vapor ranged from non-detect to 150 $\mu g/m^3$.

A total of 14 indoor air samples were collected from the seven residential properties. The indoor air sampling results showed all samples contained low concentrations of toluene in basement indoor air, ranging from 2.03 $\mu g/m^3$ to 37.9 $\mu g/m^3$; and first floor indoor air ranging from 2.72 $\mu g/m^3$ to 37.9 $\mu g/m^3$. The BTEX concentrations in basement indoor air ranged from 4.21 $\mu g/m^3$ to 73.19 $\mu g/m^3$. The BTEX concentrations in the first floor indoor air ranged from 6.34 $\mu g/m^3$ to 68.16 $\mu g/m^3$. MEK concentrations in basement and first floor ranged from non-detect to 39.6 $\mu g/m^3$ and non-detect to 26.1 $\mu g/m^3$, respectively. Acetone concentrations in basement and first floor air ranged from non-detect to 45.4 $\mu g/m^3$, and non-detect to 72 $\mu g/m^3$, respectively.

In 2008, SVI samples were collected from one additional residence. Acetone and MEK were detected at 690 $\mu g/m^3$ and 22 $\mu g/m^3$, respectively in sub-slab vapor. MEK was detected in basement and first floor indoor air at a concentration of 1.68 $\mu g/m^3$ and 1.89 $\mu g/m^3$, respectively. MEK was present in outdoor air at 1.23 $\mu g/m^3$. Acetone was detected in basement and first floor air at a concentration of 22.7 $\mu g/m^3$ and 25.4 $\mu g/m^3$. Acetone was also present in outdoor air sample at 16.2 $\mu g/m^3$.

Overall, off-site soil vapor, sub-slab vapor and indoor air results indicate the presence of site-related contaminants, but not at levels where actions are needed to address exposures related to soil vapor intrusion.

In December 2008, additional groundwater sampling from perimeter wells indicated that groundwater impacts were not migrating to the outer edges of the source area and an attempt was made to vertically delineate the VOC contamination.

In December 2009, NYSDEC notified Konica Minolta that the site classification in the NYS registry was being changed from a Class 4 to a Class 2, which represents a site that is believed to pose a risk to human health the environment and, requires active remediation to alleviate the contamination found at the site.

2.2.3 RI Amendment Investigation

In March of 2011, Roux Associates performed a soil and groundwater investigation to delineate remaining VOCs impacts in the North Lot. The results of the investigation are presented in the 2013 Remedial Investigation Amendment Summary Report (Roux Associates, 2013b) and show that residual pockets of VOC contamination appear to be concentrated in silt lenses within the remediation area at depths up to 20 feet bls, and groundwater VOC contamination is present along the northwest fence line, in the eastern portion of the North Lot near the building and in the western portion of the North Lot. There was also indication of an off-site source to the north of the North Lot, as evidenced by VOC contamination in a soil boring along the fence line.

In May of 2011, Liberty Environmental, Inc. (Liberty) performed a soil and groundwater investigation to delineate remaining VOC impacts in the North Lot and to determine if any offsite impacts exist north of the North Lot fence line. Thirteen soil borings were advanced and soil and groundwater grab samples were collected. Results indicated that VOC impacts remained in both soil and groundwater in the northern and eastern portions of the North Lot. Offsite soil borings advanced immediately north of the fence line showed VOC impacts exceeding NYSDEC protection of groundwater soil cleanup objectives; however, soil borings advanced adjacent to The Place indicated no VOC impacts.

To refine the delineation of potential residual material contributing to the elevated concentrations of VOCs in groundwater, and to confirm results of the investigation performed in March 2011 and by Liberty, 20 soil borings were advanced from October 24 to November 9, 2012 in the North

Lot area (RI Amendment Investigation). Four (4) additional soil borings were advanced on November 29, 2012. Soil borings were advanced using either a GeoProbe® or a rotary sonic drill rig.

Offsite Monitoring Well MW-103 was installed on May 24, 2013. The monitoring well was constructed of two-inch diameter Schedule 40 PVC casing and 10-feet of two-inch diameter, 20-slot (0.020 inches) PVC screen. The screened interval is from 9 to 19 feet below land surface, which is the same interval as monitoring well MW-102.

A review of soil sampling analytical results obtained during performance of the RI Amendment scope of work indicated that residual VOC impacts have been fully delineated throughout the North Lot area (Roux Associates, 2013b). The residual pockets of VOC impacts detected during previous investigations have been delineated vertically and horizontally as evidenced by soil samples with results below applicable soil cleanup objectives.

A review of the groundwater sample and groundwater screening sample analytical results collected during the RI Amendment indicated that the groundwater source area is limited to the North Lot. The results from Monitoring Well MW-102 indicated that there is a localized area of impacted groundwater in the perched zone immediately north of the Site beneath the grassed shoulder south of The Place. The results from MW-103 confirm that groundwater impacted above NYSDEC ambient water-quality standards in the perched zone has not migrated further north than the south side of The Place.

A review of data from wells downgradient of the source area in the perched zone (MW-06 and MW-08) and in the deeper flow zone (MW-101) indicated that there is no downgradient migration of VOCs in groundwater from the source area.

2.3 Amendment to Record of Decision

On March 22, 1991, the NYSDEC signed a Record of Decision (ROD) which selected a remedy to clean up the Powers Chemco Site, also known as the Columbia Ribbon and Carbon Manufacturing Site. The ROD called for a remedial system consisting of a groundwater pump and treat system,

and an air sparge/soil vapor extraction system to treat VOCs present at the site. The remedial system was designed and constructed based on results of the pilot study approved by the NYSDEC in 1992. The remedial system operation began in 1994 and was shutdown in 1999 in accordance with the approved PADMP. Since then, the remedial system has been inactive as it was not cost-effective to operate. Post-shutdown monitoring was initiated in 2000.

After the NYSDEC approved the permanent shutdown of the remedial systems in 1999, post-shutdown sampling results indicated the continued presence of VOC contamination in soil and groundwater at elevated levels. Based on these results, the NYSDEC directed that Konica Minolta (the responsible party) to conduct additional investigation and remediation of the residual VOC contamination as discussed in Sections 2.2.2 and 2.2.3 above. Based on the results of these investigations and the evaluation of the performance of the original ROD remedial actions, the NYSDEC developed and issued the March 2014 amendment to the 1991 ROD (2014 ROD Amendment), as the previously selected remedy has not achieved the remedial action objectives for this site. Based on the evaluations conducted on various remedial alternatives identified in the 2013 Feasibility Study Report, a remedy has been selected and will be implemented. A detailed summary of the selected remedy presented in the ROD amendment is provided below in Section 2.4.

2.4 Summary of Selected Remedy

The amended remedial elements are listed below.

The estimated present worth to carry out the amended remedy is $5,504,900. The estimated present worth to complete the original remedy was $4,000,000. The cost to construct the amended remedy is estimated to be $5,084,000 and the estimated average annual cost for two years is $160,400.

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation and off-site disposal of contaminated subsurface soils exceeding the lower of the Department's protection of groundwater soil cleanup objectives (SCOs) or restricted residential use SCOs. Excavations will be backfilled with clean fill. The first five feet of soil below grade will be excavated and will be tested for reuse as backfill. The remaining soil will be excavated for off-site disposal. It is estimated that approximately 21,000 tons of soil will be excavated, of which 5,000 tons from the upper five feet may be re-used as backfill. Construction water removed to facilitate excavation will be treated to meet effluent requirements prior to disposal.

3. *In situ* chemical oxidation (ISCO) of residual contaminated groundwater which remains after excavations are backfilled with clean fill. ISCO is a technology used to treat volatile organic compounds in the soil and groundwater. The process injects a chemical oxidant into the subsurface via injection wells or an infiltration gallery. The method of injection and depth of injection is determined by location of the contamination. As the chemical oxidant comes into contact with the contaminant, an oxidation reaction occurs that breaks down the contaminant into relatively benign compounds such as carbon dioxide and water. An oxidant such as RegenOx or equivalent chemical oxidant will be used.

4. Application of RegenOx or equivalent chemical oxidant to residual, impacted off-site soil and groundwater, where excavation is not feasible due to presence overhead power lines and gas lines in the vicinity of the north side boundary.

5. A site cover currently exists and will be maintained to allow for restricted residential use of the site. Any site redevelopment will maintain a site cover, which may consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper two feet of exposed surface soil will exceed the

applicable soil cleanup objectives (SCOs). Where a soil cover is required it will be a minimum of two feet of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for restricted residential use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

6. Imposition of an institutional control in the form of an environmental easement for the controlled property that:

   - requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

   - allows the use and development of the controlled property for restricted residential use (commercial and industrial uses allowed) as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

   - restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and

   - requires compliance with the Department-approved Site Management Plan.

7. A Site Management Plan is required, which includes the following:

   - an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional controls remain in place and effective:

     Institutional Controls: The Environmental Easement discussed above.
     Engineering Controls: The cover system and monitoring network discussed herein. This plan includes, but may not be limited to:

     – descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;

     – a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion;

     – provisions for the management and inspection of the identified engineering controls;

     – maintaining site access controls and Department notification;

     – the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

- a monitoring plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
  - installation of new monitoring wells in the backfilled excavation area;
  - monitoring of groundwater to assess the baseline sampling and performance and effectiveness of the remedy;
  - monitoring for soil vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above; and
  - a schedule of monitoring and frequency of submittals to the Department.

3.0 REMEDIAL ACTION SCOPE OF WORK

All activities will be performed as described in this section and in compliance with the following project plans included in the appendices, as applicable for this scope of work:

- Appendix A - Quality Assurance Project Plan (QAPP);
- Appendix C - Site Specific Health and Safety Plan (HASP); and
- Appendix D - Community Air Monitoring Plan (CAMP).

The remediation activities for this RAWP will consist of the following tasks:

- Excavation Sampling Plan;
- Site Specific Health and Safety Plan Preparation;
- Site Mobilization and Site Preparation;
- Dust and Odor Control Plans;
- Soil Excavation;
- Dewatering
- Stockpiling;
- Transportation and Offsite Disposal;
- ISCO; and
- Site Restoration.

3.1 Excavation Sampling Plan

Groundwater samples will be collected either from test pit(s) or from existing monitoring wells near the proposed excavation area prior to excavation activities. The groundwater sample results will be used to design the dewatering treatment system components. The groundwater samples will be analyzed for VOCs and metals in accordance with the QAPP (Appendix A).

In addition to the groundwater samples, a bucket mixing test using several soil samples may be performed using different stabilizing reagents and conducting USEPA paint filter tests and criteria.

This information, if obtained, will allow for better design and planning of any stabilization of the stockpiled soil, if required, prior to off-site disposal.

The depth to clean soil beneath the impacted portion of the North Lot was delineated during the RI, and ranged from 15 to 28 feet below land surface (bls)[1]. The depth to groundwater in the perched zone ranged from six to 14 feet bls during the RI[2]. The depth to water in the regional water-table aquifer ranged from 26 to 27 feet bls. The intent of the RA scope of work is to excavate all soil that is impacted above SCOs. The respective post-excavation and *ex situ* waste characterization sampling to be performed during the RA are described below.

3.1.1 Post-Excavation Sampling

The proposed limits of excavation (Plate 1) were located to be midway between impacted and non-impacted soil boring locations (except for the off-site area). After excavation to the desired lateral and vertical limits is achieved, the remaining sidewalls will be sampled for the following parameters:

- VOCs per USEPA SW-846 Method 8260B;
- SVOCs per USEPA SW-846 Method 8270; and
- TAL metals.

Sidewall samples will be collected from every 30 linear feet of sidewall excavated along the proposed limits of excavation after each 5-foot excavation cut has been performed, inclusive of the upper 5-feet of the excavation. When the anticipated depth of excavation has been achieved, bottom samples will be collected for every 900 square feet of bottom area excavated.

Excavation will extend beyond the limits shown in Plate 1 if post-excavation sample results exceed the lower of the NYSDEC's protection of groundwater soil cleanup objectives (SCOs) or restricted residential use SCOs. Otherwise, the excavation activities will be considered complete.

[1] Plate 4, "Remedial Investigation Amendment Summary Report," Roux Associates, June 10, 2013.
[2] Table 2, "Remedial Investigation Amendment Summary Report," Roux Associates, June 10, 2013.

3.1.2 Ex-Situ Waste Characterization

Ex situ waste characterization samples will be collected from the excavated soil in the soil staging area. The excavated soil will be handled and segregated into appropriate waste streams based on waste characterization results.

3.1.2.1 RCRA Solid Waste Classification Determination

Based upon available historical information and anecdotal information regarding use of the Site, HUS does not have any specific information on how VOCS were used by Powers Chemco during their period of operation at the Site. It is likely that they were used as ingredients in the manufacturing of printer inks, and not for their solvent properties. However, the NYSDEC has determined that based on the type of disposal practices that were employed historically at the Site, solvents containing toluene and unused toluene were disposed of in open pits as part of routine disposal practices. Therefore, the NYSDEC has determined that all soils excavated for off-site disposal and not approved for on-site reuse during the remedial action will be classified as hazardous waste (U220 or F005) under 40 CFR 261.31 due to the toluene detected in soil. Accordingly, waste profile samples will be collected to determine if the waste can be disposed of as non-hazardous waste using the contained-in rule under TAGM 3028. The TAGM 3028 contained-in rule will be used for soils that are hazardous by rule but do not have hazardous levels of toluene or other chemicals of concern (specifically benzene, 2-butanone, ethylbenzene, toluene and total xylenes). Excavated soil to be transported off-site will be segregated into the following categories:

- Soils containing levels of constituents exceeding the contained-in-criteria will be disposed of as U220 and F005 hazardous waste; or
- Soils containing listed hazardous waste constituents at concentrations less than the contained-in-criteria will be disposed of as non-hazardous waste.

3.1.2.2 Waste Characterization

Excavated soil will be placed into stockpiles onsite and sampled and analyzed for waste characterization purposes. Additional material will not be added to a stockpile once it has been sampled. Waste characterization samples will be collected immediately upon accumulation of a discrete and sufficient volume of segregated wastes. Samples will be analyzed for such

parameters as required to meet requirements of offsite disposal facilities and applicable laws, rules, and regulations. In addition, the minimum sampling frequency will be in accordance with Table 5.4(e)10 - Recommended Number of Soil Samples for Soil Imported To or Exported From a Site (NYSDEC DER-10 / Technical Guidance for Site Investigation and Remediation) (reproduced below).

Contaminant	**VOCs**	**SVOCs and Inorganics**	
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 1,000 Cubic yards or consult with DER		

Considering the sampling requirements identified above, the Site chemicals of concern and the requirements of offsite disposal facilities for non-hazardous and hazardous soil, excavated soil will be stockpiled and sampled as follows:

- Initial 1,000 Cubic Yards of Soil to be Excavated: Eight (8) 125 cubic yard stockpiles will be created and eight (8) corresponding discrete samples will be collected for VOC analysis per EPA Method 8260B and two (2) composite samples for SVOC analysis per EPA Method 8270C, eight (8) RCRA metals analyses per EPA Method 6010 and total petroleum hydrocarbon (TPH) analysis per EPA Method 8015.

- All Remaining Soil to be Excavated: For every additional 1,000 cubic yard batch of soil excavated, two (2) discrete VOC samples for VOC Analysis per EPA Method 8260B and two (2) composite samples for SVOC analysis per EPA Method 8270C, eight (8) RCRA Metals per EPA Method 6010 and TPH per EPA Method 8015 will be collected.

The waste characterization activities will be conducted to identify appropriate requirements for offsite transportation and disposal. Waste characterization samples will be submitted for laboratory analysis for the following additional constituents (as needed):

- Toxicity characteristic leaching procedure (TCLP) VOCs;
- TCLP SVOCs;
- TCLP inorganics (including TCLP mercury);
- Total VOCs;
- Ignitability;
- Reactivity;
- Corrosivity;
- Paint filter test (as received), and
- TCLP pH.

TCLP data will be used at the beginning of the remedial work. Based on the TCLP results, if they are lower than the respective TCLP limits, further TCLP analyses will be required only if the total (VOCs, SVOCs, metals, etc.) analyses are equal to or more than 20 times the respective TCLP limits. One TCLP sample per stockpile will be collected and analyzed.

Prior to sampling, the volume in each pile will be estimated based on either the number of truck loads represented by the pile or the dimensions of each pile to estimate the volume of material. Samples will be collected at random locations within each pile at depths of at least 12 inches below the surface of the pile.

The waste characterization samples will be submitted to an accredited laboratory under chain-of-custody procedures for laboratory analysis on a 3-day turnaround basis. Waste characterization analytical results will not undergo data validation unless required by the receiving disposal facilities. Following receipt of the analytical results for waste characterization samples, the Field Waste Manager will identify the proposed waste material characterization.

Roux Associates will track analytical reports and summarize analytical data by waste stream in a waste summary spreadsheet and will update the spreadsheet upon receipt of the data. Information to be tracked will include information called for in the example tracking spreadsheet provided in Appendix B of this RAWP.

Parts of existing groundwater treatment system (PVC piping, well screens, etc.) that will be removed as part of the source area remediation, will be staged, cleaned, managed, manifested, transported and disposed off-site consistent with the characterization of the surrounding soil. At a minimum, all debris encountered within the limits of the Work will be shipped off as non-hazardous waste to an approved disposal facility. NYSDEC approval of all waste is required prior to disposal at any permitted facility.

Every effort will be made to remove all water recovery wells, air inlet wells and vapor recovery wells within the limits of the work. In cases where the total depth of the wells exceed the depth of final excavation and the contractor is unable to remove the entire well, the well will be cut at the excavation limits and decommissioned in accordance with DEC guidance, e.g. CP-43 Commissioner's Policy on Groundwater Monitoring Well Decommissioning, prior to backfilling.

3.1.2.3 Waste Characterization Criteria

The results of the waste characterization will be compared to the criteria summarized in Table 1, where applicable. Included in the criteria in Table 1 are:

- Regulatory Levels from Code of Federal Regulations Title 40 Section 261.24, dated July 1, 2011;
- Soil/Sediment "Contained-in" Action Levels from TAGM 3028 - "Contained-In" Criteria for Environmental Media (Dated November 11, 1992); and
- Part 376 Land Disposal Restrictions (LDRs) "Treatment Standards for Hazardous Wastes".

All waste characterization TCLP results will be compared to the Regulatory Levels in Table 1, where applicable. If the TCLP results are above the Regulatory Levels, the waste will be profiled as hazardous by characteristic. If the TCLP results are below the Regulatory Levels in Table 1, the waste characterization data will be compared to the soil/sediment "contained-in" action levels

in Table 1. Only waste that has concentrations in excess of the soil/sediment "contained-in" action levels will be subject to the LDRs. The "contained-in" and LDR treatment standards will only be applied to the compounds of concern (benzene, 2-butanone, ethylbenzene, toluene and total xylenes). All other constituents, where applicable, will be compared to the TCLP Regulatory Levels.

3.1.2.4 Contained-In Determination Process

As discussed above, there is a possibility that a portion of the waste generated at the Site may not be impacted with listed hazardous waste constituents at hazardous concentrations. For these materials, if the concentrations of the compounds of concern are below contained-in criteria, then approval will be requested from the NYSDEC for offsite disposal as non-hazardous waste.

The contained-in determinations will be submitted to the NYSDEC within three weeks of a waste stream being generated. Included in the submittal to the NYSDEC will be a description of the waste stream, a summary of the waste characterization sampling, a table comparing the analytical results to the TAGM 3028 criteria, and a request for a contained-in determination.

3.1.2.5 Sustainability

The classification of soils under the contained-in rule will reduce greenhouse gas emissions. The hazardous waste disposal facilities are significantly farther from the Site than non-hazardous waste disposal facilities, and soils classified as hazardous waste require additional treatment, even if the waste is not characteristically hazardous. By disposing of soil as hazardous waste only if the concentrations of toluene or other applicable chemicals of concern in the soil warrant the determination, transportation and treatment-related emissions will be reduced.

3.2 Community Air Monitoring Plan

Air monitoring for VOCs and particulates will be performed during all excavation and soil loading activities in accordance with the CAMP provided in Appendix D.

3.3 Site Mobilization and Site Preparation

A project kick-off meeting will be conducted with HUS, Roux Associates, and the selected Contractor prior to the commencement of the RA. The Contractor shall supply all labor and materials required for the removal and disposal of contaminated soil. In addition, all necessary insurance certificates, disposal facility permits, imported clean fill documentation, and any other required documents shall be obtained prior to mobilization. Mobilization and Site preparation activities will include:

1. Utility mark-outs through NYS One Call (DigSafe).

2. Mobilization of equipment to the work area.

3. Installation of safety fencing and traffic barricades to delineate the work zones, act as a work Site security measure, and mark the truck loading and decontamination areas.

4. Implementation of erosion and sediment control measures in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Hay bales will be placed at locations upgradient of the excavation area to control stormwater runoff and surface water from entering or exiting the excavation. Any catch basin inlets proximate to the excavation area will be protected to prevent disturbed soil from entering. A stabilized construction entrance will be provided using crushed stone at the entrance to the Site located off of "The Place."

5. Set-up of stockpile soil staging area for the excavation area. The soil stockpile area will be located in the former building footprint as shown on Plate 1.

6. Set-up of temporary facilities and decontamination facilities, including decontamination pad in order to decontaminate trucks and other vehicles/equipment. The decontamination pad shall be constructed using 20-mil high density polyethylene (HDPE) liner with perimeter berms, sloped to a low-lying sump to contain any liquids. The decontamination pad shall be sized to accommodate the largest construction vehicle to be used, and located adjacent to the waste staging area. A typical decontamination pad and erosion and control measures are shown on Plate 2.

7. Installation of a 20,000-gallon frac tank, associated piping and treatment units to contain, treat and convey construction-generated water from dewatering activities. The proposed location of the frac tank and treatment units is adjacent to the soil staging area shown in Plate 1. The treated groundwater will be discharged to the Nassau County Department of Public Works storm sewer via an existing catch basin.

8. Removal of large diameter trees within the limits of the work.

9. Removal of pavement to access the soil excavation area.

3.4 Odor and Dust Control

Odors and dust will be continually monitored during excavation activities and addressed using the measures discussed below.

3.4.1 Odor Control Plan

The Contractor will monitor the work zone and maintain the liners covering the stockpiled soil at all times for odor as well as dust control purposes unless soil is being actively loaded/ unloaded. All stockpiled soil will be covered with 12 mil thickness or greater of polyethylene sheeting. Several odor control products may also be used to mitigate both odors and vapor. An odor spray, Bisolve™, will be sprayed over the excavation and stockpiled soil and will be used as a daily control if required. An additional odor control may be utilized if necessary by deploying an odor masking agent at perimeter of the work zone using drum-mounted foggers. Foam may also be used to suppress vapors and odors, if necessary. The foam unit, Rusmar™ PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. If needed, foam would be applied to stockpiled soil and excavation sidewalls. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any complaints about the project from the local community. Implementation of all odor controls, including the halt of work, will be the responsibility of the Contractor.

In summary, if an odor complaint is received, the following procedures will be implemented:

1. Work in the affected area will be halted, and the source of odors will be identified.
2. NYSDEC, NYSDOH, and HUS will be notified of the odor complaint.
3. Nuisance odors will be abated through the use of tarps to cover stockpiles, backfilling open excavations; and/or use of a foam unit or other appropriate measures.
4. Work will resume in the affected area only after the nuisance odors have been abated.

3.4.2 Dust Control Plan

A dust suppression plan that addresses dust management during excavation activities will include, as needed, any or all of the items listed below:

- Maintenance and proper covering, when applicable, of excavated soil/ imported fill material stockpiles.
- Dust suppression may be achieved through the use of a dedicated onsite water truck. The truck will be equipped with a water cannon capable of spraying water directly onto the excavation, stockpiles and work area.
- Gravel may be used on the Site asphalt pavement to provide a clean and dust-free access road surface.
- Onsite truck routes may be limited to minimize the area disturbed by truck traffic.

3.5 Proposed Excavation

The approximate areal extent of the area of concern in the North Lot area is 0.3 acres. With the exception of a small area in the vicinity of R-SB-105 (the western-most portion of the impacted area), the RI soil data has shown that the first five feet of soil has no impacts above the Soil Cleanup Objectives (SCOs). This was due to the fact that previous remedial actions[3] performed at the Site included excavation and offsite disposal of soil in the unsaturated zone from the entire area. The remaining extent of VOC-impacted soil occurs from approximately 5 ft bls to a maximum depth of 25 feet bls. The actual depth of the source area excavation may vary, but will be confirmed by the collection and analysis of post-excavation soil samples. The excavation will result in the removal of approximately 12,800 cubic yards of soil. The results of the recent RI also indicated that there is a localized area of impacted groundwater in the perched zone in the area of the proposed excavation that will be removed, treated and discharged to the POTW as part of dewatering operations. Residually impacted groundwater, if present after the excavation activities, will be treated with ISCO following the placement of clean backfill.

A small portion of the impacted area is located offsite between the northern property line and "The Place" and is north of a chain-link fence that runs along the northern property line (Plate 1). The offsite soil sampling during the RI indicated that impacted soils extended north of the property fence to approximately 15 feet from an overhead utility line and 25 feet from a natural gas line. The actual location of the natural gas line has to be confirmed. Prior to implementing

[3] "Engineer's Certification Report: Removal of Drums and Contaminated Soils from the Former Columbia Ribbon and Carbon Co. Site", Fred C. Hart & Associates, September 28, 1984

the RA, the required separation distance from the underground natural gas line to the proposed excavation limit will be confirmed or revised. Based on preliminary discussions with the overhead electrical line representative, the separation distance from the overhead utility to the proposed excavation cannot be less than 14 feet. Therefore, there will be a small volume of impacted soil and groundwater that will be outside of the proposed excavation (Plate 1). This area of impacted soil and groundwater will be addressed by *in situ* chemical oxidation (ISCO).

A line of three ISCO injection points will be placed along the northern perimeter of the excavated area after backfilling adjacent to the south side of "The Place". This will focus ISCO treatment along the sidewalls and bottom of the off-site portion of the excavated area, and will facilitate treatment of the un-excavated offsite area. The spacing of the injection points may be adjusted, as necessary, to adequately treat the unexcavated soil.

Along the perimeter of the proposed excavation area within the property boundaries, a slide rail shoring system with some sloping and benching will be used. Sloping of the excavation perimeter, when performed, will be based on industry standards and Occupational Safety and Health Administration (OSHA) requirements for the applicable soil type present at the Site.

With the exception of soil from beneath the area shown in Figure 3, soil from the upper five feet of the excavated area will be staged separately for reuse as backfill into the completed excavation. Sampling requirements for imported fill and the soil proposed for reuse are described in Section 3.8.

Impacted soil from the excavation will be placed directly into a wheel-loader bucket at the top edge of the excavation. The wheel loader will then transport the soil to a lined and bermed soil stockpile staging area.

An average density of 1.6 tons per cubic yard was assumed for the excavated soil. Based on this density assumption, it is estimated that approximately 20,500 tons of soil will be excavated, of which 5,000 tons (i.e., the upper 5 feet) will be re-used as backfill assuming the backfill meets the onsite reuse criteria detailed in Section 3.8 of this RAWP. The fill material should not exceed the

allowable constituents levels for imported fill or soil for the use onsite as provided in Appendix 5 of DER-10.

3.5.1 Community Air Monitoring Plan

The CAMP (Appendix D) was developed in accordance with the NYSDOH Generic Community Air Monitoring Plan contained in Appendix 1A of the DER-10 (NYSDEC, 2010). The air monitoring plan includes real-time continuous particulate monitoring using particulate monitoring devices. VOCs and odors will be monitored and mitigated as necessary using foam or other odor-suppressant means.

Dust would be controlled by spraying a water mist over the work area if perimeter action levels established in the CAMP are exceeded. This would be generated by connecting a misting device to a hose, which would be connected to any potable water source. The degree to which these measures are used would depend on particulate levels in ambient air at the perimeter of the Site as determined through implementation of the CAMP.

A soil sampling plan will be followed for the analytical testing of excavated soil prior to off-site disposal. Following backfilling of the on-site staged soil and clean imported backfill, post-remedy groundwater monitoring will be performed to determine the need for ISCO.

3.5.2 Dewatering

Dewatering will be necessary during excavation activities. The excavation will be dewatered using a sump and pump (or similar) method. A slotted polyvinyl chloride (PVC) pipe will be wrapped in geotextile fabric and placed in a sump in the corner of the excavation area and will be moved as the excavation progresses. A suction hose or submersible pump will be used to convey the groundwater to a frac tank. The groundwater will be pumped through the appropriate treatment units (e.g., liquid-phase carbon units) prior to discharge to the Glen Cove Sanitary Sewer System. The treatment system will be designed to meet the required site-specific discharge limits of the Nassau County Department of Public Works (NCDPW). As required by the NCDPW, the discharge will not exceed 1 part per million (ppm) total VOCs. The NCDPW requires the collection of (3) effluent samples that will be analyzed for Total VOCs by

EPA Method 624, SVOCs by EPA Method 625, TPH by EPA Method 8015, and the 13 priority pollutant metals. As required, one (1) sample will be taken at the commencement of discharge, one (1) on the second week of the discharge and one (1) at the end of the discharge period. A summary of the rates/volumes and VOC concentrations for the discharge will be forwarded to the following address:

Nassau County Department of Public Works
Cedar Creek Water Pollution Control Plant
3340 Merrick Road
Wantagh, New York 11793-4341

Attention: Peter J. Witkowski

One week prior to the date of pumping operation, and during system startup, Mr. Marciano Cipriano of the NCDPW's Industrial Pretreatment Unit will be contacted for inspection of the treatment system.

3.6 Stockpiling

The excavated soil will be stockpiled onto a staging area lined with 40-mil sheeting with a perimeter berm. The staging area will be sloped and equipped with a sump to collect water drained from the stockpiled soils. The drained water will be collected and transferred to a frac tank. Stabilizing operations may also be conducted within the soil staging area. The stabilizing operations may include the addition of a stabilization reagent such as calcium oxide (Calciment™ or equivalent).

The Contractor will be responsible for installation, operation, and maintenance of the staging area. Stockpiles will be kept covered at all times with appropriately anchored tarps of 12-mil thickness or greater except where soil is being placed, stabilized or removed. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

3.7 Transportation and Offsite Disposal

All transport of materials will be performed by licensed haulers in accordance with 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 Contractor will be responsible for ensuring that all outbound trucks are inspected and will be brushed or washed as required to remove loose soil at the truck wash station before leaving the Site.

Truck traffic approaching and leaving the site will be coordinated to minimize impacts to local traffic and the residential neighborhood. For the project, all truckers will be instructed to approach the site by turning left on Herb Hill Road from Charles Street, then right through the site gate along Herb Hill Road. Trucks will be prohibited from stopping and idling in the neighborhood outside the Site. Queuing of trucks will be performed onsite in order to minimize offsite disturbance. Offsite queuing will be prohibited.

All soil excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6 NYCRR Part 360) and Federal regulations. NYSDEC approval will be obtained for each proposed disposal facility prior to coordinating and transportation and disposal of hazardous or non-hazardous waste from the Site. All liquids to be removed from the dewatering and soil stabilization activities will be handled, transported, and disposed in accordance with applicable local, State, and Federal regulations. The soil transportation and disposal will be performed in accordance with a Waste Tracking Plan (to be prepared by Roux Associates prior to performing the work).

3.7.1 Profiling Requirements

The Contractor will establish waste profiles for waste streams in coordination with the selected and approved waste disposal facilities. The Contractor will submit the completed profiles to HUS for review and signature. The Contractor will utilize the analytical data generated during waste characterization sampling events to establish waste profiles. Roux Associates will track profile preparation, submission, and approvals in an approvals tracking spreadsheet and update the spreadsheet daily (Attachment A).

3.7.2 Manifesting

Hazardous wastes transported from the Site will be accompanied by Uniform Hazardous Waste Manifests. Non-hazardous wastes will be transported from the Site under non-hazardous waste manifests or bills of lading. Hazardous wastes will be assigned the appropriate hazardous waste codes. LDR Notification Forms will also be prepared for each hazardous waste stream subject to LDR regulations (40 CFR 268).

Waste manifests (for both hazardous and non-hazardous wastes) for each off-site shipment of waste material generated during the remedial action will be completed. An authorized representative of HUS will sign waste manifests for each off-site shipment of waste materials.

3.7.3 Record Keeping

Certificates of Destruction/Disposal from disposal facilities will be collected. In addition, copies of manifests, LDR notices, Certificates of Destruction/Disposal, and other required documentation will be maintained at the Site and will be included as part of the Final Engineering Report (FER) to be prepared once the RA has been completed.

3.8 Backfilling

An approved offsite backfill source will be identified prior to initiating backfill activities. Imported backfill will be sampled and analyzed in accordance with DER-10 as follows:

Contaminant	**VOCs**	**SVOCs, Inorganics, and 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	

Contaminant	**VOCs**	**SVOCs, Inorganics, and PCBs/Pesticides**	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/ Composite**
>1000	Add an additional 2 VOC and 1 composite for each additional 1,000 Cubic yards or consult with DER		

Similarly, the upper five feet of excavated soil designated for on-site reuse will be sampled for the same parameters and frequency identified above.

Each batch of samples will be sampled for VOCs, SVOCs, Metals, Pesticides/Herbicides and PCBs. The analytical results will be summarized and compared to NYSDEC Part 375 Protection of Groundwater Standards and restricted residential use SCOs. The summary of results for each batch of fill will be submitted to the NYSDEC for review and approval prior to placement and compaction on-site.

In addition, documentation of the source of fill will be provided to the NYSDEC for approval of the source of the material before it is used on the site, which should include:

- the name of the person providing the documentation and relationship to the source of the fill;
- the location where the fill was obtained;
- identification of any state or local approvals as a fill source; and
- if no prior approval is available for the source, a brief history of the use of the property which is the source of the fill.

Following compaction of the backfill, a 6-inch layer of crushed stone will be used to bring the excavation to grade. Any stone used to bring the excavation to grade will not be sampled prior to use assuming the stone consists of virgin material from a permitted mine or quarry.

3.9 *In Situ* Chemical Oxidation Treatment of Groundwater

Following excavation and backfilling of the source area in the North Lot, up to 10 monitoring wells will be installed within the backfilled area and sampled for VOCs. This will be considered a

baseline sampling round to assess groundwater quality after removal of the impacted soil source area, and removal of impacted groundwater by dewatering activities.

If the total VOC concentrations in any of the monitoring wells exceeds SCOs for groundwater, then *in situ* groundwater treatment via ISCO will be conducted to address any residual dissolved groundwater impacts remaining after excavation and backfill. Following the excavation and backfilling, an oxidant such as RegenOx™, or approved equivalent, will be injected into the subsurface within the backfilled excavation area to address any remaining residual groundwater impacts. The MSDS for the oxidant (Appendix E) will be submitted to the NYSDEC and included in the USEPA underground injection control (UIC) notification that will be submitted to the USEPA following NYSDEC approval of this RAWP and prior to the injection event.

The oxidant will be injected using approximately 20 temporary injection points within the excavated and backfilled area to a depth of approximately 25 feet bls with a 10-foot treatment zone per point extending from 15 to 25 feet bls. The total quantity of oxidant that will be injected will be determined based on the baseline groundwater concentrations. The need for additional rounds of ISCO injections will be based on groundwater quality data following the first ISCO treatment round.

To design and assess the performance of the ISCO treatment of groundwater, a groundwater monitoring program will be established. New monitoring wells will be installed in the excavation area. The number of wells installed will be sufficient to collect groundwater data to determine the amount of oxidant as well as monitor the ISCO injections and long-term groundwater trends within the excavated area. The groundwater monitoring program will include two components: baseline sampling and performance monitoring. The baseline and performance monitoring groundwater samples will be analyzed for VOCs, SVOCs, filtered and unfiltered metals, total organic carbon (TOC), and alkalinity.

Field parameters (pH, dissolved oxygen, oxidation-reduction potential, conductivity and temperature) will be collected from onsite monitoring wells once a week for one month following the first injection event. One month following the first injection event, the monitoring wells will

be sampled and analyzed as above. A minimum of two rounds of sampling and analysis for VOCs will be conducted following the first injection event. The need for subsequent ISCO injection events will be based on the performance monitoring groundwater sample analyses.

Roux Associates will evaluate the results of each injection event to determine the effectiveness of the oxidant at reducing the residual VOC concentrations in the Site groundwater. The evaluation will be summarized with the appropriate monthly progress report submission.

3.10 Site Restoration Activities and Demobilization

The equipment, materials, and temporary facilities installed during the remedial activities will be removed from the Site. All equipment will be decontaminated prior to leaving the Site.

Final Site restoration shall include:

- restoration of disturbed portions of the site to pre-remediation conditions with respect to topography, hydrology and vegetation, to the extent practicable; and
- restoration sufficient to ensure the effectiveness and compliance with the remedial program.

3.11 Final Engineering Report

An FER will be prepared following completion of the RA activities in accordance with Section 5.8 of DER-10. The FER will describe the work performed as part of the remediation and will include:

- Disposal documentation for all material removed from the Site, including excavated impacted soil, solid waste, and fluids (if any).
- Survey drawings and site maps including, but not limited to, excavation areas and injection point locations and site boundaries.
- A certification by a New York professional engineer that all construction activities completed during the remediation were performed in accordance with the specifications provided in this RAWP, as approved by the NYSDEC, and that the activities were personally witnessed by a person under the direct supervision of the professional engineer.
- Any changes or modifications to the work, as well as any problems encountered during excavation and their resolution, will be documented.
- A description of all backfill material used for site restoration, including source and quality.

4.0 RA IMPLEMENTATION SCHEDULE AND PROGRESS REPORTS

This RA is anticipated to begin in the second quarter of 2014. The estimated schedule for major remedial construction tasks will be as follows:

- Site mobilization and Site control activities --------- April 2014;
- Soil excavation activities ---------- April 2014 to August 2014;
- Site Restoration ---------- August 2014 to September 2014;
- Monitoring Well Installation ---------- September 2014;
- Baseline Sampling Event ---------- September 2014;
- ISCO (first round) (if necessary) ---------- October 2014; and
- FER Submission to NYSDEC ---------- December 2014.

During the performance of the Work, various NYSDEC and other regulatory approvals will be required as soil excavation activities are performed. Some of the key approvals, referenced within this RAWP, are provided below:

- NYSDEC review and approval of Waste Tracking Plan to be prepared by Roux Associates prior to shipping any waste.
- NYSDEC approval will be obtained for each proposed disposal facility prior to coordinating and transportation and disposal of hazardous or non-hazardous waste from the Site.
- NYSDEC review and approval of waste characterization data generated from all excavated soils.
- NYSDEC approval of all waste is required prior to disposal at any permitted facility.
- Nassau County Department of Public Works review and approval of treated wastewater analyses prior to discharge.
- NYSDEC review and approval of all imported backfill results as well as respective source material documentation.

Monthly (periodic progress) reports will submitted to the NYSDEC and will summarize the progress of the remedial actions accomplished during the reporting period.

5.0 REFERENCES

NYSDEC, 2010. DER-10 Technical Guidance for Site Investigation and Remediation, May 2010.

Roux Associates, 2013a. Feasibility Study, Konica Minolta Holdings, USA, Glen Cove, New York, April 1, 2013.

Roux Associates, 2013b. Remedial Investigation Amendment Summary Report (Revised), Konica Minolta Holdings, USA, Glen Cove, New York, June 10, 2013.

1. Waste Characterization Criteria

Table 1. Waste Characterization Criteria
POWERS CHEMCO SITE NO. 1-30-028, Remedial Action Work Plan

Contaminant	CAS No.	EPA Hazardous Waste Number	Regulatory Level (mg/L)[1]	Contained-In Level[2] - Soil/Sediment Action Level (mg/kg)	Land Disposal Restrictions[3] Non-Wastewater Standard (mg/kg)
Arsenic	7440-38-2	D004	5	--	--
Barium	7440-39-3	D005	100	--	--
Benzene	71-43-2	D018	0.5	22	10
Cadmium	7440-43-9	D006	1	--	--
Carbon tetrachloride	56-23-5	D019	0.5	--	--
Chlordane	57-74-9	D020	0.03	--	--
Chlorobenzene	108-90-7	D021	100	--	--
Chloroform	67-66-3	D022	6	--	--
Chromium	7440-47-3	D007	5	--	--
2,4-D	94-75-7	D016	10	--	--
1,4-Dichlorobenzene	106-46-7	D027	7.5	--	--
1,2-Dichloroethane	107-06-2	D028	0.5	--	--
1,1-Dichloroethene	75-35-4	D029	0.7	--	--
2,4-Dinitrotoluene	121-14-2	D030	0.13 [4]	--	--
Endrin	72-20-8	D012	0.02	--	--
Ethylbenzene	100-41-4	NA	NC	58	10
Heptachlor (and its epoxide)	76-44-8	D031	0.008	--	--
Hexachlorobenzene	118-74-1	D032	0.13 [4]	--	--
Hexachlorobutadiene	87-68-3	D033	0.5	--	--
Hexachloroethane	67-72-1	D034	3	--	--
Lead	7439-92-1	D008	5	--	--
Lindane	58-89-9	D013	0.4	--	--
Mercury	7439-97-6	D009	0.2	--	--
Methoxychlor	72-43-5	D014	10	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	D035	200	47000	36
Nitrobenzene	98-95-3	D036	2	--	--
Pentrachlorophenol	87-86-5	D037	100	--	--
Pyridine	110-86-1	D038	5.0 [4]	--	--
Selenium	7782-49-2	D010	1	--	--
Silver	7440-22-4	D011	5	--	--
Tetrachloroethylene	127-18-4	D039	0.7	--	--
Toluene	108-88-3	NA	NC	6300	10
Toxaphene	8001-35-2	D015	0.5	--	--
Trichloroethene	79-01-6	D040	0.5	--	--
2,4,5-Trichlorophenol	95-95-4	D041	400	--	--
2,4,6-Trichlorophenol	88-06-2	D042	2	--	--
2,4,5-TP (Silvex)	93-72-1	D017	1	--	--
Vinyl chloride	75-01-4	D043	0.2	--	--
Xylenes, total	1330-20-7	NA	NC	16000	30

Superscript Notes:

1 - From Code of Federal Regulations Title 40 Section 261.24 (Dated 7/1/2011).

2 - Per April 4, 2014 E-mail from Henry Wilkie.

3 - From Part 376(j) Table UTS-Universal Treatment Standards.

4 - Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

Acronyms and Abbreviations:

-- = Information not included in table. Refer to applicable reference.

CAS No. = Chemical abstracts service number.

mg/L = milligram per liter.

mg/kg = milligram per kilogram.

NA = Not available.

NC = No criteria presented in referenced document for indicated constituent.

FIGURES

1. Site Location
2. Site Map
3. Depth to Clean Zone and Conceptual Limits of Proposed Excavation

QUADRANGLE LOCATION

SOURCE:
USGS; 1968, Sea Cliff, N.Y.
7.5 Minute Topographic Quadrangle

0 2000'

Title:

SITE LOCATION MAP

71 CHARLES STREET
GLEN COVE, NEW YORK

POWERS CHEMCO SITE NO. 1-30-028
REMEDIAL ACTION WORK PLAN

Prepared for:
KONICA MINOLTA HOLDINGS USA, INC.

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: G.N.	Date: 21AUG13	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	1
Project Mgr.: G.N.	Project No.: 2020.0001Y000	
File: 2020.0001Y132.03.CDR		

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200' 0 200'

N

Title:

SITE MAP

POWERS CHEMCO SITE NO. 1-30-028
REMEDIAL ACTION WORK PLAN

Prepared For:
KONICA MINOLTA HOLDINGS USA, INC.
GLEN COVE, NEW YORK

Remedial REMEDIAL ENGINEERING, P.C. *ENVIRONMENTAL ENGINEERS*	Compiled by: O.R.	Date: 11MAR14	FIGURE
	Prepared by: B.H.C.	Scale: AS SHOWN	2
	Project Mgr: O.R.	Project: 2020.0001Y000	
	File: 2020.0001Y132.01.DWG		

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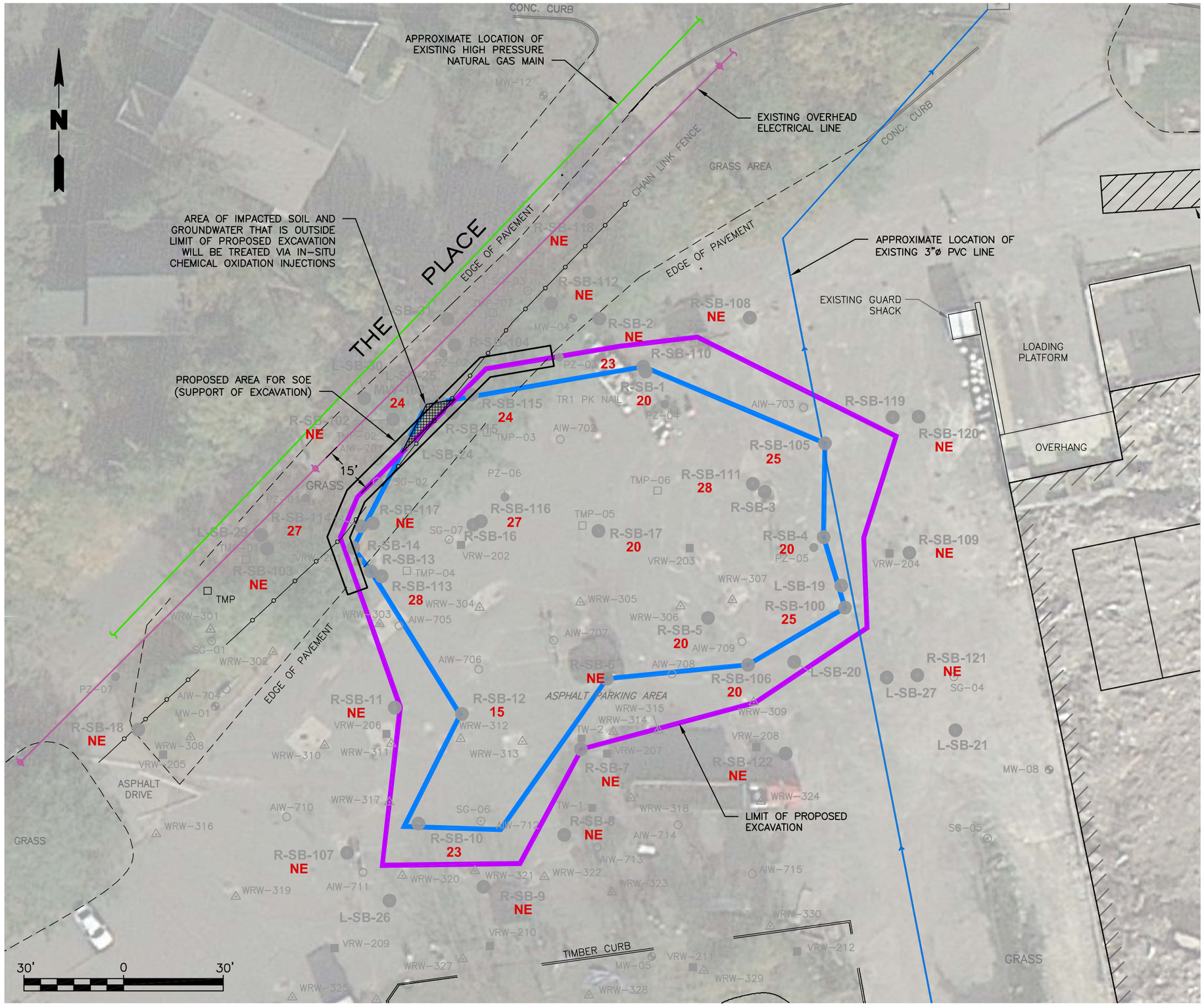

LEGEND

R-SB-1	SOIL BORING LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION)
R-SB-103	SOIL BORING LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION AMENDMENT)
R-SB-109	SOIL BORING AND GROUNDWATER SCREENING SAMPLE LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION AMENDMENT)
L-SB-24	LIBERTY SOIL BORING LOCATION AND DESIGNATION
	MONITORING WELL
	PIEZOMETER
	PASSIVE AIR INJECTION WELL – REMNANT FROM PREVIOUS REMEDIAL ACTIVITIES TO BE REMOVED
	SOIL GAS SAMPLING POINT
	VAPOR RECOVERY WELL – REMNANT FROM PREVIOUS REMEDIAL ACTIVITIES TO BE REMOVED
	WATER RECOVERY WELL – REMNANT FROM PREVIOUS REMEDIAL ACTIVITIES TO BE REMOVED
	TEMPORARY SOIL AND GROUNDWATER SAMPLING POINT
	CONCEPTUAL AREA OF KNOWN IMPACTS TO SOIL AND GROUNDWATER
	PROPOSED LIMIT OF EXCAVATION OF GROUNDWATER SOURCE AREA
20	APPROXIMATE DEPTH (FEET BELOW GRADE) OF TOP OF CLEAN ZONE BENEATH GROUNDWATER SOURCE AREA (SEE NOTE 6)
NE	NO EXEEDANCE OF PART 375 IMPACT TO GROUNDWATER CRITERIA

NOTES

1. ELECTRICAL POWER AVAILABLE AT TREATMENT BUILDING.
2. PROPOSED SOIL STAGING AREA LOCATED ON EXISTING CONCRETE SLAB REMAINING FROM BUILDING DEMOLITION ACTIVITIES. THE SOIL STAGING AREA IS APPROXIMATELY 9 FEET BELOW GRADE OF PROPOSED EXCAVATION AREA.
3. THE 3"ø PVC LINE WAS USED TO SEND TREATED GROUNDWATER TO THE CITY OF GLEN COVE STORM SEWER SYSTEM.
4. THIS PROPERTY DESIGNATED SECTION 31, BLOCK "G" ON THE LAND AND TAX MAP OF THE COUNTY OF NASSAU.
5. ABSTRACT OF TITLE AND EASEMENTS FOR SUBJECT PARCEL AND ADJOINING PARCELS NOT PROVIDED FOR THE PREPARATION OF THIS SURVEY. ABSENCE OF EASEMENTS DOES NOT DENY THE EXISTENCE OF SAME.
6. ACTUAL DEPTH OF SOURCE AREA EXCAVATION ABOVE CLEAN ZONE MAY VARY, BUT WILL BE CONFIRMED BY THE COLLECTION AND ANALYSIS OF POST-EXCAVATION SOIL SAMPLES.

Title:

DEPTHS TO CLEAN ZONE AND CONCEPTUAL LIMITS OF PROPOSED EXCAVATION

POWERS CHEMCO SITE NO. 1-30-028
REMEDIAL ACTION WORK PLAN

Prepared For:
KONICA MINOLTA HOLDINGS USA, INC.
GLEN COVE, NY

Remedial
REMEDIAL ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERS

Compiled by: O.R.	Date: 01APR14	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	3
Project Mgr:	Project: 2020.0001Y000	
File: 2020.0001Y132.03.DWG		

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APPENDICES

A. Quality Assurance Project Plan (QAPP)
B. Waste Summary Spreadsheet
C. Site Specific Health and Safety Plan
D. Community Air Monitoring Plan
E. Material Safety Data Sheet (MSDS) for RegenOx™

Quality Assurance Project Plan
(QAPP)

August 26, 2013

QUALITY ASSURANCE PROJECT PLAN

Powers Chemco Site
a.k.a. Columbia Ribbon
and Manufacturing Company Site
71 Charles Street, Glen Cove
Nassau County, New York
Site No. 1-30-028

Prepared for

KONICA MINOLTA HOLDINGS U.S.A., INC.
71 Charles Street
Glen Cove, New York 11542

ROUX ASSOCIATES, INC.

Environmental Consulting & Management

ROUX

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared to describe the measures that will be taken to ensure that the data generated during performance of the Remedial Action Work Plan (RAWP) excavation and *in situ* chemical oxidation (ISCO) activities at 71 Charles Street, Glen Cove, New York (Site) are of quality sufficient to meet project-specific data quality objectives (DQOs). The QAPP was prepared in accordance with the guidance provided in New York State Department of Environmental Conservation (NYSDEC) Technical Guidance DER-10 (Technical Guidance for Site Investigation and Remediation) and the United States Environmental Protection Agency's (USEPA's) Guidance for the Data Quality Objectives Process (EPA QA/G-4).

2.0 BACKGROUND, OBJECTIVES, AND SCOPE

In order to achieve project objectives, Roux Associates has developed a scope of work that includes sampling of soil and groundwater. A brief overview of each element of the RAWP scope of work is provided below.

2.1 Soil

Ex situ Waste characterization samples of soil will be collected and analyzed at a frequency as determined by the disposal facilities for the VOCs, semi-volatile organic compounds (SVOCs), target analyte list (TAL) metals, metals, polychlorinated biphenyls (PCBs)/pesticides, toxicity characteristic leaching procedure (TCLP) metals, total petroleum hydrocarbons (TPH), TCLP VOCs, TCLP SVOCs, TCLP PCBs/pesticides, and resource conservation and recovery act (RCRA) characteristics.

After excavation to the desired lateral and vertical limits is achieved, the remaining sidewalls will be sampled for the following parameters:

- VOCs per USEPA SW-846 Method 8260B;
- SVOCs per USEPA SW-846 Method 8270; and
- TAL metals.

Sidewall samples will be collected from every 30 linear feet of sidewall excavated along the proposed limits of excavation after each 5-foot excavation cut has been performed, inclusive of the upper 5-feet of the excavation. When the anticipated depth of excavation has been achieved, bottom samples will be collected for every 900 square feet of bottom area excavated.

2.2 Groundwater

Groundwater samples will be collected from three existing monitoring wells located around the perimeter of the proposed excavation prior to excavation activities to assess the quality of groundwater for dewatering design purposes. In addition, groundwater samples will be collected from four new monitoring wells to be installed by Roux Associates following the excavation activities. Each well will be sampled for TCL VOCs (with tentatively identified compounds

[TICs]) and TAL metals. Field parameters, including temperature, pH, conductivity, redox potential, dissolved oxygen, and turbidity will also be measured.

3.0 PROJECT ORGANIZATION

The overall management structure and a general summary of the responsibilities of project team members are presented below.

Project Manager

Nathan Epler of Roux Associates/Remedial Engineering will serve as Project Manager. The Project Manager is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the investigation. This individual will provide overall management for the implementation of the scope of work and will coordinate all field activities. The Project Manager is also responsible for data review/interpretation and report preparation. Activities of the Project Manager are supported by the Project Quality Assurance Coordinator.

Field Team Leader

Glenn Netuschil of Roux Associates/Remedial Engineering will serve as the Field Team Leader. The Field Team Leader bears the responsibility for the successful execution of the RAWP excavation, as scoped in the RAWP Work Plan. The Field Team Leader will direct the activities of all technical staff in the field as well all subcontractors. The Field Team Leader will also assist in the interpretation of data and in report preparation. The Field Team Leader reports to the Project Manager.

Laboratory Project Manager

TestAmerica Laboratories, Inc. (TestAmerica) of Shelton, Connecticut, has been selected to analyze the field samples for this project and will be responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Project Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Field Team Leader.

Quality Assurance Officer

Wai Kwan, Ph.D. of Roux Associates will serve as the Quality Assurance Officer (QAO) for this project. The QAO is responsible for conducting reviews, inspections, and audits to ensure that

the data collection is conducted in accordance with the QAPP. The QAO's responsibilities range from ensuring effective field equipment decontamination procedures and proper sample collection to the review of all laboratory analytical data for completeness and usefulness. The QAO reports to the Project Manager and makes independent recommendations to the Field Team Leader.

4.0 SAMPLING PROCEDURES

Additional details regarding soil sampling protocols are described in Roux Associates' Standard Operating Procedure for the Collection of Soil Samples for Laboratory Analysis, which is provided in Attachment A-1.

All groundwater samples will be placed in the laboratory-supplied containers and shipped to the laboratory under chain of custody procedures in accordance with Roux Associates' SOPs provided in Attachment A-2.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The primary intended use for the RAWP Work Plan data is to characterize the soil for proper off-site disposal, confirm that the excavation has removed impacted soil and that the groundwater remedy ISCO has achieved the remedial goals for the Site. The primary DQO of the soil and groundwater, therefore, is that data be accurate and precise, and hence representative of the actual Site conditions. Accuracy refers to the ability of the laboratory to obtain a true value (i.e., compared to a standard) and is assessed through the use of laboratory quality control (QC) samples, including laboratory control samples and matrix spike samples, as well as through the use of surrogates, which are compounds not typically found in the environment that are injected into the samples prior to analysis. Precision refers to the ability to replicate a value, and is assessed through both field and laboratory duplicate samples.

Sensitivity is also a critical issue in generating representative data. Laboratory equipment must be of sufficient sensitivity to detect target compounds and analytes at levels below NYSDEC standards and guidelines whenever possible. Equipment sensitivity can be decreased by field or laboratory contamination of samples, and by sample matrix effects. Assessment of instrument sensitivity is performed through the analysis of reagent blanks, near-detection-limit standards, and response factors. Potential field and/or laboratory contamination is assessed through use of trip blanks, method blanks, and equipment rinse blanks (also called “field blanks”).

Table 1 lists the field and laboratory QC samples that will be analyzed to assess data accuracy and precision, as well as to determine if equipment sensitivity has been compromised. Table 2 shows the reporting limits and minimum detection limits achievable by the laboratory.

All RAWP “assessment” analyses (i.e., TCLP VOCs, TCLP SVOCs, TCL VOCs, SVOCs, pesticides/PCBs; TAL metals) will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW-846 methods. The laboratory selected to analyze the field samples collected during the RAWP shall maintain a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Contract Laboratory Protocol (CLP) certification for each of the “assessment” analyses listed in Section 2.0.

Table 1. Field and Laboratory QC Summary

QC Check Type	Minimum Frequency	Use
Field QC		
Duplicate	1 per matrix per SDG*	Precision
Trip Blank	1 per VOC cooler	Sensitivity
Equipment Rinse Blank	1 per day	Sensitivity
Laboratory QC		
Laboratory Control Sample	1 per matrix per SDG	Accuracy
Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate**	1 per matrix per SDG	Accuracy/Precision
Surrogate Spike	All organics samples	Accuracy
Laboratory Duplicate	1 per matrix per SDG	Precision
Method Blank	1 per matrix per SDG	Sensitivity

Notes:

* SDG - Sample Delivery Group - Assumes a single extraction or preparation

** Provided to lab by field sampling personnel

Table 2. Laboratory Limits for Soil and Water

Analysis Group Description	Method Description	Method Code
Soil Analysis	Volatile Organic Compounds (GC/MS)	8260B

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Dichlorodifluoromethane	75-71-8	5	0.35	ug/Kg
Chloromethane	74-87-3	5	0.78	ug/Kg
Vinyl chloride	75-01-4	5	0.23	ug/Kg
Bromomethane	74-83-9	5	2.08	ug/Kg
Chloroethane	75-00-3	5	0.98	ug/Kg
Trichlorofluoromethane	75-69-4	5	0.15	ug/Kg
1,1-Dichloroethene	75-35-4	5	0.58	ug/Kg
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	0.79	ug/Kg
Acetone	67-64-1	20	2.24	ug/Kg
Carbon disulfide	75-15-0	5	0.41	ug/Kg
Methyl acetate	79-20-9	5	0.44	ug/Kg
Methylene Chloride	75-09-2	20	1.09	ug/Kg
trans-1,2-Dichloroethene	156-60-5	5	0.39	ug/Kg
Methyl tert-butyl ether	1634-04-4	5	0.21	ug/Kg
1,1-Dichloroethane	75-34-3	5	0.3	ug/Kg
cis-1,2-Dichloroethene	156-59-2	5	0.37	ug/Kg
Methyl Ethyl Ketone	78-93-3	10	1.59	ug/Kg
Chloroform	67-66-3	5	0.34	ug/Kg
1,1,1-Trichloroethane	71-55-6	5	0.53	ug/Kg
Cyclohexane	110-82-7	5	0.69	ug/Kg
Carbon tetrachloride	56-23-5	5	0.95	ug/Kg
Benzene	71-43-2	5	0.57	ug/Kg
1,2-Dichloroethane	107-06-2	5	0.58	ug/Kg
Trichloroethene	79-01-6	5	0.81	ug/Kg
Methylcyclohexane	108-87-2	5	0.33	ug/Kg
1,2-Dichloropropane	78-87-5	5	0.67	ug/Kg
Bromodichloromethane	75-27-4	5	0.3	ug/Kg
cis-1,3-Dichloropropene	10061-01-5	5	0.56	ug/Kg
methyl isobutyl ketone	108-10-1	5	0.55	ug/Kg
Toluene	108-88-3	5	0.074	ug/Kg
trans-1,3-Dichloropropene	10061-02-6	5	0.27	ug/Kg
1,1,2-Trichloroethane	79-00-5	5	0.37	ug/Kg
Tetrachloroethene	127-18-4	5	0.81	ug/Kg
2-Hexanone	591-78-6	10	1.2	ug/Kg
Dibromochloromethane	124-48-1	5	0.35	ug/Kg
1,2-Dibromoethane	106-93-4	5	0.76	ug/Kg
Chlorobenzene	108-90-7	5	0.59	ug/Kg
Ethylbenzene	100-41-4	5	0.7	ug/Kg
m&p-Xylene	179601-23-1	5	0.35	ug/Kg
o-Xylene	95-47-6	5	0.19	ug/Kg
Xylenes, Total	1330-20-7	5	0.486	ug/Kg
Styrene	100-42-5	5	0.15	ug/Kg
Bromoform	75-25-2	5	0.61	ug/Kg
Isopropylbenzene	98-82-8	5	0.19	ug/Kg
1,1,2,2-Tetrachloroethane	79-34-5	5	0.52	ug/Kg

Table 2. Laboratory Limits for Soil and Water

1,3-Dichlorobenzene	541-73-1	5	0.21	ug/Kg
1,4-Dichlorobenzene	106-46-7	5	0.67	ug/Kg
1,2-Dichlorobenzene	95-50-1	5	0.24	ug/Kg
1,2-Dibromo-3-Chloropropane	96-12-8	10	4.53	ug/Kg
1,2,4-Trichlorobenzene	120-82-1	5	0.75	ug/Kg
1,2-Dichloroethane-d4 (Surr)	17060-07-0			ug/Kg
4-Bromofluorobenzene	460-00-4			ug/Kg
Dibromofluoromethane	1868-53-7	5		ug/Kg
Toluene-d8 (Surr)	2037-26-5			ug/Kg
Tentatively Identified Compound	STL00231			ug/Kg

Analysis Group Description	Method Description	Method Code
Soil Analysis	Purge and Trap	5030B
Soil Analysis	Semivolatile Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	8270C

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
1,1'-Biphenyl	92-52-4	270	17.5	ug/Kg
2,4,5-Trichlorophenol	95-95-4	1700	13.6	ug/Kg
2,4,6-Trichlorophenol	88-06-2	270	7.4	ug/Kg
2,4-Dichlorophenol	120-83-2	270	14.4	ug/Kg
2,4-Dimethylphenol	105-67-9	270	13.1	ug/Kg
2,4-Dinitrotoluene	121-14-2	270	21.5	ug/Kg
2,4-Dinitrophenol	51-28-5	1700	81	ug/Kg
2,6-Dinitrotoluene	606-20-2	270	7.9	ug/Kg
2-Chloronaphthalene	91-58-7	270	11.5	ug/Kg
2-Chlorophenol	95-57-8	270	15.7	ug/Kg
2-Methylnaphthalene	91-57-6	270	7.7	ug/Kg
2-Methylphenol	95-48-7	270	16.2	ug/Kg
2-Nitroaniline	88-74-4	670	16.4	ug/Kg
2-Nitrophenol	88-75-5	270	17	ug/Kg
3,3'-Dichlorobenzidine	91-94-1	330	55.5	ug/Kg
3-Nitroaniline	99-09-2	670	8.6	ug/Kg
4,6-Dinitro-2-methylphenol	534-52-1	1700	116	ug/Kg
4-Bromophenyl phenyl ether	101-55-3	270	17.4	ug/Kg
4-Chloro-3-methylphenol	59-50-7	270	11.1	ug/Kg
4-Chloroaniline	106-47-8	270	43.9	ug/Kg
4-Chlorophenyl phenyl ether	7005-72-3	270	19.9	ug/Kg
Methylphenol, 3 & 4	106-44-5	270	17.7	ug/Kg
4-Nitroaniline	100-01-6	270	20.7	ug/Kg
4-Nitrophenol	100-02-7	1700	20.4	ug/Kg
Acenaphthene	83-32-9	270	16	ug/Kg
Acenaphthylene	208-96-8	270	13.2	ug/Kg
Acetophenone	98-86-2	270	14	ug/Kg
Anthracene	120-12-7	270	10.5	ug/Kg
Atrazine	1912-24-9	330	17.1	ug/Kg
Benzaldehyde	100-52-7	270	45	ug/Kg
Benzo[a]anthracene	56-55-3	270	9.6	ug/Kg
Benzo[a]pyrene	50-32-8	270	7.3	ug/Kg
Benzo[b]fluoranthene	205-99-2	270	7.2	ug/Kg

Table 2. Laboratory Limits for Soil and Water

Benzo[g,h,i]perylene	191-24-2	270	17.6	ug/Kg
Benzo[k]fluoranthene	207-08-9	270	24.2	ug/Kg
Bis(2-chloroethoxy)methane	111-91-1	270	12.5	ug/Kg
Bis(2-chloroethyl)ether	111-44-4	270	14	ug/Kg
Bis(2-ethylhexyl) phthalate	117-81-7	270	26.1	ug/Kg
Butyl benzyl phthalate	85-68-7	270	15.1	ug/Kg
Caprolactam	105-60-2	270	21.2	ug/Kg
Carbazole	86-74-8	270	15	ug/Kg
Chrysene	218-01-9	270	19.9	ug/Kg
Di-n-butyl phthalate	84-74-2	270	39.2	ug/Kg
Di-n-octyl phthalate	117-84-0	270	15.3	ug/Kg
Dibenz(a,h)anthracene	53-70-3	270	21.2	ug/Kg
Dibenzofuran	132-64-9	270	19	ug/Kg
Diethyl phthalate	84-66-2	270	27.2	ug/Kg
Dimethyl phthalate	131-11-3	270	15.5	ug/Kg
Fluoranthene	206-44-0	270	13.4	ug/Kg
Fluorene	86-73-7	270	16.2	ug/Kg
Hexachlorobenzene	118-74-1	270	18.7	ug/Kg
Hexachlorobutadiene	87-68-3	270	20.8	ug/Kg
Hexachlorocyclopentadiene	77-47-4	670	127	ug/Kg
Hexachloroethane	67-72-1	270	15.4	ug/Kg
Indeno[1,2,3-cd]pyrene	193-39-5	270	17.5	ug/Kg
Isophorone	78-59-1	270	14.9	ug/Kg
N-Nitrosodi-n-propylamine	621-64-7	270	18.2	ug/Kg
N-Nitrosodiphenylamine	86-30-6	270	15.2	ug/Kg
Naphthalene	91-20-3	270	14	ug/Kg
Nitrobenzene	98-95-3	270	17.2	ug/Kg
Pentachlorophenol	87-86-5	670	164	ug/Kg
Phenanthrene	85-01-8	270	13.3	ug/Kg
Phenol	108-95-2	270	17.9	ug/Kg
Pyrene	129-00-0	270	12.7	ug/Kg
2,2'-oxybis[1-chloropropane]	108-60-1	270	14	ug/Kg
1,2-Dichlorobenzene-d4	2199-69-1			ug/Kg
2,4,6-Tribromophenol	118-79-6	270		ug/Kg
2-Chlorophenol-d4	93951-73-6			ug/Kg
2-Fluorobiphenyl	321-60-8	270		ug/Kg
2-Fluorophenol	367-12-4	330		ug/Kg
Nitrobenzene-d5	4165-60-0	270		ug/Kg
Phenol-d5	4165-62-2	330		ug/Kg
Terphenyl-d14	1718-51-0	270		ug/Kg
Tentatively Identified Compound	STL00231	330		ug/Kg

Table 2. Laboratory Limits for Soil and Water

Analysis Group Description	Method Description	Method Code
Soil Analysis	Automated Soxhlet Extraction	3541
Soil Analysis	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	8082

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
PCB-1016	12674-11-2	17	1.317	ug/Kg
PCB-1221	11104-28-2	17	1.317	ug/Kg
PCB-1232	11141-16-5	17	1.317	ug/Kg
PCB-1242	53469-21-9	17	1.317	ug/Kg
PCB-1248	12672-29-6	17	1.317	ug/Kg
PCB-1254	11097-69-1	17	1.441	ug/Kg
PCB-1260	11096-82-5	17	1.441	ug/Kg
Tetrachloro-m-xylene	877-09-8			ug/Kg
DCB Decachlorobiphenyl	2051-24-3			ug/Kg

Analysis Group Description	Method Description	Method Code
Soil Analysis	Ultrasonic Extraction	3550B
Soil Analysis	Organochlorine Pesticides (GC)	8081A

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
4,4'-DDD	72-54-8	3.3	0.594	ug/Kg
4,4'-DDE	72-55-9	3.3	0.67	ug/Kg
4,4'-DDT	50-29-3	3.3	0.81	ug/Kg
Aldrin	309-00-2	1.7	0.181	ug/Kg
alpha-BHC	319-84-6	1.7	0.244	ug/Kg
beta-BHC	319-85-7	1.7	0.374	ug/Kg
DCB Decachlorobiphenyl	2051-24-3			ug/Kg
delta-BHC	319-86-8	1.7	0.365	ug/Kg
Dieldrin	60-57-1	3.3	0.571	ug/Kg
Endosulfan I	959-98-8	1.7	0.292	ug/Kg
Endosulfan II	33213-65-9	3.3	0.622	ug/Kg
Endosulfan sulfate	1031-07-8	3.3	0.594	ug/Kg
Endrin	72-20-8	3.3	0.617	ug/Kg
Endrin aldehyde	7421-93-4	3.3	0.407	ug/Kg
Endrin ketone	53494-70-5	3.3	0.607	ug/Kg
gamma-BHC (Lindane)	58-89-9	1.7	0.287	ug/Kg
Heptachlor	76-44-8	1.7	0.319	ug/Kg
Heptachlor epoxide	1024-57-3	1.7	0.301	ug/Kg
Methoxychlor	72-43-5	17	3.658	ug/Kg
Tetrachloro-m-xylene	877-09-8			ug/Kg
Toxaphene	8001-35-2	83	9.15	ug/Kg
alpha-Chlordane	5103-71-9	1.7	0.275	ug/Kg
gamma-Chlordane	5103-74-2	1.7	0.53	ug/Kg

Table 2. Laboratory Limits for Soil and Water

Analysis Group Description	Method Description	Method Code
Soil Analysis	Ultrasonic Extraction	3550B
Soil Analysis	Metals (ICP/MS)	6020

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Silver	7440-22-4	0.4	0.08	mg/Kg
Aluminum	7429-90-5	20	4	mg/Kg
Arsenic	7440-38-2	0.4	0.08	mg/Kg
Barium	7440-39-3	0.4	0.12	mg/Kg
Beryllium	7440-41-7	0.4	0.12	mg/Kg
Calcium	7440-70-2	40	12	mg/Kg
Cadmium	7440-43-9	0.4	0.08	mg/Kg
Cobalt	7440-48-4	0.4	0.08	mg/Kg
Chromium	7440-47-3	0.8	0.16	mg/Kg
Copper	7440-50-8	0.8	0.08	mg/Kg
Iron	7439-89-6	20	6.4	mg/Kg
Potassium	7440-09-7	40	4	mg/Kg
Magnesium	7439-95-4	40	4	mg/Kg
Manganese	7439-96-5	1	0.16	mg/Kg
Sodium	7440-23-5	40	13.2	mg/Kg
Nickel	7440-02-0	0.4	0.08	mg/Kg
Lead	7439-92-1	0.4	0.08	mg/Kg
Antimony	7440-36-0	0.64	0.16	mg/Kg
Selenium	7782-49-2	0.8	0.24	mg/Kg
Thallium	7440-28-0	0.56	0.16	mg/Kg
Vanadium	7440-62-2	0.4	0.08	mg/Kg
Zinc	7440-66-6	4	0.4	mg/Kg

Analysis Group Description	Method Description	Method Code
Soil Analysis	Preparation, Metals	3050B
Soil Analysis	Mercury (CVAA)	7471A

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Mercury	7439-97-6	0.05	0.004	mg/Kg

Analysis Group Description	Method Description	Method Code
Soil Analysis	Preparation, Mercury	7471A_Prep
Soil Analysis	Diesel Range Organics (DRO) (GC)	8015B_DRO

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Diesel Range Organics [C10-C28]	STL00143	17000		
o-Terphenyl	84-15-1			

Analysis Group Description	Method Description	Method Code
Soil Analysis	Ultrasonic Extraction	3550B
Soil Analysis	Gasoline Range Organics - (GC)	8015B_GRO

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Gasoline Range Organics (C6-C9)	STL00215	25		
a,a,a-Trifluorotoluene	98-08-8			

Table 2. Laboratory Limits for Soil and Water

Analysis Group Description	Method Description	Method Code
Soil Analysis	Closed System Purge and Trap	5035A_FP
Soil Analysis	Percent Moisture	Moisture

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Percent Moisture	STL00177	0.1		
Percent Solids	STL00234	0.1		

Analysis Group Description	Method Description	Method Code
Soil Analysis	Cyanide, Total andor Amenable	9012B

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Cyanide, Total	57-12-5	500	117	ug/Kg

Analysis Group Description	Method Description	Method Code
Soil Analysis	Cyanide, Total and/or Amenable, Distillation	9012B_Prep
Soil Analysis	Gasoline Range Organics - (GC)	8015B_GRO

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Gasoline Range Organics (C6-C9)	STL00215	1250		
a,a,a-Trifluorotoluene	98-08-8			

Analysis Group Description	Method Description	Method Code
Soil Analysis	Closed System Purge and Trap	5035A_M
Water Analysis	Volatile Organic Compounds (GC/MS)	8260B

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Dichlorodifluoromethane	75-71-8	5	1.01	ug/L
Chloromethane	74-87-3	5	1.09	ug/L
Vinyl chloride	75-01-4	5	0.99	ug/L
Bromomethane	74-83-9	5	2.12	ug/L
Chloroethane	75-00-3	5	1.06	ug/L
Trichlorofluoromethane	75-69-4	5	1.11	ug/L
1,1-Dichloroethene	75-35-4	5	0.83	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	0.97	ug/L
Acetone	67-64-1	10	1.03	ug/L
Carbon disulfide	75-15-0	5	0.9	ug/L
Methyl acetate	79-20-9	5	0.48	ug/L
Methylene Chloride	75-09-2	5	0.78	ug/L
trans-1,2-Dichloroethene	156-60-5	5	0.76	ug/L
Methyl tert-butyl ether	1634-04-4	5	0.17	ug/L
1,1-Dichloroethane	75-34-3	5	1.03	ug/L
cis-1,2-Dichloroethene	156-59-2	5	0.99	ug/L
Methyl Ethyl Ketone	78-93-3	10	1.09	ug/L
Chloroform	67-66-3	5	0.67	ug/L
1,1,1-Trichloroethane	71-55-6	5	0.69	ug/L
Cyclohexane	110-82-7	5	0.7	ug/L
Carbon tetrachloride	56-23-5	5	1.07	ug/L
Benzene	71-43-2	5	0.74	ug/L
1,2-Dichloroethane	107-06-2	5	0.72	ug/L
Trichloroethene	79-01-6	5	0.62	ug/L

Table 2. Laboratory Limits for Soil and Water

Methylcyclohexane	108-87-2	5	0.98	ug/L
1,2-Dichloropropane	78-87-5	5	0.71	ug/L
Bromodichloromethane	75-27-4	5	0.48	ug/L
cis-1,3-Dichloropropene	10061-01-5	5	0.28	ug/L
methyl isobutyl ketone	108-10-1	10	0.38	ug/L
Toluene	108-88-3	5	0.72	ug/L
trans-1,3-Dichloropropene	10061-02-6	5	0.57	ug/L
1,1,2-Trichloroethane	79-00-5	5	0.65	ug/L
Tetrachloroethene	127-18-4	5	0.81	ug/L
2-Hexanone	591-78-6	10	1.09	ug/L
Dibromochloromethane	124-48-1	5	0.55	ug/L
1,2-Dibromoethane	106-93-4	5	0.52	ug/L
Chlorobenzene	108-90-7	5	0.72	ug/L
Ethylbenzene	100-41-4	5	0.87	ug/L
m&p-Xylene	179601-23-1	5	1.66	ug/L
o-Xylene	95-47-6	5	0.66	ug/L
Xylenes, Total	1330-20-7	5	2.27	ug/L
Styrene	100-42-5	5	0.64	ug/L
Bromoform	75-25-2	5	0.46	ug/L
Isopropylbenzene	98-82-8	5	0.85	ug/L
1,1,2,2-Tetrachloroethane	79-34-5	5	0.81	ug/L
1,3-Dichlorobenzene	541-73-1	5	0.14	ug/L
1,4-Dichlorobenzene	106-46-7	5	0.59	ug/L
1,2-Dichlorobenzene	95-50-1	5	0.22	ug/L
1,2-Dibromo-3-Chloropropane	96-12-8	5	1.16	ug/L
1,2,4-Trichlorobenzene	120-82-1	5	0.72	ug/L
1,2-Dichloroethane-d4 (Surr)	17060-07-0			ug/L
4-Bromofluorobenzene	460-00-4	5		ug/L
Dibromofluoromethane	1868-53-7	5		ug/L
Toluene-d8 (Surr)	2037-26-5	5		ug/L
Tentatively Identified Compound	STL00231			ug/L

Analysis Group Description	Method Description	Method Code
Water Analysis	Purge and Trap	5030B
Water Analysis	Metals (ICP/MS)	6020

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Silver	7440-22-4	5	1	ug/L
Aluminum	7429-90-5	250	50	ug/L
Arsenic	7440-38-2	5	1	ug/L
Barium	7440-39-3	5	1	ug/L
Beryllium	7440-41-7	5	1	ug/L
Calcium	7440-70-2	500	100	ug/L
Cadmium	7440-43-9	5	1	ug/L
Cobalt	7440-48-4	5	1	ug/L
Chromium	7440-47-3	10	2	ug/L
Copper	7440-50-8	10	1	ug/L
Iron	7439-89-6	250	50	ug/L
Potassium	7440-09-7	500	50	ug/L

Table 2. Laboratory Limits for Soil and Water

Magnesium	7439-95-4	500	50	ug/L
Manganese	7439-96-5	12	2	ug/L
Sodium	7440-23-5	500	100	ug/L
Nickel	7440-02-0	5	1	ug/L
Lead	7439-92-1	5	1	ug/L
Antimony	7440-36-0	8	2	ug/L
Selenium	7782-49-2	10	2	ug/L
Thallium	7440-28-0	7	2	ug/L
Vanadium	7440-62-2	5	1	ug/L
Zinc	7440-66-6	50	5	ug/L

Analysis Group Description	Method Description	Method Code
Water Analysis	Preparation, Total Metals	3010A
Water Analysis	Mercury (CVAA)	7470A

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Mercury	7439-97-6	0.2	0.06	ug/L

Analysis Group Description	Method Description	Method Code
Water Analysis	Preparation, Mercury	7470A_Prep
Water Analysis	Metals (ICP/MS)	6020

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Silver	7440-22-4	5	1	ug/L
Aluminum	7429-90-5	250	50	ug/L
Arsenic	7440-38-2	5	1	ug/L
Barium	7440-39-3	5	1	ug/L
Beryllium	7440-41-7	5	1	ug/L
Calcium	7440-70-2	500	100	ug/L
Cadmium	7440-43-9	5	1	ug/L
Cobalt	7440-48-4	5	1	ug/L
Chromium	7440-47-3	10	2	ug/L
Copper	7440-50-8	10	1	ug/L
Iron	7439-89-6	250	50	ug/L
Potassium	7440-09-7	500	50	ug/L
Magnesium	7439-95-4	500	50	ug/L
Manganese	7439-96-5	12	2	ug/L
Sodium	7440-23-5	500	100	ug/L
Nickel	7440-02-0	5	1	ug/L
Lead	7439-92-1	5	1	ug/L
Antimony	7440-36-0	8	2	ug/L
Selenium	7782-49-2	10	2	ug/L
Thallium	7440-28-0	7	2	ug/L
Vanadium	7440-62-2	5	1	ug/L
Zinc	7440-66-6	50	5	ug/L

Table 2. Laboratory Limits for Soil and Water

Analysis Group Description	Method Description	Method Code
Water Analysis	Preparation, Total Metals	3010A
Water Analysis	Sample Filtration	FILTRATION
Water Analysis	Mercury (CVAA)	7470A

Analyte Description	CAS Number	RL - Limit	MDL - Limit	Units
Mercury	7439-97-6	0.2	0.06	ug/L

Analysis Group Description	Method Description	Method Code
Water Analysis	Preparation, Mercury	7470A_Prep
Water Analysis	Sample Filtration	FILTRATION

Roux Associates' Standard Operating Procedure for Soil Sampling

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

Roux Associates' Standard Operating Procedure for Groundwater Sampling

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for the sampling of ground-water monitoring wells for dissolved constituents. As part of the SOP for the sampling of ground-water monitoring wells, sample collection equipment and devices must be considered, and equipment decontamination and pre-sampling procedures (e.g., measuring water levels, sounding wells, and purging wells) must be implemented. Sampling objectives must be firmly established in the work plan before considering the above.

Valid water-chemistry data are integral to a hydrogeologic investigation that characterizes ground-water quality conditions. Water-quality data are used to evaluate both current and historic aquifer chemistry conditions, as well as to estimate future conditions (e.g., trends, migration pathways). Water-quality data can be used to construct ground-water quality maps to illustrate chemical conditions within the flow system, to generate water-quality plots to depict conditions with time and trends, and to perform statistical analyses to quantify data variability, trends, and cleanup levels.

2.0 EQUIPMENT AND MATERIALS

2.1 In order to sample ground water from monitoring wells, specific equipment and materials are required. The equipment and materials list may include, but not necessarily be limited to, the following:

a. Bailers (Teflon™ or stainless steel).

b. Pumps (centrifugal, peristaltic, bladder, electric submersible, bilge, hand-operated diaphragm, etc.).

c. Gas-displacement device(s).

d. Air-lift device(s).

e. Teflon™ tape, electrical tape.

f. Appropriate discharge hose.

g. Appropriate discharge tubing (e.g., polypropylene, teflon, etc.) if using a peristaltic pump.

h. Appropriate compressed gas if using bladder-type or gas-displacement device.

i. Portable generator and gasoline or alternate power supply if using an electric submersible pump.

j. Non-absorbent cord (e.g., polypropylene, etc.).

k. Plastic sheeting.

l. Tape measure (stainless steel, steel, fiberglass) with 0.01-foot measurement increments and chalk (blue carpenter's).

m. Electronic water-level indicators (e.g., m-scope, etc.) or electric water-level/product level indicators.

n. Non-phosphate, laboratory-grade detergent.

o. Distilled/Deionized water.

p. Potable water.

q. Paper towels, clean rags.

r. Roux Associates' field forms (e.g., daily log, well inspection checklist, sampling, etc.) and field notebook.

s. Well location and site map.

t. Well keys.

u. Stop watch, digital watch with second increments, or watch with a second hand.

v. Water Well Handbook.

w. Calculator.

x. Black pen and water-proof marker.

y. Tools (e.g., pipe wrenches, screwdrivers, hammer, pliers, flashlight, pen knife, etc.).

z. Appropriate health and safety equipment, as specified in the site health and safety plan (HASP).

aa. pH meter(s) and buffers.

bb. Conductivity meter(s) and standards.

cc. Thermometer(s).

dd. Extra batteries (meters, thermometers, flashlight).

ee. Filtration apparatus, filters, pre-filters.

ff. Plasticware (e.g., premeasured buckets, beakers, flasks, funnels).

gg. Disposable gloves.

hh. Water jugs.

ii. Laboratory-supplied sample containers with labels.

jj. Cooler(s).

kk. Ice (wet, blue packs).

ll. Masking, duct, and packing tape.

mm. Chain-of-custody form(s) and custody seal(s).

nn. Site sampling and analysis plan (SAP).

oo. Site health and safety plan (HASP).

pp. Packing material (e.g., bubble wrap)

qq. "Zip-lock" plastic bags.

rr. Overnight (express) mail forms.

3.0 DECONTAMINATION

3.1 Make sure all equipment is decontaminated and cleaned before use (refer to the SOP for Decontamination of Field Equipment for detailed decontamination methods, summaries for bailers and pumps are provided below). Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form and in the field notebook.

a. Decontaminate a bailer by: 1) wearing disposable gloves, 2) disassembling (if appropriate) and scrubbing in a non-phosphate, laboratory-grade detergent and distilled/deionized water solution, and 3) rinsing first with potable water and then distilled/deionized water.

b. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing the pump and discharge hose (if not disposable) first with a non-phosphate, laboratory-grade detergent and potable water solution in an appropriate container (clean bucket, garbage can, or 55-gallon drum) and then with

distilled/deionized water or potable water, and 3) wiping pump-related equipment (e.g., electrical lines, cables, discharge hose) first with a clean cloth and detergent solution and then rinsing or wiping with a clean cloth and distilled/deionized water or potable water.

3.2 Note that the decontamination procedures for bailers and pumps are the minimum that must be performed. Check the work plan to determine if chemicals specified by individual state regulatory agencies must also be used for decontamination procedures (e.g., hexane, nitric acid, acetone, isopropanol, etc.).

4.0 CALIBRATION OF FIELD ANALYSIS EQUIPMENT

Calibrate field analysis equipment before use (e.g., thermometers, pH and conductivity meters, etc.). Refer to the specific SOP for field analysis for each respective piece of equipment. Document, and initial and date the calibration procedures on the appropriate field form, in the field notebook, and in the calibration log book.

5.0 PROCEDURE

5.1 Document, and initial and date well identification, pre-sampling information, and problems encountered on the appropriate field form and in the field notebook as needed.

5.2 Inspect the protective casing of the well and the well casing, and note any items of concern such as a missing lock, or bent or damaged casing(s).

5.3 Place plastic sheeting around the well to protect sampling equipment from potential cross contamination.

5.4 Remove the well cap or plug and, if necessary, clean the top of the well off with a clean rag. Place the cap or plug on the plastic sheeting. If the well is not vented, allow several minutes for the water level in the well to equilibrate. If fumes or gases are present, then diagnose these with the proper safety equipment. Never inhale the vapors.

5.5 Measure the depth to water (DTW) from the measuring point (MP) on the well using a steel tape and chalk or an electronic sounding device (m-scope). Refer to the specific SOPs for details regarding the use of a steel tape or a m-scope for measuring water levels. Calculate the water-level elevation. Document, and initial and date the information on the appropriate field form and in the field notebook.

5.6 Measuring the total depth of the well from the MP with a weighted steel tape. Calculate and record the volume of standing water in the well casing on the appropriate field form and in the field notebook.

5.7 Decontaminate the equipment used to measure the water level and sound the well with a non-phosphate, laboratory-grade detergent solution followed by a distilled/deionized water rinse.

5.8 Purge the well prior to sampling (refer to the SOP for Purging a Well). The well should be pumped or bailed to remove the volume of water specified in the work plan. Usually three to five casing volumes are removed if the recharge rate is adequate to accomplish this within a reasonable amount of time.

If the formation cannot produce enough water to sustain purging, then one of two options must be followed. These include: 1) pumping or bailing the well dry, or 2) pumping or bailing the well to "near-dry" conditions (i.e., leaving some water in the well). The option employed must be specified in the work plan and be in accordance with regulatory requirements.

If the well is purged dry, then all the standing water has been removed and upon recovery the well is ready for sampling. However, depending on the rate of recovery and the time needed to complete the sampling round, one of the following procedures may have to be implemented: 1) the well may have to be sampled over a period of more than one day; 2) the well may not yield enough water to collect a complete suite of samples and only select (most important) samples will be collected; or 3) the well may not recover which will preclude sampling. Regardless of the option that must be followed, the sampling procedure must be fully documented. When preparing to conduct a sampling round, review drilling, development and previous sampling information (if available) to identify low-yielding wells in order to purge them first, and potentially allow time for the well to recover for sampling.

5.9 Record the physical appearance of the water (i.e., color, turbidity, odor, etc.) on the appropriate field form and in the field notebook, as it is purged. Note any changes that occur during purging.

5.10 If a bailer is used to collect the sample, then:

a. Flush the decontaminated bailer three times with distilled/deionized water.

b. Tie the non-absorbent cord (polypropylene) to the bailer with a secure knot and then tie the free end of the bailer cord to the protective casing or, if possible, some nearby structure to prevent losing the bailer and cord down the well.

c. Lower the bailer slowly down the well and into the water column to minimize disturbance of the water surface. If a bottom-filling bailer is used, then do not submerge the top of the bailer; however, if a top-filling bailer is used, then submerge the bailer several feet below the water surface.

d. Remove and properly discard one bailer volume from the well to rinse the bailer with well water before sampling. Again, lower the bailer slowly down the well to the appropriate depth depending on the bailer type (as discussed above in 5.11 c). When removing the bailer from the well, do not allow the bailer cord to rest on the ground but coil it on the protective plastic sheeting placed around the well. Certain regulatory agencies require that the first bailer volume collected be utilized for the samples.

5.11 If a pump is used to collect the sample, then use the same pump used to purge the well and, if need be, reduce the discharge rate to facilitate filling sample containers and to avoid problems that can occur while filling sample containers (as listed in Number 5.14, below). Alternately, the purge pump may be removed and a thoroughly decontaminated bailer can be used to collect the sample.

5.12 Remove each appropriate container's cap only when ready to fill each with the water sample, and then replace and secure the cap immediately.

5.13 Fill each appropriate, pre-labeled sample container carefully and cautiously to prevent: 1) agitating or creating turbulence; 2) breaking the container; 3) entry of, or contact with, any other medium; and 4) spilling/splashing the sample and exposing the sampling team to contaminated water. Immediately place the filled sample container in a ice-filled (wet ice or blue pack) cooler for storage. If wet ice is used it is recommended that it be repackaged in zip-lock bags to help keep the cooler dry and the sample labels secure. Check the work plan as to whether wet ice or blue packs are specified for cooling the samples because certain regulatory agencies may specify the use of one and not the other.

5.14 "Top-off" containers for volatile organic compounds (VOCs) and tightly seal with Teflon™-lined septums held in place by open-top screw caps to prevent volatilization. Ensure that there are no bubbles by turning the container upside down and tapping it gently.

5.15 Filter water samples (Procedure 4.6) collected for dissolved metals analysis prior to preservation to remove the suspended sediment from the sample. If water samples are to be collected for total metals analysis, then collect a second set of samples without field filtering.

In the event that the regulatory agency(ies) want unfiltered samples for metals analysis, a second set of filtered samples should also be collected. Because unfiltered samples are indications of total metals (dissolved and suspended) they are not representative of aquifer conditions because ground water does not transport sediment (except in some rare cases). Thus, the results for dissolved metals in ground water should be based on filtered samples even if both filtered and unfiltered sets are presented in a report.

5.16 Add any necessary preservative(s) to the appropriate container(s) prior to, or after (preferred), the collection of the sample, unless the appropriate preservative(s) have already been added by the laboratory before shipment.

5.17 Collect quality control (QC) samples as required in the work plan to monitor sampling and laboratory performance. Refer to the SOP for Collection of Quality Control Samples.

5.18 Conduct field analyses after sample collection is complete by measuring and recording the temperature, conductivity, pH, etc. (as called for in the work plan). Note and record the "final" physical appearance of the water (after purging and sampling) on an appropriate field form and in the field notebook.

5.19 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cover.

5.20 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," placed in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory.

5.21 Decontaminate bailers, hoses, and pumps as discussed in the decontamination SOP. Wrap decontaminated equipment with a suitable material (e.g., clean plastic bag or aluminum foil). Discard cords, rags, gloves, etc. in a manner consistent with site conditions.

5.22 Complete all necessary field forms, field notebook entries, and the chain-of-custody forms. Retain one copy of each chain-of-custody form. Secure the cooler with sufficient packing tape and a custody seal.

5.23 Samples collected from Monday through Friday will be delivered within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Consult the work plan to determine if any of the analytes require a shorter delivery time.

END OF PROCUDURE

APPENDIX B

Waste Summary Spreadsheet

Table B-1. Waste Tracking-Accumulation Time Frames, POWERS CHEMCO SITE NO. 1-30-028, Remedial Action Work Plan

Description				Accumulation Time Frames		
Waste Stream #	Waste Stream Description	Source	Location	Earliest Date Generated	45 Days from Generation	90 Days From Generation

Table B-2. Waste Tracking-Review of Waste Characterization Results, POWERS CHEMCO SITE NO. 1-30-028, Remedial Action Work Plan

Characterization										
Regulatory Status	Waste Code(s)	Volume	Dates Sampled	# of Samples	Results Received	Lab Report ID	Field Sample I.D.	Lab Sample I.D.	Results Reviewed	LDR Constituents >UTS?

Table B-3. Waste Tracking-Approval Process, POWERS CHEMCO SITE NO. 1-30-028, Remedial Action Work Plan

Approval Process							
		Profile					
Proposed Disposal Facility	Location	Drafted	ID #	Signed by Generator?	Dated Submitted	Date Approved	Approval Code

Table B-4. Waste Tracking-Shipping Process, POWERS CHEMCO SITE NO. 1-30-028, Remedial Action Work Plan

Shipment						Comments
Transporter	Draft Manifest Prepared	Draft Manifest Reviewed / Approved	Date Shipment Scheduled	Date Shipped	Return Manifest Received	

Site Specific
Health and Safety Plan

April 15, 2014

HEALTH AND SAFETY PLAN

71 Charles Street
Glen Cove, New York 11542

Prepared for

KONICA MINOLTA
GRAPHIC IMAGING, U.S.A., INC.
5800 Foremost Drive, SE, Suite 310
Grand Rapids, Michigan 49546

ROUX ASSOCIATES, INC.

Environmental Consulting & Management

ROUX

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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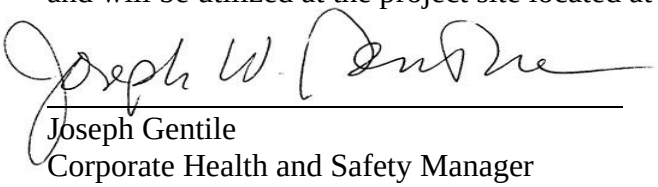
APPROVALS

By their signature, the undersigned certify that this Health and Safety Plan (HASP) is approved and will be utilized at the project site located at 71 Charles Street, Glen Cove, New York.



April 15, 2014

Joseph Gentile — Date
Corporate Health and Safety Manager
Roux Associates, Inc.

April 15, 2014

Jordanna Kendrot — Date
Site Health and Safety Officer
Roux Associates, Inc.

April 15, 2014

Nathan Epler — Date
Project Principal
Roux Associates, Inc.

1.0 INTRODUCTION

This Site-specific and Safety Plan (HASP) has been prepared in accordance with 29 CFR 1910.120 Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) and Roux Associates, Inc. (Roux Associates) Standard Operating Procedures (SOPs). It addresses all activities to be performed during the implementation of the Remedial Action Phase activities at 71 Charles Street, Glen Cove, New York (Site) (Figure 1). The HASP will be implemented by the designated Site Health and Safety Officer (SSO) during work at the Site. The HASP attempts to identify all potential hazards at the Site; however, Site conditions are dynamic and new hazards may appear constantly. Personnel must remain alert to existing and potential hazards as Site conditions change and protect themselves accordingly.

Compliance with this HASP is required of all persons and subcontractors who perform fieldwork or enter the Site. The contents of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed and approved by the Corporate Health and Safety Manager (CHSM), with the SSO implementing the changes to the HASP.

Upon entering the Site, all visitors are required to sign in. All visitors entering the Contamination Reduction Zone (CRZ) (defined in Section 8.1.2), the Contamination Reduction Corridor (CRC) (defined in Section 8.1.2), or the Exclusion Zone (EZ) (defined in Section 8.1.3) will be required to read and comply with the provisions of this HASP. Visitors will be required to comply with applicable OSHA requirements such as training, medical monitoring, and respiratory protection.

In the event that a visitor does not adhere to the provisions of this HASP, he or she will be required to leave the Site. Mobilization activities not requiring intrusive activities (e.g., survey, equipment staging, etc.) or exposure to potentially impacted areas may only be performed if supervised by a competent Roux Associates employee.

1.1 Scope of Work

The Scope of Work activities will include construction oversight, air monitoring, soil sampling, groundwater sampling, and injection treatment activities for the Remedial Action Phase activities.

The Scope of Work activities are as follows:

1. Obtain necessary permits and approvals.
2. Preparation and implementation of an approved Health and Safety Plan (HASP).
3. Mobilization and site start up.
4. Perform construction oversight for the project. Planned construction activities include:
    a. Clearing and grubbing;
    b. Installation and maintenance of erosion and sediment controls;
    c. Installation and maintenance of a temporary wastewater treatement system for construction water;
    d. Excavation and stockpiling of impacted soil;
    e. Transportation and disposal of impacted soil;
    f. Backfilling and site restoration.
5. Collect waste characterization and post-excavation soil samples.
6. Perform air monitoring in accordance with the Community Air Monitoring Program (CAMP).
7. Maintain good site housekeeping procedures at all times
8. Demobilization

1.2 Emergency Numbers

1.2.1 Emergency Phone Numbers

Emergency Medical Service 911

Police: Nassau County Police Department (NCPD).....911

Fire: 911

Hospital: Glen Cove Hospital (North Shore LIJ) .....(516) 674-7300

National Response Center.....(800) 424-8802

Poison Control Center.....(800) 222-1222

CHEMTREC.....(800) 262-8200

Fire: Glen Cove Fire Department .....(516) 676-0366

Center for Disease Control.....(800) 311-3435

USEPA (Region II).....(212) 637-5000

NYSDEC Emergency Spill Response .....(800) 457-7362

1.2.2 Project Management/Health and Safety Personnel

Title	Contact	Telephone/Cell
Roux Associates		
Project Director	Nathan Epler	(631) 232-2600 Cell – (631) 921-5675
Site Health and Safety Officer	Jordanna Kendrot	(631) 232-2600 Cell – (631) 926-2552
Corporate Health and Safety Manager	Joe Gentile	(856) 423-8800 Cell – (610) 844-6911

1.2.3 Other Important Phone Numbers

Nassau County Emergency Response Team .....….911

1.2.4 Directions to Glen Cove Hospital (North Shore LIJ) – 101 St. Andrews Lane Glen Cove, New York 11542

See Figure 2 for street map.

- Start at 71 Charles Street, Glen Cove, New York, take a Left onto Herb Hill Road
- Turn Left at Brewster Street
- Continue onto Forest Avenue
- Turn Right at Walnut Avenue
- Arrive at Glen Cove Hospital on your right

2.0 HEALTH AND SAFETY STAFF

This section briefly describes all site personnel and their health and safety responsibilities for the RI work to be implemented at the Site. All personnel are responsible for ensuring compliance with the HASP.

2.1 Project Principal (PP) – Nathan Epler – Roux Associates

- Has the overall responsibility for the health and safety of Site personnel.
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.

2.2 Corporate Health and Safety Manager (CHSM) – Joseph Gentile – Roux Associates

- Implements the HASP.
- Performs or oversees site-specific training and approves revised or new safety protocols or field operations.
- Coordinates revisions of this HASP with Project Principal and/or Project Manager.
- Responsible for the development of new task safety protocols and procedures and resolution of any outstanding safety issues which may arise during the conduction of site work.
- Review and approve all health and safety training and medical surveillance records for personnel and subcontractors.

2.3 Site Safety and Health Officer (SSO) – Jordanna Kendrot – Roux Associates

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment.
- Conducts initial onsite specific training prior to personnel and/or subcontractors commencing work.
- Conducts and documents periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Completes and maintains Accident Report and Investigation Forms.
- Notifies PP and CHSM of all accident/incidents.

- Notifies PP/PM of daily field operations and work progress, who will then communicate at the end of the day to the designated representative the following:
    1. End of day tasks completed
    2. Next day's planned activities
    3. Third party issues
    4. Change of Plans – approvals
- Change in level of personal protective equipment (PPE).
- Maintains contact with Contractors.
- Determines upgrade or downgrade wind direction for personal protective equipment (PPE) based on Site conditions and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as manufacturer's suggested instructions determine.
- Submits and maintains health and safety field log books, daily safety logs, training logs, air monitoring result reports, weekly safety report.

2.4 Field Personnel and Subcontractors

- Report any unsafe or potentially hazardous conditions to the SSO/PM.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP and any revisions, which are instituted.
- Prevent admittance to work Site by unauthorized personnel.

3.0 SITE LOCATION, DESCRIPTION, AND HISTORY

Descriptions of the Site and surrounding property usage are included in the following sections. The location of the Site is presented in Figure 1.

3.1 Property Location and Description

The Site is located at 71 Charles Street, Glen Cove, Nassau County, New York and currently owned by Konica Minolta Graphic Imaging, U.S.A., Inc. (KM). According to the information provided by Konica Minolta Graphic Imaging, U.S.A., Inc, the Site is comprised of a 15-acre parcel located on the west side of Charles Street, between Herb Hill Road and The Place. Northeastern and southern sections of the Site previously contained a one and two story manufacturing, warehouse, and office buildings. The buildings were demolished in 2012. The former buildings were surrounded primarily by paved areas with a minimally landscaped area to the north and east of the former office building and surrounding the large parking area (North Lot) on The Place. The parking lot consists of approximately 1.5 acres in the northwestern corner of the site, a portion of which is the area known to be impacted by historical disposal of industrial wastes. Construction activities will take place in the North Lot area of the Site.

4.0 WASTE DESCRIPTION/CHARACTERIZATION

4.1 General

The following information is presented in order to identify the types of materials that may be encountered at the Site. The detailed information on these materials was obtained from:

- SAX's Dangerous Properties of Industrial Materials – Lewis Eight Edition
- Chemical Hazards of the Workplace – Proctor/Hughes
- Condensed Chemical Dictionary – Hawley
- Rapid Guide to Hazardous Chemicals in the Workplace – Lewis 1990
- NIOSH Pocket Guide to Chemical Hazards – 2005
- ACGIH TLV® Values and Biological Exposure Indices
- OSHA 29 CFR 1910.1000

4.2 Chemical/Material Safety Data Sheets

Several chemicals that may potentially be present in soils and groundwater at the Site, based on previous soil, soil vapor and groundwater sampling results and historic operations conducted at the Site that have been identified. The Summary of Toxicological Data is found in Table 1 and is provided for review of chemicals that may be encountered. The Summary of Toxicological Data Sheets provides information such as the chemicals characteristics, health hazards, protection, and exposure limits.

4.2.1 Contaminants of Concern

Soil and groundwater contaminants that may be encountered during excavation, sampling, and drilling activities include both organic and inorganic compounds. Prior investigations at the site have indicated detection of Volatile Organic Compounds (VOCs), most notably toluene, and metals.

The toxicological, physical, and chemical properties of potential contaminants are presented in Table 1.

5.0 HAZARD ASSESSMENT

The potential to encounter chemical hazards is dependent upon the work activity performed (intrusive versus non-intrusive) and the duration and location of the work activity. Such hazards could include inhalation and/or skin contact with chemicals/gases that could cause: dermatitis, skin burns, being overcome by vapors or asphyxiation.

Physical hazards that may be encountered during Site work include: heat and cold stress, exposure to excessive noise, loss of limbs, being crushed, head injuries, punctures, cuts, falls, electrocution, bruises, and other physical hazards due to motor vehicle operation, heavy equipment, open excavation and power tools.

Biological hazards may exist during Site activities. These hazards include exposure to insect bites/stings, animals and animal wastes and bloodborne pathogens.

Prior to the beginning of each new phase of work, an activity hazard analysis will be prepared by the SSO with assistance from the CHSM. The analysis will address the hazards for each activity performed in the phase and will present the procedures and safeguards necessary to eliminate the hazards or reduce the risk. The Job Safety Analysis Sheets are located in Appendix A.

5.1 Chemical Hazards

The potential for personnel and subcontractors to come in contact with chemical hazards may occur during the following tasks:

- Construction Oversight Activities
- Soil Sampling Activities
- Groundwater Sampling Activities
- Injection Treatment Activities

For chronic and acute toxicity data, refer to Summary of Toxicological Data Sheets in Table 1 for further details on compound characteristics.

5.1.1 Exposure Pathways

Exposure to these compounds during ongoing activities may occur through inhalation of contaminated dust particles, inhalation of VOCs and SVOCs, dermal absorption, and accidental ingestion of the contaminant by either direct or indirect cross-contamination activities.

Inhalation of contaminated dust particles (VOCs, SVOCs, and inorganics) can occur during adverse weather conditions (high or changing wind directions) or during operations that may generate airborne dust such as excavation and loading of contaminated soils. Dust control measures such as applying water to roadways and excavations will be implemented where visible dust is generated. Where dust control measures are not feasible or effective, respiratory protection will be used when necessary (see Section 9.2.2 for monitoring procedures and action levels).

5.1.2 Operational Action Levels

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards is outlined in Table 2.

5.1.3 Additional Precautions

Dermal absorption or skin contact with chemical compounds is possible during intrusive activities at the Site. The use of PPE in accordance with Section 8.2 and strict adherence to proper decontamination procedures should significantly reduce the risk of skin contact.

The potential for accidental ingestion of potentially hazardous chemicals is expected to be remote, when good hygiene practices are used.

5.2 Physical Hazards

A variety of physical hazards may be present during Site activities. These hazards include typical construction activities: operation of motor vehicles and heavy equipment operation, the excavation area, the use of power and hand tools, roping and rigging of steel sheeting, walking on objects, tripping over objects, working on surfaces which have the potential to promote falling, skin burns, crushing of fingers, toes, limbs, head injuries caused by falling objects, temporary loss of one's hearing and/or eyesight. The referenced hazards are not unique and are generally familiar to most hazardous waste site workers at construction sites. Task specific safety requirements for each

phase will be covered during safety briefings. Job Safety Analysis summaries are contained in Appendix A.

5.2.1 Noise

Noise is a potential hazard associated with operation of heavy equipment, power tools, pumps, and generators. High noise equipment operations will be evaluated at the discretion of the SSO. Employees with an 8-hour time weighted average exposure exceeding 85 dBA will be included in a hearing conservation program in accordance with 29 CFR 1910.95 and 1926.52.

It is mandated that employees working around heavy equipment or using power tools that produce noise levels exceeding 90 dBA wear hearing protection that shall consist of earplugs or protective earmuffs.

5.2.2 Heat Stress

Heat stress is a significant potential hazard associated with the use of protective equipment in a hot weather environment. The human body is designed to function at a certain internal temperature. When metabolism or external sources (fire or hot summer day) cause the body temperature to rise, the body seeks to protect itself by triggering cooling mechanisms. The SSO will monitor the air temperature (as described later in this section) to determine potential adverse affects the weather can cause onsite personnel. Excess heat is dissipated by two means:

- Changes in blood flow to dissipate heat by convection, which can be seen as "flushing" or reddening of the skin in extreme cases.
- Perspiration is the release of water through skin and sweat glands. While working in hot environments, evaporation of perspiration is the primary cooling mechanism.

Protective clothing worn to guard against chemical contact effectively stops the evaporation of perspiration. Thus the use of protective clothing increases heat stress concerns.

The major disorders due to heat stress are heat cramps, heat exhaustion, and heat stroke. Heat cramps are painful spasms, which occur in the skeletal muscles of workers who sweat profusely in the heat and drink large quantities of water, but fail to replace the bodies lost salts or electrolytes. Drinking water while continuing to lose salt tends to dilute the body's extracellular fluids.

Soon water seeps by osmosis into active muscles and causes pain. Muscles fatigued from work are usually most susceptible to cramps.

Extreme weakness or fatigue, dizziness, nausea, and headache characterize heat exhaustion. In serious cases, a person may vomit or lose consciousness. The skin is clammy and moist, complexion pale or flushed, and body temperature normal or slightly higher than normal. Treatment is rest in a cool place and replacement of body water lost by perspiration. Mild cases may recover spontaneously with this treatment; severe cases may require care for several days. There are no permanent effects.

Heat stroke is a medical emergency. It is a very serious condition caused by the breakdown of the body's regulating mechanisms. The skin is very dry and hot with red mottled or bluish appearance. Unconsciousness, mental confusion, or convulsions may occur. Without quick and adequate treatment, the result can be death or permanent brain damage. As first aid treatment, the person should be moved to a cool place. Body heat should be reduced artificially, but not too rapidly, by soaking the person's clothes in water and fanning them.

Steps that can be taken to reduce heat stress are:

- Acclimate the body. Allow a period of adjustment to make further heat exposure endurable.
- Drink more liquids to replace the body water lost during sweating.
- Rest is necessary and should be conducted under the direction of the SSO.
- Wear personal cooling devices. These are two basic designs; units with pockets for holding frozen packets and units that circulate fluid from a reservoir through tubes to different parts of the body. Both designs can be in the form of a vest, jacket, or coverall. Some circulating units also have a cap for cooling the head.
- Wear long cotton underwear under chemical protective clothing. The cotton will absorb perspiration and will hold it close to the skin. This will provide the body with the maximum cooling available from the limited evaporation that takes place beneath chemical resistant clothing. It also allows for rapid cooling of the body when the protective clothing is removed.

Heat stress is a significant hazard associated with using protective equipment in hot weather environments. Local weather conditions may produce conditions, which will require restricted work schedules in order to protect employees.

Appendix B contains procedures for heat stress; these will be used as a guideline and to provide additional information.

5.2.3 Cold Stress

Cold temperatures are a significant potential hazard. Examples of cold temperature hazards are frostbite and hypothermia.

Frostbite is the most common injury resulting from exposure to cold. The extremities of the body are most often affected. The signs of frostbite are:

- The skin turns white or grayish-yellow.
- Pain is sometimes felt early but subsides later. Often there is no pain.
- The affected parts feel intensely cold and numb.

Hypothermia is characterized by shivering, numbness, drowsiness, muscular weakness, and a low internal body temperature when the body feels extremely warm. This can lead to unconsciousness and death. With both frostbite and hypothermia, the affected areas need to be warmed quickly. Immersion in warm water is an effective means of warming the affected areas quickly. In such cases, medical assistance will be sought.

To prevent these effects from occurring, persons working in the cold should wear adequate clothing and reduce the time spent in the cold area. The field SSO is responsible for determining appropriate time personnel should spend in adverse weather conditions and will monitor this.

Appendix B, which contains the Heat and Cold Stress Guidelines, provides additional information.

5.2.4 Lockout/Tagout

Roux Associates and all Site contractors will develop a lockout/tagout plan in the event of the repair of electrical, pneumatic, hydraulic, and/or mechanical systems, per OSHA requirements under 29 CFR 1910.147.

5.3 Biological Hazards

The biological hazards, which have the potential to cause adverse health effects, are from exposure to domestic flies, ticks, mosquitoes, insects, animals and animal wastes, bloodborne pathogens, and poison ivy. The Job Safety Analysis (Appendix A) suggests controls for various hazards to be potentially encountered onsite.

5.3.1 Insect Stings

Stings from insects are often painful, cause swelling and can be fatal if a severe allergic reaction such as anaphylactic shock occurs. If a sting occurs, the stinger should be scraped out of the skin, opposite of the sting direction. The area should be washed with soap and water followed by application of an ice pack.

If the victim has a history of allergic reaction, s/he should be taken to the nearest medical facility. If the victim has medication to reverse the effects of the sting, it should be taken immediately.

If the victim experiences a severe reaction, a constricting band should be placed between the site of the sting and the heart. The site should be kept below the heart if possible. A physician should be contacted immediately for further instructions.

5.3.2 Animals and Animal Wastes

Due to most of the onsite structures being abandoned for several years, there lies the potential for various wildlife to reside within the structures, including, but not limited to, pigeons, bats, mice, rats, squirrels, raccoons and feral cats. Certain animals can represent significant sources (vectors) of disease transmission. Precautions to avoid or minimize potential contact with (biting) animals (such as some of the above listed) or animal waste and/or deceased animals should be considered prior to all field activities. Rats, squirrels, raccoons, feral cats and other wild animals can inflict

painful bites which can also cause disease (i.e. rabies, as in the case of rabid animals). Site personnel should avoid contact with any of the above.

If contact occurs, be sure to clean the area thoroughly with soap and water as soon as possible. If a bite occurs, the area should be cleaned thoroughly immediately with soap and water and medical attention should be sought.

5.3.4 Bloodborne Pathogens

The majority of the occupational tasks onsite will not involve a significant risk of exposure to blood, blood components, or body fluids. The highest risk of acquiring any bloodborne pathogen for employees onsite will be following an injury. When administering first aid care, there are potential hazards associated with bloodborne pathogens that cause diseases such as Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), Hepatitis A (HAV), Hepatitis C (HCV), or the Herpes Simplex Virus (HSV). An employee who has not received the appropriate certifications and been trained in bloodborne pathogens should never perform first aid and/or CPR.

In order to minimize any potential pathogen exposure, all employees should use hand washing facilities on a regular basis. Additionally, the following universal precautions should be followed to prevent further potential risk:

- Direct skin or mucous membrane contact with blood should be avoided.
- Open skin cuts or sores should be covered to prevent contamination from infectious agents.
- Body parts should be washed immediately after contact with blood or body fluids that might contain blood, even when gloves or other barriers have been used.
- Gloves and disposable materials used to clean spilled blood shall be properly disposed of in an approved hazardous waste container.
- First aid responders shall wear latex or thin mil nitrile gloves when performing any procedure risking contact with blood or body substances.
- Safety glasses will be worn to protect the eyes from splashing or aerosolization of body fluids.
- A CPR mask will be worn when performing CPR to avoid mouth-to-mouth contact.

- Work gloves will be worn to minimize the risk of injury to the hands and fingers when working on all equipment with sharp or rough edges.
- Never pick up broken glass or possible contaminated material with your unprotected hands.
- Never handle wildlife (living or deceased) encountered onsite.

5.3.5 Poison Ivy

There are vegetated areas of the site that may serve as adequate growing areas for poison ivy. If exposed to poison ivy, personnel will wash skin thoroughly with soap and water as soon as possible.

5.4 Hazard Assessment

Task	Hazards	Risk of Exposure
Construction Oversight	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Moderate
	Physical Injury	Moderate
	Noise	Moderate/High
Soil Sampling	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Moderate
	Noise	Moderate
	Physical Injury	Moderate
Groundwater Sampling	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Moderate
	Noise	Moderate
	Physical Injury	Moderate
CAMP	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Low
	Noise	Low
	Physical Injury	Moderate

6.0 TRAINING

6.1 General Health and Safety Training

In accordance with Roux Associates' corporate policies, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of the job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. As a minimum, the training shall have consisted of instruction in the topics outlined in the above reference. Personnel who have not met the requirements for initial training will not be allowed to work in any Site activities in which they may be exposed to hazards (chemical or physical).

Completion of a 40-hour Health and Safety Training Course for Hazardous Waste Operations (i.e., HAZWOPER) or an approved equivalent will fulfill the requirements of this section.

In addition to the required initial training, each employee shall have received 3 days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

Roux Associates' SSO has the responsibility of ensuring that personnel (or their employers) assigned to this project supply proof of their compliance with these requirements.

6.2 Annual Eight-Hour HAZWOPER Refresher Training

Annual 8-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The following topics will be reviewed; toxicology, respiratory protection, including air purifying devices and self-contained breathing apparatus (SCBA), medical surveillance, decontamination procedures, and personal protective clothing. In addition, topics deemed necessary by Roux Associates' Health and Safety Director may be added to the above list.

6.3 Site-Specific Training

Site personnel will receive training that will specifically address the activities, procedures, monitoring, and equipment for Site operations. It will include Site and facility layout, hazards, first aid equipment locations and emergency services at the Site, and will highlight 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 particular activity.

6.4 Onsite Safety Meetings

Daily safety meetings will be presented each morning to discuss potential safety concerns for the upcoming activities and to review the applicable Job Safety Analyses.

The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety audits by Roux Associates or other involved parties.

6.5 First Aid and CPR

The SSO will identify those individuals having first aid and CPR certification in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross and/or American Heart Association. Certification and appropriate training documentation will be kept with the Site personnel records.

6.6 Additional Training

The CHSM may require additional or specialized training throughout the project. Such training shall be in the safe operation of heavy or power tool equipment or hazard communication training or other topics deemed Site appropriate.

6.7 Subcontractor Training

All subcontractor personnel working on the Site shall have completed the 40-hour training requirement and meet the medical surveillance requirements found in Section 7.1. Subcontractor training shall be performed in accordance with 29 CFR 1910.120 and HASP specifications. In certain unique situations (e.g., mechanical failure of equipment), the non-trained individual performing emergency repairs may be allowed, at the discretion of the SSO, to perform repairs when no intrusive activities are being performed, and provisions have been made to mitigate potential exposure.

7.0 MEDICAL SURVEILLANCE PROCEDURES

7.1 General

A Medical Surveillance Program has been established as part of this plan and is included in Appendix C. Roux Associates and subcontractor personnel performing field work at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. Such examinations shall include a statement as to the worker's present health status, the ability to work in a hazardous environment (including any required PPE, which may be used during temperature extremes), and the worker's ability to wear respiratory protection.

Appendix C, "Medical Data Sheet," will be completed by all permanent, onsite personnel and will be kept in Roux Associates' offices during the conduct of Site operations. Completion is required in addition to compliance with Roux Associates' Health and Safety Program. This data sheet will be available through the Roux Associates Human Resources Department if medical assistance is needed or if transport to hospital facilities is required.

8.0 SITE CONTROL, PERSONAL PROTECTIVE EQUIPMENT, AND COMMUNICATIONS

The following three-zone approach will be used.

8.1 Site Control

Based on the Site history and operations, a potential for the presence of hazardous material does exist. During excavation, sampling, and injection treatment activities, work areas will be delineated with high visibility cones and/or caution tape, if needed. A dedicated decontamination area will be established to decontaminate all equipment used for excavation, sampling, and injection treatment activities.

A three-zone approach will be employed in order to prevent the spread of contamination from the disturbed areas onsite. The three zones include: the Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ), and the Support Zone (SZ). A stepped remedial approach will be managed and the zones modified as the work progresses. Each of the areas will be defined through the use of control barricades and/or construction/hazard fencing. A clearly marked delineation between the SZ and the remaining two zones, the CRZ and the EZ, will be maintained. The preferred method will utilize high visibility orange fencing and hand-driven metal posts or orange cones. Signage will be posted to further identify and delineate these areas.

8.1.1 Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone, as well as those factors pertinent to heat and cold stress.

8.1.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ provides an area for decontamination of personnel and equipment. The

CRZ will be used for general Site entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

8.1.3 Exclusion Zone

The area where contamination exists is considered to be the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered the EZ. This zone will be clearly delineated by orange high visibility 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 SSO 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);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

8.2 Personal Protective Equipment

8.2.1 General

The level of protection worn by field personnel will be enforced by the SSO. Levels of protection for general operations are provided below and are defined in this section. Levels of protection may be upgraded at the discretion of the SSO. All decisions on the level of protection will be based upon a conservative interpretation by the SSO of the information provided by air monitoring

results, environmental results and other appropriate information. Any changes in the level of protection shall be recorded in the health and safety field logbook.

8.2.2 Personal Protective Equipment Specifications

The initial level of personal protective equipment is Level D. It is not anticipated that either Level B or Level C protection will be necessary.

Although not anticipated, any tasks requiring Level B personal protective equipment (PPE) will utilize the following equipment:

- Positive pressure, full facepiece, self-contained breathing apparatus (SCBA) or positive pressure, supplied air respirator with escape SCBA (NIOSH approved)
- Disposable coveralls (Tyvek, Poly-coated Tyvek, or Saranex)
- Gloves, inner: latex or nitrile
- Gloves, outer: nitrile or neoprene
- Chemical resistant boots over the work boots
- Steel or composite safety toe work boots
- Hard hat
- Hearing protection (as needed)
- Boot cover (as needed)

For tasks requiring Level C PPE, the following equipment may be used in any combination:

- Full-face, air purifying, canister-equipped respirators (NIOSH approved) utilizing Organic Vapor/Acid Gas and P-100 filters (half-face if approved by SSO)
- Disposable coveralls (Tyvek, Poly-coated Tyvek, or Saranex) as required
- Gloves, inner: latex or nitrile as required
- Gloves, outer: nitrile or neoprene as required
- Chemical resistant boots over the work boots as required
- Steel or composite safety toe work boots
- Hard hat

- Hearing protection (as needed)
- Safety glasses (if half-mask is utilized)
- Boot covers (as needed)

The Minimum level of PPE for entry onto the Site is Level D PPE. The following equipment shall be used:

- Work uniform (long pants, long-sleeved shirt)
- Hard hat
- Steel toe work boots
- Safety glasses
- Boot covers (as needed)
- Hearing protection (as needed)
- Reflective safety vest or high-visibility clothing

Modified Level D PPE consists of the following:

- Regular Tyvek coveralls (Poly-coated Tyvek as required)
- Outer gloves: leather, cotton, neoprene or nitrile (as required)
- Inner gloves: latex or nitrile (doubled) as required
- Chemical resistant boots over work boots (as required)
- Steel toe work boots
- Hard hat
- Safety glasses
- Hearing protection as needed
- Reflective safety vest or high-visibility clothing

8.2.3 Initial Levels of Protection

Levels of protection for the proposed scope of work may be upgraded or downgraded depending on direct-reading instruments or personnel monitoring. The following are the initial levels of protection that shall be used for each planned field activity:

Activity	Initial level of PPE
Mobilization/Demobilization	D
Construction Oversight	D
Soil Sampling	D
CAMP	D
Groundwater Sampling	D
In-Situ Chemical Oxidation (ISCO) Injection Activities	D

8.3 Communications

If working in level C/B respiratory protection is required, personnel may find that communication becomes a more difficult task and process to accomplish. Distance and space further complicate this. In order to address this problem, electronic instruments, mechanical devices, or hand signals will be used as follows:

Telephones – Mobile telephones will be carried by designated personnel for communication with emergency support services/facilities.

Radios – Two-way radios will be utilized onsite for communications between field personnel in areas where visual contact cannot be maintained and where hand signals cannot be employed.

Air Horn – Available as posted in the Site trailer or support zone to alert field personnel to an emergency situation. The emergency signal will be three sharp blasts of the air horn.

Hand Signals – This communication method will be employed by members of the field team along with use of the buddy system. Signals become especially important when in the vicinity of heavy moving equipment and when using Level B respiratory equipment. The signals shall become familiar to the entire field team before Site operations commence, and will be reinforced and reviewed during site-specific training.

Signal	Meaning
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand

Thumbs down	No; Unable to understand you, I'm not all right

9.0 MONITORING PROCEDURES

9.1 General

Monitoring will be performed to verify the adequacy of respiratory protection, to aid in Site layout, and to document worker exposure. If air monitoring in these areas indicates the presence of potentially hazardous materials, control measures will be implemented. All monitoring instruments shall be operated by qualified personnel only and will be calibrated daily prior to use or, more often, as necessary.

9.2 Exclusion Zone Monitoring

9.2.1 Instrumentation

The following monitoring instruments will be available for use during field operations as necessary. There will be a minimum of one of each piece of equipment on the Site at all times:

- Photoionization Detector (PID) with 10.6 EV probe or Flame Ionization Detector (FID) or equivalent.
- Dust/Particulate Monitor (DM), MIE Miniram, or equivalent.

A PID may be used to monitor chlorinated VOCs in active work areas, during intrusive activities. VOCs shall also be measured upwind of the work areas to determine background concentrations.

A particulate monitor shall be used to measure concentrations of dust and particulate matter.

When deemed necessary, a CGI/O_2 meter shall be used to monitor for combustible gases and oxygen content during confined space entry or when the SSO deems necessary.

Calibrations shall be documented and recorded daily and included in the daily air monitoring report. This report will be specific to work area monitoring. All instruments shall be calibrated before and after each daily use in accordance with manufacturer's procedures (Appendix D).

9.2.2 Action Levels

Action levels for the upgrading of PPE requirements in the HASP will apply to all Site work during investigation and remediation activities at the Site. Action levels are for known contaminants using direct reading instruments in the Breathing Zone (BZ) for VOCs and

particulates, and at the source for combustible gases. The BZ will be determined by the SSO, but is typically 4 to 5 feet above the work area surface or elevation. The action levels to be utilized for the Site are found in Table 2.

9.2.3 Monitoring During Field Activities

Intrusive Operations – Continuous Personnel Breathing Zone Air Monitoring will be performed by the SSO during injection treatment activities. Real-time monitoring for all onsite activities will be accomplished as follows:

- Monitoring of VOCs in and around the work zones.
- Monitoring for particulates in and around the work zones, when necessary.

The frequency of monitoring may be modified by the SSO after consultation with the Project Manager and/or CHSM. The rationale for any modification must be documented in the HASP.

10.0 SAFETY CONSIDERATIONS

10.1 General

In addition to the specific requirements of this HASP, common sense should be used at all times.

The following general safety rules and practices will be in effect at the site.

- All open holes, trenches, and obstacles will be properly barricaded in accordance with local Site needs and requirements. Proximity to traffic ways, both pedestrian and vehicular, and location of the open hole, trench, or obstacle will determine these needs.

- All excavation and other Site work will be planned and performed with consideration for underground lines.

- Smoking and ignition sources in the vicinity of potentially flammable or contaminated material are strictly prohibited.

- Drilling, boring, and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment, and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs; lights; canopies; buildings and other structures and construction; and natural features such as trees, boulders, bodies of water, and terrain.

- When working in areas where flammable vapors may be present, particular care shall be exercised with tools and equipment that may be sources of ignition. All tools and equipment provided must be properly classified for the area and bonded and/or grounded appropriately.

- Approved and appropriate safety equipment (as specified in this HASP), such as eye protection, hard hats, hand protection (nitrile, leather and/or cut resistant gloves as necessary), foot protection, and respirators, must be worn in areas where required. In addition, eye protection must be worn when sampling soil or water that may be contaminated.

- All site personnel may be called upon to use respirator protection in some situations. Fit testing will be necessary for all persons using respirators. The criteria for facial hair will be determined by the SSO. In general, the guideline is that facial hair cannot interfere with the proper fit of the respirator.

- No smoking, eating, chewing tobacco, gum chewing, eating or drinking, etc., will be allowed outside the SZ.

- Contaminated tools and hands must be kept away from the face.

- Personnel must use personal hygiene safe guards (washing up) before eating, smoking, etc., and at the end of the shift.

- Each sample must be treated and handled as though it were contaminated.

- Persons with long hair and/or loose-fitting clothing that could become entangled in power equipment must take adequate precautions.
- Horseplay is prohibited in the work area.
- Work while under the influence of intoxicants, narcotics, or controlled substances is strictly prohibited.

10.2 Traffic Control

Traffic control methods and barricades will be used as needed when working in areas of vehicular traffic. Since the site is fenced off and the areas of investigation are not in current use, outside vehicular and pedestrian traffic is not considered to be an issue.

10.3 Sample Handling

Personnel responsible for handling of samples will wear the prescribed level of protection. Samples are to be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions shall be noted. Laboratory personnel and all field personnel shall be advised of sample hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling in order to assure that the practices are appropriate for the suspected contaminants in the sample.

11.0 DECONTAMINATION AND DISPOSAL PROCEDURES

11.1 Contamination Prevention

Contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

Personnel

- Do not walk through areas of obvious or known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure that there are no cuts, tears or other signs of deterioration with PPE.
- Fasten all closures in suits; cover with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, cosmetics, gum, etc., into contaminated areas.

Sampling/Monitoring

- When required by the SSO, cover instruments with clear plastic, leaving openings for sampling ports.
- Bag sample containers prior to emplacement of sample material.

Heavy Equipment

- Care should be taken to limit the amount of contamination that comes in contact with heavy equipment (tires, contaminated augers).
- If contaminated tools are to be placed on non-contaminated equipment for transport to a decontamination area, plastic should be used to keep the equipment clean.
- Dust control measures including water misting will be used on roads inside the Site boundaries, as needed.

11.2 Personnel Decontamination

A field wash for equipment and PPE shall be set up and maintained for all persons exiting the EZ. The system will include a gross wash and rinse for all disposable clothing and boots worn in the

EZ. As necessary, equipment and facilities will be available for personnel to wash their hands, arms, neck, and face.

11.3 Equipment Decontamination

All potentially contaminated equipment used at the Site will be decontaminated to prevent contaminants from leaving the Site. The decontamination area will provide for the containment of all wastewater from the decontamination process. Respirators and any other PPE that comes in contact with contaminated materials shall pass through a field wash in the decontamination area, and a thorough decontamination at the end of the day. All decontamination rinse water will be collected and managed in accordance with all applicable regulations.

11.4 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment are required, normal decontamination procedures may need to be abbreviated or omitted. The Site SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances and/or medical personnel. Outer garments are then removed at the medical facility. No attempt will be made to wash or rinse the victim, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material, which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems (ambulatory) or injuries, the normal decontamination procedures will be followed. Note that heat stroke requires immediate treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress require prompt attention and removal of protective clothing immediately. Unless the victim is obviously contaminated, decontamination should be omitted or minimized, and treatment begun immediately.

11.5 Disposal Procedures

A system of segregating all waste will be developed by the SSO.

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 potentially contaminated materials (e.g., clothing, gloves, etc.,) will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as domestic waste.

12.0 EMERGENCY PLAN

Should an emergency situation occur, the emergency plan outlined in this section, shall be known by Roux Associates and all Subcontractors prior to the start of work. The emergency plan will be available for use at all times during Site work. The plan provides the phone numbers for the fire, police, ambulance, hospital, poison control centers, and directions to the hospital from the Site. This information is to be found in Section 1.2 of the HASP.

Various individual Site characteristics will determine preliminary actions taken to assure that this emergency plan is successfully implemented in the event of a Site emergency. Careful consideration must be given to the proximity of neighborhood housing or places of employment, and to the relative possibility of Site release of vapors, which could affect the surrounding community.

The emergency coordinator shall implement the contingency plan whenever conditions at the Site warrant such action. The coordinator will be responsible for coordination of the evacuation, emergency treatment, and transport of Site personnel as necessary, and notification of emergency response units and the appropriate management staff.

The project manager is the emergency coordinator. In cases where the project manager is not available, the SSO shall serve as the emergency coordinator.

The SSO during an emergency will perform air monitoring as needed, as well as lend assistance and provide health and safety information to responding emergency personnel.

Site Personnel will endeavor to keep non-essential personnel away from the incident until the appropriate emergency resources arrive. At that time, the responders will take control of the Site. Site personnel may be asked to lend assistance to emergency personnel such as during evacuations, help with the injured, etc.

12.1 Evacuation

Evacuation procedures will be discussed prior to the start of work and periodically during safety meetings. In the event of an emergency situation, such as fire, or explosion, an air horn,

automobile horn, or other appropriate device will be sounded for three (3) sharp blasts indicating the initiation of evacuation procedures. The emergency evacuation route shall be known by all site workers. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SSO or project manager must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down once the alarm has been sounded. All Site personnel will assemble in the designated nearest safe location. Once the safety of all personnel is established, the fire department and other emergency response groups will be notified by telephone of the emergency.

12.2 Personnel Injury

Emergency first aid shall be performed onsite as appropriate. If necessary, the individual shall be decontaminated and transported to the nearest hospital. The SSO will contact the necessary individuals to supply medical data sheets to medical personnel, if requested. The SSO will complete the accident/incident reports in accordance with Section 13.4 of the HASP.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, the injured person shall be escorted to the hospital. A map to this facility is shown in Figure 2.

12.3 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone: (Direct contact, no phone messages).

		Office:	**Cell:**
1. Project Director:	Nathan Epler	631-232-2600	631-921-5675
2. Project Manager:	Omar Ramotar	631-232-2600	631-553-9274
3. Office Health & Safety Manager:	Joseph Gentile	856-423-8800	610-844-6911
4. Site Health and Safety Officer:	Jordanna Kendrot	631-232-2600	631-926-2552

5. The employee's supervisor.

Written confirmation of verbal reports are to be submitted within 24 hours. The report forms entitled "Accident Report" and "Accident Investigation Form" (Appendix E) are to be used for this purpose. All representatives contacted by telephone are to receive a copy of these reports. If the employee involved is not a Roux Associates employee, his/her employer shall receive a copy of the report. In addition to filling out the Accident Report and the Accident Investigation Forms, if a Roux employee is involved in a vehicle accident, the employee must also complete the Acord form (Appendix BLANK).

For reporting purposes, the term accident refers to fatalities, lost time, restricted duty, medical treatment and first aid injuries, spill or exposure to hazardous materials (radioactive materials, toxic materials, explosive or flammable materials), fire, explosion, property damage, and potential occurrence (i.e., near miss) of the above.

Any information released from the health care provider, which is not deemed confidential patient information, is to be attached to the appropriate form. Any medical information, which is released by patient consent, is to be filed in the individual's medical record and treated as confidential.

12.4 Personnel Exposure

Skin Contact:	Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination.
Inhalation:	Move to fresh air and/or, if necessary, decontaminate/transport to hospital.
Ingestion:	Decontamination and transport to emergency medical facility.
Puncture Wound or Laceration:	Decontamination and transport to emergency medical facility.

12.5 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO or project manager will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.

- Potential for cold stress and cold-related injuries.
- Treacherous weather-related conditions.
- Limited visibility.
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain or snow, icy conditions, fog, high winds, extreme heat/cold, and lightning. Observe daily weather reports and evacuate if necessary in case of inclement weather conditions.

13.0 LOGS, REPORTS AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for this project.

13.1 Medical and Training Records

The employer keeps medical and training records. The subcontractor employer must provide verification of training and medical qualifications to the SSO. The SSO will keep a log of personnel meeting appropriate training and medical qualifications for Site work. The log will be kept in the project file. Roux Associates will maintain medical records in accordance with 29 CFR 1910.20.

13.2 Onsite Log

The SSO or project manager will keep a log of onsite personnel daily in the designated field book.

13.3 Exposure Records

Any personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept by Roux Associates in accordance with 29 CFR 1910.20.

13.4 Accident/Incident Reports

An accident/incident report must be completed following procedures given in Appendix E. The originals will be sent to Roux Associates for maintenance. Copies will be distributed as stated. A copy of the forms will be kept in the project file.

13.5 OSHA Form 300

An OSHA Form 300 (Log of Occupational Injuries and Illnesses) (Appendix G) will be kept at the Site. All reportable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to Roux Associates for maintenance. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form.

13.6 Daily Safety Logs

The Health and Safety Briefing/Tailgate Meeting form in Appendix D will be completed daily by the SSO and submitted to the project manager.

13.7 Weekly Safety Reports

The Weekly Safety Reports in Appendix H will be completed by the SSO, if needed, and submitted to the designated Owner's representative, if requested.

13.8 Close-Out Safety Report

At the completion of the work, Roux Associates will submit a closeout Safety Report that will include all logs and reports generated during the project. The report will be signed and dated by the SSO and submitted to the Safety Manager and/or Owner's representative, if requested.

14.0 FIELD TEAM REVIEW

Each Roux Associates employee or subcontractor shall sign this section after site-specific training is completed and before being permitted to work at the Site.

I have read and reviewed the Site Health and Safety Plan prepared for this Site. I understand and will comply with the provisions contained therein.

Site/Project: Konica Minolta Graphic Imaging, Inc.
71 Charles Street
Glen Cove, New York

Date	Name	Signature	Company

SSO CERTIFICATION OF HOSPITAL DIRECTIONS

Name of Roux Associates SSO:

Date:_____

This is to certify that on _____, I personally drove the route to Glen Cove Hospital (North Shore LIJ) as listed in the HASP. The Map Routing and Directions were/were not as listed in the plan. Listed below were conditions that resulted in different directions.

_____

Roux Associates Site Health and Safety Officer

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 71 Charles Street, Glen Cove, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,1,1-Trichloroethane	71-55-6	TWA 350 ppm STEL 440 ppm C 440 ppm	C 350 ppm (1900 mg/m^3) [15-minute]	TWA 350 ppm (1900 mg/m^3)	700 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eyes, skin, central nervous system, cardiovascular system, liver	Colorless liquid with a mild, chloroform-like odor. BP: 165°F UEL: 12.5% LEL: 7.5%
1,1,2-Trichloroethane	79-00-5	TWA 10 ppm	Ca TWA 10 ppm (45 mg/m^3) [skin]	TWA 10 ppm (45 mg/m^3) [skin]	Ca [100 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, chloroform-like odor. BP: 237°F UEL: 15.5% LEL: 6%
1,1-Dichloroethane	75-34-3	TWA 100 ppm	TWA 100 ppm (400 mg/m^3)	TWA 100 ppm (400 mg/m^3)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation skin; central nervous system depression; liver, kidney, lung damage	Skin, liver, kidneys, lungs, central nervous system	Colorless, oily liquid with a chloroform-like odor. BP: 135°F Fl.P: 2°F UEL: 11.4% LEL: 5.4%
1,1-Dichloroethene	75-35-4	TWA 5 ppm	Ca (lowest feasible concentration)	TWA 1ppm	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor. BP: 89°F Fl.P: -2°F UEL: 15.5% LEL: 6.5% Class IA Flammable Liquid
1,2,4-Trimethylbenzene	95-63-6	None established	TWA 25 ppm (125mg/m^3)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 337°F FL.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable liquid
1,2,4-Trimethylbenzene	95-63-6	TWA 25 ppm (125 mg/m^3)	TWA 25 ppm (125 mg/m^3)	None established	N.D.	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 337°F Fl.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable Liquid
1,2-Dichlorobenzene	95-50-1	TWA 25 ppm STEL 50 ppm	C 50 ppm (300 mg/m^3)	C 50 ppm (300 mg/m^3)	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide] BP: 357°F Fl.P: 151°F UEL: 9.2% LEL: 2.2% Class IIIA Combustible Liquid
1,2-Dichloroethane	107-06-2	TWA 10 ppm	Ca TWA 1 ppm (4 mg/m^3) STEL 2 ppm (8 mg/m^3)	TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	Ca [50 ppm]	inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.] BP: 182°F Fl.P: 56°F UEL: 16% LEL: 6.2% Class IB Flammable Liquid
1,2-Dichloroethene (total)	540-59-0	TWA 200 ppm (790 mg/m^3)	TWA 200 ppm (790 mg/m^3)	TWA 200 ppm (790 mg/m^3)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor BP: 118-140°F Fl.P: 36-39°F UEL: 12.8% LEL: 5.6% Class IB Flammable Liquid
1,3,5-Trimethylbenzene	108-67-8	None established	TWA 25 ppm (125mg/m^3)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 329°F FL.P: 122°F Class II Flammable liquid
1,3,5-Trimethylbenzene	108-67-8	TWA 25 ppm (125 mg/m^3)	TWA 25 ppm (125 mg/m^3)	None established	N.D	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 329°F Fl.P: 122°F Class II Flammable Liquid

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,4-Dichlorobenzene	106-46-7	TWA 10 ppm	Ca	TWA 75 ppm (450 mg/m^3)	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	Colorless or white crystalline solid with a mothball-like odor. [insecticide] BP: 345°F Fl.P: 150°F LEL: 2.5% Combustible Solid
2,4-Dimethylphenol	105-67-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system, mouth, throat, stomach; dizziness, weakness, fatigue, nausea, headache; systemic damage; moderate to severe eye injury.	Skin, CVS, eyes, CNS	Clear, colorless liquid with a faint ether or chloroform-like odor BP: 178°F
2-Butanone (MEK)	78-93-3	TWA 200 ppm (590 mg/m^3) STEL 300 ppm (885 mg/m^3)	TWA 200 ppm (590 mg/m^3) STEL 300 ppm (885 mg/m^3)	TWA 200 ppm (590 mg/m^3)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor. BP: 175°F Fl.P: 16°F UEL(200°F): 11.4% LEL(200°F): 1.4% Class IB Flammable Liquid
Acenaphthene	83-32-9	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Brown solid
Acetone	67-64-1	TWA 500 ppm STEL 50 ppm	TWA 250 ppm (590 mg/m^3)	TWA 1000 ppm (2400 mg/m^3)	2500 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor BP: 133°F Fl.P: 0°F UEL: 12.8% LEL: 2.5% Class IB Flammable Liquid
Anthracene	65996-93-2	TWA 0.2 mg/m^3	Ca TWA 0.1 mg/m^3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m^3 (benzene-soluble fraction)	Ca [80 mg/m^3]	inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
Antimony	7440-36-0	TWA 0.5 mg/m^3	TWA 0.5 mg/m^3	TWA 0.5 mg/m^3	50 mg/m^3 (as Sb)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder. BP: 2975°F
Arsenic (inorganic)	7440-38-2 (metal)	TWA 0.01 mg/m3	Ca C 0.002 mg/m3 [15-min]	TWA 0.010 mg/m3	Ca [5 mg/m3 (as As)]	Inhalation; ingestion; skin absorption; skin and/or eye contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic sys	Metal: sliver-gray or tin-white, brittle, odorless solid BP: sublimes
Asbestos	1332-21-4	TWA 0.1 f/cc	Ca 100,000 fibers/m3	TWA 0.1 fiber/cm3	Ca [IDLH value has not been determined]	Inhalation; ingestion; skin and/or eye contact	Asbestosis (chronic exposure), dyspnea, interstitial fibrosis, restricted pulmonary function, finger clubbing, irritation eyes, [potential occupational carcinogen]	Respiratory system, eyes,	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite), fibrous, odorless solids. BP: decomposes
Asphalt fumes	8052-42-4	TWA 0.5 mg/m^3(fumes)	Ca C 5 mg/m3 [15 min]	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; skin and/or eye contact	Irritation eyes, resp sys	Eyes, respiratory system	Black or dark brown cement-like substance Combustible solid
Barium	7440-39-3	TWA 0.5 mg/m3	None established	TWA 0.5 mg/m3	None established	Inhalation, ingestion, skin contact	Irritation skin, respiratory system, digestive system	Skin, eyes, respiratory system	Yellow white powder BP: 1640 C
Benzene	71-43-2	TWA 0.5 ppm STEL 2.5 ppm	Ca TWA 0.1 ppm STEL 1 ppm	TWA 1 ppm STEL 5 ppm	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F] BP: 176°F Fl.Pt = 12°F LEL: 1.2% UEL: 7.8% Class B Flammable liquid
Benzo[a]anthracene	56-55-3	None established	None established	None established	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	Irritation eyes, skin, respiratory system, CNS	Skin	Pale Yellow crystal, solid BP: 438 C
Benzo[a]pyrene	50-32-8	None established	TWA 0.1 mg/m3	TWA 0.2 mg/m3	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing foetus. May cause reproductive damage. Skin, respiratory and eye irritant or burns.	Skin, eye, bladder, lung, reproductive	Yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources] BP: 495 C
Benzo[b]fluoranthene	205-99-2	None established	TWA 0.1 mg/m3	TWA 0.2 mg/m3	None established	Inhalation; ingestion; skin and/or eye contact	No data were identified on the toxicity of benzo[b]fluoranthene to humans. Based on results of studies in animals, IARC concluded that benzo[b]fluoranthene is possibly carcinogenic to humans	Respiratory system, skin, bladder, kidneys	Off-white to tan powder

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Benzo[k]fluoranthene	207-08-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory tract, gastrointestinal; fatal if swallowed, inhaled, absorbed through the skin; vomiting, nausea, diarrhea	Lungs, respiratory system	Yellow crystals BP: 480 C
Beryllium	7440-41-7 (metal)	TWA 0.002 mg/m^3	Ca C 0.0005 mg/m^3	TWA 0.002 mg/m^3 C 0.005 mg/m^3 (30 minutes) with a maximum peak of 0.025 mg/m^3	Ca [4 mg/m^3 (as Be)]	inhalation, skin and/or eye contact	Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]	Eyes, skin, respiratory system	Metal: A hard, brittle, gray-white solid. BP: 4532°F
Bis(2-ethylhexyl) phthalate	117-81-7	TWA 5 mg/m^3	TWA 5 mg/m^3 STEL 10 mg/m3 (do not exceed during andy 15-minute work period)	TWA 5 mg/m^3	None established	inhalation, skin and/or eye contact	Irritation eyes, skin, nose, throat; affect the nervous system and liver; damage to male reproductive glands	Eyes, skin, nose, respiratory system, nervous system, reproductive system, liver	Colorless to light colored, thick liquid with slight odor
Butane	106-97-8	TWA 1000 ppm	TWA 800 ppm (1900 mg/m^3)	None established	None established	inhalation, skin and/or eye contact (liquid)	Drowsiness, narcosis, asphyxia; liquid: frostbite	central nervous system	Colorless gas with a gasoline-like or natural gas odor. BP: 31°F UEL: 8.4% LEL: 1.6% Flammable Gas
Cadmium	7440-43-9 (metal)	TWA 0.01 mg/m^3	Ca	TWA 0.005 mg/m^3	Ca [9 mg/m^3 (as Cd)]	inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	respiratory system, kidneys, prostate, blood	Metal: Silver-white, blue-tinged lustrous, odorless solid. BP: 1409°F
Carbon Disulfide	75-15-0	TWA 1 ppm	TWA 1 ppm (3 mg/m^3) STEL 10 ppm (30 mg/m^3) [skin]	TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	Colorless to faint-yellow liquid with a sweet ether-like odor. BP: 116°F Fl.P: -22°F UEL: 50.0% LEL: 1.3% Class IB Flammable Liquid
Chlorobenzene	108-90-7	TWA 10 ppm	None established	TWA 75 ppm (350 mg/m^3)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver	Colorless liquid with an almond-like odor BP: 270°F Fl.P: 82°F UEL: 9.6% LEL: 1.3%
Chloroethane	75-00-3	TWA 100ppm	Handle with caution in the workplace	TWA 1000 ppm (2600 mg/m^3)	3800 ppm [10%LEL]	inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Liver, kidneys, respiratory system, cardiovascular system, central nervous system	Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. BP: 54°F Fl.P: NA (Gas) -58°F (Liquid) UEL: 15.4% LEL: 3.8% Flammable Gas
Chloroform	67-66-3	TWA 10 ppm	Ca STEL 2 ppm (9.78 mg/m^3) [60-minute]	C 50 ppm (240 mg/m^3)	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Liver, kidneys, heart, eyes, skin, central nervous system	Colorless liquid with a pleasant odor BP: 143°F
Chromium	7440-47-3	TWA 0.5 mg/m^3 (metal and Cr III compounds) TWA 0.05 mg/m^3 (water-soluble Cr IV compounds) TWA 0.01 mg/m^3 (insoluble Cr IV compounds)	TWA 0.5 mg/m^3	TWA 1 mg/m^3	250 mg/m^3 (as Cr)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. BP: 4788°F
Chrysene; Phenanthrene; Pyrene; Coal tar pitch volatiles	65996-93-2	TWA 0.2 mg/m3	Ca TWA 0.1 mg/m^3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m^3 (benzene-soluble fraction)	Ca [80 mg/m^3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
cis-1,2-Dichloroethene	158-59-2	TWA 200 ppm	TWA 200 ppm	TWA 200 ppm	None established	inhalation, skin absorption, ingestion	Harmful if swallowed, inhaled, or absorbed through skin. Irritant. Narcotic. Suspected carcinogen	Skin	Colorless liquid BP: 60 C Fl.P: 4 C UEL: 12.8% LEL: 9.7 %
Copper	7440-50-8	TWA 0.2mg/m^3 (fume) 1 mg/m^3 (dusts and mists)	TWA 1 mg/m^3	TWA 1 mg/m^3	100 mg/m^3 (as Cu)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing	Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)	Noncombustible Solid in bulk form, but powdered form may ignite. BP: 4703°F
Dibenzo[a,h]anthracene	53-70-3	None established	None established	None established	None established	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin	Eyes, skin; skin photosensitization.	Colorless crystalline powder BP: 524°C
Diesel Fuel #2	68476-34-6	None established	None established	Designated as an OSHA Select Carcinogen	None established	ingestion, skin and/or eye contact	Kidney damage; potential lung damage; suspected carcinogen; irritation of eyes, skin, respiratory tract; dizziness, headache, nausea; chemical pneumonitis (from aspiration of liquid); dry, red skin; irritant contact dermatitis; eye redness, pain.	Eyes, skin, kidneys	Clear yellow brown combustible liquid; floats on water; distinct diesel petroleum hydrocarbon odor. BP: 356-716°F Fl.P: 154.4-165.2°F LEL: 0.6% UEL: 7.0%

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Ethylbenzene	100-41-4	TWA 100 ppm STEL 125 ppm	TWA 100 ppm (435 mg/m^3) STEL 125 ppm (545 mg/m^3)	TWA 100 ppm (435 mg/m^3)	800 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with an aromatic odor. BP: 277°F Fl.P: 55°F UEL: 6.7% LEL: 0.8% Class IB Flammable Liquid
Fluoranthene	206-44-0	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible burns; heart and liver injury, pulmonary edema, respiratory arrest, gastrointestinal disturbances.	Heart, liver, lungs.	Yellow needles.
Fluorene	86-73-7	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation skin, digestive tract	Skin	White crystals BP: 563°F
Fuel Oil #2	68476-30-2	TWA 100mg/m^3 (aerosol and vapor, as total hydrocarbons)	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS effects; nausea, vomiting, headache, cramping, dizziness, weakness, loss of coordination,, drowsiness; kidney, liver damage	Eyes, skin, CNS	Clear or yellow to red oily liquid, kerosene-like odor BP: 347 - 689 °F UEL:5-6% LEL: 0.7-1.0%
Gasoline	8006-61-9	TWA 300 ppm STEL 500 ppm	Carcinogen	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; ingestion; skin and/or eye contact	Eyes and skin irritation, mucous membrane; dermatitis; headache; listlessness, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis; possible liver, kidney damage [Potential occupational carcinogen]	Eyes, skin, respiratory system, CNS, Liver, Kidneys	Clear liquid with a characteristic odor, aromatic Fl.Pt = -45°F LEL = 1.4% UEL = 7.6% Classs 1B Flammable Liquid
Hexachlorobutadiene	87-68-3	TWA 0.02 ppm	Ca TWA 0.02 ppm (0.24 mg/m^3) [skin]	None established	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: irritation eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, kidneys	Clear, colorless liquid with a mild, turpentine-like odor. BP: 419°F
Hydrogen Sulfide	7783-06-4	TWA (10 ppm) STEL (15 ppm) (adopted values for which changes are proposed in the NIC)	C 10 ppm (15 mg/m^3) [10-minute]	C 20 ppm 50 ppm [10-minute maximum peak]	100 ppm	inhalation, skin and/or eye contact	Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite	Eyes, respiratory system, central nervous system	Colorless gas with a strong odor of rotten eggs. BP: -77°F UEL: 44.0% LEL: 4.0% Flammable Gas
Indeno[1,2,3-cd]pyrene	193-39-5	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible human carcinogen (skin); weakness; affect liver, lung tissue, renal tissue; impariment of blood forming tissue	Skin	Fluorescent green-yellow crystalline solid BP: 536 C
Isopropylbenzene	98-82-8	TWA 50 ppm	TWA 50 ppm (245 mg/m^3) [skin]	TWA 50 ppm (245 mg/m^3) [skin]	900 ppm [10%LEL]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sharp, penetrating, aromatic odor. BP: 306°F Fl.P: 96°F UEL: 6.5% LEL: 0.9%
Kerosene	8008-20-6	TWA 200 mg/m^3	TWA 100 mg/m^3	None established	IDLH value has not been determined	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system	Colorless to yellowish, oily liquid with a strong, characteristic odor. BP: 347-617°F Fl.P: 100-162°F UEL: 5% LEL: 0.7% Class II Combustible Liquid
Lead	7439-92-1	TWA 0.05 mg/m^3	TWA (8-hour) 0.050 mg/m^3	TWA 0.050 mg/m^3	100 mg/m^3 (as Pb)	inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidnev disease: irritation eves: hvpertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. BP: 3164°F Noncombustible Solid in bulk form
Manganese	7439-96-5 (metal)	TWA 0.2 mg/m^3	TWA 1 mg/m^3 STEL 3 mg/m^3	C 5 mg/m^3	500 mg/m^3 (as Mn)	inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid. BP: 3564°F
Mercury (organo) alkyl compounds (as Hg)	7439-97-6	TWA 0.01 mg/m^3 STEL 0.03 mg/m^3 [skin]	TWA 0.01 mg/m^3 STEL 0.03 mg/m^3 [skin]	TWA 0.01 mg/m^3 C 0.04 mg/m^3	2 mg/m^3 (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects	Eyes, skin, central nervous system, peripheral nervous system, kidneys	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound
Mercury compounds [except (organo) alkyls] (as Hg) Mercury	7439-97-6	TWA 0.025 mg/m^3 (elemental and inorganic forms)	Hg Vapor: TWA 0.05 mg/m^3 [skin] Other: C 0.1 mg/m3 [skin]	TWA 0.1 mg/m^3	10 mg/m^3 (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Methyl tert-butyl ether (MTBE)	1634-04-4	TWA 50 ppm	No established REL	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, mucous membrane, respiratory; dizziness, nausea, headache, intoxication	Eyes, skin, mucous membrane, respiratory system, central nervous system	Colorless liquid BP: 55.2 C
Methylene Chloride	75-09-2	TWA 50 ppm, A3 - suspected human carcinogen	Ca	TWA 25 ppm STEL 125 ppm	Ca [2300 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]	Eyes, skin, cardiovascular system, central nervous system	Colorless liquid with a chloroform-like odor BP: 104°F UEL: 23% LEL: 13%
Naphtha (coal tar)	8030-30-6	None established	TWA 100 ppm (400 mg/m^3)	TWA 100 ppm (400 mg/m^3)	1000 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; dizziness, drowsiness; dermatitis; in animals: liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Reddish-brown, mobile liquid with an aromatic odor BP: 320-428°F Fl.P: 100-109°F Class II Combustible Liquid
Naphthalene	91-20-3	TWA 10 ppm STEL 15 ppm	TWA 10 ppm (50 mg/m^3) STEL 15 ppm (75 mg/m^3)	TWA 10 ppm (50 mg/m^3)	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	Colorless to brown solid with an odor of mothballs. BP: 424°F Fl.P: 174°F UEL: 5.9% LEL: 0.9%
n-Butylbenzene	104-51-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS depression, lung damage; nausea, vomiting, headache, dizziness, weakness, loss of coordination, blured vision, drowsiness, confusion, disorientation	Eyes, skin,repiratory system, central nervous system	Colorless liquid with a sweet odor BP: 183 C Fl.P: 59 C UEL: 5.8% LEL: 0.8%
Nickel	7440-02-0 (Metal)	TWA 1.5 mg/m^3 (elemental) TWA 0.1 mg/m^3 (soluble inorganic compounds) TWA 0.2 mg/m^3 (insoluble inorganic compounds) TWA 0.1 mg/m^3 (Nickle subsulfide)	Ca TWA 0.015 mg/m^3	TWA 1 mg/m^3	Ca [10 mg/m^3 (as Ni)]	inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Metal: Lustrous, silvery, odorless solid. BP: 5139°F
Nitrobenzene	98-95-3	TWA 1 ppm	TWA 1 ppm (5 mg/m^3) [skin]	TWA 1 ppm (5 mg/m^3) [skin]	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; in animals: liver, kidney damage; testicular effects	Eyes, skin, blood, liver, kidneys, cardiovascular system, reproductive system	Yellow, oily liquid with a pungent odor like paste shoe polish. BP: 411°F Fl.P: 190°F LEL(200°F): 1.8%
n-Propylbenzene	103-65-1	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Harmful if swallowed, Irritation eyes, skin, digestive tract, respiratory tract, central nervous system	Eyes, skin, central nervous system, respiratory system	colorless or light yellow liquid BP: 159 C Fl.P: 47 C UEL: 6% LEL: 0.8%
Petroleum hydrocarbons(Petroleum distillates)	8002-05-9	None established	TWA 350 mg/m^3 C 1800 mg/m^3 [15 min]	TWA 500 ppm (2000 mg/m^3)	1,100 [10% LEL]	Inhalation; ingestion; skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, drowsiness, headache, nausea; dried/cracked skin; chemical pneumonitis	CNS, eyes, respiratory system, skin	Colorless liquid with a gasoline or kerosene-like odor BP: 86-460°F Fl. Pt = -40 to -86°F UEL: 5.9% LEL: 1.1% Flammable liquid
Phenol	108-95-2	TWA 5 ppm	TWA 5 ppm (19 mg/m^3) C 15.6 ppm (60 mg/m^3) [15-minute] [skin]	TWA 5 ppm (19 mg/m^3) [skin]	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching	Eyes, skin, respiratory system, liver, kidneys	Colorless to light-pink, crystalline solid with a sweet, acrid odor. BP: 359°F UEL: 8.6% LEL: 1.8%
p-Isopropyltoluene	99-87-6	None established	None established	None established	None established	inhalation, skin absorption, eye contact	Irritation skin	CNS, skin	Colorless, clear liquid, sweetish aromatic odor BP: 350.8°F Class III Flammable liquid
sec-Butylbenzene	135-98-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, upper airway; central nervous system, headache, dizziness; gastrointestinal disturbance	Respiratory system, central nervous system, eyes, skin;	Colorless liquid BP: 344°F Fl.P: 126 °F UEL: 6.9% LEL: 0.8% Combustible liquid
Selenium	7782-49-2	TWA 0.2 mg/m^3	TWA 0.2 mg/m^3	TWA 0.2 mg/m^3	1 mg/m^3 (as Se)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eyes, skin, respiratory system, liver, kidneys, blood, spleen	Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.] BP: 1265°F
Silver	7440-22-4 (metal)	TWA 0.1 mg/m^3 (metal, dust, fumes) TWA 0.01 mg/m^3 (Soluble compounds, as Ag)	TWA 0.01 mg/m^3	TWA 0.01 mg/m^3	10 mg/m^3 (as Ag)	inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Nasal septum, skin, eyes	Metal: White, lustrous solid BP: 3632°F
Slop Oil	69029-75-0	None established	None established	None established	None established	Inhalation; ingestion	Irritation eyes, skin, gastrointestinal tract	Eyes, skin, gastrointestinal tract	Clear light to dark amber liquid, with mild hydrocarbon odor. BP: >500°F Fl.P : 250°F

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Sulfuric Acid	7664-93-9	TWA 0.2 mg/m^3	TWA 1 mg/m^3	TWA 1 mg/m^3	15 mg/m^3	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis	Eyes, skin, respiratory system, teeth	Colorless to dark-brown, oily, odorless liquid. BP: 554°F Noncombustible Liquid
tert-Butylbenzene	98-06-6	None established	None established	None established	None established	inhalation, skin absorption, ingestion,	Eye and respiratory irritant; CNS depression; liver or kidney damage	Respiratory system, central nervous system, eyes, liver, kidney	Colorless liquid with an aromatic odor BP: 168 - 169 C Fl.P: 34 C UEL:5.6 % LEL: 0.8 %
Tetrachloroethene	127-18-4	TWA 25 ppm STEL 100 ppm (STEL) listed as A3, animal carcinogen	Ca Minimize workplace exposure concentrations	TWA 100 ppm C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor. BP: 250°F Noncombustible Liquid
Toluene	108-88-3	TWA 20 ppm	TWA 100 ppm (375 mg/m^3) STEL 150 ppm (560 mg/m^3)	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, pungent, benzene-like odor. BP: 232°F Fl.P: 40°F UEL: 7.1% LEL: 1.1% Class IB Flammable Liquid
trans-1,2-Dichloroethene	156-60-5	TWA 200 ppm	None established	TWA 200 ppm STEL 250 ppm (skin)	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Narcotic. Irritation eyes, skin, respiratory tract, mucous membrane; CNS depression.	Respiratory tract, mucous membrane, eyes, skin, CNS	Colorless liquid with a fruity pleasant odor BP: 48°C Fl.P 6C UEL: 12.8% LEL: 9.7%
Trichloroethene	79-01-6	TWA 10 ppm STEL 25 ppm	Ca	TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)	Ca [1000 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid (unless dyed blue) with a chloroform-like odor. BP: 189°F UEL(77°F): 10.5% LEL(77°F): 8%
Vinyl Chloride	75-01-4	TWA 1 ppm	Carcinogen	TWA 1 ppm C 5 ppm [15-minute]	Ca [IDLH value has not been determined]	inhalation, skin, and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Liver, central nervous system, blood, respiratory system, lymphatic system	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. BP: 7°F UEL: 33.0% LEL: 3.6% Flammable Gas
Xylene (m, o & p isomers)	108-38-3, 95-47-6, 106-42-3	TWA 100 ppm (435 mg/m^3) STEL 150 ppm	TWA 100 ppm (435 mg/m^3)	TWA 100 ppm (435 mg/m^3)	900 ppm	Skin absorption, inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 282°F, 292°F, 281°F Fl. Pt. 82°F, 90°F, 81°F LEL: 1.1%, 0.9%, 1.1% UEL: 7.0%, 6.7%, 7.0% Classs C Flammable Liquid
Zinc	7440-66-6	TWA 10 mg/m3 (Inhalable fraction)	None established	TWA 10 mg/m3 (for zinc oxide fume)	None established	skin and/or eye contact, inhalation, ingestion	Irritation eyes, skin, respiratory tract; gastrointestinal disturbances	Eyes, skin, respiratory system	Bluish gray solid BP: 1664.6°F Flammable

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NIOSH Pocket Guide to Chemical Hazards. 2005. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health

Abbreviations:

ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca - considered by NIOSH to be a potential occupational carcinogen
CAS# Chemical Abstracts Service registry number which is unique for each chemical.
Fl. Pt. – Flash point

IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
mg/m^3 – Milligrams of substance per cubic meter of air
NIOSH -National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
STEL – Short-term exposure limit
TLV -ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)

TABLE 2

ACTION LEVELS FOR WORKER BREATHING ZONE

Instrument	Action Level *	Level of Respiratory Protection/Action
PID	0 to <5 ppm (one minute sustained)	Level D *
PID	>5 to <50 ppm (one minute sustained)	Utilize APR (Level C)
PID	>50 to <100 ppm (one minute sustained)	Level B
PID	>100ppm	Stop work** (ventilate, apply foam)
CGI/H_2S Meter	<5%	Level D
CGI/H_2S Meter	>5% to <25%	Level B
CGI/H_2S Meter	>25%	Stop work**
CGI/CO Meter	>25%	Level B
CGI/CO Meter	>50%	Stop work** (ventilate area)
CGI/O_2 Meter	<10% LEL, in excavation	Level D
	19.5% oxygen – 23.5%	Level D
CGI/O_2 Meter	>10% LEL, in excavation	Allow to vent, apply foam**
	>23.5% oxygen	Stop work, Oxygen Enriched ATM**
Dust Monitor	0 – 1.0 mg/m^3, 5-minutes average	Level D
Dust Monitor	>1.0 to 5.0 mg/m^3, 5-minutes average	Level D – Institute dust suppression measures
Dust Monitor	5.0 to >50 mg/m^3, 5-minute average	Level C – Institute dust suppression measures

Note: Action levels are based on above background levels.

* Instrument readings will be taken in the breathing zone (BZ) of the workers, unless otherwise indicated.

** Suspend work in immediate area. Conduct air monitoring periodically to determine when work can continue. Implement mitigative measures.

NOTE: MAP SOURCE- MAPQUEST 2011

Title:

SITE LOCATION

PRE-DESIGN INVESTIGATION

Prepared For:

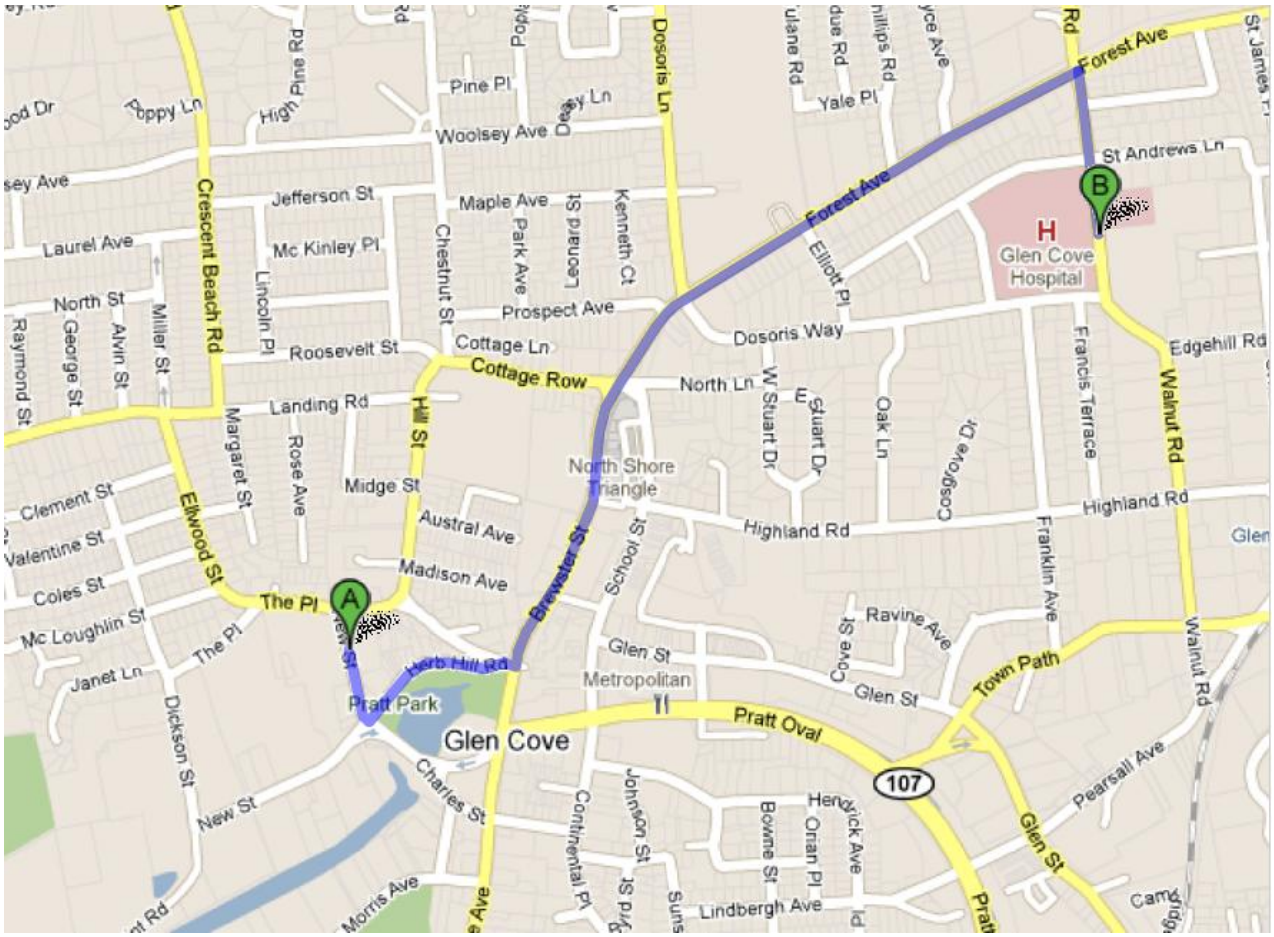
KONICA MINOLTA
GRAND RAPIDS, MICHIGAN

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: NE	Date: 1/14/11	FIGURE
Prepared by: NE	Scale: NTS	1
Project Mgr: NE	Office: NY	
2020.0001Y102.02.pptx	Project: 2020.0001Y	

FIGURE 2

Directions to Glen Cove Hospital (North Shore LIJ) – 101 St. Andrews Lane Glen Cove, New York 11542



- Start at 71 Charles Street, Glen Cove, New York, take a Left onto Herb Hill Road
- Turn Left at Brewster Street
- Continue onto Forest Avenue
- Turn Right at Walnut Avenue
- Arrive at Glen Cove Hospital on your right

APPENDIX A

Job Safety Analysis

JOB SAFETY ANALYSIS	DATE 1/11/11	☒ NEW ☐ REVISED	PAGE 1 of 1

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):
KONICA MINOLTA	**General**	**Site Mobilization**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CHSM
		Subraham Singh	OHSM

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	☒ OTHER: Insect Repellant, sunscreen (as needed)
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION: (as needed)	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

20 lb. Type ABC fire extinguisher, First Aid Kit, vehicle tire chocks, caution tape, HASP, Tailgate meeting forms, SOW/Work Plan, Site contact information, "Work Area" signs and 42 inch safety cones and flags

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Mobilize/demobilize and establish work area	1a. Fall: tripping/falling due to uneven terrain, weather conditions, and materials/equipment stored at the Site	1a. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 1a. Use established pathways and walk on stable, secure ground.
	1b. Contact: with traffic (including any unintended movement of the work truck), Contact / Interference with Other Site Activities	1b. When first arriving onsite park (i.e., pull through or back) 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 proper coordination with other site activities. 1b. Identify potential traffic sources. 1b. Wear appropriate PPE including high visibility clothing or reflective vest. 1b. Use a spotter while moving work vehicles; plan ahead to avoid backing when unnecessary. 1b. Delineate work area with cones, flags, caution tape, and/or other barriers. 1b. Position "Work Area" signs at site entrances. 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. Chock wheels of work truck and other support equipment on wheels and engage parking brake if possible.
	1c. Exertion: during moving of equipment(cones and signage) into work area	1c. Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 1c. Ensure that loads are balanced to reduce the potential for muscle strain.
	1d. Exposure: to biological hazards: ticks, bees/wasps, poison ivy, insects, etc. (ticks are most active any time the temperature is above freezing, typically from March to November)	1d. Inspect area to avoid contact with biological hazards. 1d. Wear long sleeved clothing to protect skin and apply insect repellant containing DEET when working in overgrown areas of the Site. 1d. Personnel shall examine themselves for ticks at least daily. 1d. If skin comes in contact with poison ivy, wash skin thoroughly with soap and water as soon as possible.
	1e. Exposure: to sun, possibly causing sunburn	1e. Wear sunscreen with an SPF of at least 15 whenever 30 minutes or more of exposure is expected.
	1f. Exposure: Noise hazards (certain sites operate heavy machinery)	1f. Wear hearing protection if you must raise your voice to be heard at arm's length.
	1g. Exposure: Extreme weather conditions (hot, or cold)	1g. Wear appropriate clothing, use layers if necessary, for the cold. 1g. Stay hydrated, drink fluids throughout the day, and take breaks as needed. 1g. Use hand warmers if needed. 1g. In summer, prepare with enough ice for sample storage, and extra ice for cooling beverages.

[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 five 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.

[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	DATE 1/10/11	☒ NEW ☐ REVISED	PAGE 1 of 1

JSA TYPE CATEGORY: **KONICA MINOLTA**	WORK TYPE: **Drilling**	WORK ACTIVITY (Description): **Constructing Decontamination Pad/Decontaminating Augers/Drill Rods**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CHSM
		Subraham Singh	OHSM

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES	☐ GOGGLES ☒ FACE SHIELD (as needed) ☒ HEARING PROTECTION: (as needed) ☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect Repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Wood Planks, Plastic Sheeting, Power Washer with Hose Connection, Water Source, 55-gallon Drum, Non-phosphate Soap, Brushes, Absorbent Pads

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Setting up work area to construct decontamination pad-unloading materials and equipment	1a. Fall: slip/trip/fall hazards associated with materials, tools and equipment	1a. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment. 1a. Do not climb over stored materials/equipment; walk around. Practice good housekeeping. 1a. Use established pathways and walk on stable, secure ground.
	1b. Contact: cuts from equipment	1b. Use proper PPE (especially hands: cut-resistant gloves)
	1c. Exertion: lifting	1c. Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 1c. Ensure that loads are balanced to reduce the potential for muscle strain. 1c. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
2. Construct decontamination pad with 4, 2" by 4" wood planks and 4-millimeter plastic sheeting	2a. Caught: lacerations/abrasion/pinching/ Crushing	2a. Use retractable utility knife to eliminate potential for cuts. 2a. Use proper PPE (especially hands: cut-resistant gloves) to prevent splinters, cuts, and abrasions
	2b. Exertion: Lifting/bending/kneeling	2b. See 1b; when setting the wood planks and wrapping plastic sheeting
	2c. Contact: from construct decontamination pad shifting or augers rolling	2c. Select the most even surface area to construct the decontamination pad to eliminate the potential for the pad from shifting or the augers to roll when cleaning
3. Decontaminating Augers using power washer	3a. Exertion: loading and unloading augers onto to Bobcat for transport to the decontamination pad (if applicable)	3a. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift. 3a. Use spotter to guide driver and manage on Site traffic.
	3b. Exposure: steam and high pressure water	3b. Use the proper PPE (face shield). 3b. Inspect all hose connection and whip check to verify. 3b. Stay out of the line of fire and keep others away from washing operation.
4.Decontaminate field equipment (if applicable)	4a. Exposure to contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors)	4a. Wear chemical-resistant disposable gloves and safety glasses. 4a. Use an absorbent pad to clean spills.
	4b. Exposure to chemicals in cleaning solution including ammonia	4b. See 4a. 4b. Review the cleaning solution MSDS for hazards and safe handling recommendations.

[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 five 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.

[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	DATE 1/10/2011	☒ NEW ☐ REVISED	PAGE 1 of 1

JSA TYPE CATEGORY	WORK TYPE	WORK ACTIVITY (Description)
KONICA MINOLTA	**Drilling**	**Borehole Patching**

DEVELOPMENT TEAM	POSITION / TITLE	REVIEWED BY:	POSITION / TITLE
Supy Singh	Office Health and Safety Manager	Joe Gentile	Corporate Health and Safety Manager
Wendy Monterosso	Project Hydrogeologist		

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: cut resistant and leather
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☐ OTHER
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: high visibility/safety vest	
☒ SAFETY GLASSES	☒ SAFETY SHOES		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Jack Hammer, Power Source, Hand Tools, Dust Mask, Safety Cones and Flags, if needed

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Unload, prepare, and setup materials next to the excavated borehole	**1a. FALL:** Slips/trips/falls due to uneven terrain, weather conditions, and equipment and materials stored in the immediate work area **1b. EXERTION:** Poor body positioning while lifting equipment and materials	1a. Inspect walking path for uneven terrain, weather-related hazards (i.e., ice, puddles, snow, etc.), and obstructions prior to mobilizing equipment and materials. Equipment and materials will be stored at the lowest point of potential energy (i.e tools should not be propped against walls or nearby equipment) and out of the walkway and immediate work area in a convenient, stable, and orderly manner. Equipment and materials that are not anticipated to be used will be returned to an appropriate storage area that is out of the immediate work area. 1b. Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. Ensure that loads are balanced to reduce the potential for muscle strain. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
2. Preparing the concrete mixture (if applicable)	**2.a. EXPOSURE:** Inhaling dust particles during the pouring of concrete Concrete mixture coming into contact with skin **2b. EXERTION:** Poor body positioning while mixing concrete	2.a. Use the proper PPE (gloves, eye, and dust mask). Stand upwind while pouring concrete onto the mixing area. Limit the amount of dust exposed to the work area by wetting the immediate concrete work area (if concrete is being mixed on the surface). Use appropriate tools to limit the amount of direct contact with concrete mixture (trowels/shovels/etc.). 2b. Two people are required to mix concrete if plastic sheeting is used as a mixing trough. A 4 ft. by 4 ft. or larger piece of 4 millimeter thick plastic sheeting must be used to limit the amount of bending and back strain. The largest quantity of concrete that can be mixed at any given time with this method must not exceed 50 lbs. or 1 bag. Use proper body positioning techniques to mix the concrete (plant both feet firmly, lock elbows, bend knees, and square shoulders).
3. Pour the concrete mixture or asphalt over excavated borehole	**3a. EXPOSURE:** Concrete mixture or asphalt coming into contact with skin **3b. EXERTION:** Poor body positioning while spreading asphalt/concrete **3c. FALL:** Slips/trips/falls from wet surface condition	3a. Use proper PPE (gloves, eye, and dust mask). Use appropriate tools to limit the amount of direct contact with hole patch or concrete mixture (trowels/shovels/float/etc.). 3b. Use proper body positioning techniques; bend knees. 3c. Complete borehole patch to pre-existing surface grade. Complete borehole patch to surface grade and identify with cones and caution tape.
4. Clean-up the work area around the completed patch	**4. FALL:** Slip/trip/falls from wet surface condition	4. Delineate wet area with cones and caution tape. Inspect completed patch to ensure that the borehole patch is even with the surrounding surface and to ensure that the work was completed neatly.

[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 five 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.

[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	DATE 1/10/11	☒ NEW ☐ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
KONICA MINOLTA	**Monitoring Well Gauging/Sampling**	**Groundwater Gauging and Sampling**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CHSM
		Subraham Singh	OHSM

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	☒ OTHER: Insect Repellant, sunscreen (as needed)
☐ LIFELINE / BODY HARNESS	☐ HEARING PROTECTION	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Required Equipment: Interface probe and/or Water level meter, scissors, tubing cutter, 20 lb. Type ABC fire extinguisher
Equipment as needed: 42 inch Safety cones, Caution Tape, Peristaltic pump, appropriate power sources, tubing, master flex, bailers, poly rope, 55-gallon drums; buckets; decontamination supplies
Tools as needed: socket wrench, screw driver, crow bar, mallet

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Open/close well	1a. Exertion: muscle strain	1a. Use proper lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 1a. Ensure that loads are balanced to reduce the potential for muscle strain. 1a. Two people are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
	1b. Caught: pinch points associated with removing/replacing manholes and working with hand tools	1b. Wear leather gloves when working with well cover and hand tools. 1b. Use proper tools (ratchet and pry bar for well cover) and inspect before use. 1b. Do not put fingers under well cover.
	1c. Exposure: potential hazardous vapors	1c. No open flames/heat sources. 1c. Allow well to vent after opening it and before sampling activities begin to minimize exposure to vapors. 1c. Work on the upwind side of well.
	1d. Contact with traffic	1d. Identify potential traffic sources. 1d. Wear appropriate PPE including high visibility clothing or reflective vest. 1d. Delineate work area with 42 inch safety cones and/or other barriers. Position vehicle to protect against oncoming traffic. Use caution tape to provide a more visible delineation of the work area. 1d. Face traffic, maintain eye contact with oncoming vehicles, and establish a safe exit route.
2. Gauge well	2a. Contact with contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors)	2a. See 1c. 2a. Wear chemical-resistant disposable gloves and safety glasses when gauging well. 2a. Use an absorbent pad to clean probe.
	2b. Contact with traffic	2b. See 1d.

[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 five 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.
[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. Purge and sample well using most appropriate method	3a. Exposure: contamination (e.g., SPH, contaminated groundwater, vapors)	3a. Wear chemical-resistant disposable gloves and safety glasses when gauging well. 3a. Insert and remove tubing or bailers slowly to avoid splashing. 3a. Use an absorbent pad to clean spills (see 1c).
	3b. Exertion: muscle strain while carrying equipment	3b. Use proper lifting techniques when handling/moving equipment. 3b. Use mechanical assistance or make multiple trips to carry equipment (see 1a).
	3c. Exposure: exposure to preservatives and contaminated liquids	3c. Wear chemical-resistant disposable gloves, cut-resistant gloves and safety glasses when handling samples. 3c. Open and fill sample jars slowly to avoid splashing and contact with preservatives.
	3d. Contact: cuts by glass or sharp objects3e. Co	3d. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant gloves when handling sample jars, VOA vials or when using cutting tools.3e. See
	3f. Electrical hazards	3f. Avoid touching battery terminals. 3f. Position batteries away from water source.
4. Transfer purge water from 5-gallon buckets to 55-gallon drums (if necessary); move drums to storage area- **See Waste Disposal/Storage JSA**	4a. Exposure to contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater)	4a. Do not overfill buckets or drums and pour liquids in such a manner that they do not splash. 4a. Properly dispose of used materials/PPE in provided drums in designated drum storage area (see 3a).
	4b. Exertion: muscle strain from lifting/carrying 5-gallon buckets	4b. Use proper lifting techniques when carrying buckets. Do not overfill buckets (see 3b).
	4c. Caught: pinch points associated with handling drum lid	4c. Ensure that fingers are not placed under the lid of the drum. Wear leather gloves and use proper tools (ratchet) while sealing drum lid.
	4d. Contact with traffic 4e. Fall: spilled purge water	4d. See 1d. 4e. Clean up any spills using absorbent pads.
5. Decontaminate interface probe	5a. Exposure to contamination (e.g., SPH, contaminated groundwater, vapors)	5a. See 3a.
	5b. Exposure to chemicals in cleaning solution including ammonia	5b. See 3a.

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JSA TYPE CATEGORY: **KONICA MINOLTA**	WORK TYPE: **Soil sampling**	WORK ACTIVITY (Description): **Soil Sample Collection**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CSHM
		Subraham Singh	OHSM

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST ☒ HARD HAT ☐ LIFELINE / BODY HARNESS ☒ SAFETY GLASSES: with side shields	☐ GOGGLES ☐ FACE SHIELD ☐ HEARING PROTECTION ☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes	☐ AIR PURIFYING RESPIRATOR ☐ SUPPLIED RESPIRATOR ☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	☒ GLOVES: Leather, Nitrile and cut resistant ☒ OTHER: Insect Repellant, sunscreen (as needed)

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Hand Tools, Photoionization Detector, Ziploc Bags, Sample Jars, Clear Tape, Labels, Pens/Markers/Pencils, Drum Labels, Decontamination Supplies, Bucket with lid, 42 inch Safety Cones, 20 lb. Type ABC Fire Extinguisher, First Aid Kit, Absorbent Pads

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Verify pre-clearance protocol	1. Underground utility damage; property damage; personal injury	1. Confirm that "Call Before You Dig" and local utility companies were contacted prior to drilling. 1. Walk the Site to evaluate utility markings and review maps.
2. Soil sample extraction from split-spoon/acetate liner	2a. Exposure: cuts and abrasions 2b. 2c. Caught: pinch points associated with the equipment 2d. Exertion: personal injury from lifting and assembling split spoon	2a. Use the right tool (Geoprobe liner cutter, or retractable blade knife) when opening split-spoon/acetate liner. 2a. Cut away from the body. 2a. Leather gloves will be worn by personnel who handle the split-spoon. 2b. Personnel that handle environmental soil samples are required to wear chemically-resistant (i.e., nitrile or latex) and cut-resistant gloves when cutting or handling glassware. 2c. When closing/re-assembling the spoon, hands/fingers should be kept away from the pinch points and threads. 2c. Use leather gloves. 2d. See 2b. 2d. To the extent possible, the spoons should be reassembled on a flat surface.
3. Lithologic observation and soil sampling	3a. Caught: personal injury from pinch points, cuts, and abrasions from sampling equipment (including sample jars), tools, and material within soil sample 3b. Exposure: with contamination (impacted soil and/or lab preservatives) 3c. Exertion: muscle strain from heavy objects and repetitive motion 3d. Fall: poor housekeeping	3a. Wear cut-resistant (i.e., Kevlar) gloves under chemical-resistant disposable gloves when handling soil samples and sampling jars. 3b. Wear chemical-resistant disposable gloves to protect hands when handling samples; use containment material or plastic sheeting to protect surrounding areas. 3b. When collecting soil sample from hand auger, put large zip lock bag over entire auger to prevent spillage of soil onto the ground; 3b. Open sample jars slowly while wearing chemical and cut-resistant gloves and fill slowly and carefully to avoid contact with preservatives. 3c. See 2d. 3d. Do not climb over stored materials/equipment. Walk around. 3d. Equipment and tools will be stored at the lowest point of potential energy and out of the walkway and immediate work area (i.e., tools should not be propped against walls or nearby equipment or vehicles). 3d. Use established pathways and walk on stable, secure ground.

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4. Transfer excess soil cuttings to 55-gallon drums	4a. Contact: contaminated soil	4a. Wear chemical-resistant disposable gloves and do not overfill drums to avoid spilling soil. 4a. Properly dispose of used materials/PPE in provided drums in designated drum storage area.
	4b. Exertion: muscle strain from lifting/carrying 5-gallon buckets	4b. Use proper lifting techniques when lifting/carrying buckets (see 3d). Do not overfill buckets.
	4c. Caught: pinch points associated with handling drum lid	4c. Ensure that fingers are not placed under the lid of the drum. Wear leather gloves and use proper tools (ratchet) while opening drum and sealing drum lid.
5. Decontaminate equipment	5a. Exposure: contamination (e.g., Separate Phase Hydrocarbons (SPH), contaminated groundwater, vapors)	5a. Wear chemical-resistant disposable gloves and safety glasses. 5a. Use an absorbent pad to clean spills.
	5b. Exposure: chemicals in cleaning solution including ammonia	5b. See 5a. 5b. Review cleaning solution MSDS for hazards and proper handling.

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JSA TYPE CATEGORY:	WORK TYPE:	WORK ACTIVITY (Description):	
KONICA MINOLTA	**Waste Disposal Oversight**	**Movement of 55-gallon Drums**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CHSM
		Subraham Singh	OHSM

REQUIRED AND / OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

☐ LIFE VEST	☐ GOGGLES	☐ AIR PURIFYING RESPIRATOR	☒ GLOVES: Leather, Nitrile
☒ HARD HAT	☐ FACE SHIELD	☐ SUPPLIED RESPIRATOR	☒ OTHER: Insect Repellant, sunscreen (as needed)
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION (as needed)	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Drum Cart, 20 lb. Type ABC fire extinguisher, Drum labels, Marker, Clear Tape, Pertinent information to include on drum label

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[3]CRITICAL ACTIONS
1. Inspect 55-gal drums for proper condition, labeling	1a. Exposure: if drum contains hazardous material, if the drum is damaged; or if the drum has hazardous materials on the outside of the drum	1a. 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. Do not continue drum transport activities until further actions are determined by the Project Manager. 1a. If drum is properly labeled, but leaking, improperly sealed or in a poor condition, place drum in an over-pack drum.
	1b. Caught: drum could potentially be damaged	1b. Use proper PPE (leather gloves). 1b. If damaged, see 1a.
2. If 55-gal drum is properly labeled and in adequate condition, transfer onto a drum cart	2a. Exertion: muscle strain (handling drums)	2a Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 2a. Ensure that loads are balanced to reduce the potential for muscle strain. 2a. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift. 2a. Never move drum by picking it up. If movement is necessary, slightly lean the drum over and roll it on its edge.
	2b. Caught: pinch points associated with handling the drum	2b. Use proper PPE (leather gloves and steel-toed boots). 2b. Never put hand or foot in a position between the drum, a fixed object, the drum cart or ground.
3. Push drum cart with 55-gal drum to appropriate pre-determined drum storage area	3a. Exertion: muscle strain (pushing drum cart)	3a. See 2a. 3a. Inspect the wheels of the cart and ensure that the load is evenly distributed.
	3b. Caught: dropping of the drum	3b. Determine transport route before actually moving the drum. 3b. Remove all obstructions from transport route prior to transport. 3b. Maintain a straight route on solid, level ground, staying on paved surfaces wherever possible. 3b. Ensure that the drum is properly secured before transport.
4. Place 55-gal drum in drum storage area or on lift gate of disposal truck	4a. Exertion: muscle strain (handling drums)	4a. See 2a.
	4b. Caught: pinch points associated with handling the drum	4b. See 2b.

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JOB SAFETY ANALYSIS	DATE 1/11/11	☒ NEW ☐ REVISED	PAGE 1 of 2

JSA TYPE CATEGORY: **KONICA MINOLTA**	WORK TYPE: **Drilling**	WORK ACTIVITY (Description): **Geoprobe Soil Borings /Well Installation**	
DEVELOPMENT TEAM	**POSITION / TITLE**	**REVIEWED BY:**	**POSITION / TITLE**
Wendy Monterosso	Project Hydrogeologist	Joseph Gentile	CHSM
		Subraham Singh	OHSM

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	☒ OTHER: Insect Repellant, sunscreen (as needed)
☐ LIFELINE / BODY HARNESS	☒ HEARING PROTECTION: (as needed)	☒ PPE CLOTHING: Fluorescent reflective vest or high visibility clothing	
☒ SAFETY GLASSES	☒ SAFETY SHOES: Composite-toe or steel toe boots/shoes		

REQUIRED AND / OR RECOMMENDED EQUIPMENT

Track-Mounted Drilling Rig, saw, Hand Tools, Photoionization Detector, MultiGas meter (or equivalent), Interface Probe, 20 lb. Type ABC fire extinguisher, First Aid Kit, absorbent pads, 42" Cones & Flags and "Work Area" Signs, if needed

"SHOW ME YOUR HANDS"
Driller and helper should show that hands are clear from controls and moving parts

[1]JOB STEPS	[2]POTENTIAL HAZARDS	[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. If personnel move into the path of the drilling rig, the drilling rig will be stopped until the path is again clear. 1a. Use a spotter. 1a. Use caution by moving the rig slowly, observing the surroundings of the rig and using a spotter if necessary, while advancing the drilling rig. 1a. Inspect the driving path for uneven terrain.
	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.
2. Setting up drilling rig/work area	2a. Fall: slip/trip/fall hazards associated with drilling equipment and tools	2a. See 1b. 2a. Equipment and tools will be staged in a convenient, stable, and orderly manner. 2a. Equipment and tools will be stored at the lowest point of potential energy and out of the walkway and immediate work area (i.e. tools should not be propped against walls or nearby equipment or vehicles). 2a. Equipment and tools that are not anticipated to be used will be returned to an appropriate storage area that is out of the immediate work area. 2a. Ensure power cords and water lines are grouped when used within the work area.
	2b. Exertion: lifting	2b. Use proper body positioning and lifting techniques; keep back straight, lift with legs, keep load close to body, and never reach with a load. 2b. Ensure that loads are balanced to reduce the potential for muscle strain. 2b. Two people or a mechanical lifting aid are required when lifting objects over 50 lbs. or when the shape makes the object difficult to lift.
3. Raising tower/derrick of drilling rig	3. Contact: overhead hazards	3. 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. 3. Distance requirements for raising a tower/derrick in the area of overhead wires must be reviewed prior to drilling as follows: • 50 KV or less- minimum ckearance of 10 ft/3m • 50 KV or greater – add 0.4 in/1cm for every KV over 50 KV • If voltage is unknown, maintain at least 20ft/6m of clearance 3. The tower/derrick must not be raised beneath overhead power lines unless approved by both the client's representative and Roux PMs. 3. Maintain a safe distance from overhead structures. 3. Do not move the rig while the tower/derrick is raised.
4. Drilling activity	4a. Contact: flying debris	4a. Use the proper PPE (especially hand, eye, and ear protection). 4a. Be aware of and avoid potential lines of fire.

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	4b. Exposure: noise and dust 4c. Caught: limb/extremity pinching; abrasion/crushing 4d. Contact: equipment imbalance during advancement drill equipment 4e. Exposure: inhalation of contamination 4f. Fall: slip/trip/fall hazards	4b. Wet borehole area with sprayer to minimize dust. 4b. Stand upwind and keep body away from rig.4b. No open flames/heat sources. 4c. Use proper PPE. 4c. Always wear leather gloves when making connections and using hand tools; wear cut-resistant (i.e., Kevlar) gloves when handling cutting tools. 4c. Inspect the equipment prior to use for potential pinch points. 4c. Test all emergency shutdown devices prior to drilling. 4c. Inspect drill head for worn surface or missing teeth; replace if damaged or blunt. 4c. Ensure all jewelry is removed, loose clothing is secured, and PPE is secured close to the body. 4c. All non-essential personnel should stay away from the immediate work area; position body out of the line-of-fire of equipment. 4c. Drillers and helpers will understand and use the "Show Me Your Hands" Policy. 4d. Drillers will advance the borehole slowly and with caution to avoid causing the rig to become imbalanced and/or tip. 4d. 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. 4d. 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. For example, if the boom is ten feet high, non-essential personnel and equipment will be positioned at least ten feet away from the rig in case the rig tips over. Use cones and caution tape to demarcate the area. 4e. Air monitoring using a calibrated photoionization detector (PID) will be used to periodically monitor the breathing zone of the work area. 4e. The Action Level for breathing zone air is five parts per million (sustained) as detected by the PID. 4e. If a reading of >5 ppm 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 appropriate precautions in accordance with the site specific health and safety plan. 4f. See 2a.
5. Decontaminate equipment	5a. Exposure 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. Use an absorbent pad to clean spills. 5b. See 5a. 5b. Review the cleaning solution MSDS for hazards and safe handling recommendations.

[1] Each Job or Operation consists of a set of tasks / steps. Be sure to list all the steps needed to perform job.

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APPENDIX B

Heat and Cold Stress Guidelines

Heat Stress

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment (PPE) 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 cramps 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 moving to a shaded area, rest, and fluid intake. Normally, the individual should recover within one-half hour. If the individual has not recovered within 30 minutes and the 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. The circulatory system of the individual fails as blood collects near the skin in an effort to rid the body of excess heat. 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
- elevated body temperature.

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids and electrolytes. If the individual has not recovered within 30 minutes and the temperature has not decreased, the individual should be transported to the hospital for medical attention.

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°F;
- 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 (heat cramps, heat exhaustion, and heat stroke) is a significant hazard if any type of protective equipment (semi-permeable or impermeable) which prevents evaporative cooling if worn in hot weather environments. Local weather conditions may require restricted work schedules in order to adequately protect personnel. The use of work/rest cycles (including working in the cooler periods of the day or evening) and training on the signs and symptoms of heat stress should help prevent heat-related illnesses from occurring. Work/rest cycles will depend on the work load required to perform each task, type of protective equipment, temperature, and humidity. In general, when the temperature exceeds 88°F, a 15 minute rest cycle will be initiated once every two hours. In addition, potable water and fluids containing electrolytes (e.g., Gatorade) will be available to replace lost body fluids.

Cold Stress

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 insulating clothing must be used when the air temperature is below 40°F. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. Training on the signs and symptoms of cold stress should prevent cold-related illnesses from occurring. The signs and symptoms of cold stress include the following:

- severe shivering;
- abnormal behavior;

- slowing of body movement;
- confusion;
- 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.

APPENDIX C

Medical Data Form

MEDICAL DATA SHEET

This form must be completed by all onsite personnel prior to the commencement of activities, and shall be kept by the Human Resources Department in Roux Associates' office during site activities. This form must be delivered to any attending physician when medical assistance is needed.

(This form should be typed or printed legibly.)

Site: _____

Name: _____ Home Telephone: _____
(Area Code/Telephone Number)

Address: _____

Date of Birth: _____ Height: _____ Weight: _____

Emergency Contact: _____ Telephone: _____
(Area Code/Telephone Number)

Drug Allergies or Other Allergies: _____

_____

Previous Illnesses or Exposures to Hazardous Substances: _____

_____

_____

Current Medication (Prescription and Non-Prescription): _____

_____

_____

Medical Restrictions: _____

_____

Name, Address and Telephone Number of Person Physician: _____

_____

Health and Safety
Briefing/Tailgate Meeting Form

HEALTH & SAFETY BRIEFING / TAILGATE MEETING FORM

Site Name / Location _____

Date: _____ Weather Forecast: _____

Names of Personnel Attending Briefing

_____ _____ _____

_____ _____ _____

_____ _____ _____

Planned Work

_____

_____

_____

Instrument Calibration: Instrument/Time/Cal. Gas/Cal. Concentration/Actual Concentration

_____

_____

_____

Items Discussed

_____

_____

_____

_____

_____

Work Permit Type and Applicable Restrictions

_____

_____

_____

Signatures of Attending Personnel

_____ _____ _____

_____ _____ _____

_____ _____ _____

APPENDIX E

Accident Report and Accident Investigation Form

☐ **Roux Associates, Inc.** ☐ **Remedial Engineering, P.C.** ☐ **DOMANI Sustainability Consulting, LLC**
(Check applicable company name)

ACCIDENT REPORT

Joe Gentile, Corporate Health and Safety Manager
Cell: (610) 844-6911; Office: (856) 423-8800; Office FAX: (856) 423-3220; Home: (484) 373-0953

PART 1: ADMINISTRATIVE INFORMATION

Project #: _____
Project Name: _____
Project Location (street address/city/state)**:**
_____
_____
Client Corporate Name / Contact / Address / Phone #:
_____
_____
_____
_____
_____

Immediate Verbal Notifications Given To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No
Client Contact	☐Yes	☐No

ACCIDENT REPORT STATUS (time due):
☐ Initial (24 hr) Date: _____
☐ Final (5-10 days) Date: _____

Accident Report Delivered To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No

REPORT TYPE: ☐ Loss ☐ Near Loss Estimated Costs: $

OSHA CASE # Assigned by Corporate Health & Safety as Applicable: _____

Corporate Health & Safety Confirmed Final Accident Report
☐Yes ☐No

DATE OF INCIDENT: _____

TIME INCIDENT OCCURRED: _____ ☐AM ☐PM

INCIDENT LOCATION – City, State, and Country (If outside U.S.A.) _____

INCIDENT TYPES: (Select most appropriate if Loss occurred.)
From lists below, please select the option that best categories the incident. When selecting an injury or illness, also indicate the severity level.

☐**INJURY** ☐**ILLNESS**

----------**Severity Level**----------

☐Fatality ☐First Aid ☐Medical Treatment
☐Restricted Work ☐Lost Time

OTHER INCIDENT TYPES

☐Spill / Release
Material involved: _____
Quantity (U.S. Gallons): _____

☐Misdirected Waste ☐Consent Order ☐NOV
☐Property Damage ☐Exceedance
☐Motor Vehicle ☐Fine / Penalty

ACTIVITY TYPE (Check most appropriate one.)

☐Decommissioning	☐Geoprobe	☐Sampling
☐Demolition	☐Motor Vehicle	☐System Start-up
☐Dewatering	☐Operations/	☐Trenching
☐Drilling	Maintenance	☐AST/UST Removal
☐Excavation	☐Pump/Pilot Test	☐Other_____
☐Gauging	☐Rigging/Lifting	

INJURY TYPE (Check all applicable.)

☐Abrasion	☐Occupational Illness
☐Amputation	☐Puncture
☐Burn	☐Rash
☐Cold/Heat Stress	☐Repetitive Motion
☐Inflammation	☐Sprain/Strain
☐Laceration	☐Other_____

BODY PART AFFECTED (Check all applicable.)

☐Respiratory	☐Shoulder	☐Face
☐Neck	☐Arm	☐Leg
☐Chest	☐Wrist	☐Knee
☐Abdomen	☐Hand/Fingers	☐Ankle
☐Groin	☐Eye	☐Foot/Toes
☐Back	☐Head	☐Other_____

I. PERSON(S) DIRECTLY / INDIRECTLY INVOLVED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Directly/Indirectly Involved in Incident:	Designate: Roux/Remedial/Domani Emp Roux/Remedial/Domani Sub Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:
1)				
2)				
3)				
4)				

II. PERSONS INJURED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Injured in Incident:	Designate: Roux/Remedial/Domani Emp Roux/Remedial/Domani Sub Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:	Description of Injury:
1)					
2)					
3)					

No One Gets Hurt!

III. PROPERTY DAMAGED IN INCIDENT (Attach additional information as necessary/applicable.)

Property Damaged:	Property Location:	Owner Name, Address & Phone #:	Description of Damage:	Estimated Cost:
1)				$
2)				$
3)				$

IV. WITNESSES TO INCIDENT (Attach additional information as necessary/applicable.)

Witness Name:	Address:	Phone #:
1)		
2)		
3)		

PART 2: WHAT HAPPENED AND INCIDENT DETAILS

PROVIDE FACTUAL DESCRIPTION OF INCIDENT (e.g., describe loss/near loss, injury, response/treatment).

I. AUTHORITIES/GOVERNMENTAL AGENCIES NOTIFIED (Attach additional information as necessary/applicable.)

Authority/Agency Notified:	Name/Phone #/Fax # of Person Notified:	Address of Person Notified:	Date/Time of Notification:	Exact Information Reported/Provided:
1)				
2)				
3)				

II. PUBLIC RESPONSES TO INCIDENT (if applicable)

1) Response/Inquiry By: (check one)	Entity Name:	Name/Phone # of Respondent/ Inquirer:	Address of Entity/Person:	Date/Time of Response/Inquiry:
☐Newspaper ☐Television ☐Community Group ☐Neighbors ☐Other _____				
Describe Response/Inquiry:				
Roux/Remedial/Domani Response:				
2) Response/Inquiry By: (check one)	Entity Name:	Name/Phone # of Respondent/ Inquirer:	Address of Entity/Person:	Date/Time of Response/Inquiry:
☐Newspaper ☐Television ☐Community Group ☐Neighbors ☐Other _____				
Describe Response/Inquiry:				
Roux/Remedial/Domani Response:				

(Check all that apply.) (Attach photos, drawings, etc. to help illustrate the incident.)
ATTACHED INFORMATION: ☐Photo ☐Sketches ☐Vehicle Acord Form ☐Police Report ☐Other

Name(s) of person(s) who prepared Initial and Final Report:	**Title(s):**	**Phone number(s):**

Roux Associates, Inc./Remedial Engineering, P.C./DOMANI Sustainability Consulting, LLC

ACCIDENT INVESTIGATION REPORT

(March 2008)

Project #: **Project Name:** **Project Location:** **Accident Date:**

PART 3: INVESTIGATION TEAM ANALYSIS

CONCLUSION: WHY IT HAPPENED (LIST & NUMBER CAUSAL FACTORS AND CORRESPONDING ROOT CAUSES)

ROOT CAUSE(S) AND SOLUTION(S): HOW TO PREVENT INCIDENT FROM RECURRING

CAUSAL FACTOR	ROOT CAUSE		SOLUTION(S) [Must Match Root Cause(s)]		PERSON RESPONSIBLE	AGREED DUE DATE	ACTUAL COMPLETION DATE
			#	Solution(s)			
			1				
			2				
			3				
			4				
			5				
			6				

INVESTIGATION TEAM:

PRINT NAME	JOB POSITION	DATE	SIGNATURE

No One Gets Hurt!

APPENDIX F

Acord Form

ACORD™ AUTOMOBILE LOSS NOTICE

DATE

PRODUCER	PHONE (A/C, No, Ext):	COMPANY	NAIC CODE:	MISCELLANEOUS INFO (Site & location code)
James C. Herrmann & Associates LTD 265 Sunrise Highway, Suite #20 Rockville Centre, NY 11570	516-678-2626	Commerce & Industry	19410	

POLICY NUMBER	REFERENCE NUMBER	CAT #
CA-3777920		

CODE:	SUB CODE:	EFFECTIVE DATE	EXPIRATION DATE	DATE OF ACCIDENT AND TIME		PREVIOUSLY REPORTED
AGENCY CUSTOMER ID:		06/01/10	06/01/11		AM / PM	YES / NO

INSURED

NAME AND ADDRESS	SOC SEC # OR FEIN:	RESIDENCE PHONE (A/C, No)	BUSINESS PHONE (A/C, No, Ext)
Roux Associates, Inc. 209 Shafter Street Islandia, NY 11749	11-2579482	NA	631-232-2600

CONTACT

CONTACT INSURED

NAME AND ADDRESS	RESIDENCE PHONE (A/C, No)	BUSINESS PHONE (A/C, No, Ext)	WHERE TO CONTACT / WHEN TO CONTACT
Susan Sullivan, General Counsel Roux Associates, Inc. 209 Shafter Street Islandia, NY 11749		631-232-2600	Fax Notice: 631-232-1525

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)
					COLLISION DED	

LOSS PAYEE	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?
Employee					YES / NO

DESCRIBE DAMAGE	ESTIMATE AMOUNT	WHERE CAN VEHICLE BE SEEN?	WHEN CAN VEH BE SEEN?	OTHER INSURANCE ON VEHICLE

PROPERTY DAMAGED

DESCRIBE PROPERTY (If auto, year, make, model, plate #)	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)

REMARKS (Include adjuster assigned)

REPORTED BY	REPORTED TO	SIGNATURE OF INSURED	SIGNATURE OF PRODUCER

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, District of Columbia, Kentucky, Louisiana, Maine, Michigan, New Jersey, New Mexico, Pennsylvania and 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 D.C., LA, ME and VA insurance benefits may also be denied.

Applicable in California

Any person who knowingly files a statement of claim containing any false or misleading information is subject to criminal and civil penalties.

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 fraudulanet 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 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 G

OSHA 300

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year _____

U.S. Department of Labor
Occupational Safety and Health Administration

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Form approved OMB no. 1218-0176

Establishment name _____

City _____ State _____

Identify the person			Describe the case			Classify the case											
						CHECK ONLY ONE box for each case based on the most serious outcome for that case:				Enter the number of days the injured or ill worker was:		Check the "injury" column or choose one type of illness:					
(A) Case No.	(B) Employee's Name	(C) Job Title (e.g., Welder)	(D) Date of injury or onset of illness (mo./day)	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	Death	Days away from work	Remained at work		Away From Work (days)	On job transfer or restriction (days)	(M) Injury	Skin Disorder	Respiratory Condition	Poisoning	Hearing Loss	All other illnesses
								Job transfer or restriction	Other record-able cases								
						(G)	(H)	(I)	(J)	(K)	(L)	(1)	(2)	(3)	(4)	(5)	(6)
					Page totals	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Injury (1) | Skin Disorder (2) | Respiratory Condition (3) | Poisoning (4) | Hearing Loss (5) | All other illnesses (6)

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year _____

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of… (M)			
(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Establishment information

Your establishment name _____

Street _____

City _____ State _____ Zip _____

Industry description (e.g., Manufacture of motor truck trailers)

_____

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)

___ ___ ___ ___

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

___ ___ ___ ___ ___ ___

Employment information

Annual average number of employees _____

Total hours worked by all employees last year _____

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

_____ Company executive

_____ Title

_____ Phone

_____ Date

OSHA's Form 301
Injuries and Illnesses Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone _____ Date _____

Information about the employee

1) Full Name _____

2) Street _____

City _____ State _____ Zip _____

3) Date of birth _____

4) Date hired _____

5) ☐ Male
☐ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional

_____

_____

7) If treatment was given away from the worksite, where was it given?

Facility _____

Street _____

City _____ State _____ Zip _____

8) Was employee treated in an emergency room?
☐ Yes
☐ No

9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

10) Case number from the Log _____ *(Transfer the case number from the Log after you record the case.)*

11) Date of injury or illness _____

12) Time employee began work _____ AM/PM

13) Time of event _____ AM/PM ☐ Check if time cannot be determined

14) **What was the employee doing just before the incident occurred?** Describe the activity, as well as the tools, equipment or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) **What happened?** Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."

16) **What was the injury or illness?** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt", "pain", or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) **What object or substance directly harmed the employee?** Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.

18) **If the employee died, when did death occur?** Date of death

APPENDIX H

Weekly Safety Report

APPENDIX H

WEEKLY SAFETY REPORT

Job Name_____ Job#_____

Week of: **Days Without Lost Time Injury:**

Describe any recordable incidents or accidents:

What actions were taken to prevent such incidents or accidents from occurring again?

Was training conducted addressing the incident? Y N What date?___

What level of PPE is currently in place?

Has PPE been upgraded or downgraded?

Have Perimeter Air Monitoring action limits been exceeded:

What action was taken to mitigate the exceedance?

Have personal air monitoring limits been exceeded:

What actions were taken?

List any problems with air monitoring equipment:

Write a summary of work completed during the week:

Write a summary of proposed work for the coming week:

Summarize any safety issues that are outstanding:

HSO Name: _____ HSO Signature: _____

APPENDIX I

Job Safety and Health Protection Poster

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- ❑ You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- ❑ You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- ❑ You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act.*
- ❑ You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- ❑ Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- ❑ You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- ❑ Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act),* P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act.* The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, visit our website at www.osha.gov or call 1-800-321-OSHA or your nearest OSHA office:

Atlanta (404) 562-2300	Boston (617) 565-9860	Chicago (312) 353-2220	Dallas (214) 767-4731
Denver (303) 844-1600	Kansas City (816) 426-5861	New York (212) 337-2378	Philadelphia (215) 861-4900
San Francisco (415) 975-4310	Seattle (206) 553-5930	Teletypewriter (TTY) 1-877-889-5627	

If you work in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

OSHA Occupational Safety and Health Administration

www.osha.gov U.S. Department of Labor

OSHA 3165-09R

Community Air Monitoring Plan

August 26, 2013

COMMUNITY AIR MONITORING PLAN

Powers Chemco Site
a.k.a. Columbia Ribbon
and Manufacturing Company Site
71 Charles Street, Glen Cove
Nassau County, New York
Site No. 1-30-028

Prepared for

KONICA MINOLTA HOLDINGS U.S.A., INC.
71 Charles Street
Glen Cove, New York 11542

ROUX ASSOCIATES, INC.

Environmental Consulting & Management

ROUX

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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TABLE

ATTACHMENTS

1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) has developed this project-specific Community Air Monitoring Plan (CAMP) to implement real time monitoring at the North Lot of the Powers Chemco, a.k.a. Columbia Ribbon and Manufacturing Company (Site Code 1-30-028) located at 71 Charles Street, Glen Cove, New York (the Site) during the Remedial Action Work Plan (RAWP) excavation activities planned for the Site. Previous investigation results indicate that volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganic compounds (metals) are present in soil across the Site. Particulates will be monitored in addition to VOCs as part of this CAMP.

The monitoring program will monitor for total VOCs and particulates at the downwind perimeter of the excavation area during ground intrusive activities. The design of the CAMP is intended to provide a measure of protection for the downwind community and onsite workers not directly involved with the subject work activities from potential airborne contaminant releases as a direct result of RAWP excavation activities. This plan is consistent with the New York State Department of Health's (NYSDOH's) Generic Community Air Monitoring Plan guidance document included as Appendix 1A of the New York State Department of Environmental Conservation's (NYSDEC) Technical Guidance for Site Investigation and Remediation (DER-10) and the Fugitive Dust and Particulate Monitoring Program included as Appendix 1B of DER-10.

Roux Associates will be responsible for the implementation of the CAMP and will have direct and constant communication with all components of the remediation team in order to effectively and instantaneously initiate the necessary Site controls to prevent and/or minimize any work stoppages related to CAMP issues.

The specifics of the CAMP are presented in the following six (6) sections:

1.1 Establishing Background Conditions

1.2 VOC Monitoring Approach

1.3 Particulate Monitoring Approach

1.4 Meteorological Monitoring Approach

1.5 Available Suppression Techniques

1.6 Reporting

1.1 Establishing Background Conditions

Background air quality monitoring will be conducted during a maximum of two work days prior to the start of the remedial activities. Background air quality monitoring will be conducted for up to 8 hours per day, with the timing generally coinciding with the hours work will typically be occurring at the Site. Background air quality monitoring will be conducted at two sampling stations. Particulate matter (PM-10) will be monitored continuously at each location with a MIE DataRam 4000. The DataRams will be set to take 15-minute running average measurements, and record one average measurement every 15 minutes, including the time and date of the end of the measurement period. The particulate data stored on the DataRams will be periodically transferred to a laptop computer and analyzed as necessary. All particulate will be measured in units of micrograms per cubic meter (µg/m3).

VOCs will also be monitored continuously for the background measurement period utilizing RAE Systems MiniRAE 2000 VOC monitors equipped with 10.6 eV lamps. The VOC monitors will be set to take 15-minute running average measurements, and record one average measurement every 15 minutes, including the time and the date of the end of the measurement period. All VOC data will be measured in units of parts per million (ppm).

1.2 VOC Monitoring Approach

During all remedial activities, VOCs will be monitored continuously at the upwind and downwind perimeter of the Work area at temporary monitoring stations. The background data generated during the Background Air Monitoring Task (described above in Section 1.1) will be used to establish general background concentrations and as work progresses, the background information will be updated. The monitoring work will be conducted using MiniRAE 2000 portable VOC monitors or similar type monitors with 10.6 eV lamps for all VOC monitoring. The equipment will be calibrated at least once daily using isobutylene as the calibration gas. One (1) upwind and one (1) downwind monitor will be deployed each day. Given the close proximity of the residential properties on the northwestern property boundary, one permanent monitoring station will be set up between the residences and the

work area. Each monitoring unit is equipped with an audible and/or visible alarm to indicate exceedance of the action levels (as summarized in Table 1).

All 15-minute readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes will be recorded. If an exceedance of the action level occurs, an Action Limit Report will be completed identifying the monitoring device location, the measured VOC level, the activity causing the exceedance, meteorological conditions, and the corrective actions taken, as provided in Attachment 1. Additionally, the NYSDEC and NYSDOH will be notified within 24 hours of the VOC Action Limit Report generation. Daily monitoring equipment locations and meteorological conditions will also be documented on a daily CAMP Monitoring Location Plan. All documentation will be kept on file at the Site during RI work activities. Chemical specific air monitoring using similar methods and procedures as outlined for the VOC baseline sampling will be conducted if perimeter action levels for VOCs are regularly exceeded or are prevalent offsite.

1.3 Particulate Monitoring Approach

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action levels (as summarized in Table 1). Monitoring equipment will be MIE Data Ram 4000 monitors or equivalent. One (1) upwind and one (1) downwind monitor will be deployed each day equipped with an omni-directional sampling inlet and a PM-10 sample head. The data logging averaging period will be set to 15-minutes with time and date stamp recording. Alarm averaging will be set at 90 µg/m3 above background per 15-minute period. This setting will allow proactive evaluation of work conditions prior to reaching Action Levels of 100 µg/m3 above background. The equipment is equipped with an audible and/or visible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the action level occurs, an Action Limit Report will be completed identifying the monitoring device location, the measured particulate level, the activity causing the exceedance, meteorological conditions, and the corrective actions taken, as provided in Attachment 1. Daily monitoring equipment locations and meteorological conditions will also be documented on the daily CAMP Monitoring Location Plan, provided in Attachment 2. All documentation will be kept on file at the Site during RI work activities.

1.4 Meteorological Monitoring

Meteorological data consisting of wind speed, wind direction, temperatures, barometric pressure, and relative humidity will be collected. The measurements will be continuous and 15-minute average values will be digitally recorded by the instrument. Wind direction readings will be utilized to position the VOC and particulate monitoring equipment in appropriate upwind and downwind locations. A Davis Corporation wireless instrument station or equivalent will be used to collect and download all meteorological monitoring data.

1.5 Available Suppression Techniques

A dust suppression plan that addresses dust management during excavation activities will include, as needed, any or all of the items listed below:

- Maintenance and proper covering, when applicable, of excavated soil/ imported fill material stockpiles.
- Dust suppression may be achieved through the use of a dedicated onsite water truck. The truck will be equipped with a water cannon capable of spraying water directly onto the excavation, stockpiles and work area.
- Gravel may be used on the Site asphalt pavement to provide a clean and dust-free access road surface.

Onsite truck routes may be limited to minimize the area disturbed by truck traffic.

Several odor control products may also be used to mitigate both odors and vapor. An odor spray, Bisolve^{TM}, will be sprayed over the excavation and stockpiled soil and will be used as a daily control if required. An additional odor control may be utilized if necessary by deploying an odor masking agent at perimeter of the work zone using drum-mounted foggers. Foam may also be

used to suppress vapors and odors, if necessary. The foam unit, Rusmar™ PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. If needed, foam would be applied to stockpiled soil and excavation sidewalls. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any complaints about the project from the local community. Implementation of all odor controls, including the halt of work, will be the responsibility of the Contractor.

1.6 Reporting

All recorded data will be downloaded and field logged, including Action Limit Reports (if any) and daily CAMP monitoring location figures. All records will be maintained onsite during field activities for NYSDEC/NYSDOH review. A description of all CAMP-related activities will be included in the Construction Completion Report submitted to the NYSDEC and NYSDOH. If an Action Limit Report is generated due to VOC exceedances, then the NYSDEC and NYSDOH must be notified within 24 hours.

Table 1. Action Limit Summary for VOCs and Particulates, North Lot, 71 Charles Street, Glen Cove, Nassau, New York

Contaminant	Downwind Action Levels*	Action/Response
Volatile Organic Compounds (VOCs) (Monitoring Via Photoionization Detector and Odor Observation)	< 5 ppm	1. Resume work with continued monitoring.
	5 ppm < level < 25 ppm	1. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. 2. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
	> 25 ppm	1. Identified contributing ground intrusive activities must be halted and vapor suppression techniques must be evaluated and modified until monitoring indicates VOC levels below the action level. 2. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
Particulates (Monitoring Via Particulate Meter and Observation)	< 100 ug/m^3	1. If dust is observed leaving the work area, then dust control techniques must be implemented or additional controls used.
	100 ug/m3 < level < 150 ug/m^3	1. Employ dust suppression techniques. 2. Work may continue with dust suppression techniques provided that the downwind PM-10 particulate concentration does not exceed 100 ug/m3 above the upwind level and provided that no visible dust is migrating from the work area.
	> 150 ug/m^3	1. STOP work. 2. Re-evaluate activities, modify dust suppression techniques. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m3 of the upwind level and in preventing visible dust migration.

* 15-minute running time-weighted average (twa) above background. Particulate readings are based on the respirable (PM-10) fraction. Background readings are taken at upwind locations relative to Work Areas or Exclusion Zones.

Action Limit Report

ACTION LIMIT REPORT

Project Location: North Lot, 71 Charles Street, Glen Cove, Nassau, New York

Date: Time:

Name: _____

Contaminant: PM-10: VOC: _____

Wind Speed: Wind Direction: _____

Temperature: Barometric Pressure: _____

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: _____

ACTIVITY DESCRIPTION

CORRECTIVE ACTION TAKEN

Community Air Monitoring Location Plan

LEGEND

✖ CAMP MONITORING STATION LOCATION

(DATE: _____)

NOTES

1. THIS PROPERTY DESIGNATED SECTION 31, BLOCK "G" ON THE LAND AND TAX MAP OF THE COUNTY OF NASSAU.
2. ABSTRACT OF TITLE AND EASEMENTS FOR SUBJECT PARCEL AND ADJOINING PARCELS NOT PROVIDED FOR THE PREPERATION OF THIS SURVEY. ABSENCE OF EASEMENTS DOES NOT DENY THE EXISTINCE OF SAME.

N

Title:

COMMUNITY AIR MONITORING LOCATION PLAN

REMEDIAL INVESTIGATION

Prepared For:

KONICA MINOLTA
GLEN COVE, NEW YORK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: W.M.	Date: 02OCT12	FIGURE
Prepared by: B.H.C.	Scale: AS SHOWN	1
Project Mgr: W.M.	Project: 2020.0001Y	
File: 2020.0001Y119.01.DWG		

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APPENDIX E

Material Safety Data Sheet (MSDS) for RegenOx™

RegenOx® – Part A (Oxidizer Complex)

Material Safety Data Sheet (MSDS)

Last Revised: June 24, 2010

Section 1 – Supplier Information and Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H_2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.
Chemical Family:	Inorganic Chemicals
Trade Name:	RegenOx® – Part A (Oxidizer Complex)
Product Use:	Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical	Percentage
15630-89-4	Sodium Percarbonate	60 -100 %
5968-11-6	Sodium Carbonate Monohydrate	10 – 30 %
7699-11-6	Silicic Acid	< 1 %
63231-67-4	Silica Gel	< 1 %

Section 3 – Physical Data

Form:	Powder
Color:	White
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA

Section 3 – Physical Data (cont)

Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm^3
Solubility:	Min 14.5g/100g water @ 20 ºC
Viscosity:	NA
pH (3% solution):	≈ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 ºC.

Section 4 – Reactivity Data

Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations

TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	*No*
Unlisted Substance:	*Yes*
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:

Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.

Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.

Protect from moisture. Do not store near combustible materials. Keep containers well sealed.

Store separately from reducing materials. Avoid contamination which may lead to decomposition.

Handling:

Avoid contact with eyes, skin and clothing. Use with adequate ventilation.

Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.

Label containers and keep them tightly closed when not in use.

Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)

Engineering Controls:

General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.

Respiratory Protection:

For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.

Hand Protection:

Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & Explosion:	Product is non-explosive. In case of fire, evacuate all non-essential personnel, wear protective clothing and a self-contained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water

First Aid

Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **Do Not** induce vomiting.

Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water.

Section 9 – Accidental Release Measures

Precautions:

Cleanup Methods:	Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.

Section 10 – Information on Toxicology

Toxicity Data

LD50 Oral (rat):	2,400 mg/kg
LD50 Dermal (rabbit):	Min 2,000 mg/kg
LD50 Inhalation (rat):	Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:	NA

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name:	Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.]
UN Number:	1479
Hazard Class:	5.1
Labels:	5.1 (Oxidizer)
Packaging Group:	III

Section 14 – Other Information

HMIS® Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

RegenOx® – Part B (Activator Complex)

Material Safety Data Sheet (MSDS)

Last Revised: June 4, 2010

Section 1 – Supplier Information and Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium silicate solution, silica gel and ferrous sulfate
Chemical Family:	Inorganic Chemicals
Trade Name:	RegenOx® – Part B (Activator Complex)
Product Use:	Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form:	Liquid
Color:	Blue/Green
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA
Flammability/Flash Point:	NA
Vapor Pressure:	NA

Section 3 – Physical Data (cont)	
Specific Gravity	1.39 g/cm^3
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data	
Stability:	Stable under normal conditions.
Conditions to Avoid:	None.
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations	
TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	*No*
Unlisted Substance:	*Yes*
SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification	
Extremely Hazardous Substance:	No
SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know	
Hazard Category:	Acute
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:	Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat above 60 degrees C and colder than 10 degrees C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.
Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation. Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls:	General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.
Respiratory Protection:	Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.
Hand Protection:	Wear chemical resistant gloves.
Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.
Other:	
Protection Against Fire & Explosion:	Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	

First Aid

Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **DO NOT** induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:

PPE:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).
Environmental Hazards:	Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.
Cleanup Methods:	Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data

Sodium Silicate:	When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist. The acute oral toxicity of this product has not been tested.
Ferrous Sulfate:	LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:	Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Neutralize and landfill solids in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T.	This product is not regulated as a hazardous material so there are no restrictions.

Section 14 – Other Information

HMIS® Rating	Health – 2 (moderate)	Reactivity – 0 (none)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat
	Contact – 1 (slight)	

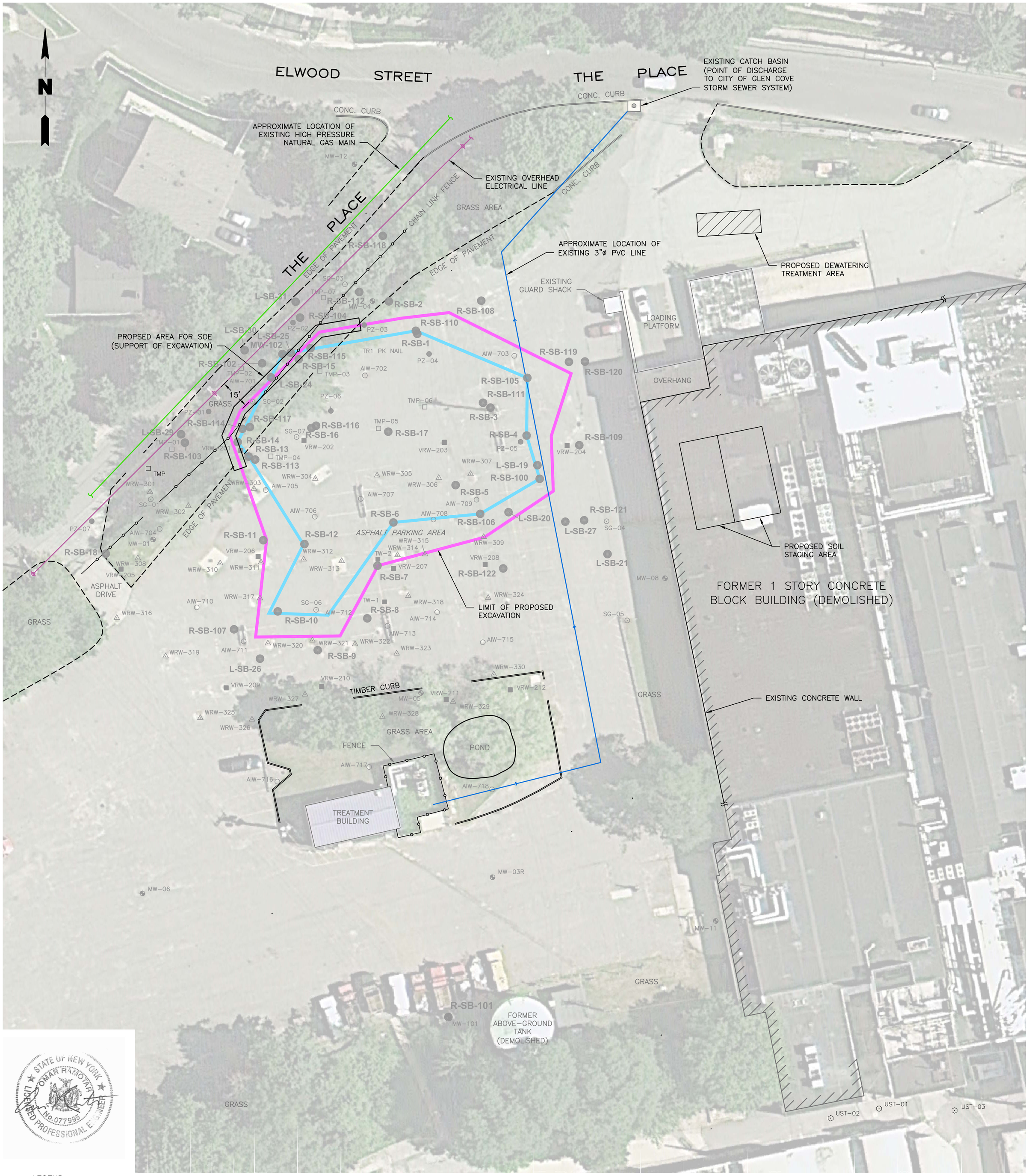
HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

PLATES

1. Proposed Remedial Action Excavation Plan
2. Soil Erosion and Sediment Control Details



LEGEND

R-SB-1 ●	SOIL BORING LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION)
R-SB-103 ●	SOIL BORING LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION AMENDMENT)
R-SB-109 ●	SOIL BORING AND GROUNDWATER SCREENING SAMPLE LOCATION AND DESIGNATION (REMEDIAL INVESTIGATION AMENDMENT)
L-SB-24 ●	LIBERTY SOIL BORING LOCATION AND DESIGNATION
◍	MONITORING WELL
●	PIEZOMETER
○	PASSIVE AIR INJECTION WELL
⊙	SOIL GAS SAMPLING POINT
■	VAPOR RECOVERY WELL
△	WATER RECOVERY WELL
□	TEMPORARY SOIL AND GROUNDWATER SAMPLING POINT
	CONCEPTUAL AREA OF KNOWN IMPACTS TO SOIL AND GROUNDWATER
	PROPOSED LIMIT OF EXCAVATION OF GROUNDWATER SOURCE AREA

NOTES

1. ELECTRICAL POWER AVAILABLE AT TREATMENT BUILDING.
2. PROPOSED SOIL STAGING AREA LOCATED ON EXISTING CONCRETE SLAB REMAINING FROM BUILDING DEMOLITION ACTIVITIES. THE SOIL STAGING AREA IS APPROXIMATELY 9 FEET BELOW GRADE OF PROPOSED EXCAVATION AREA.
3. THE 3"ø PVC LINE WAS USED TO SEND TREATED GROUNDWATER TO THE CITY OF GLEN COVE STORM SEWER SYSTEM.
4. THIS PROPERTY DESIGNATED SECTION 31, BLOCK "G" ON THE LAND AND TAX MAP OF THE COUNTY OF NASSAU.
5. ABSTRACT OF TITLE AND EASEMENTS FOR SUBJECT PARCEL AND ADJOINING PARCELS NOT PROVIDED FOR THE PREPARATION OF THIS SURVEY. ABSENCE OF EASEMENTS DOES NOT DENY THE EXISTENCE OF SAME.

30' 0 30'

Title:

PROPOSED REMEDIAL ACTION EXCAVATION PLAN

POWERS CHEMCO SITE NO. 1-30-028
REMEDIAL ACTION WORK PLAN

Prepared For:
KONICA MINOLTA HOLDINGS USA, INC.
GLEN COVE, NY

Remedial
REMEDIAL ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERS

Compiled by: N.E.	Date: 23AUG13	PLATE
Prepared by: J.A.D.	Scale: AS SHOWN	1
Project Mgr: N.E.	Project: 2020.0001Y000	
File: 2020.0001Y132.01.DWG		

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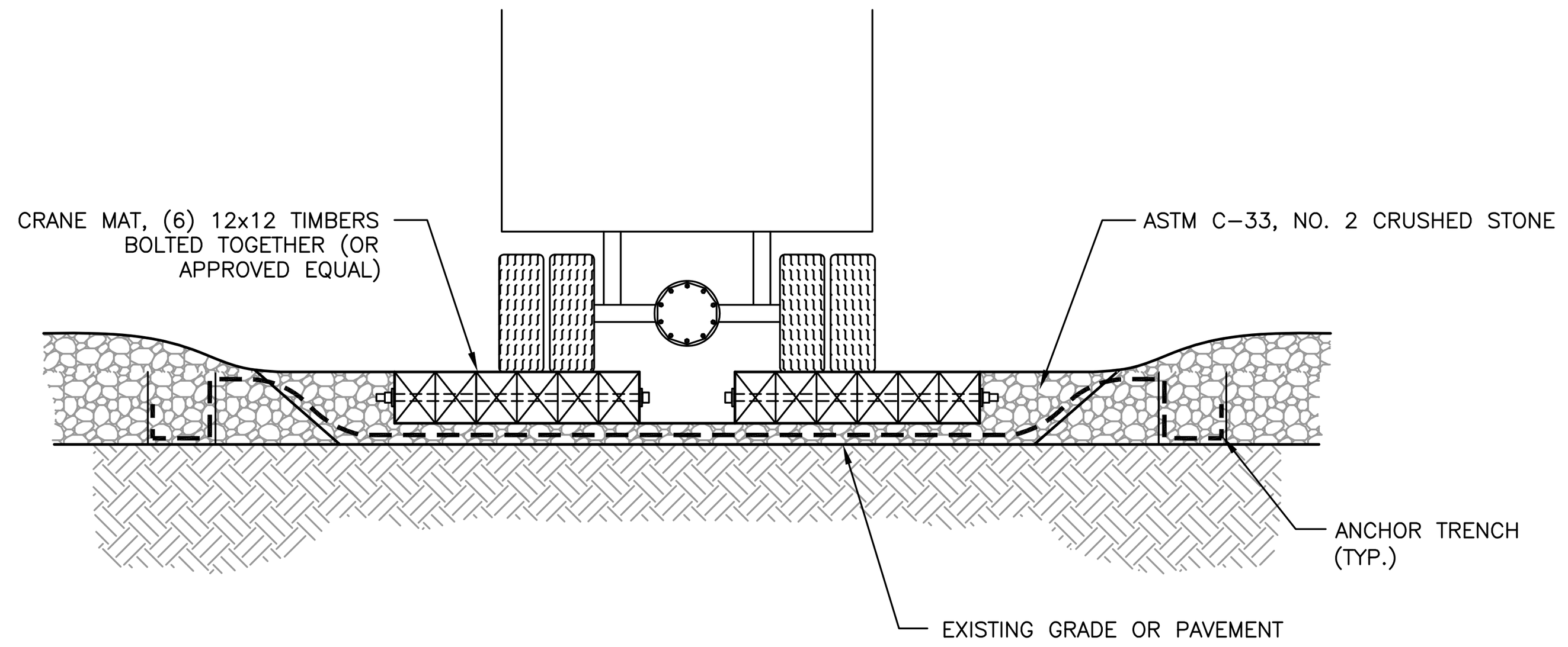
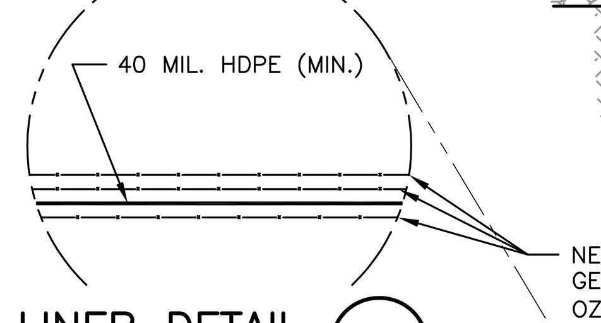
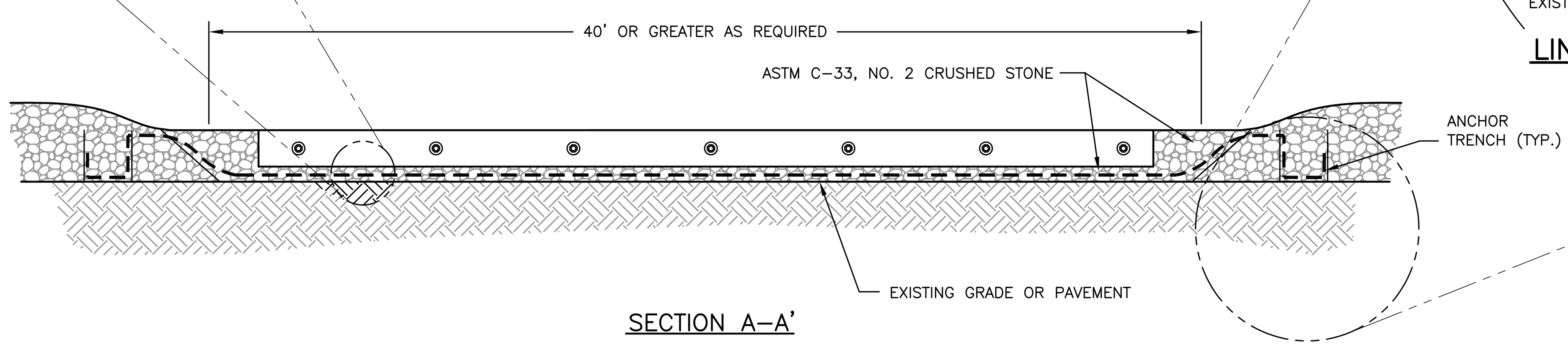


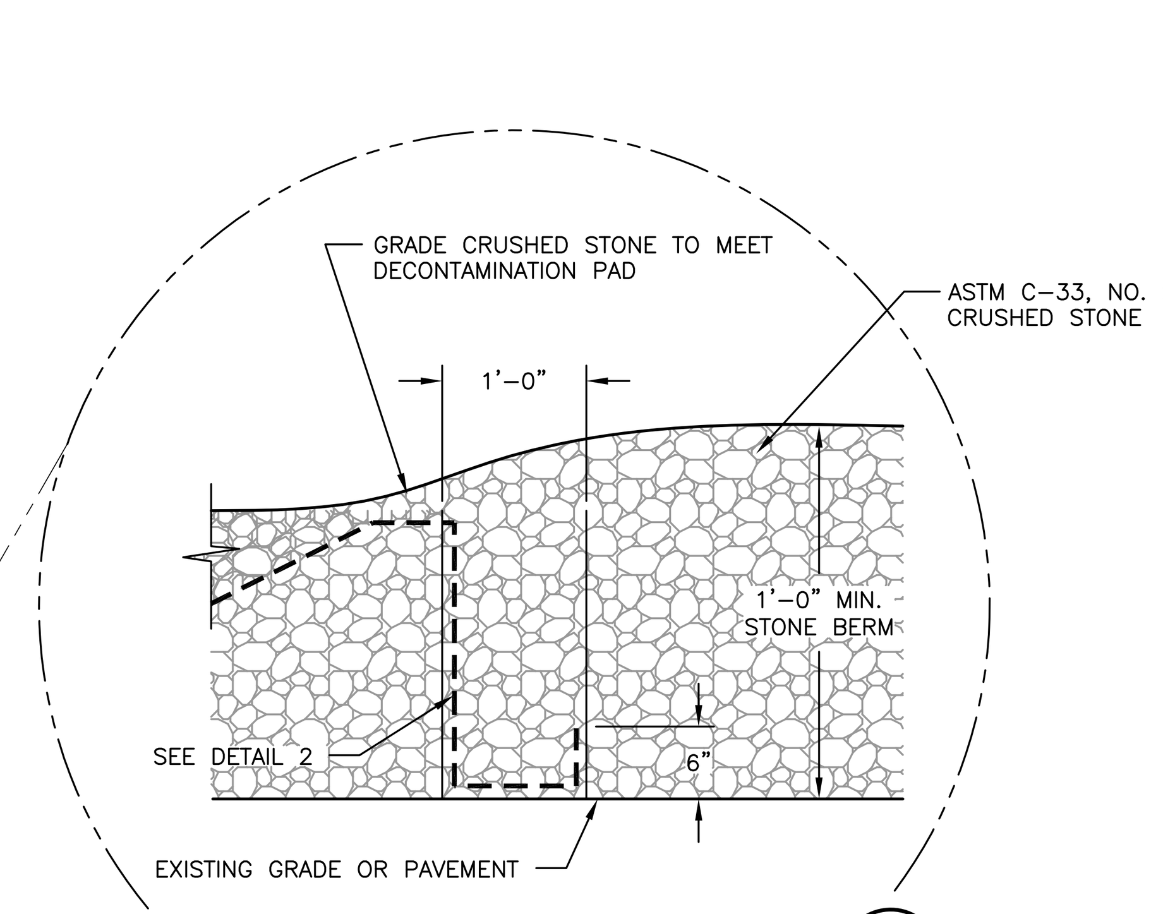
SECTION B–B'



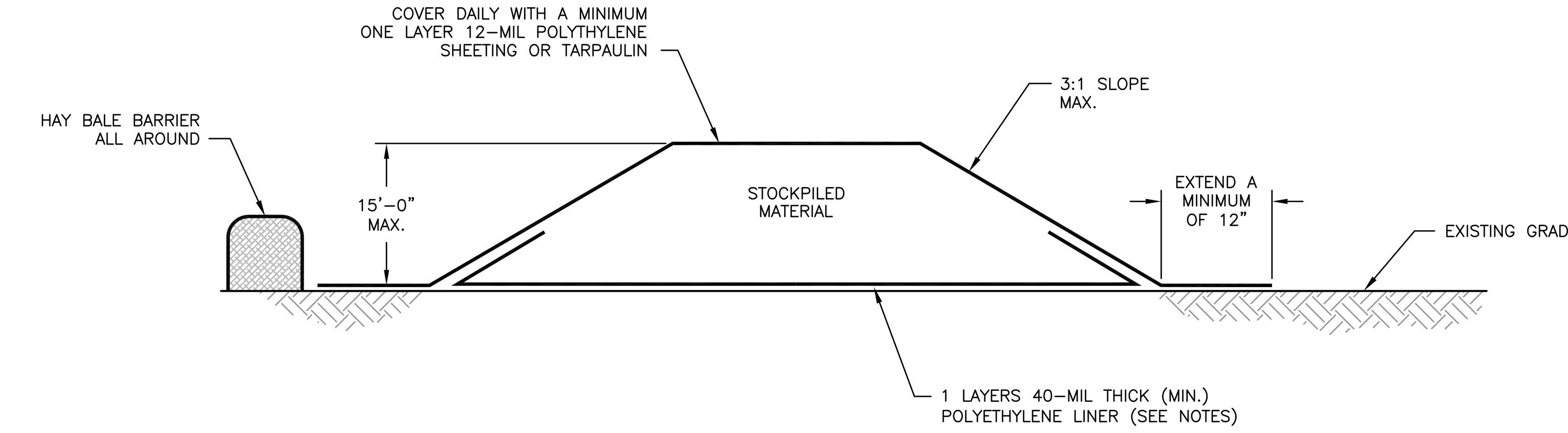
LINER DETAIL (2)
SCALE: NOT TO SCALE



SECTION A–A'



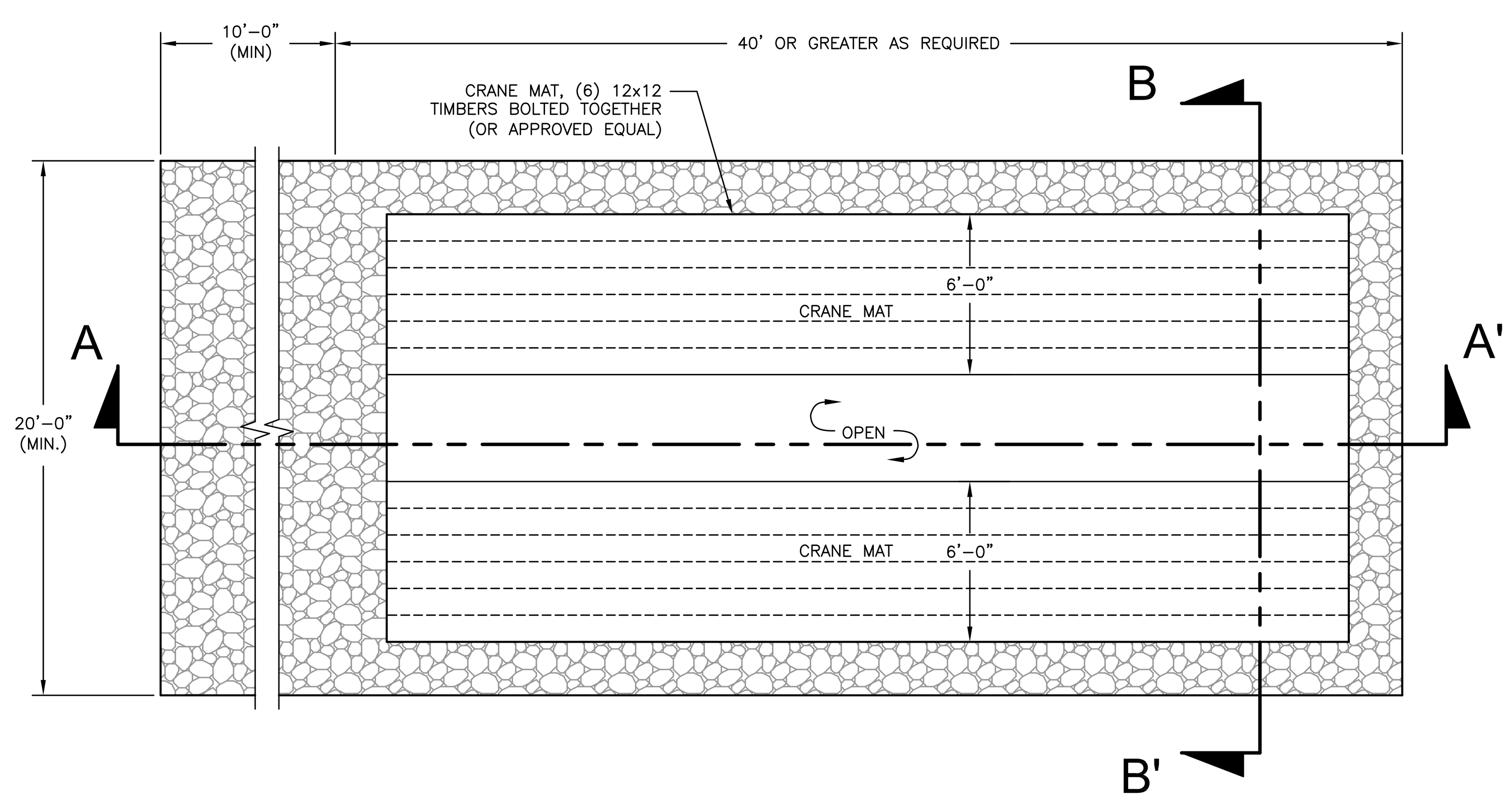
LINER ANCHOR TRENCH DETAIL (3)
SCALE: NOT TO SCALE



STOCKPILE NOTES

1. THE REQUIREMENTS SHOWN ARE MINIMUM REQUIREMENTS. REFER ALSO TO SPECIFICATION SECTION 01520 FOR SPECIFIC STAGING REQUIREMENTS.
2. POLYETHYLENE SHEETING SHALL OVERLAP BY A MINIMUM OF TWELVE (12) INCHES AND SHALL BE ANCHORED, USING HAY BALES OR EQUIVALENT WEIGHTS, AT 5 TO 10 FOOT CENTERS. USE ADDITIONAL WEIGHTS, AS NECESSARY, TO PROPERLY ANCHOR SHEETING DURING WINDY CONDITIONS
3. PLACE TWO (2) LAYERS OF POLYETHYLENE LINER BELOW ALL STOCKPILED ROCK, CONCRETE, ASPHALT, OR DEBRIS.
4. ALL STOCKPILES SHALL BE LABELED WITH SIGNS INDICATING THE STOCKPILE CONTENTS.
5. 12-MIL POLYETHYLENE SHEETING OR WEIGHTED TARPAULIN SHALL BE USED TO COVER THE STOCKPILE.
6. WHERE STACKING IS NOT PRACTICAL AND IN PAVED AREAS, HAY BALES SHALL BE TIED TOGETHER TO PREVENT MOVEMENT OR OPENINGS IN THE BARRIER.

(5) CONTAMINATED MATERIAL STOCKPILE DETAIL
SCALE: NOT TO SCALE

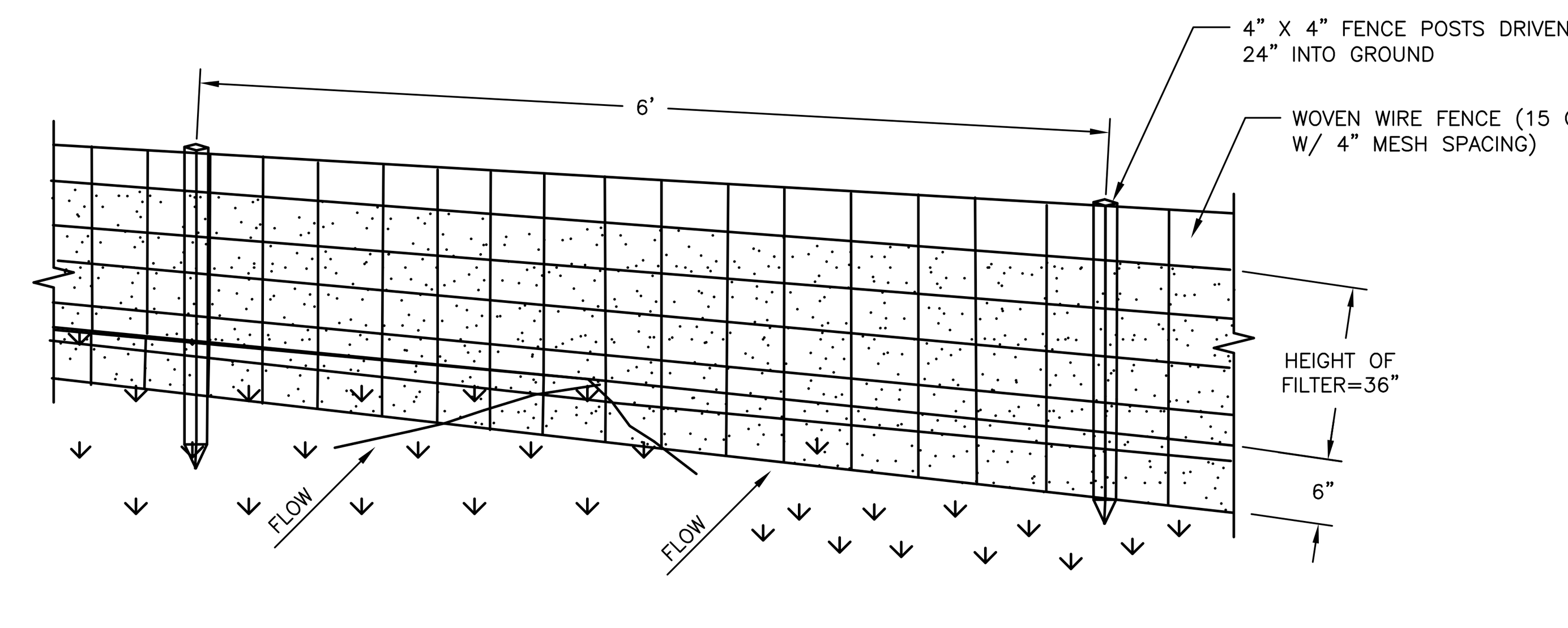


PLAN VIEW

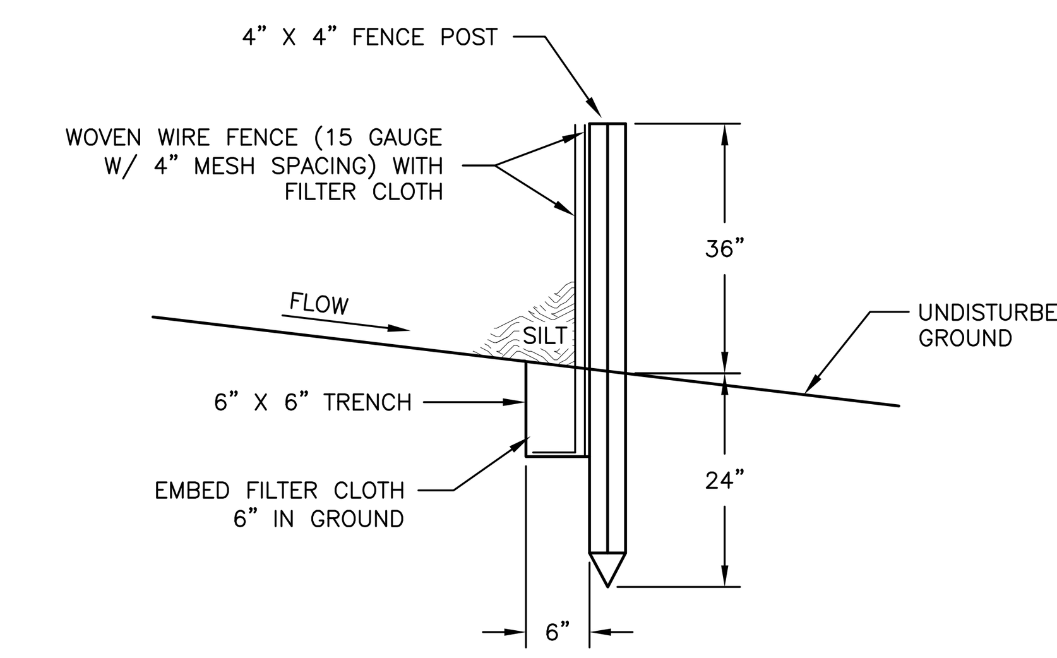
STABILIZED CONSTRUCTION ENTRANCE/DECONTAMINATION PAD NOTES

1. CONTRACTOR SHALL INSTALL DECONTAMINATION PAD/STABILIZED CONSTRUCTION ENTRANCE AT EACH CONSTRUCTION VEHICLE ACESS POINT TO THE SITE OR NECESSARY FOR THE WORK.
2. STONE SHALL BE ASTM C-33, SIZE NO. 2, CLEAN CRUSHED ANGULAR STONE.
3. NON-WOVEN GEOTEXTILE – PLACE OVER ENTIRE AREA PRIOR TO PLACING OF STONE.
4. 12-OZ NON-WOVEN GEOTEXTILE SHALL BE MIRAFI 1120N OR APPROVED EQUUVALENT. REFER ALSO TO SPECIFICATION SECTION 02275 FOR SPECIFIC GEOTEXTILE REQUIREMENTS.
5. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SOIL ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SOIL. ALL SOIL SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
6. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SOIL PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.
8. STABILIZED CONSTRUCTION ENTRANCE/DECONTAMINATION PAD SHALL BE COVERED WITH 10-MIL POLYETHYLENE WHEN NOT IN USE SPECIFICALLY DURING RAIN EVENTS.

(1) STABILIZED CONSTRUCTION ENTRANCE/ DECONTAMINATION PAD DETAIL
SCALE: NOT TO SCALE



PERSPECTIVE VIEW

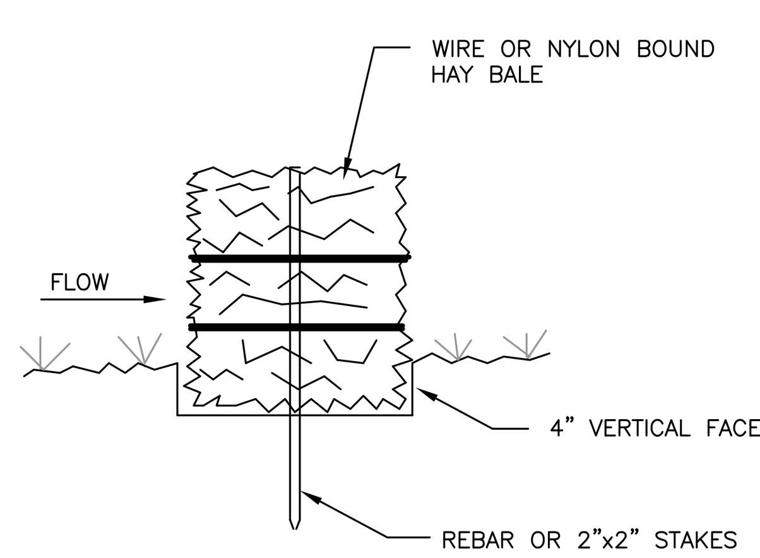


SECTION VIEW

CONSTRUCTION SPECIFICATIONS/NOTES

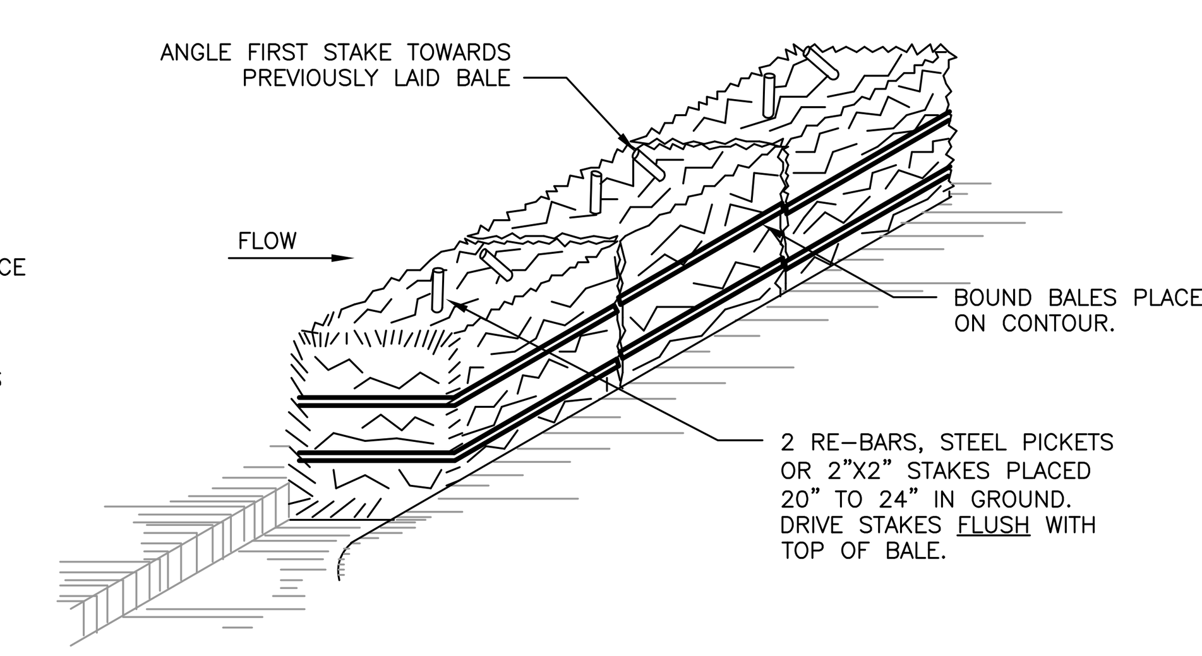
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 15 GAUGE, 4" MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER TREVIRA SPUNBOND 1115, MIRAFI 100X, TYPAR 3401, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
6. SILT FENCING WILL BE INSTALLED ON THE LOW SIDE AND EXTEND APPROXIMATELY 70% AROUND THE PERIMETERS OF SOIL STOCKPILES GENERATED FROM EXCAVATING OPERATIONS.

(6) SILT FENCE DETAIL
SCALE: NOT TO SCALE



DRAINAGE AREA NO MORE THAN 1/4 ACRE PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%.

BEDDING DETAIL



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS/NOTES

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. WHERE HAY BALES AND SILT FENCES ARE REQUIRED TOGETHER, THE HAY BALES SHALL BE LOCATED UPGRADIENT OF SILT FENCE.
5. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
6. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

(4) STRAW BALE DIKE
SCALE: NOT TO SCALE

DUST CONTROL SPECIFICATIONS/NOTES

1. DUST (PARTICULATE MATTER) CONTROL MEASURES WILL BE EMPLOYED THROUGHOUT THE WORK.
2. THE FOLLOWING MEASURES WILL BE IMPLEMENTED TO CONTROL PARTICULATES IN DRIVING AREAS INCLUDING:
   - LIMITING ON-SITE SPEED TO FIVE MILES PER HOUR. SIGNAGE OF THE 5-MILE PER HOUR LIMIT WILL BE POSTED AT ALL SITE ENTRANCES AND ALONG ROUTES WITHIN THE SITES;
   - LOADING OF ANY DRY MATERIAL THAT MAY RELEASE DUST FROM TRUCKS WILL BE ACCOMPANIED BY MANUAL WATER SPRAYING OF THE MATERIAL; AND
   - COVERING ALL TRUCKS CARRYING LOOSE MATERIAL SUCH AS DEBRIS, EXCAVATED MATERIAL OR BACKFILL, AND VERIFYING THAT COVERS ON ALL SUCH TRUCKS HAVE BEEN PROPERLY SEALED. OUTGOING TRUCKS WILL BE INSPECTED AT THE GATE, AND NOT ALLOWED TO EXIT IF COVERS ARE NOT PROPERLY SEALED.
   - IF AN EXCEEDANCE OF ACTION LIMITS OCCURS (SEE CAMP) AND IF DUST SUPRESSION TECHNIQUES DO NOT LOWER PARTICULATES TO BELOW 150 ug/m^3 OR VISIBLE DUST PERSISTS, WORK WILL WILL BE SUSPENDED UNTIL CORRECTIVE MEASURES TAKEN.
3. NON-DRIVING AREAS, INCLUDING SOIL AND DEBRIS STOCKPILES, WILL BE SPRINKLED WITH WATER; SPRAYED WITH NON-HAZARDOUS, BIODEGRADABLE SUPPRESSING AGENT; COVERED; OR OTHERWISE ENCLOSED TO CONTROL DUST.

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NO.	DATE	REVISION DESCRIPTION	INT.

STATE OF NEW YORK · OMAR RAMOTAR · No. 077995 · LICENSED PROFESSIONAL ENGINEER

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PROJECT NAME:
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POWERS CHEMCO SITE NO. 1-30-028

PROJECT FOR:
KONICA MINOLTA HOLDINGS USA, INC.
GLEN COVE, NEW YORK

TITLE:
SOIL EROSION AND SEDIMENT CONTROL DETAILS

PLATE
2