REMEDIAL INVESTIGATION WORK PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET, POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

NYSDEC Site No. C314081

Prepared for:
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For Submittal to:
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1.0 INTRODUCTION

This document presents a Remedial Investigation Work Plan (RIWP) intended to assess environmental conditions at the Former A.C. Dutton Lumber Yard facility in Poughkeepsie, New York. The RIWP is being conducted through the New York State Department of Environmental Conservation's (the "Department") Brownfield Cleanup Program (BCP) as promulgated though Title 14 of Article 27 of New York's Environmental Conservation Law. Future use is likely to involve multi-story residential units with parking or other amenities located at the ground floor level. This will consist of approximately 500 to 600 apartments or condominiums and some commercial and recreational facilities to provide needed services for local residents.

The purpose of this RIWP is to provide specific guidelines and to establish procedures for the remedial investigation. The proposed investigation incorporates results of previous site investigations undertaken by Ecosystems Strategies, Inc. (ESI) of Poughkeepsie, NY in 2002 on behalf of Scenic Hudson Land Trust, Inc. The objective of the proposed investigation is to further assess known areas of concern and fully characterize the nature and extent of impacts at the site. Ultimately, results of these investigations will be used to evaluate appropriate remedial alternatives through an Alternatives Analysis and develop a Remedial Work Plan that is consistent with proposed re-use of the property.

2.0 BACKGROUND

2.1 Site Location

The site is located on Hoffman Street in the Town and City of Poughkeepsie, Dutchess County New York (Figure 1). It is located approximately one-half mile north of the Metro North Poughkeepsie railroad station and the Mid-Hudson Bridge. The site is adjacent to the Hudson River, which borders the site to the west, and is within the 100-year flood plain of the River. An aerial photograph depicting conditions at the site in the mid-1990s is provided as Figure 2, and a 2004 aerial photograph depicting near-current conditions is provided as Figure 3.

2.2 Site Description

The site currently consists of two tax parcels making up approximately 15 acres. The majority of the 15 acres falls in the City of Poughkeepsie and the remainder lies in the Town of Poughkeepsie. The tax parcels are identified as follows:

Parcel and Acreage	Tax I.D.
City of Poughkeepsie (11.35 acres)	31-6062-59-766443-00
Town of Poughkeepsie (3.65 acres)	14-6062-02-763508-00

The physical address of the property is 2 Hoffman Street and can be accessed from the south via Dutchess Avenue. The portion of the property located in the City of Poughkeepsie is zoned 1-2, General Industrial District. The portion of the property within Town of Poughkeepsie is located in the WD2 (Waterfront District 2) and zoned IH (Heavy Industry).

There are currently seven buildings at this site in varying states of disrepair. There are two warehouse buildings located at the southern end of the parcel. The main plant office building and the newest pressure treatment facility occupy the south central portion of the property with a warehouse and older pressure treatment facility to the north. One partially collapsing two story brick building exists on the western side of the property near the rail spur that traverses the site adjacent to the Hudson River. The remainder of the parcel primarily consists of paved access and former lumber storage areas.

2.3 Site History

2.3.1 Historic Use of Site

According to a 1987 Phase I Investigation report prepared by EnviroPlan Associates, Inc. of Poughkeepsie, NY, the parcel has been in industrial use since the mid-1800s. The A.C. Dutton Lumber Corporation operated a wholesale lumber company at the site beginning in 1913 and the on-site pressure treatment of lumber using chromated copper arsenate (CCA) reportedly began in 1966. Prior to 1913, site uses included an iron works and a glass works plant. The former glass works plant was reportedly located at the southern end of the parcel.

At the A.C. Dutton facility, raw materials were brought to the site by truck, boat, and rail, processed in either the two treatment plants, temporarily stored in a sheltered drip pad area and allowed to dry, and then stored outside prior to commercial resale. It is suspected that storage of treated lumber has not always occurred on impervious surfaces.

2.3.2 Petroleum Bulk Storage Facilities

The last known Petroleum Bulk Storage (PBS) registration (#3-175935) expired on 6/30/02. The PBS registration certificates were available going back to 1991 and show five tanks at the facility registered as aboveground storage tanks (ASTs). The PBS registration certificates do not show closed tanks. Other information in the files further describes the tank numbers, sizes, and materials stored as follows:

Tank #	Size (gal)	Contents
1	3000	Diesel
2	1500	No. 2 fuel oil
3	3000	No. 2 fuel oil
4	2 @ 275 (manifold)	No. 2 fuel oil
5	275	No. 2 fuel oil

During site investigations performed by Ecosystem Strategies, Inc. (ESI) in 2002, both ASTs and underground storage tanks (USTs) were identified in the field.

AST/UST	Size (gal)	Location
AST	3000	Adjacent to northern pressure treatment plant
AST	3000	Inside concrete enclosure south of main office building
AST	275	Inside brick warehouse building at southern end of parcel
AST	275	Inside brick warehouse building at southern end of parcel
UST	Unknown	Beneath concrete slab west of brick warehouse building
UST	1500	Beneath main office building
UST	20,000*	Adjacent to northeastern corner of southern pressure treatment plant
UST	1,000*	Beneath western brick building

*identified via ground penetrating radar (GPR) survey performed by ESI

As part of the proposed investigation, the status of existing PBS registrations will be updated, assessed and reconciled with the type and location of storage tanks identified in the field by ESI.

2.3.3 Hazardous Substance Bulk Storage Facilities

The last known Hazardous Substance Bulk Storage (HSBS) registration (#3-000170) expired on August 9, 2003. The HSBS registrations for the site dating back to 1991 show seven tanks at the facility, none of which appear to be closed. The tanks are registered as containing a chemical with Chemical Abstract Series (CAS) No. 07778-39-4. This corresponds to arsenic acid, the largest percentage hazardous component in the CCA liquid used at the site.

Registered tanks are identified by their location with acronyms NTP (New Treatment Process) and OTP (Old Treatment Process). The general location of CCA tanks inside each of the pressure treatment plants is identified on Figure 4.Although it is not indicated on the registration, it is believed that all tanks are registered as ASTs and include the following.

Tank #	Size (gal)	Location
NTP01	25,000	New treatment plant
NTP02	25,000	New treatment plant
NTP03	7000	New treatment plant
OTP01	15,000	Old treatment plant
OTP02	12,500	Old treatment plant
OTP03	12,500	Old treatment plant
OTP04	5,600	Old treatment plant

Miron Building Products (A.C. Dutton) no longer occupies this address but was the owner of record for the tanks and should have updated the HSBS registration renewal paperwork. There has probably been a lapse in registration for the HSBS facility. There are no known consent orders pending by the NYSDEC at this time. As part of the proposed investigation, the status of existing HSBS registrations will be updated, assessed and reconciled with the type and location of storage tanks observed in the field.

2.3.4 Historic Spills

An internet search of the NYSDEC Spill Incidents Database identified a spill called in by ESI in 2002 as part of an investigation performed on behalf of Scenic Hudson. This spill, identified as No. 0206848, was called in on October 2, 2002 and is still open. The spill relates to soil impacted by semi-volatile organic compounds detected near an on-site fuel tank. It is anticipated that required actions associated with this spill will be addressed during planned remedial investigation and remediation at the site.

2.3.5 Previous Owners

The site is currently owned by The O'Neill Group – Dutton, LLC. The former owner, A.C. Dutton Corporation, was owned in part or in subsidiary by Miron Building Products Corporation, Inc. The O'Neill Group - Dutton, LLC has entered the BCP Program as a Volunteer.

3.0 SITE DESCRIPTION

3.1 Geology of Site

The Surficial Geologic Map of New York, prepared by Cadwell (1989), identifies unconsolidated deposits in the vicinity of the site as fluvial sand and gravel deposits (adjacent to the Hudson River) and glacial till consisting of sand, silt and gravel and exhibiting variable texture. The Dutchess County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. Overall, material encountered by ESI during subsurface investigation at the site in 2002 was consistent with the soil survey findings. In those instances when native soils were encountered, the material was described as silty-sand with gravel. Historically, areas of the site received fill that was placed along western portions of the property to level and extend the shoreline of the Hudson River westward.

According to the Geologic Map of New York, Lower Hudson Sheet, prepared by Fisher et al. (1970), bedrock in the vicinity of the site consists of the Taconic Melange Formation and the Austin Glen Formation. The Taconic Melange is described as a chaotic mix of pebble to block sized Cambrian to Middle Ordivician Age rocks in a pelitic matrix. The Austin Glen formation consists of interbedded layers of greywacke and shale. Outcrops observed on the eastern margin of the site contain competent siltstone layers interbedded with less competent shale.

3.2 Hydrogeology of Site

During investigations conducted by ESI, groundwater was typically encountered within unconsolidated deposits at depths of four to six feet below the ground surface. Given regional topography and the location of surface water bodies, it is assumed that shallow groundwater flows from east to west across the site and discharges to Hudson River. Because the reach of the Hudson River adjacent to the site is tidally influenced, it is possible that groundwater flow at the site is in part influenced by tides.

Groundwater in the area of the site is not used as a drinking water resource. The site is served by municipal water and sewer. Further assessments of groundwater quality at the site will be performed as part of the proposed investigation. Possible off-gassing or vapor intrusion from impacted groundwater into future structures also will be assessed during the investigation.

3.3 Previous Investigations

A comprehensive site investigation was undertaken at the site by ESI in 2002 on behalf of Scenic Hudson Land Trust, Inc. Results of these investigations were summarized in two reports:

- Summary Report of Subsurface Investigation dated October 3, 2002.
- Summary Report of Supplemental Subsurface Investigation dated November 25, 2002.

An overview of sampling results from the ESI investigations is provided below. Sampling locations from the 2002 ESI investigations are identified on Figure 4.

Groundwater Sampling

The ESI investigation included the sampling of shallow groundwater at five temporary wells installed by Geoprobe® during the initial 2002 investigation. Temporary well points were constructed from approximate 1.25-inch diameter poly vinyl chloride (PVC) wells placed in Geoprobe® boreholes. Groundwater samples were obtained by bailer and analyzed for metals, volatile organic compounds (VOCs), and semi volatile organic compounds (SVOCs). Sampling results indicated the presence of metals and SVOCs in selected wells. Historical ESI groundwater data are summarized in Table 1.

Soil Sampling

Historical soil sampling analytical results from ESI investigations are summarized in Table 2. ESI investigations documented impacts to shallow soil that are consistent with the use of CCA wood preservative at the site. Maximum chromium, copper, and arsenic impacts were identified beneath and immediately adjacent to the northern and southern pressure treatment plants. Metals impacts also were identified beneath pavement in open areas within the northern and central portions of the site and along the railroad spur. Overall, soil analytical data obtained by ESI indicate that the highest metals concentrations are present in shallow soil (e.g., 0-0.5 feet) immediately below pavement and that metal concentrations decrease with depth. Selected samples also were analyzed for arsenic by the toxicity characteristic leaching procedure (TCLP). Results from one of these samples exceeded the 5 milligram per liter (mg/L) TCLP toxicity characteristic for arsenic.

Petroleum hydrocarbon impacts were identified in three general areas at the site during investigations conducted by ESI. These areas included soil in the vicinity of the 3,000-gallon AST located adjacent to the northern pressure treatment plant (e.g., boring B-6/MW-1), soil located in the vicinity of a 1,000-gallon UST located beneath the small brick building west of the northern pressure treatment plant (e.g., boring 3B-9), and in the vicinity of the brick warehouse building and suspected UST at the southern end of the property (e.g., boring B-31/MW-5).

Sediment Sampling

Sampling of sediment within Kidney Creek and the shoreline of the Hudson River was performed by ESI. Samples were analyzed for metals, total petroleum hydrocarbons (TPH) and for polychlorinated biphenyls (PCBs). These data indicate that activities at the site may have impacted conditions within adjacent surface water resource areas, particularly with respect to arsenic, chromium, and copper. Historical sediment sampling results are summarized in Table 3.

Sampling of Surfaces/Structures

The ESI investigation also included the sampling of various surfaces (e.g., asphalt and concrete) and structures (e.g., drains and pits) at the facility. Several floor drains and pits were identified in the northern pressure treatment plant and at the adjacent timber drying kiln. Dye testing of these structures by ESI confirmed that the drains and sumps are interconnected and do not discharge to the environment.

ESI sampling data from wipe samples collected on equipment or structural surfaces indicated that residues / dust present on or within manmade structures contain high concentrations of copper, arsenic, and chromium and that these materials need to be appropriately characterized and managed during site redevelopment. Analytical data obtained by ESI through the sampling of various surfaces are summarized on Table 4.

4.0 REMEDIAL INVESTIGATION WORK PLAN

4.1 Conceptual Site Model (CSM)

The redevelopment of the former A. C. Dutton site is intended for residential, recreational, and commercial use. The history of property usage in the area of the site has been generally commercial and industrial in nature. The adjacent parcel to the north is currently occupied by Vassar College, and is now undergoing redevelopment into a new boat house and rowing center. The properties to the east are either commercial or residential and to the south, beyond Dutchess Avenue, is the Central Hudson Gas Regulating Station, formerly a manufactured gas plant. The Hudson River abuts to the west. Existing residential areas are upgradient from the site and are not likely to be impacted by contaminants at the site. Additionally, the region surrounding the site is provided with potable water by the Poughkeepsie Water District; therefore, a human exposure pathway has not been identified with respect to groundwater.

Sampling results obtained by ESI are consistent with the historic use of CCA wood preservative at the property. In many areas, green staining indicative of oxidized copper is visible on exposed surfaces. Analytical data indicate that shallow soil underlying the former pressure treatment plants (northern and southern) as well as soil located beneath paved surfaces throughout property has been impacted by metals, particularly copper, chromium, and arsenic. Mercury and silver were detected infrequently in samples obtained by ESI; however, metals impacts are dominated by the three CCA constituents. Vertically, soil analytical results indicate that the metals impacts decrease with depth, which is consistent with the release of CCA wood preservative to the ground surface.

Sampling results and field observations indicate that surfaces across the site (e.g., concrete and paved surfaces) have been impacted by metals released through the use of CCA preservative inside the pressure treatment plants and in exterior areas where treated wood was managed and staged pending re-sale and transport from the site. In places, it is apparent that CCA preservative has penetrated highly weathered areas on the floor of the pressure treatment buildings and in exterior paved areas. It is also likely that the handling and storage of treated wood occurred historically on unpaved surfaces. Aerial photographs indicate that storage and handling of wood occurred across the site (See Figures 2 and 3). Therefore, shallow soil at the site has potentially been impacted by releases of metals to the surface.

Petroleum impacted soil also has been identified in three areas on the site. The extent of petroleum impacts has not been fully characterized; however, impacts appear to be concentrated near the water table, which has been encountered between four and six feet below grade. At this time, releases of petroleum have been identified in the following areas:

- vicinity of a 3,000-gallon AST located adjacent to the northern pressure treatment plant
- vicinity of a 1,000-gallon UST located beneath the western brick building
- vicinity of the brick warehouse building at the southern end of the parcel

Sources of two of the petroleum releases are attributed to petroleum storage tanks and impacts are likely limited in extent both laterally and vertically. Additional data are needed at the southern end of the site to determine the nature and extent of petroleum impacts and the likely source of these impacts. It is possible that petroleum impacts at the southern end of the parcel are related to off-site activities.

In the case of both metal and petroleum impacts, contamination is predominantly located in soil. With the possible exception of separate phase petroleum on groundwater at the southern end of the site, extensive groundwater impacts have not been identified. Future assessment activities will include the installation of pre-packed well screens with diligent well development to investigate the presence or absence of metals impacts to groundwater. At this time, it appears that the predominant transport mechanism for potential off-site impacts to adjacent resource areas (e.g., Hudson River) is through overland flow and not via groundwater. Currently there are no known catch basins at the site.

4.2 Intent of the Investigation

The scope of work for the Remedial Investigation Work Plan (RIWP) is consistent with NYSDEC DER-10 Technical Guidance for Remedial Investigation and Remediation and with NYSDEC Technical Administrative Guidance Memorandum TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels. This remedial investigation will also conform to the provisions of the United States Environmental Protection Agency (EPA) Triad Approach.

The Triad Approach uses streamlined approaches to sampling, analysis and data management activities during site assessment and remediation. Ultimately, the EPA expects to institutionalize these approaches and use these principles to guide the way data are collected and analyzed in future site cleanup decisions. This three-pronged approach incorporates the following:

- Systematic Planning – Uses a Conceptual Site Model (CSM) as the planning tool to ensure that the end goals for each project are clearly identified and the most resource-effective course is chosen to meet those goals. The CSM identifies the information that is already known about the project, which is used to determine what additional information must be obtained in order to make project decisions. The CSM will be updated as new information becomes available so that the next course of action can be planned in the most efficient manner.

- Dynamic Work Plan – The application of a dynamic work strategy guides project teams in making decisions in the field about the progress of investigation and remediation activities. This allows them to focus efforts on those areas that are most relevant to achieving the project goals, and reducing efforts on those areas which are determined in the field to be less relevant.

- On-Site Analytical Tools – Rapid sampling platforms and on-site data interpretation are used by field personnel to focus data collection on relevant matrices. When a large amount of field data is needed to make project decisions, real-time information support is necessary. The implementation of state of the art analytical screening instruments enables an experienced field staff to rapidly develop project models in time-sensitive conditions.

The remedial investigation will involve sampling of surface and subsurface soil, groundwater, and sediment. In addition to the investigating areas where sampling has not yet been performed, approximately 20% of previously sampled locations will be re-sampled (See Figure 3). If it is determined that newly obtained results are comparable to historic data, the remaining 80% of previous samples will be considered adequate for site characterization, and will not be resampled. If discrepancies continue to be found between historic and new data, previous sample locations will be resampled as warranted. A summary of this and other sampling issues is provided in Table 5.

Sampling of soil on the parcel to the north, which is currently occupied by the Vassar College boathouse, may be performed with the consent of the property owner. The intent of this sampling effort is to determine whether historical activities at the subject parcel may have resulted in off-site impacts.

Given results of the previous investigations, potential contaminants of concern at the site include:

- Metals, particularly arsenic, chromium, and copper
- Cyanide
- VOCs
- SVOCs

4.3 Proposed Scope of Work

This Field Sampling Plan (FSP) describes the sampling protocol, sampling locations, and the quality assurance/quality control (QA/QC) processes necessary to accomplish the objectives of the Remedial investigation at the Former A.C. Dutton Lumber Facility located in Poughkeepsie, New York. The accompanying Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP) are components of the SIWP and are attached as Appendix A and Appendix B, respectively.

The objective of the FSP is to provide the Field Operations Leader, Site Manager, and other operational personnel with sampling objectives and methodologies that apply to field operations. Where appropriate, the SIWP makes reference to the QAPP, which contains protocols for sampling, decontamination, and other QA/QC protocols.

4.3.1 Utility Subsurface (UFPO) Notifications

As required by law, the UFPO state-wide underground utility locating service will be contacted prior to commencement of subsurface sampling activities to mark the location of public underground utilities within the project area.

4.3.2 Soil Sample Collection and Analysis

In order to provide adequate areal sampling coverage of soils at the site, a 100-foot on center regularly spaced grid, designated with an alpha-numeric identification system, will be established over the site (See Figure 4). Surficial geologic and chemical data will be collected at each 100-foot grid node location by using a GeoProbe direct push sampling system. It is suspected that contamination resulted from drip-drying lumber allowing it to migrate over the asphalt/concrete until it reached a crack or surface depression and migrated downward. Therefore, sample locations will be biased toward large cracks in the pavement or at relatively low-lying areas.

At each grid location, a shallow soil sample will be obtained at the surface or immediately beneath pavement or concrete. Attempts will be made to limit the shallow soil sampling interval to the top 0.5 feet of surface soil. In areas where there are concrete slabs, foundations or paved drying areas on the ground surface, the surficial interval will begin immediately beneath the pavement or concrete. If additional sample volume is required, several samples can be collected within a 1-meter radius of the grid node location.

Once a sufficient number of surficial samples have been obtained and evaluated, additional samples will be collected in areas where evidence of soil contamination was observed. These samples will be collected both laterally and vertically in areas surrounding the initial detections in order to delineate the extent and magnitude of contamination with as much confidence as possible. Borings may be advanced over a tightened 50-foot grid to get a lateral delineation of contaminants. Depending on these observations, additional borings may be advanced in decreasing radii in order to more accurately define the extent of contamination. To characterize vertical conditions, samples will be collected at approximately 1-2 foot interval depths down to and including the saturated zone. As such, there is no summary of proposed samples, as the final number of samples collected and analyzed will be dependent on field observations.

Soil cores will be logged in the field and evidence of soil staining, odor, changes in lithology, moisture content, etc. will be recorded. If evidence of soil contamination (e.g. at petroleum impacted areas) is observed in the saturated zone, the boring may be extended to document the vertical extent of impacts through visual, olfactory, and/or field screening methods.

Sample points may be altered slightly due to field conditions or obstructions. In the event that refusal is encountered at a given sample point, the boring will be off-set approximately 1 meter and reasonable attempts to advance a replacement boring will be made.

Metals Analysis

As discussed above, metals impacts were identified over much of the site. Therefore, field sampling for metals will be focused on characterizing this large area, including defining the vertical extent of contamination, while addressing the need for rapid sample processing and data interpretation.

Samples collected will be field screened for the presence of metals using a hand-held NITON XLp-702 Multi-element Soils Analyzer, or equivalent. This instrument will provide the majority of field sampling results. Samples from the uppermost intervals will be analyzed first. After evaluating these results, additional analysis of the deeper intervals will continue until contamination is no longer observed. Initially, samples from approximately 1 in 5 sample locations will be submitted to a NYSDOH ELAP certified laboratory for analysis, and 1 in every 20 sample locations will be submitted for TCLP analysis. The number of samples submitted for normal laboratory analysis may decrease depending on correlation between field screening and laboratory results. Samples submitted for TCLP analysis will be chosen from the locations with the highest field screening results. The submission of these samples accomplishes two main objectives; 1 – act as a check on the field instrument results and 2 – qualifies these samples for consideration in a final site delineation and removal design. Due to the extended holding times allowable for metals, it is likely that most samples will be temporarily held until an estimate of impacts can be made. In this way, samples submitted for confirmatory laboratory analysis can be focused on relevant areas. A summary of sampling issues, including those for metals, is provided in Table 5.

Organic Compounds

Soil samples will be screened in the field for the presence of volatile organic compounds using headspace analysis with a hand-held organic vapor meter (OVM). Soil samples will be logged in the field and evidence of soil staining, odor, changes in lithology, moisture content, etc. will be recorded.

Selected soil samples will be submitted to a NYSDOH ELAP certified laboratory for analysis of volatile and semi-volatile organic compounds (VOCs/SVOCs). Sample intervals and specific analyses will vary based on depth, existing chemical data, and area of concern at the site. Soil samples not specifically designated for analysis will be submitted on hold to the laboratory in the event that additional analyses are required to complete the vertical characterization of metals impacts. A summary of sampling issues, including those for organics, is provided in Table 5.

4.3.3 Monitoring Well Installation and Groundwater Sampling

Following the advancement of the soil boring using the GeoProbe DPT rig, approximately 8 of the proposed soil borings will be completed as shallow unconsolidated aquifer monitoring wells. Three of the wells (MW-1R, MW-2R, and MW-5R, Figure 3) are proposed as replacement wells for former temporary well points where elevated arsenic concentrations and/or evidence of petroleum hydrocarbon impacts were detected previously.

Two additional wells (MW-6 and MW-7) are proposed for installation in the vicinity of the northern pressure treatment plant. Monitoring well MW-6 will be installed in an area where contaminated soil was excavated previously and in the vicinity of historical sampling location SS-2. Arsenic concentrations in shallow soil at SS-2 are similar in magnitude to 3B-14 located inside the northern pressure treatment plant. The shallow sample at 3B-14 exceeded the TCLP limit of 5 mg/L for arsenic.

Wells MW-8 and MW-9 are to be installed in areas where elevated metals concentrations in soil are suspected or known to be present. Well MW-10 is proposed as an upgradient well to document groundwater quality at the property boundary upgradient of the brick warehouse building where separate phase petroleum contamination was encountered previously.

Proposed monitoring wells will be constructed with either 5 or 10-foot long well screens set approximately 3-12 feet into the groundwater table. As necessary, the annular space around the well screen will be backfilled with size-appropriate filter pack sand to a height of approximately 1 foot above the screen. Bentonite chips will be placed within the remaining annular space to prevent vertical migration of surface water.

Monitoring wells will be left as PVC stick-ups and will not be completed at grade with protective steel risers or flush-mount curb boxes. As necessary, selected wells can be modified during the remediation/site redevelopment stage of the project if specific wells need to serve as long-term monitoring points.

Following installation, monitoring wells will be developed by surge and purge techniques to remove fines and to improve hydraulic connection between the formation and the well screen. Each well will be developed until the well is producing water below 50 nephelometric units (NTUs) and the field parameters (i. e., temperature, pH, conductivity etc.) have stabilized. There shall not be any limits for the duration of development or the total volume of water removed.

Groundwater samples will be collected approximately one week following well installation and development. Groundwater samples will be collected from newly installed monitoring wells by low-flow methods using a peristaltic pump technique. Prior to collection of groundwater samples, the depth of the water table will be measured. This information will be used to construct a groundwater contour map(s) and determine if floating product is present. A summary of sampling issues, including those for groundwater samples, is provided in Table 5.

One round of groundwater samples will be taken from the newly installed monitoring wells. Based on historic analytical results, groundwater samples will be analyzed using ASP Category B protocols by the following Methods:

- VOCs by Method 8260B
- SVOCs by Method 8270C
- RCRA 8 suite of metals including Copper by Method 6010B; Mercury by Method 7471/7470 (Select samples). Samples collected for metals analysis may be analyzed for both total and dissolved metals.
- Total Cyanide by Method 9010B, 9012A or 9014

4.3.4 Sediment Sampling

Sediment samples will be collected at five locations along the Hudson River shoreline abutting the site. Proposed sediment sampling locations are identified on Figure 4. Three of the samples will be obtained at the location of previous ESI sediment samples. Two additional locations are proposed north of the Kidney Creek outfall. Sediment samples will be analyzed for the following parameters using ASP Category B protocols:

- SVOCs by Method 8270C
- RCRA 8 metals and copper by Method 6010B, Method 7471/7470 for Mercury

4.3.5 Petroleum and Hazardous Bulk Storage Tanks

Interim Remedial Measures (IRMs) may be necessary to address the abandoned tanks and treatment process vessels on the site. An inventory of remaining tanks and vessels on the property will be performed, and an assessment will be made regarding the need for an IRM for each tank. Remaining tanks will be re-registered with the NYSDEC. Separate Work Plans will be developed for the IRMs as needed.

4.3.6 Off-Site Exposure Assessment

To evaluate the potential contamination of properties adjacent to the subject property as a result of actions on the subject property, information obtained during the remedial investigation will provide for an off site exposure assessment. This will include the collection of soil samples at the site boundaries, placement of monitoring wells such that off-site migration of groundwater can be assessed and monitored, and review of historic information to determine the extent of site activities.

4.3.7 Tidal Assessments

The Hudson River at Poughkeepsie is tidally influenced. Therefore, water table elevations and groundwater flow potentials at the site are likely affected by tidal changes. To assess the effect of tides on the shallow unconsolidated aquifer underlying the site, a water elevation staff gauge will be established at the approximate location of sediment sample SS-11 (Figure 4). The staff gauge will be installed by hand and will be surveyed for elevation.

Periodic water level measurements will be recorded from the newly installed monitoring wells (Section 4.2.3), and will be compared to the water elevations recorded at the staff gauge, as well as tide schedules published by the U. S. Coast Guard.

Data obtained during this study will document whether tidal changes in the Hudson River are likely to significantly affect groundwater flow potentials within the shallow unconsolidated aquifer underlying the site and provide information on possible contaminant fate and transport mechanisms.

4.4 Mapping and Location Survey

Sampling and monitoring locations (e.g., groundwater, soil, and sediment) will be survey located in the field and these locations will be added to the base map maintained by Fuss & O'Neill. At monitoring wells, PVC measuring point elevations will be determined so that groundwater elevations can be calculated from water level data recorded at monitoring wells. Additionally, efforts will be made to verify the location of previous ESI sampling locations and UST locations. If sufficient field evidence can be obtained regarding the physical location of historical sampling points, these locations will be confirmed by field survey.

4.5 Human Health Exposure Assessment

The potential impacts to future users of the property, based on proposed site development, will be evaluated in the context of the potential exposure pathways and contaminants of concern. The Human Health Exposure Assessment (HHEA) will evaluate the potential exposure to site contaminants of concern during redevelopment and reasonably anticipated future site. The HHEA will focus on the contaminants present at the site, and will present an analysis and evaluation of the potential risks and hazards to human health that may exist.

5.0 PROTOCOLS AND METHODS

The following sections describe health and safety, data quality objectives, and the sampling and analytical protocols to be used in this investigation. In addition, methods for data validation and handling of investigation derived wastes are documented.

5.1 Health and Safety Plan

The site Health and Safety Plan for the project is provided in Appendix B. The HASP addresses the requirements of Occupational Safety and Health Administration safety and health standards: OSHA 29 CFR General Industry. This HASP is designed to cover those special and/or unique health and safety procedures arising from actual or potential contact with contaminated materials and those requirements pursuant to OSHA 29 CFR 1910.120.

5.2 Data Quality Objectives

The data quality objectives of this Work Plan include:

- Define the nature and extent of impacted media
- Assess compliance with applicable cleanup criteria
- Generate data to support a remedial action alternatives assessment and to develop a Remedial Work Plan

Environmental media to be sampled as part of this investigation include soil, groundwater, and sediment. Standards and criteria to be considered during the evaluation of analytical results include:

- The New York State Department of Environmental Conservation Brownfield Soil Cleanup Objectives under TAGM 4046
- The New York State Department of Environmental Conservation Groundwater Standards as provided in TOGS 1.1.1

Analytical detection limits will be low enough to allow for the comparison of laboratory results to applicable criteria. Laboratory analysis for this project will be provided by Severn Trent Laboratories of Newburgh, New York. NYSDEC will be notified if a different New York State Department of Health (NYSDOH) approved laboratory is to be used in conjunction with this project.

5.3 Sampling Protocols

As outlined above, it is anticipated that site characterization activities will include the collection of soil, sediment, and groundwater samples. Protocols for the collection of samples are included in the project QAPP.

5.4 Analytical Methods

Based on historic uses of the site, the target compounds for this investigation include volatile and semi-volatile organic compounds (VOCs and SVOCs) typically associated with petroleum compounds (e.g., fuel oil), metals, and cyanide:

- Volatiles will be analyzed by Method 8260B
- Semi-volatiles will be analyzed by Method 8270C
- Metals will be analyzed by Method 6010 (and Method 7471/7470 for Mercury)
- Arsenic and chromium in soil also will be assessed by the Toxicity Characteristic Leaching Procedure (TCLP)
- Total Cyanide by Method 9010B or 9012A or 9014
- Total Organic Carbon (TOC) by TAGM 4046 Appendix B Methodology

Samples will be analyzed by Severn Trent Laboratories. Standard operating procedures for the laboratories are referenced in the project QAPP.

5.5 QA/QC Procedures

The field sampling program will include the use of trip blanks, equipment blanks, and field duplicates. Fuss & O'Neill's quality assurance/quality control (QA/QC) procedures are documented in the project QAPP. In general, the field sampling program will include the collection of one VOC trip blank for each day that VOC sampling occurs. In addition, one equipment blank and one field duplicate will be collected for every 20 sample locations. As such, the soil/sediment sampling program is expected to include approximately 13 equipment blanks and 13 field duplicates for metals. One equipment blank and one field duplicate soil sample will be obtained for each of VOCs, SVOCs, and cyanide.

With respect to groundwater, the sampling program will include one equipment blank and one field duplicate for each parameter included in the sampling program for that media.

A summary of sampling issues, including QA/QC issues, is provided in Table 5.

5.6 Investigation Derived Waste

Soil cutting generated during the soil boring and monitoring well installations will be containerized and characterized for off-site disposal. Any borehole not completed as a monitoring well will be backfilled with bentonite pellets.

All waste water will be contained and characterized for proper off-site disposal. All decontamination water will be contained and disposed of properly. If separate phase petroleum is observed on purge water or development water, this investigation derived waste will be segregated and contained for later disposal.

Liquid and soil waste will be placed in clearly labeled Department of Transportation-approved drum(s). The drums will be covered and secured except when material is being added or removed. Characterization of wastes will consist of an evaluation of existing analytical results, location relative to known contaminant sources, and laboratory results.

Waste materials that cannot be immediately classified as hazardous or non-hazardous will be labeled "Pending Hazardous Waste Analysis – Being Tested." Drums containing wastes generated at the property will be stored in a designated staging area on site.

5.7 Data Usability

This Work Plan outlines a systematic process for assessing data generated during monitoring and environmental investigation activities at the site. The generation and use of quality data is important in the assessment of areas of concern and the selection of appropriate corrective measures.

The function of the data verification process is to identify sampling and analytical error and not to make final determinations about the overall usability of the data for the project. The usability assessment will be conducted by the Quality Assurance Officer (QAO) and the results of the assessment will be reported to the project manager. The usability assessment will report how validated project data is reconciled with the project quality objectives and limitations, if any, of the data. Reconciliation may require re-sampling or recommending the use of selected data even though it did not meet the project DQO's.

Quality control issues will be discussed in the usability assessment and the QAO will recommend the use or rejection of the data. Ultimately, the project manager will determine the usability of the data based on an understanding of the project DQOs and the results of the data validation process. The results of the usability assessment will be summarized in the Data Usability Summary Report (DUSR).

Data from this investigation may be validated by the Project Quality Assurance Officer (QAO). The results summarized in the Data Usability Summary Report (DUSR) will address the following:

- Assess and summarize the analytical quality and defensibility of data for the end user
- Document factors contributing to analytical error that may affect data usability, such as: data discrepancies, poor laboratory practices that impact data quality, site locations for which samples were difficult to analyze
- Document "sampling error" that may be identified by the data validation process, such as contaminated trip or equipment blanks, incorrect storage or preservation techniques, improper sampling containers, and improper sampling techniques

6.0 REMEDIAL INVESTIGATION REPORT AND DATA MANAGEMENT

Field and laboratory data collected during the investigation will be entered into GIS/Key™, an environmental data management system. GIS/Key™ is the database system used by Fuss & O'Neill to sort, query, and produce output of selected data. Data entered into the database are verified by the operator by comparing the database output to the original field data sheets and hard copy laboratory results. Once the data has been verified, GIS/Key™ can be used to present the data in a variety of ways, including: tabular data presentations, graphical data presentations, contour maps, geological cross sections, section view isopleths and three dimensional graphical representations of contaminant distribution. Output from GIS/Key™ can be enhanced using software utilities such as MS Excel, AutoCAD, and ArcView.

Output from GIS/Key™ will be used to refine the CSM for the site. The Remedial Investigation Report will include information such as:

- Description of setting and historical information regarding site activities and potential release mechanisms
- Documentation of environmental field assessment activities and laboratory data generated during the investigation
- Updated CSM describing the nature and extent of impacts associated with identified release areas at the site
- Documentation that data generated during the investigation are appropriate for comparison to applicable standards
- Evaluation of environmental data to determine compliance with the NYDEC Brownfield Cleanup Criteria

This information may be summarized in tabular form and presented on maps and cross-sections, as appropriate, showing contaminant distribution and other features which could affect contaminant migration. A complete summary report including assessment activities and findings will be prepared at the completion of the investigation for submittal to the NYSDEC. Ultimately, this report will provide a basis for the evaluation and implementation of remedial action(s) at the site.

7.0 PROJECT SCHEDULE

A summary of proposed key milestones for the Remedial Investigation is presented below. Note that the schedule is subject to change based on results of field assessment activities and conditions encountered in the field.

	Months after Authorization																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Task																		
BCP Program																		
1) BCP Application	■	■	■															
2) Supplemental RI and Report			■	■	■	■	■											
3) Remedy Scoping & RAWP			■	■	■	■	■	■	■									
4)Site Remediation										■	■	■	■	■	■	■	■	■
5)Engineers Report and Certification																		■

8.0 REFERENCES

ASTM, 1997. ASTM Standards Relating to Environmental Site Characterization, American Society For Testing Materials, ASTM Publication Number PCN: 03-418297-38.

EnviroPlan Associates, Inc., 1987, Phase I Investigation, A.C. Dutton Lumber Corporation, City/Town of Poughkeepsie, Dutchess County, New York, dated November 1987.

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Ecosystems Strategies, Inc., 2002b, Summary Report of Supplemental Subsurface Investigation performed on the A.C. Dutton Property, 2 Hoffman Street (formerly 1 Hoffman Street), City and Town of Poughkeepsie, Dutchess County, dated November 25, 2002.

NYSDEC, January 1994. Technical and Administrative Guidance Memorandum TAGM #4046 Determination of Soil Cleanup Objectives and Cleanup Levels.

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NYSDEC, Division of Environmental Remediation, May 2004. Draft Brownfield Cleanup Program Guide.

U.S. EPA, Region I, July 1, 1993. Tiered Organic and Inorganic Data Validation Guidelines.

U.S. EPA, August 1994. EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations. Draft Interim Final, EPA QA/R5.

U.S. EPA, Region I, December 1996. Data Validation Functional Guidelines for Evaluating Environmental Analyses.

U.S. EPA, October 1998. Quality Assurance Guidance for Conducting Brownfield's Site Assessments.

TABLES

TABLE 1
SUMMARY OF HISTORICAL GROUNDWATER QUALITY DATA
A.C. DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

PARAMETERS	Sample Location	MW-1	MW-2	MW-3	MW-4	MW-5	NYSDEC TOGS 1.1.1**
	Sample Date	09/13/02	09/13/02	09/13/02	09/13/02	09/13/02	
	Screen Interval (ft.)	2.5-7.5	02/07/05	05/10/05	2.5-7.5	05/15/05	
Total Metals (Method 6010)	(mg/l)						
Arsenic		0.045	0.038	ND<0.004	0.009	0.023	0.025
Chromium		0.024	0.019	0.011	0.010	0.009	0.05
Copper		0.036	0.012	0.005	0.029	0.017	0.2
VOCs (Method 8260)	(ug/l)	ND	ND	ND	ND	ND	
SVOCs (Method 8270)	(ug/l)						
Fluoranthene		ND<10	ND<10	ND<10	ND<10	10	0.05GV
Pyrene		ND<10	ND<10	ND<10	ND<10	25	0.05

*Separate phase product observed at MW-5

** NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1)

Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998.

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TABLE 2
SUMMARY OF HISTORICAL SOIL QUALITY DATA
AREA OF CONCERN 1-RAILROAD SPUR
A.C.DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

	Sample Identification	B-10	B-11 (MW-2)	B-12	B-13	3B-7a	3B-7	3B-9a	3B-9	3B-11a	3B-11	3B-13a	3B-13	3B-15a	3B-15	3B-16a	3B-17a	3B-17	3B-18a
	Sample Depth (ft)	0-4	0-4	0-4	0-4	0-0.5	2-4	0-0.5	2-4	0-0.5	2-4	0-0.5	2-4	0-0.5	2-4	0-0.5	0-0.5	2-4	0-0.5
PARAMETERS	Sample Date	8/26/02	8/26/02	8/26/02	8/27/02	10/31/02	10/29/02	10/31/02	10/29/02	10/31/02	10/29/02	10/31/02	10/29/02	10/31/02	10/29/02	10/31/02	10/31/02	10/29/02	10/31/02
Total Metals (Method 6010)	(mg/kg)																		
Arsenic		21.5	64.5	51.9	41.2	585	6.44	71.8	26.8	324	18.9	50.1	8.78	36.7	104	719	264	69.1	120
Barium		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium		13.7	18.7	24.8	52.6	716	26.8	61.9	0.82	296	11.2	43.4	8.62	42.1	10.4	616	261	34.4	118
Copper		29.0	27.5	37.7	43.5	913	30.5	65.8	0.58	298	26.2	95.1	39.8	38.2	2,600	519	337	91	124
Lead		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TCLP Arsenic	(mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Cyanide	(mg/kg)	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---	---	---
VOCs (Method 8260)	(ug/kg)																		
Benzene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
n-Butylbenzene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
p-& m-xylenes		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SVOCs (Method 8270)	(ug/kg)																		
Acenaphthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Acenaphthylene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(a)anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(b)fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(g,h,i) perylene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chrysene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dibenz(a,h)anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dibenzofuran		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fluorene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Indeno (1,2,3-cd) pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-methylnapthalene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Phenanthrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCBs	(mg/kg)																		
PCB 1254		---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCB 1260		---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TPH	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:

---- = not analyzed

ND = not detected above method detection limit

TABLE 2
SUMMARY OF HISTORICAL SOIL QUALITY DATA
AREA OF CONCERN 2-NORTHERN TREATMENT PLANT
A.C.DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

		Interior												Exterior																	
	Sample Identification	B-1	B-2	B-3	B-4	3B-14			3HB-5	3HB-9				B-5		B-6 (MW-1)			B-8		B-26		B-27	SS-2	3HB-3	3HB-4	3SS-15	3SS-16	3SS-17	3SS-18	3SS-19
	Sample Depth (ft)	0-4	0-4	0-4	0-4	0-2	2-4	4-8	2-4	0-1	1-2	2-3	3-4	1-4	6-8	0-4	6-8	8-12	0-4	4-6	1-2	4-8	1-2	0-0.5	2-4	2-4	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
PARAMETERS	Sample Date	8/26/02	8/26/02	8/26/02	8/26/02	10/29/02	10/29/02	10/29/02	10/29/02	11/6/02	11/6/02	11/6/02	11/6/02	8/26/02	8/26/02	8/26/02	8/26/02	8/26/02	8/26/02	8/26/02	8/27/02	8/27/02	8/27/02	8/26/02	10/29/02	10/29/02					
Total Metals (Method 6010)	(mg/kg)																														
Arsenic		28.7	36.2	287	792	6,060	1,580	16.4	103	49.8	9.71	31.5	10.2	23.7	—	32.8	—	—	40.8	—	284	63.8	108	5,820	139	548	2,660	89.2	246	14.5	590
Barium		—	—	—	—	—	—	—	—	—	—	—	—	—	—	90.2	—	—	—	—	—	149	42.9	—	—	—	—	—	—	—	—
Cadmium		—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.09	—	—	—	—	—	—	ND	—	—	—	—	—	—	—	—
Chromium		4.66	56.2	360	272	4,470	2,510	16.2	50.8	68.6	86.3	60.0	51.2	3.60	—	12.2	—	—	11.4	—	151	63.5	84.1	4,310	91.6	770	1,700	50.4	225	9.68	490
Copper		5.59	14.2	29.4	14.5	48.3	26.8	10.1	72.4	32.9	20.8	35.7	18.3	9.63	—	58.2	—	—	146	—	178	—	—	3,410	145	538	1,720	65.9	226	21.6	415
Lead		—	—	—	—	—	—	—	—	—	—	—	—	—	—	91.2	—	—	—	—	—	7.54	45.6	—	—	—	—	—	—	—	—
Mercury		—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.90	—	—	—	—	—	ND	ND	—	—	—	—	—	—	—	—
Selenium		—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	—	—	—	2.91	ND	—	—	—	—	—	—	—	—
Silver		—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	—	—	—	ND	ND	—	—	—	—	—	—	—	—
TCLP Arsenic	(mg/l)	—	—	—	—	16.5	0.166	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.718	—	—	—	—	—
Total Cyanide	(mg/kg)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—
VOCs (Method 8260)	(ug/kg)																														
Benzene		—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	ND	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
1,3,5-Trimethylbenzene		—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	ND	—	—	64	—	—	—	—	—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—	—	—	—	—	—	—	6	—	ND	—	—	130	—	—	—	—	—	—	—	—	—	—	—
n-Butylbenzene		—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	ND	—	—	180	—	—	—	—	—	—	—	—	—	—	—
p-& m-xylenes		—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	ND	—	—	52	—	—	—	—	—	—	—	—	—	—	—
SVOCs (Method 8270)	(ug/kg)																														
Acenaphthene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,600	—	—	520	—	—	—	—	—	—	—	—	—	—	—
Acenaphthylene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Anthracene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,300	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Benzo(a)anthracene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,400	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Benzo(a)pyrene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	440	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Benzo(b)fluoranthene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,400	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Benzo(g,h,i) perylene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	430	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Benzo(k)fluoranthene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,700	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Chrysene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2,000	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Dibenz(a,h)anthracene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Dibenzofuran		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,400	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Fluoranthene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5,700	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Fluorene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,800	—	—	390	—	—	—	—	—	—	—	—	—	—	—
Indeno (1,2,3-cd) pyrene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	630	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
2-methylnapthalene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	770	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,400	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
Phenanthrene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6,800	—	—	570	—	—	—	—	—	—	—	—	—	—	—
Pyrene		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4,700	—	—	ND	—	—	—	—	—	—	—	—	—	—	—
PCBs	(mg/kg)																														
PCB 1254		—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PCB 1260		—	—	—	—	—	—	—	—	—	—	—	—	—	—	ND	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TPH	(mg/kg)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes:
— = not analyzed
ND = not detected above method detection limit

TABLE 2
SUMMARY OF HISTORICAL SOIL QUALITY DATA
AREA OF CONCERN 3-CENTRAL PORTION OF SITE
A.C.DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

PARAMETERS															Western Brick Bldg.		Concrete Platform				20,000 gallon UST			
	Sample Identification	B-14	B-15 (MW-3)		B-16	B-17	B-18	B-19	B-20		3HB-12	3SS-22	3SS-23	3SS-24	B-9	3B-5	3HB-10	3HB-11	3SS-20	3SS-21	3B-1	3B-2	3B-3	3B-4
	Sample Depth (ft)	1-4	0-2	6-8	0-4	0-4	4-8	2-4	0-4	4-6	0-0.5	0-0.5	0-0.5	0-0.5	0-4	4-8	0-1	0-1	0-0.5	0-0.5	8-12	12-16	12-16	12-16
	Sample Date	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	11/6/02	11/6/02	11/6/02	11/6/02	8/26/02	10/29/02	11/6/02	11/6/02	11/6/02	11/6/02	10/29/02	10/29/02	10/29/02	10/29/02
Total Metals (Method 6010)	(mg/kg)																							
Arsenic		21.3	---	---	31.7	18.0	19.6	22.8	23.2	21.3	19.5	132	160	77.3	26.4	---	99.9	74.9	78.9	70.5	---	---	---	---
Barium		83.8	---	---	---	63.4	131	126	---	112	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium		0.75	---	---	---	0.62	0.77	ND	---	0.83	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium		5.69	---	---	9.71	3.05	9.52	5.11	5.08	7.79	6.51	119	141	35.2	4.93	---	116	72.3	53.4	67.6	---	---	---	---
Copper		---	---	---	45.8	---	---	---	31.8	---	13.5	154	102	41.5	6.22	---	77.0	56.7	117	103	---	---	---	---
Lead		22.4	---	---	---	---	25.0	20.2	---	21.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury		ND	---	---	---	ND	1.44	ND	ND	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium		ND	---	---	---	ND	ND	ND	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver		ND	---	---	---	ND	ND	ND	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TCLP Arsenic	(mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Cyanide	(mg/kg)	---	2.42	---	---	---	---	---	---	---	---	---	---	---	5.69	---	---	---	---	---	---	---	---	---
VOCs (Method 8260)	(ug/kg)																							
Benzene		---	---	ND	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND*	ND*	ND*	ND*
1,3,5-Trimethylbenzene		---	---	ND	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND*	ND*	ND*	ND*
Naphthalene		---	---	ND	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND*	ND*	ND*	ND*
n-Butylbenzene		---	---	ND	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND*	ND*	ND*	ND*
p-& m-xylenes		---	---	ND	---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	ND*	ND*	ND*	ND*
SVOCs (Method 8270)	(ug/kg)																							
Acenaphthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Acenaphthylene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Benzo(a)anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	800	---	---	---	---	---	---	---	---
Benzo(a)pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	1100	---	---	---	---	---	---	---	---
Benzo(b)fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	800	---	---	---	---	---	---	---	---
Benzo(g,h,i) perylene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	1300	---	---	---	---	---	---	---	---
Chrysene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	770	---	---	---	---	---	---	---	---
Dibenz(a,h)anthracene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Dibenzofuran		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fluoranthene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Fluorene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Indeno (1,2,3-cd) pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
2-methylnapthalene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Naphthalene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Phenanthrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
Pyrene		---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND	---	---	---	---	---	---	---	---
PCBs	(mg/kg)																							
PCB 1254		---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCB 1260		---	---	ND	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TPH	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Notes:

---- = not analyzed

ND = not detected above method detection limit

* Analyzed by STARS list

TABLE 2
SUMMARY OF HISTORICAL SOIL QUALITY DATA
AREA OF CONCERN 4-SOUTHERN TREATMENT PLANT
A.C.DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

PARAMETERS		Interior							Exterior			
	Sample Identification	B-34			B-36	3HB-6		3HB-8	3B-19		3SS-13	3SS-14
	Sample Depth (ft)	1-2	2-4	6-8	1-1.5	0-2	2-4	0-2	0-4	4-8	0-0.5	0-0.5
	Sample Date	8/28/02	8/28/02	8/28/02	8/28/02	10/31/02	10/31/02	10/31/02	10/29/02	10/29/02		
Total Metals (Method 6010)	(mg/kg)											
Arsenic		45.9	15.6	---	3,740	165	40.3	285	16.5	13.0	2,480	2,350
Barium		---	---	---	---	30.2	37.5	48.9	---	---	---	---
Cadmium		---	---	---	---	ND	ND	0.61	---	---	---	---
Chromium		130	39.3	---	1,700	125	27.3	135	6.67	17.8	1,680	1,680
Copper		61.4	57.5	---	648	36.5	36.6	162	16.1	43.2	1,280	757
Lead		---	---	---	---	25.3	24.9	51.4	---	---	---	---
Mercury		---	---	---	---	ND	ND	ND	---	---	---	---
Selenium		---	---	---	---	ND	1.89	1.22	---	---	---	---
Silver		---	---	---	---	0.74	ND	ND	---	---	---	---
TCLP Arsenic	(mg/l)	---	---	---	---	---	---	---	---	---	---	---
Total Cyanide	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---
VOCs (Method 8260)	(ug/kg)											
Benzene		---	---	ND	---	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene		---	---	ND	---	---	---	---	---	---	---	---
Naphthalene		---	---	ND	---	---	---	---	---	---	---	---
n-Butylbenzene		---	---	ND	---	---	---	---	---	---	---	---
p-& m-xylenes		---	---	ND	---	---	---	---	---	---	---	---
SVOCs (Method 8270)	(ug/kg)											
Acenaphthene		---	---	---	---	---	---	---	---	---	---	---
Acenaphthylene		---	---	---	---	---	---	---	---	---	---	---
Anthracene		---	---	---	---	---	---	---	---	---	---	---
Benzo(a)anthracene		---	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene		---	---	---	---	---	---	---	---	---	---	---
Benzo(b)fluoranthene		---	---	---	---	---	---	---	---	---	---	---
Benzo(g,h,i) perylene		---	---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene		---	---	---	---	---	---	---	---	---	---	---
Chrysene		---	---	---	---	---	---	---	---	---	---	---
Dibenz(a,h)anthracene		---	---	---	---	---	---	---	---	---	---	---
Dibenzofuran		---	---	---	---	---	---	---	---	---	---	---
Fluoranthene		---	---	---	---	---	---	---	---	---	---	---
Fluorene		---	---	---	---	---	---	---	---	---	---	---
Indeno (1,2,3-cd) pyrene		---	---	---	---	---	---	---	---	---	---	---
2-methylnapthalene		---	---	---	---	---	---	---	---	---	---	---
Naphthalene		---	---	---	---	---	---	---	---	---	---	---
Phenanthrene		---	---	---	---	---	---	---	---	---	---	---
Pyrene		---	---	---	---	---	---	---	---	---	---	---
PCBs	(mg/kg)											
PCB 1254		---	---	---	---	---	---	---	---	---	---	---
PCB 1260		---	---	---	---	---	---	---	---	---	---	---
TPH	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---

Notes:

---- = not analyzed

ND = not detected above method detection limit

TABLE 2
SUMMARY OF HISTORICAL SOIL QUALITY DATA
AREA OF CONCERN 5-FORMER GLASS WORKS BUILDING AND VICINITY
A.C.DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

PARAMETERS	Sample Identification	B-21 (MW-4)		B-22	B-23	B-24		B-29	B-30	B-31 (MW-5)	B-32	B-33
	Sample Depth (ft)	0-4	4-8	1-3	4-8	1-3	3-4	1-4	11-12	12-16	1-4	1-4
	Sample Date	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/27/02	8/28/02	8/28/02	8/28/02	8/28/02	8/28/02
Total Metals (Method 6010)	(mg/kg)											
Arsenic		8.44	10.8	3.31	60.4	23.5	8.92	218	---	---	35.8	11.9
Barium		---	72.7	11.5	---	---	---	---	---	---	60.1	36.6
Cadmium		---	ND	ND	---	---	---	---	---	---	ND	ND
Chromium		2.79	19.7	4.99	14.9	8.77	11.4	9.18	---	---	15.7	9.7
Copper		4.95	---	---	45.8	23.0	15.6	26.0	---	---	---	---
Lead		---	96.9	34.4	---	---	---	---	---	---	150	37.0
Mercury		---	ND	0.32	---	---	---	---	---	---	ND	ND
Selenium		---	1.38	1.60	---	---	---	---	---	---	2.5	1.65
Silver		---	ND	0.32	---	---	---	---	---	---	ND	ND
TCLP Arsenic	(mg/l)	---	---	---	---	---	---	---	---	---	---	---
Total Cyanide	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---
VOCs (Method 8260)	(ug/kg)											
Benzene		---	---	---	ND	---	---	---	ND	32	---	---
1,3,5-Trimethylbenzene		---	---	---	ND	---	---	---	ND	ND	---	---
Naphthalene		---	---	---	ND	---	---	---	ND	5	---	---
n-Butylbenzene		---	---	---	ND	---	---	---	ND	ND	---	---
p-& m-xylenes		---	---	---	ND	---	---	---	ND	ND	---	---
SVOCs (Method 8270)	(ug/kg)											
Acenaphthene		---	---	---	---	---	---	---	ND	---	---	---
Acenaphthylene		---	---	---	---	---	---	---	ND	---	---	---
Anthracene		---	---	---	---	---	---	---	ND	---	---	---
Benzo(a)anthracene		---	---	---	---	---	---	---	ND	---	---	---
Benzo(a)pyrene		---	---	---	---	---	---	---	ND	---	---	---
Benzo(b)fluoranthene		---	---	---	---	---	---	---	ND	---	---	---
Benzo(g,h,i) perylene		---	---	---	---	---	---	---	ND	---	---	---
Benzo(k)fluoranthene		---	---	---	---	---	---	---	ND	---	---	---
Chrysene		---	---	---	---	---	---	---	ND	---	---	---
Dibenz(a,h)anthracene		---	---	---	---	---	---	---	ND	---	---	---
Dibenzofuran		---	---	---	---	---	---	---	ND	---	---	---
Fluoranthene		---	---	---	---	---	---	---	ND	---	---	---
Fluorene		---	---	---	---	---	---	---	ND	---	---	---
Indeno (1,2,3-cd) pyrene		---	---	---	---	---	---	---	ND	---	---	---
2-methylnapthalene		---	---	---	---	---	---	---	ND	---	---	---
Naphthalene		---	---	---	---	---	---	---	ND	---	---	---
Phenanthrene		---	---	---	---	---	---	---	ND	---	---	---
Pyrene		---	---	---	---	---	---	---	ND	---	---	---
PCBs	(mg/kg)											
PCB 1254		ND	---	ND	---	---	---	ND	---	---	---	---
PCB 1260		ND	---	ND	---	---	---	ND	---	---	---	---
TPH	(mg/kg)	---	---	---	---	---	---	---	---	---	---	---

Notes:

---- = not analyzed

ND = not detected above method detection limit

TABLE 3
SUMMARY OF HISTORICAL SEDIMENT QUALITY DATA
HUDSON RIVER SHORELINE AND KIDNEY CREEK
A.C. DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

	Sample Identification	Hudson River Sediment					Kidney Creek Sediment	
		3SS-6	3SS-7	3SS-8	3SS-9	3SS-10	2SS-1	3SS-12
	Sample Depth (ft)	2-3	1-2	0-2	0-1	2-3	0-0.5	2-3
PARAMETERS	Sample Date	10/31/02	10/31/02	10/31/02	10/31/02	10/31/02	9/13/02	10/31/02
Total Metals (Method 6010)	(mg/kg)							
Arsenic		39.7	14.4	16.4	7.55	24.9	5.78	23.7
Barium		58.8	43.4	45	50.1	72.7	—	48.4
Cadmium		0.86	0.65	1.17	ND	0.86	—	5.17
Chromium		42.3	22.4	28.5	19.0	23.3	9.90	26.6
Copper		50.4	44.5	45.5	27.7	70.7	20.3	57.5
Lead		74.0	54.3	144	63.4	191	—	236
Mercury		ND	0.43	0.26	ND	0.44	—	0.32
Selenium		1.8	ND	ND	ND	2.35	—	ND
Silver		ND	ND	ND	ND	ND	—	ND
TCLP Arsenic	(mg/l)	—	—	—	—	—	—	—
Total Cyanide	(mg/kg)	—	—	—	—	—	—	—
VOCs (Method 8260)	(ug/kg)							
Benzene		—	—	—	—	—	—	—
1,3,5-Trimethylbenzene		—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—
n-Butylbenzene		—	—	—	—	—	—	—
p-& m-xylenes		—	—	—	—	—	—	—
SVOCs (Method 8270)	(ug/kg)							
Acenaphthene		—	—	—	—	—	—	—
Acenaphthylene		—	—	—	—	—	—	—
Anthracene		—	—	—	—	—	—	—
Benzo(a)anthracene		—	—	—	—	—	—	—
Benzo(a)pyrene		—	—	—	—	—	—	—
Benzo(b)fluoranthene		—	—	—	—	—	—	—
Benzo(g,h,i) perylene		—	—	—	—	—	—	—
Benzo(k)fluoranthene		—	—	—	—	—	—	—
Chrysene		—	—	—	—	—	—	—
Dibenz(a,h)anthracene		—	—	—	—	—	—	—
Dibenzofuran		—	—	—	—	—	—	—
Fluoranthene		—	—	—	—	—	—	—
Fluorene		—	—	—	—	—	—	—
Indeno (1,2,3-cd) pyrene		—	—	—	—	—	—	—
2-methylnapthalene		—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—
Phenanthrene		—	—	—	—	—	—	—
Pyrene		—	—	—	—	—	—	—
PCBs	(mg/kg)							
PCB 1254		ND	—	—	—	0.08	—	ND
PCB 1260		0.13	–	–	–	0.04	—	ND
TPH	(mg/kg)	710	1020	880	2570	360	—	560

Notes:

— = not analyzed

ND = not detected above method detection limit

TABLE 4
SUMMARY OF HISTORICAL SURFACE SAMPLING DATA
A.C. DUTTON PROPERTY
POUGHKEEPSIE, NEW YORK

PARAMETERS	Sample Identification	SS-1	SS-3	SS-5	SS-6	SS-7	SS-8	NFD-W	NFD-E	KL-SUMP	SL-1
	Sample Depth (ft)	0	0-0.04	0-0.04	0-0.17	0-0.04	0-0.17				
	Sample Date	8/26/02	8/26/02	8/27/02	8/27/02	8/27/02	8/28/02	10/31/02	10/31/02	11/6/02	11/6/02
Total Metals (Method 6010)	(mg/kg)										
Arsenic		138,000	1,220	823	40,100	16,800	96,700	71,100	57,200	591.0	31.4
Barium		—	—	—	—	—	162	—	—	—	—
Cadmium		—	—	—	—	—	ND	—	—	—	—
Chromium		93,700	1,280	748	17,400	10,400	54,200	33,300	26,600	391.0	19.1
Copper		8,290	1,270	511	21,200	7,890	30,700	38,900	32,600	738.0	47.4
Lead		—	—	—	—	—	741	—	—	—	—
Mercury		—	—	—	—	—	7.62	—	—	—	—
Selenium		—	—	—	—	—	ND	—	—	—	—
Silver		—	—	—	—	—	1,060	—	—	—	—
TCLP Arsenic	(mg/l)	—	—	—	—	—	—	—	—	—	—
Total Cyanide	(mg/kg)	—	—	—	—	—	—	—	—	—	—
VOCs (Method 8260)	(ug/kg)										
Benzene		—	—	—	—	—	—	—	—	—	—
1,3,5-Trimethylbenzene		—	—	—	—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—	—	—	—
n-Butylbenzene		—	—	—	—	—	—	—	—	—	—
p-& m-xylenes		—	—	—	—	—	—	—	—	—	—
SVOCs (Method 8270)	(ug/kg)										
Acenaphthene		—	—	—	—	—	—	—	—	—	—
Acenaphthylene		—	—	—	—	—	—	—	—	—	—
Anthracene		—	—	—	—	—	—	—	—	—	—
Benzo(a)anthracene		—	—	—	—	—	—	—	—	—	—
Benzo(a)pyrene		—	—	—	—	—	—	—	—	—	—
Benzo(b)fluoranthene		—	—	—	—	—	—	—	—	—	—
Benzo(g,h,i) perylene		—	—	—	—	—	—	—	—	—	—
Benzo(k)fluoranthene		—	—	—	—	—	—	—	—	—	—
Chrysene		—	—	—	—	—	—	—	—	—	—
Dibenz(a,h)anthracene		—	—	—	—	—	—	—	—	—	—
Dibenzofuran		—	—	—	—	—	—	—	—	—	—
Fluoranthene		—	—	—	—	—	—	—	—	—	—
Fluorene		—	—	—	—	—	—	—	—	—	—
Indeno (1,2,3-cd) pyrene		—	—	—	—	—	—	—	—	—	—
2-methylnapthalene		—	—	—	—	—	—	—	—	—	—
Naphthalene		—	—	—	—	—	—	—	—	—	—
Phenanthrene		—	—	—	—	—	—	—	—	—	—
Pyrene		—	—	—	—	—	—	—	—	—	—
PCBs	(mg/kg)										
PCB 1254		—	—	—	—	—	—	—	—	—	—
PCB 1260		—	—	—	—	—	—	—	—	—	—
TPH	(mg/kg)	—	—	—	—	—	—	—	—	—	—

Notes:

— = not analyzed
ND = not detected above method detection limit
Samples SS-1, SS-6, and SS-7 collected from floor of northern treatment building
Samples SS-3 and SS-5 collected from exterior pavement.
Sample SS-8 collected from floor of southern treatment building.
Sample SL-1 collected from loading platform.
Sample KL-SUMP collected from metal-lined sump in the former lumber drying kiln.
Samples NFD-W and NFD-E collected from floor drains in the northern treatment building.

TABLE 5
SUMMARY OF SAMPLING ISSUES
A.C. DUTTON PROPERTY
POUGHKEEPSIE, NY

	Metals		Organics	
Sampling Issue	Action	Approximate Number of Samples Proposed (1)	Action	Approximate Number of Samples Proposed(1)
Re-Sampling of Historical Sampling Results (2)	Re-sample 20% of the original 103 soil samples collected.	21	Re-sample 20% of the original 14 soil samples collected.	3
	Re-sample 20% of the original 7 sediment samples collected.	2	N/A	N/A
	Re-sample 20% of the original 5 groundwater samples collected.	1	Re-sample 20% of the original 5 groundwater samples collected.	1
TCLP Analysis(3)	1 TCLP analysis for 1 in 20 soil initial sample locations.	13	N/A	N/A
Fraction of Samples to Lab After Field Screening (4)	Initially submit 1 soil sample to the Lab for every 5 soil samples screened in the field, plus one for the eight monitoring wells to be sampled, pending correlation with Lab and field screening results.	54	Initially submit 1 soil sample to the Lab for every 5 soil samples screened in the field, plus one for the eight monitoring wells to be sampled, pending correlation with Lab and field screening results.	54
Confirmatory ("End") Soil Sampling	Submit confirmatory soil samples to the Lab from the property boundary, and select locations throughout the property.	39	Submit confirmatory soil samples to the Lab from the property boundary, and select locations throughout the property.	39
Duplicates	Collect 1 duplicate sample per every 20 sample locations, plus one for the eight monitoring wells to be sampled.	14	One duplicate for each of VOCs, SVOCs, and cyanide, plus one for the eight monitoring wells to be sampled.	4
Trip Blank (5)	N/A	N/A	Collect 1 soil trip blank for each day VOC sampling occurs, plus one for groundwater sampling.	16
Equipment Blanks	Collect 1 equipment blank per every 20 sample locations, plus one for the eight monitoring wells to be sampled.	17	One equipment blank for each of VOCs, SVOCs, and cyanide, plus one for the eight monitoring wells to be sampled.	4

(1) Assume approximately 264 soil sample locations.

(2) Re-sampling 20% of the historical sampling locations will only occur if those locations re-sampled have similar analytical results. If historical and current analytical results are significantly different, than all historical sample locations will be re-sampled.

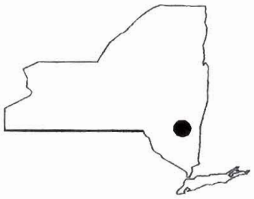
(3) TCLP analysis will be focused on samples with the highest concentrations measured during field screening.

(4) The approximation of proposed samples assumes one sample per sample location. The number of samples collected per location depends on field screening, as described in the Triad Approach.

(5) Assume field sampling will occur 5 days per week, for 3 weeks, and that at least one VOC sample will be collected each day.

E:\P2004\0764\A1N\RIWP\Dutton proposed sampling summary.xls

FIGURES



MAP REFERENCE

THIS MAP WAS PREPARED FROM THE FOLLOWING 7.5 MINUTE USGS MAP: Poughkeepsie, 1957 Photorevised 1982.

SCALE:	
HORZ.: 1" = 2000'	
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0 1000 2000
GRAPHIC SCALE

FUSS & O'NEILL OF NEW YORK, P.C.
Consulting Engineers
80 WASHINGTON STREET SUITE 301, POUGHKEEPSIE, NY 12601
845.452.8801
www.FandO.com

A.C. DUTTON (ONEKEY, LLC.)

USGS LOCATION MAP

2 HOFFMAN DRIVE

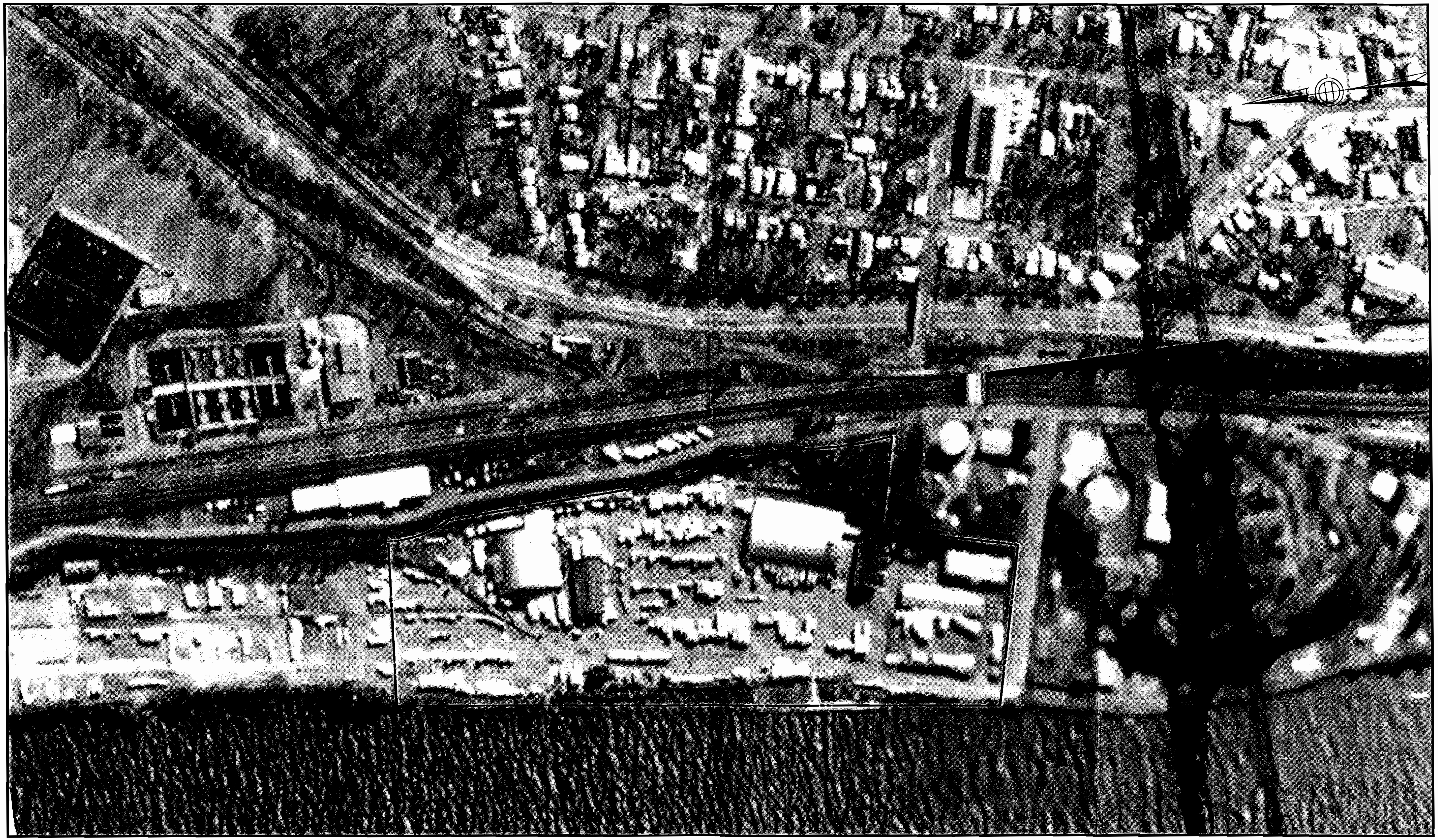
CITY OF POUGHKEEPSIE DUTCHESS COUNTY, NEW YORK

PROJ. No.: 20040764A1N
DATE: JUNE 2005

FIG. 1

UCS:
MS VIEW:
LMAN:
CTB:

UCS:
MS VIEW:
LMAN:
CTB:



No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

MAP REFERENCE
1994–1999 One Meter Color Infrared UTM Zone 18
Statewide
Date: 1994–1996
Film Type: Color Infrared
Resolution: 1 Meter
Zone: Utm 18

SCALE:
HORZ.: 1" = 200'
VERT.:
DATUM:
HORZ.:
VERT.:

GRAPHIC SCALE

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Consulting Engineers
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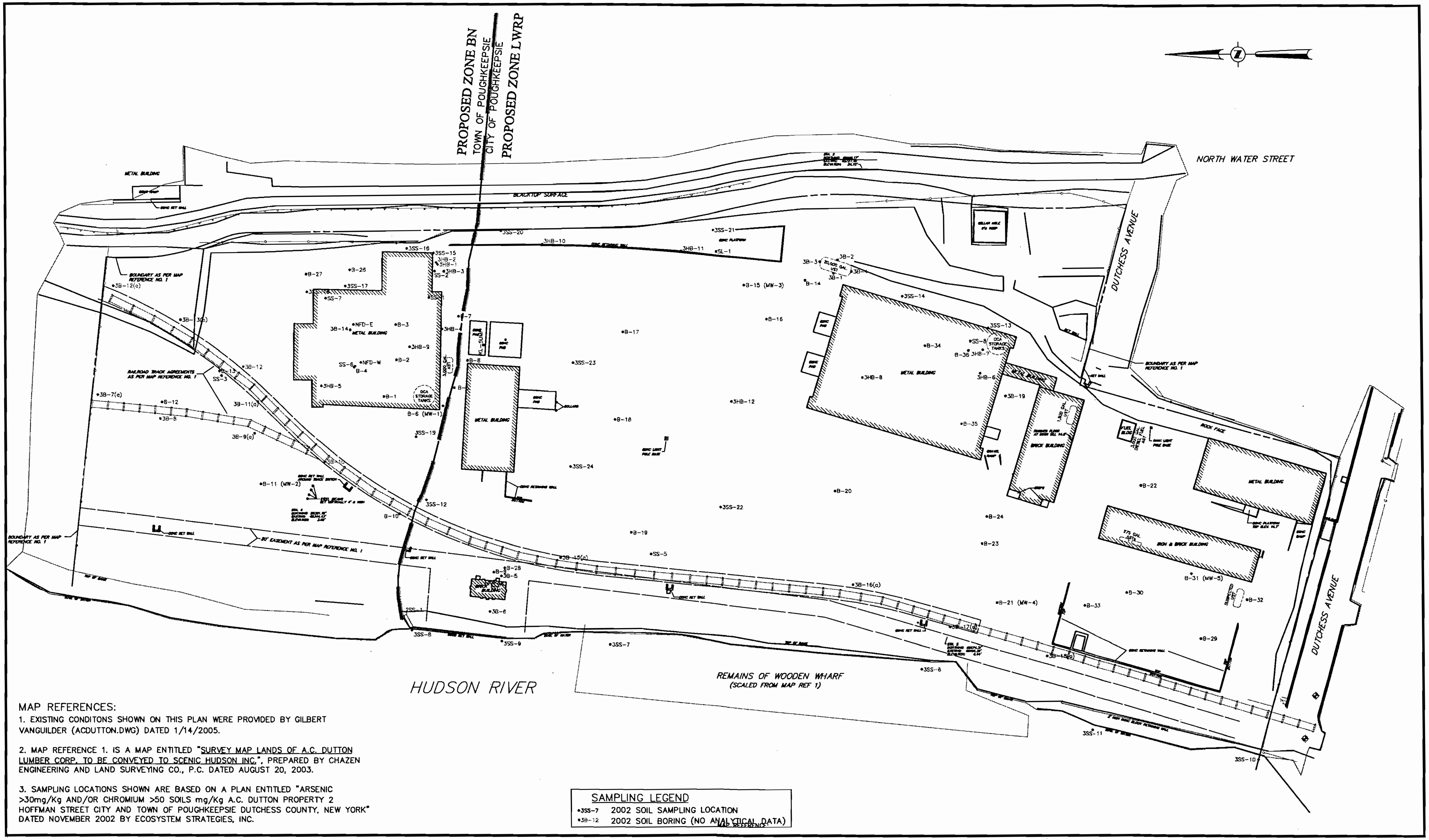
A.C. DUTTON
1995 AERIAL PHOTOGRAPH
REMEDIAL INVESTIGATION WORK PLAN

CITY OF POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

PROJ. No.: 2004076.A1N
DATE: JUNE 2005

FIG. 2

UCS: WRLD | MS VIEW: 100 | LMAN: EXIST SAMPLES-0305 | CTB: F&O Standard (Half)



MAP REFERENCES:

1. EXISTING CONDITONS SHOWN ON THIS PLAN WERE PROVIDED BY GILBERT VANGUILDER (ACDUTTON.DWG) DATED 1/14/2005.

2. MAP REFERENCE 1. IS A MAP ENTITLED "SURVEY MAP LANDS OF A.C. DUTTON LUMBER CORP. TO BE CONVEYED TO SCENIC HUDSON INC.", PREPARED BY CHAZEN ENGINEERING AND LAND SURVEYING CO., P.C. DATED AUGUST 20, 2003.

3. SAMPLING LOCATIONS SHOWN ARE BASED ON A PLAN ENTITLED "ARSENIC >30mg/Kg AND/OR CHROMIUM >50 SOILS mg/Kg A.C. DUTTON PROPERTY 2 HOFFMAN STREET CITY AND TOWN OF POUGHKEEPSIE DUTCHESS COUNTY, NEW YORK" DATED NOVEMBER 2002 BY ECOSYSTEM STRATEGIES, INC.

SAMPLING LEGEND

•3SS-7 2002 SOIL SAMPLING LOCATION
•3B-12 2002 SOIL BORING (NO ANALYTICAL DATA)

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

TO MY KNOWLEDGE AND BELIEF, THESE MAPS ARE SUBSTANTIALLY CORRECT AS NOTED HEREON.

LAWRENCE R. GEISSLER, JR. 12327 LICENSE No.

SCALE:
HORZ.: 1" = 100'
VERT.: N/A
DATUM:
HORZ.: NAD83(96)(002)
VERT.: NAVD88

0 50 100
GRAPHIC SCALE

FUSS & O'NEILL P.C. Consulting Engineers
80 WASHINGTON STREET SUITE 80, POUGHKEEPSIE, NY 12601
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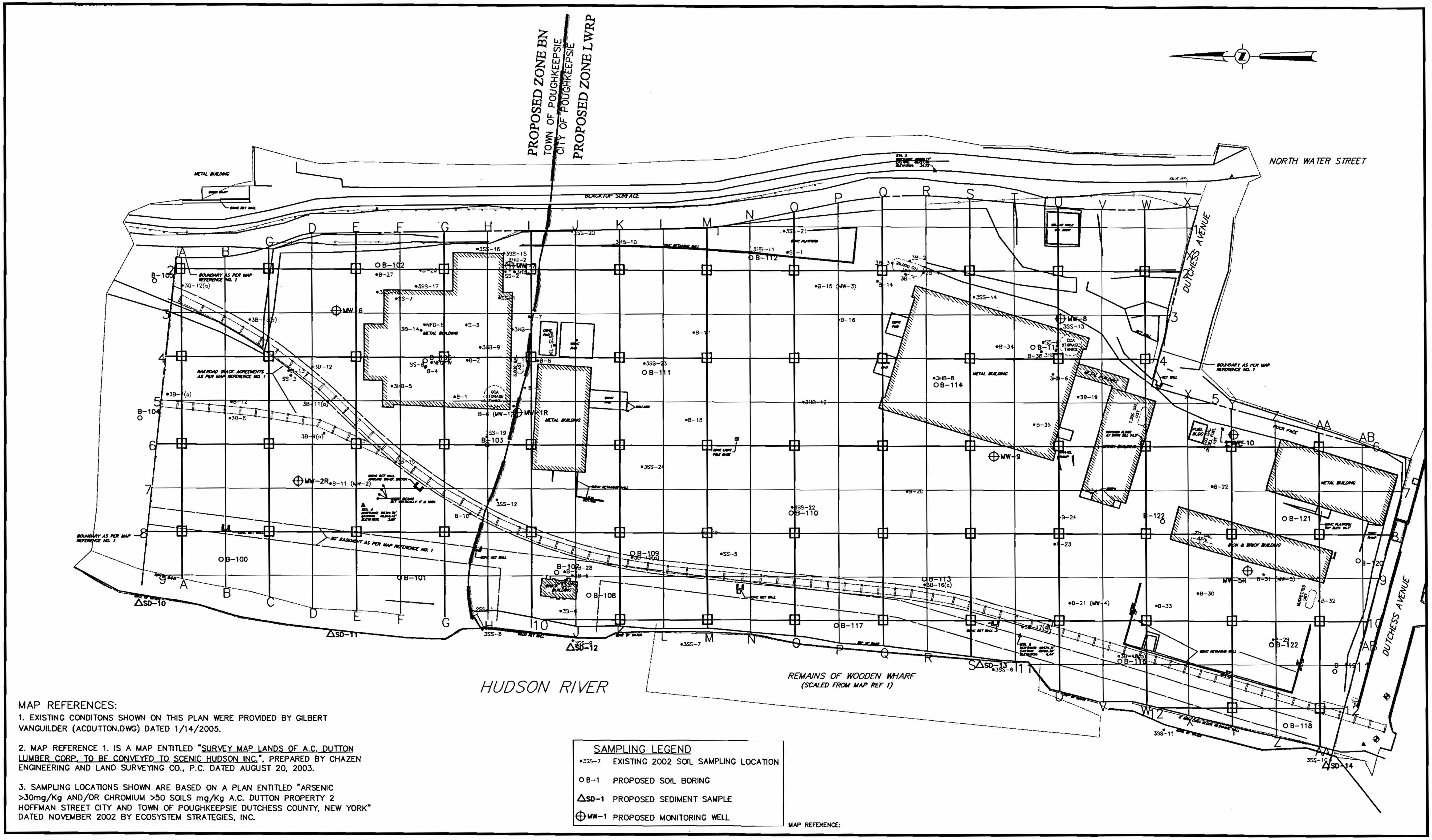
www.FandO.com

A.C. DUTTON
HISTORIC SAMPLING LOCATIONS
REMEDIAL WORK PLAN

POUGHKEEPSIE NEW YORK

PROJ. No.: 20040764.A1N
DATE: AUGUST 2005

FIG. 3



MAP REFERENCES:

1. EXISTING CONDITONS SHOWN ON THIS PLAN WERE PROVIDED BY GILBERT VANGUILDER (ACDUTTON.DWG) DATED 1/14/2005.

2. MAP REFERENCE 1. IS A MAP ENTITLED "<u>SURVEY MAP LANDS OF A.C. DUTTON LUMBER CORP. TO BE CONVEYED TO SCENIC HUDSON INC.</u>", PREPARED BY CHAZEN ENGINEERING AND LAND SURVEYING CO., P.C. DATED AUGUST 20, 2003.

3. SAMPLING LOCATIONS SHOWN ARE BASED ON A PLAN ENTITLED "ARSENIC >30mg/Kg AND/OR CHROMIUM >50 SOILS mg/Kg A.C. DUTTON PROPERTY 2 HOFFMAN STREET CITY AND TOWN OF POUGHKEEPSIE DUTCHESS COUNTY, NEW YORK" DATED NOVEMBER 2002 BY ECOSYSTEM STRATEGIES, INC.

SAMPLING LEGEND

●3SS-7	EXISTING 2002 SOIL SAMPLING LOCATION
○B-1	PROPOSED SOIL BORING
△SD-1	PROPOSED SEDIMENT SAMPLE
⊕MW-1	PROPOSED MONITORING WELL

MAP REFERENCE:

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

TO MY KNOWLEDGE AND BELIEF, THESE MAPS ARE SUBSTANTIALLY CORRECT AS NOTED HEREON.

LAWRENCE R. GEISSLER, JR.
12327
LICENSE No.

SCALE:
HORZ.: 1" = 100'
VERT.: N/A
DATUM:
HORZ.: NAD83(96)(002)
VERT.: NAVD88
0 50 100
GRAPHIC SCALE

FUSS & O'NEILL P.C. *Consulting Engineers*
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A.C. DUTTON
PROPOSED SAMPLING PLAN
REMEDIAL I NVESTGATION WORK PLAN
POUGHKEEPSIE NEW YORK

PROJ. No.: 20040764.A1N
DATE: AUGUST 2005

FIG. 4

UCS: WRLD | MS VIEW: 100 | LMAN: PROP SAMPS-0305 | CTB: F&O Standard (Half)

APPENDIX A

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET, POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

NYSDEC Site No. C314081

Prepared for:
The O'Neill Group - Dutton, LLC

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

July 2005

1.0 TITLE PAGE

Document Title	**QUALITY ASSURANCE PROJECT PLAN**
	A.C. DUTTON LUMBER YARD SITE **HOFFMAN STREET, POUGHKEEPSIE** **DUTCHESS COUNTY, NEW YORK**
Prepared by:	**FUSS & O'NEILL OF NEW YORK, P.C.** **80 WASHINGTON STREET** **SUITE 301** **POUGHKEEPSIE, NY 12601**
Telephone Number:	**(845) 452-6801**

QUALITY ASSURANCE PROJECT PLAN
A.C. DUTTON LUMBER YARD SITE
POUGHKEEPSIE, NEW YORK

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QUALITY ASSURANCE PROJECT PLAN
A.C. DUTTON LUMBER YARD SITE
POUGHKEEPSIE, NEW YORK

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SECTION **PAGE**

QUALITY ASSURANCE PROJECT PLAN
A.C. DUTTON LUMBER YARD SITE
POUGHKEEPSIE, NEW YORK

TABLE OF CONTENTS

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The following is a list of key personnel for the sampling program to be implemented in this study. Any questions regarding project status should be directed to the principle contact.

Principle Contacts:	Stephen Gallo The O'Neill Group – Dutton, LLC c/o Onekey, LLC, Rochelle Park, NJ (201) 845-5552 sgallo@onekeyllc.com
Principle-In-Charge:	Richard Jones, PE Fuss & O'Neill, Inc. (800) 286-2469 x5522 rjones@fando.com
Project Engineer:	Craig M. Lapinski, PE Fuss & O'Neill, Inc. (800) 286-2469 x5258 clapinski@fando.com
Project Director:	James D. McIver, Jr. Fuss & O'Neill of NY, PC (845) 452-6801 jmciver@fando.com
Project Manager:	Richard S. Totino Fuss & O'Neill, Inc. (800) 286-2469 x4414 rtotino@fando.com
Quality Assurance Officer:	Lynne P. Matteson Fuss & O'Neill, Inc. (800) 286-2469 x5386 lmatteson@fando.com
Analytical Laboratory:	Richard Bayer SevernTrent Laboratories Newburgh, NY Rick.bayer@stl-inc.com (845) 562-0890

3.0 INTRODUCTION

The following Quality Assurance Project Plan (QAPP) provides a framework for assessing the quality of data from the environmental sampling programs for the Former A.C. Dutton Lumber Yard Site in Poughkeepsie, Dutchess County, New York. The format for this document was developed from the United States Environmental Protection Agency (US EPA) Brownfields Quality Assurance Project Plan Guidance Document, the New York State Department of Environmental Conservation (NYSDEC) Brownfield Guidance Document, and NYSDEC Draft DER-10. This document defines the field and laboratory procedures to be used for this project and contains several attachments including field sampling Standard Operating Procedures (SOPs), laboratory SOPs, and field sampling forms. A Quality Assurance Project Plan Checklist, is included in Appendix A.

3.1 Site Description and History

The site is located on Hoffman Street in the Town and City of Poughkeepsie, Dutchess County New York. It is located approximately one-half mile north of the Metro North Poughkeepsie railroad station and the Mid-Hudson Bridge. The site is adjacent to the Hudson River, which borders the site to the west, and is within the 100-year flood plain of the River.

The site currently consists of two tax parcels making up approximately 15 acres. The majority of the 15 acres falls in the City of Poughkeepsie and the remainder lies in the Town of Poughkeepsie. The tax parcels are identified as follows:

Parcel and Acreage	Tax I.D.
City of Poughkeepsie (11.35 acres)	31-6062-59-766443-00
Town of Poughkeepsie (3.65 acres)	14-6062-02-763508-00

The physical address of the property is 2 Hoffman Street and can be accessed from the south via Dutchess Avenue. The portion of the property located in the City of Poughkeepsie is zoned 1-2, General Industrial District. The portion of the property within Town of Poughkeepsie is located in the WD2 (Waterfront District 2) and zoned IH (Heavy Industry).

There are currently seven buildings at this site in varying states of disrepair. There are two warehouse buildings located at the southern end of the parcel. The main plant office building and the newest pressure treatment facility occupy the south central portion of the property with a warehouse and older pressure treatment facility to the north. One partially collapsing two story brick building exists on the western side of the property near the rail spur that traverses the site. The remainder of the parcel primarily consists of paved access and former lumber storage areas.

3.2 Project History and Description

The parcel has been in industrial use since the mid-1800s. The A.C. Dutton Lumber Corporation operated a wholesale lumber company at the site beginning in 1913 and the on-site pressure treatment of lumber using copper-chromate-arsenate (CCA) reportedly began in 1966. Prior to 1913, site uses included an iron works and a glass works plant. The former glass works plant was reportedly located at the southern end of the parcel.

At the A.C. Dutton facility, raw materials were brought to the site by truck, boat, and rail, processed in either the two treatment plants, temporarily stored in a sheltered drip pad area and allowed to dry, and then stored outside prior to commercial resale. It is suspected that storage of treated lumber has not always occurred on impervious surfaces.

A comprehensive site investigation was undertaken at the site by Ecosystems Strategies, Inc. (ESI) in 2002 on behalf of Scenic Hudson Land Trust, Inc. Results of these investigations were summarized in two ESI reports:

- Summary Report of Subsurface Investigation dated October 3, 2002.
- Summary Report of Supplemental Subsurface Investigation dated November 25, 2002.

Findings and data generated during these previous investigations are summarized in the July 2005 Site Investigation Work Plan (SIWP) prepared by Fuss & O'Neill.

3.3 Plan Objective and Data Quality Objectives

This QAPP is designed to guide site-wide quality of environmental sampling; therefore, project descriptions of sampling locations, constituents of concern, analytical requirements, regulatory criteria, and data quality objectives will be developed in project sampling plans.

The objective of this QAPP is to outline a structure for data quality such that the data collected will support decisions and to provide procedures for planning, implementing, and evaluating field sampling and analytical procedures.

The generation and use of quality data is important in the assessment of constituent impact on the site and, if necessary, in the selection of adequate responses to concentrations in soil, groundwater, sediment, or surface water.

4.0 SAMPLING DESIGN

An essential aspect of any sampling program is to provide high quality representative data. This section of the QAPP provides a description of sampling techniques, procedures, and equipment used during field sampling programs. These techniques and procedures are consistent with guidelines outlined in the EPA document "A Compendium of Superfund Field Operations Methods" and with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Numbers 4007, 4008, 4015, 4019, 4032, 4051 (draft), 4046 and others as applicable.

4.1 Sampling Design Rationale

The project-specific Work Plan provides the sampling rationale for every sampling event including that for the following tasks:

- Sampling environmental media
- Determination of constituents to be measured in each environmental media
- Sampling locations
- Sample depths and types
- Number and frequency of samples to be collected

The specifics of a field investigation (e.g., sampling locations, target depths, analytical methods, and a reference map) are provided in the SIWP.

4.2 Number of Samples

This QAPP is designed to address site-wide quality management of sampling; therefore, lists of number of samples, sampling locations, constituents of concern, analytical requirements, regulatory criteria, and data quality objectives are provided in the SIWP.

4.3 Sampling Locations

Proposed sampling locations will be identified in Field Sampling Plan.

The Health and Safety Plan (HASP) discusses procedures for clearing sampling locations. The procedures include notifying "NY Dig Safely" and having the location checked by an authorized site official. The procedure outlined in the HASP will be followed before any intrusive work with mechanized equipment is initiated.

5.0 SAMPLING AND ANALYTICAL PROCEDURES AND REQUIREMENTS

5.1 Sampling Procedures

The Fuss & O'Neill SOPs pertaining to sample collection are listed in Table A1 and included in Appendix B.

5.1.1 Preventive Maintenance – Field Equipment

The SOPs pertaining to preventive maintenance of field equipment are referenced in Table A2 and Table A3 and are provided in Appendix C.

Field measurement equipment will be maintained in accordance with SOPs and manufacturer instructions. The field personnel will be responsible for confirming that equipment is operating properly during use by inspecting the instrument for physical damage and performing instrument performance checks. Problems encountered with field measurement equipment will be documented in the field logbook. An attempt will be made to correct problems with the instrument while in the field. If the instrument's problem is not remedied in the field, it will be taken out of service and replaced.

The field measurement equipment is inspected, cleaned, and calibrated on a daily basis prior to being used on site. The calibration information is recorded on calibration forms which are kept at in the project file. The daily preventive maintenance checklist may include some of the following, but is instrument specific:

- Visual battery check of battery low indicator
- Replacement of batteries as necessary (spare batteries are kept on hand at Fuss & O'Neill)
- pH electrode is cleaned and calibrated on a daily basis and cleaned and re-calibrated after a noticeably dirty sample (full decontamination)
- Temperature is checked using a certified calibrated mercury thermometer, and, if necessary, the sensor is replaced
- If the specific conductance electrodes are determined to be losing their platinum coating, the electrodes are replatinized according to manufacturer's instructions with 3 percent chloroplatinic acid and the instrument is then re-calibrated
- The conductivity electrode of the SC meter will be cleaned on a daily basis and cleaned and re-calibrated after a noticeably dirty sample (full decontamination)

5.1.2 Calibration – Field Equipment

SOPs for the calibration of field instruments to be used during this project are referenced in Table A2 and included in Appendix C. Calibration frequency, acceptance criteria and corrective action are included in Table A4.

Field instrument calibration is performed in accordance with manufacturer's instructions and Fuss & O'Neill SOPs. Soil samples will be screened using an Organic Vapor Monitor.

Field instruments will be calibrated before initial use. Calibration will be recorded in the appropriate calibration log provided in Appendix C.

Calibration acceptance criteria for field instrumentation is established by the respective instrument manufacturer. If a calibration check determines that any field instrument is outside of the criteria, the instrument will be re-calibrated. If a calibration cannot occur within the acceptance criteria a back-up instrument will be used.

5.2 Analytical Procedures

The analytical laboratory for the project will be Severn Trent Laboratories of Newburgh, New York, a NY state certified laboratory. The contract laboratory's SOPs for analytical methods for this project are consistent with the NYSDEC ASP. The SOPs and the laboratory Quality Systems Manual are available upon request.

Laboratory samples for this project will be analyzed in accordance with the NYSDEC ASP, SW-846 (U.S. EPA, 1986), or EPA (U.S. EPA, 1983b) analytical methods. Sampling and analytical method requirements including container types, preservation and hold times are listed in Table A5.

5.2.1 Preventive Maintenance – Laboratory Equipment and Calibration

Preventive maintenance, calibration, measurement systems, and corrective action procedures for laboratory equipment are provided in the laboratory's QA Manual and SOPs. Fixed laboratory SOPs are available upon request.

5.3 Laboratory Data Package Deliverables

Data package deliverables from the contract laboratory will consist of the following elements:

- Cover letter/letter of transmittal signed by project manager of designee
- SDG narrative signed by project manager or designee
- Field and internal laboratory chain-of-custody records
- Data results sheets
- Laboratory matrix spike and matrix spike duplicate results
- Laboratory control samples and control duplicate results
- Method blank results
- Surrogate recoveries
- Serial dilutions

6.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

6.1 Documentation of Field Activities

All field personnel will record sampling and other project observations in a bound, water-resistant field notebook. The field notebook will document site-specific information such as:

- Project name and location
- Time and date of arrival at the site
- Sampling locations and corresponding sample numbers
- Conversations with individuals on site
- Any unusual events or observations
- All information not recorded on field data sheets
- Time of departure from the site

Additional sample collection documentation forms that will be used during the project are discussed in the following sections.

6.2 Sample Identification

Each sampling location will be assigned a unique number by which samples can be identified. An example of a sample identification number is as follows:

402 040401-01

This 11-digit number contains three types of information about the sample location. The first three digits in the number represent the employee identification number for the sampler or sampling event supervisor. This is followed by the year, month and day of sample collection. The last two digits represent a chronological sample number. If necessary, the number can be expanded to three digits; this should be determined before sampling begins in order to assure that all samples have the same format.

Samples collected at one time from the same sample location will have the same sample identification number. Some common situations are listed below:

- Multiple containers required for various analytical parameters
- Sampling events which require the sample to be submitted to two or more laboratories, as in the case of a split sample discussed below.
- Sampling events that require sampling at the same location over two or more days due to insufficient sample volume available per day.

6.3 Sample Location Identification

Each sampling location will be assigned a unique identifier (site ID). The Site ID will be recorded on the field data form in addition to the sample number and will primarily be used for graphical display of sample results as well as internal data processing.

In general, the Site ID will consist of a one- or two-letter prefix referring to the type of media sampled and a serial number indexing the sampling location. The following prefixes will be used for the indicated sampling media as applicable:

SB	Soil Boring
TP	Test Pit
MW	Sampling Well or Monitoring
SD	Sediment
PZ	Piezometer
SG	Staff Gauge

Sample locations within each class of sampling media will be assigned a two- or three-digit serial number in the order in which they are sampled. Examples of sample location IDs are as follows:

SB-01, SB-02, SB-03	Soil boring locations 01, 02, and 03
SD-12	Sediment sampling location 12
MW-01, MW-02	Monitoring wells 01 and 02

Multiple samples collected at the same location will have the same sample location ID. The depth or range of depths at which samples are collected will be unique, and will be recorded on the appropriate field data forms and chain-of-custody forms. Sample depth information will also be included on data tables.

6.4 Sample Labels

A sample label will be affixed to each sample container at the time of collection. The following information will be recorded on each label with waterproof ink:

- Sample identification number
- Client/project name
- Project location
- Project number
- Date of sample collection
- Time of sample collection
- Name of sample collector
- Sample location
- Type of preservation
- Analysis to be performed

An example of a sample label is included in Appendix D

6.5 Field Data Forms

Samples will have a field data form documenting their collection. This record will be completed by field personnel at the time of sample collection. Examples of sampling field data forms are provided in Appendix D

6.6 Chain-of-Custody Records

Control of samples shall be maintained at all times. The chain-of-custody will be used to document all transfers of the sample between the sample collector and the laboratory. The form, consisting of four copies, will include the following information:

- Chain-of-custody identification number
- Project/client name
- Project location
- Project number
- Laboratory conducting analysis
- Name/location of party to receive laboratory report
- Name/location of party to receive laboratory invoice
- Sample identification number
- Sample type
- Number and type of sample containers
- Type of preservatives
- Signature and affiliation of sampler
- Date and time of collection
- Signatures of people involved in chain of possession
- Dates and times of sample transfers

The samples will remain in the custody of the sample collector until that person relinquishes them to the laboratory or sample delivery person. With each transfer of custody of the samples, the person receiving the samples will sign the COC. After verifying that each sample listed on the COC is present, the appropriate transfer box will be checked to indicate that all samples are accounted for.

To reduce the potential for sample tampering, coolers will be shipped to the laboratory with chain-of-custody seals on the edges of the cooler between the lid and the sides. One copy of the chain-of-custody record will be retained by Fuss & O'Neill personnel, while the original and two copies will be relinquished with the samples. A completed record will be returned to Fuss & O'Neill with the sample analysis report. An example chain-of-custody form is presented in Appendix F. Copies of all shipping papers will be retained by the sampler.

6.7 Sample Containers and Preservation

Samples will be collected in lab-supplied containers. The type of container utilized will depend upon the analysis to be conducted as indicated in the Quality Assurance Plans for the laboratories and referenced in Table A5. The preservatives listed in each table apply only to aqueous samples, and not to solid samples. Containers will be pre-cleaned and certified clean (I-Chem 300 or equivalent).

For aqueous samples, appropriate preservatives will be added by the laboratory prior to shipping the containers to the site in accordance with NYSDEC ASP or SW-846 standard methods. The pH of the samples will be verified in the field by pouring a small amount of the sample onto a piece of pH paper. If the pH is not at the appropriate level, additional preservative, as supplied by the laboratory, will be added to the container.

Liquid samples collected for volatile organic analyses will be preserved with HCl to a pH < 2. Any acid utilized for preservation will be added to the VOA vial before the sample is collected to ensure that adequate mixing occurs. VOA vials will not be reopened in the field once properly sealed.

Once the samples have been collected and labeled, they will be stored in a cooler to reduce the sample temperature to less than 4• C. Sample temperature upon reaching the laboratory is dependent on how much time has passed since the sample was collected and placed in the cooler. It is possible that the time between sample collection and delivery to the laboratory may not be long enough for the sample to reach 4• C. Samples may be transferred and stored by Fuss & O'Neill in a refrigerated environment (maintained nominally at 4°C) until they are relinquished to the contract laboratory.

6.8 Sample Custody at the Laboratory

Samples for analytical chemistry will be delivered to the contract laboratory either by a commercially available courier, laboratory supplied courier or by Fuss & O'Neill personnel. An internal chain-of-custody form will be generated as the samples are assigned locations within the specific laboratory. Procedures for sample log-in, internal sample tracking and sample disposal at the contract laboratory are included in their QC Manual.

7.0 QUALITY CONTROL REQUIREMENTS

The number and type of Quality Assurance and Quality Control (QA/QC) samples submitted to the laboratory will be in accordance with the SIWP.

QA/QC samples submitted to the laboratory will include equipment blanks, trip blanks and field duplicates. The purpose of these samples is to confirm that laboratory results reflect the condition of the various media in the environment and are not the result of poor sampling or laboratory technique. Additionally, duplicate samples will be collected in order to check the accuracy of the laboratory.

Each QA/QC sample will be given its own sample code. The identity of these samples will be withheld from the laboratory conducting the analysis. When more than one QA/QC sample is submitted with a set of samples, they will be interspersed within those samples so that they are not easily identifiable by the laboratory.

7.1 Equipment Blanks

Equipment blanks will be collected for sampling events in which non-dedicated sampling equipment is used. Equipment blanks may be obtained from equipment that has a potential to come into direct contact with samples. Equipment blanks are generally obtained from sampling equipment which is decontaminated between sample locations.

Blanks are prepared in the field during the sampling event. Laboratory-supplied deionized water is pored through and/or over the decontaminated equipment which has been utilized during sampling. The water will then be collected from that piece of equipment directly to the sample container.

Equipment blanks will be analyzed for the same parameters as samples collected with the corresponding piece of sampling equipment. For most parameters, the sampling device is the only piece of equipment that comes into contact with the sample. The frequency of equipment blank collection will be approximately one per 20 samples collected by piece of equipment for solid sampling events and for water sampling events.

7.2 Trip Blanks

Trip blanks for VOCs will be obtained for each day of sampling to determine whether samples have been exposed to contamination as a result of sample container handling or transport. Trip blanks will be submitted and analyzed only if VOCs make up a portion of the analyte list on the day of sampling. The blank will be prepared by the laboratory and will accompany the sample containers from the time they leave the lab until the time it will be returned to the lab as a sample. The trip blank sample is labeled as a sample and submitted blind to the laboratory for analysis.

7.3 Duplicate Samples

Duplicate samples for analysis will be collected for each matrix (e.g., liquid, solid) sampled to check the precision of the laboratory analysis. Duplicate samples will be collected at the same time as the original sample and will be analyzed for the same parameters. The duplicate sample will be assigned a different sample number than the original set so that the sample identity is blind to the laboratory. One duplicate sample by matrix will be collected nominally per 20 samples per matrix submitted to the laboratory. Sampling will be in the order of decreasing parameter volatility by alternating between containers in the original set and those in the duplicate set.

7.4 Field Sample Control Limits

The standard Fuss & O'Neill field sample control limits for quality control are specified below. If the control limits are not met, the Quality Assurance Officer will investigate the cause of the exceedance and determine the validity of the associated data.

Quality Control Sample	Control Limit
Trip Blank	Less than detection limit*
Equipment Blank	Less than detection limit*
Field Duplicates	± 30% Percent Difference for Water; Acceptable Percent Difference will be equal to Matrix Spike Recovery Values for Matrices other than Water **

* With the exception of common laboratory contaminants of acetone, 2-butanone, methylene chloride, phthalates and toluene which will have a control limit of 5X detection limit.

** Discrepancies will be addressed on a case-by-case basis.

7.5 Laboratory Internal Quality Control

The laboratory Quality Assurance Plan explains the type of quality control checks which are routinely followed. This includes such items as analysis of client reference standards, matrix spikes, blanks, the use of internal standards and surrogate spikes. All calibrations are checked before sample analysis can begin. If the analytical system does not pass the initial QC limits, then the system is determined to be out of control and the cause of the problem must be determined and corrected before measurements can continue. Once the problem is corrected, QC measurements are repeated to verify the calibration. If the system still does not meet control limits, the system is re-examined until the problem is corrected. The QA/QC procedures and analytical precision and accuracy of the methods to be used for this project are provided the contract laboratory's SOPs for analytical methods and QC limits.

8.0 DATA MANAGEMENT AND DOCUMENTATION

8.1 Data Classes

Many different classes of data may be generated during site investigations. Data generated include documentation of field activities, paperwork associated with environmental samples and investigations, and analytical data. The data classes in this section include:

- Field Logbooks
- Sample Identification Numbers
- Field Data Forms
- Fuss & O'Neill Sample Logbook
- Refrigerator Logbook
- Chain-of-Custody
- Analytical Data
- ArcView™ Drawings
- AutoCAD Drawings

8.1.1 Field Logbooks

Field logbooks will be utilized by field personnel to document field activities. Fuss & O'Neill logbook practices are standardized and Fuss & O'Neill field personnel are familiar with these standards.

8.1.2 Sample Numbers

Every sample collected will be assigned a unique sample number by which it can be identified. Sample number formats are discussed in Section 6.2.

8.1.3 Sample Location Identification

Each sampling location will be assigned a unique identifier (Site ID). The Site ID will be recorded on the field data form and in the field logbook, in addition to the sample number. Sample location IDs will primarily be used for graphical or tabular presentation of sample results as well as for internal data handling.

8.1.4 Field Data Forms

Field data forms will be utilized to record information pertinent to the type of field activity being conducted. Each sample will have a field data form documenting its collection. The field data form will be completed by field personnel at the time of sample collection. Example field data forms are provided in Appendix E.

8.1.5 Fuss & O'Neill Sample Logbook

The Fuss & O'Neill sample logbook serves as a central repository of general information on all environmental samples collected by Fuss & O'Neill personnel. The sample logbook is located in Environmental Field Services office area. Samples collected in the field which are relinquished to a fixed laboratory will be recorded in the sample logbook. Samples collected in the field and given directly to the mobile lab for analysis will be recorded in the mobile laboratory sample logbook. Information recorded in the logbook includes sample number, job number, job name, sample location ID, laboratory, date relinquished, and date received.

8.1.6 Chain-of-Custody

The Chain-of-Custody (COC) serves as a record of control of samples. The COC will be used to document all transfers of a sample between personnel, coolers, refrigerators, etc., from the point of collection to the point of receipt by a laboratory. A sample Chain-of-Custody is provided in Appendix F.

8.1.7 Field Data

Field data collected will be entered into a data management system. Further discussions of field data management are provided in Section 8.3.1 - Field Documentation.

8.1.8 Analytical Data

Analytical data generated by the contract laboratory will be provided in Excel spreadsheet format.

8.1.9 AutoCAD Drawings

AutoCAD drawings produced for the project are electronically filed on two separate network servers. An example directory structure is for an AutoCAD drawing is J:\DWG\P2004\0267\A1N and all associated subdirectories.

8.1.10 Graphical Outputs

An original copy of all graphical outputs, (i.e. line graphs, bar graphs, three-dimensional graphs) will be stored in the appropriate correspondence file.

8.2 Data Administration

Data administration as outlined below describes the flow of data, the plan for handling and presenting data and the internal data quality measures that will be implemented prior to final data output to tables, graphics and electronic output to other programs.

8.2.1 Field Documentation

The three sources of field data are the Chain-of-Custody, Field Data Forms, and the Field Log.

8.2.1.1Chain-of-Custody

The COC will be generated in the field and travels with any environmental sample from the point of collection. When the samples leave the custody of field personnel, the field personnel will relinquish them (to refrigerator, cooler, other personnel or the laboratory). The orange copy of the COC will be retained by the personnel relinquishing the sample(s). The yellow copy will then be returned to the project hydrogeologist or engineer. A copy will be attached to the field data forms and forwarded to the project staff.

With each transfer of custody of the samples, the person receiving the samples will sign the COC. After verifying that each sample listed on the COC is present, the appropriate transfer box will be checked to indicate that all samples are accounted for.

8.2.1.2 Field Data Forms

Field data forms are typically generated in the field and completed by field personnel. Field data forms will be relinquished on a daily basis to the project staff, who will perform a completeness review of the forms.

8.2.1.3 Field Logs

The field log is utilized throughout the day by field personnel. The field log will then be photocopied and the copy will be attached to the field data forms and forwarded to the project staff. Field logs, when full, will be archived in the Environmental Field Services area.

8.2.2 Internal Data Management

8.2.2.1 Field Sampling Data

Once field sampling has occurred, all field data forms (including field staff logbook copies) will be forwarded to the Project Hydrogeologist or Engineer, who will review the field data for accuracy and completeness. If any field data forms are incorrect or incomplete, they will be returned to field personnel for completion.

8.2.2.2Original Laboratory Data

When original laboratory data is received by the Project Manger, it will be reviewed for accuracy and completeness. Accuracy and completeness, as defined herein, means that the requested parameters were appropriately analyzed and that the Fuss & O'Neill sample numbers, date collected, date received, etc. are correctly identified on the laboratory report. Fuss & O'Neill may request that the laboratory deliver its report electronically by email or CD-ROM, along with a hardcopy of the report.

8.3 Data Presentation

Data presentation must occur in a clear and logical format to accurately interpret and evaluate field and analytical data collected. Types of data that may be provided include tabular data presentations, graphical data presentations, contour maps, geological cross sections, section view isopleths and three dimensional graphics.

9.0 ASSESSMENTS AND RESPONSE ACTIONS

The Project Manager is responsible for determining the need for and implementation of any corrective action measures to the sampling or analytical procedures. Corrective action will be implemented upon the identification of problems discovered through system audits by analytical data review. If a problem is identified, the QA Officer will:

- Report the problem to the Project Manager
- Evaluate the problem in accordance with data quality objectives
- Determine whether implementation of corrective action is required
- Assign and implement a corrective action
- Evaluate the effectiveness of the corrective action

The following is a list of possible occurrences that may require corrective action and the corresponding action that would likely take place.

- If any sample bottles break during transit such that insufficient sample is available to complete the analysis, that location will be re-sampled to replace the bottles that have been broken

- If meters or other sampling equipment break or malfunction during sampling, efforts will be made to repair, re-calibrate, or replace them with back-up equipment

- If the analysis of trip or equipment blanks indicates the presence of target analytes above acceptable concentrations, re-sampling and reanalysis of samples taken that day may be required.

- If there are unusual changes in detection limits, re-sampling and reanalysis may be indicated.

10.0 PROJECT REPORTS

10.1 Introduction

Project reports will be submitted to agencies specified by the client at a frequency specified by the client. An overview of information that may be included in project status reports, internal assessments, and project result summaries are described below.

10.2 Project Status Reports

Due to logistical and weather-related problems, deviation from the project schedule may occur. Status reports may be necessary to ensure that all parties are informed. Status reports may include but will not be limited to:

- Progress of the project to date
- Revised project schedule
- Deviations from the work plan
- Analytical data

10.3 Internal Assessments and Response Actions

Performance and system audits are a qualitative evaluation of all of the components of the sampling program to ensure proper implementation and usage of the intended data gathering and associated QA/QC procedures. Internal assessments and response actions may be presented in letter reports or attached as an appendix in the final report. The content for these evaluations is outlined separately for Field and Laboratory Audits.

10.3.1 Laboratory Performance and Audits

Laboratory performance and system audits are addressed in the laboratory QC Manual.

10.4 Project Results

Reports describing project results will include information for developing a conceptual model of the site. The content of the report will include but will not be limited to:

- Summary of Investigation Tasks
- Summary of Internal Assessments and Corrective Actions
- Summary of Site Geology and Hydrogeology
- Summary of Analytical Information
- Exceedances of Numerical Criteria
- Recommendations

11.0 DATA VERIFICATION AND VALIDATION

The objectives of data validation are to:

- Assess and summarize the analytical quality and defensibility of data for the end user
- Document factors contributing to analytical error that may affect data usability, such as: data discrepancies, poor laboratory practices that impact data quality, site locations for which samples were difficult to analyze

- Document any "sampling error" that may be identified by the data validation process, such as contaminated trip or equipment blanks, incorrect storage or preservation techniques, improper sampling containers, and improper sampling techniques

Data will be validated in accordance with the NYSDEC ASP.

11.1 Evaluation Criteria

11.1.1 Precision

Precision, which is defined as a measure of mutual agreement among individual measurements of the same property, can be described as reproducibility. In the case of laboratory analytical data, precision will be used to describe the reproducibility of the analytical data.

Field Measurement Systems

To assess precision in the field, a duplicate sample will be collected nominally for every 20 samples per matrix for all parameters. The collection of field duplicates measures a combination of field and laboratory precision, thereby exhibiting more variability than a laboratory duplicate. Calculation to determine Relative Percent Difference (RPD) between the two sample results is performed. RPD is used as a measure of precision. The laboratory will analyze duplicates on a one per 20 frequency, per matrix. Recovery limits are matrix and compound dependent.

RPD is defined as follows:

$$\frac{|Conc(p) - Conc(d)|}{(\frac{1}{2})(Conc(p) + Conc(d))} \times 100 = RPD$$

where,

- Conc(p) = Primary Sample Concentration, the first sample collected at that location
- Conc(d) = Duplicate Sample Concentration, the second sample collected at that location

For water sample analysis, the percent difference goal for the field will be 30 percent. For matrices other than water, however, there are no established percent difference goals; therefore, as a guide for sample analysis of other matrices, the percent difference goal for the field will be equal to the matrix spike percent recovery values. If a percent difference result falls outside the guidance range, the discrepancy will be addressed on a case-by-case basis since the results are laboratory, parameter, and matrix dependent.

Laboratory Measurement Systems

The objective concerning precision is to equal or exceed the precision demonstrated in the analytical methods on samples of similar matrix. RPD is used as a measure of precision. The laboratory will analyze matrix spikes/matrix spike duplicates on a one per 20 frequency, per matrix. Recovery limits are matrix and compound dependent.

RPD is defined as follows:

$$\frac{|MSR - MSDR|}{(\frac{1}{2})(MSR + MSDR)} \times 100 = RPD$$

where,

- MSR = matrix spike recovery
- MSDR = matrix spike duplicate recovery

The absolute value of the recovery difference is used in the above equation.

For organic analysis, the laboratory will be spiking with the matrix spike compound list and utilizing the recovery limits defined in the analytical SOPs. Inorganics utilize the recovery limits defined in the analytical SOPs. If necessary, corrective action by the laboratory will be performed according to the provisions of their Quality Assurance Plan.

11.1.2 Accuracy

Accuracy can be defined as the degree of agreement of a measurement with an accepted reference or true value. Accuracy is generally expressed as the ratio of the measured value to the true value, which gives a measure of bias inherent in the system. Accuracy can be assessed both in the field and in the laboratory. The data validation completeness checklist in Appendix A will be used to document the field calibration and laboratory calibration for each sampling event.

Field Measurement Systems

Accuracy will be measured for field activities to assess the correct performance of the project measurement systems. Before initial use, the instruments will be calibrated to a known standard. Additionally, at the end of a daily sampling event, the instruments will be calibrated with a known control to assess the accuracy of field measurement systems. The calibration acceptance criteria are defined in Table A4.

Laboratory Measurement Systems

The laboratory accuracy will be determined from spiked sample recoveries, published historical data, method validation studies, experience with similar samples, and project specific requirements. The goal for spiked sample recoveries will be the concentrations published in SW-846 Guidance Document. These concentrations vary from one compound to another.

11.1.3 Completeness

Completeness is a measure of the amount of valid data obtained from each sampling event, compared with the amount which was expected to be obtained under correct conditions. A goal of 95 percent completeness of valid analytical results will typically be set for all samples collected. The completeness of the sampling data set can be evaluated as a percentage of the number of valid analytes to the total number of expected analytes.

The equation for determining the completeness of analytical results will be:

$$\frac{(\textit{Total Number of Valid Results})}{(\textit{Total Number of Results})} \times 100 = \textit{Completeness}$$

Completeness of analytical results will be evaluated by analytical method.

If analytical data completeness is below 95 percent due to laboratory or field error, corrective action will consist of evaluation of the results in question as they pertain to the sampling program and possible re-sampling.

Data completeness for field measurement systems will be set at 100 percent. If an instrument fails, a back-up instrument will be used.

11.1.4 Representativeness

Representativeness is defined as the degree to which data accurately and precisely represent a characteristic of a population. This can be stated as how well the chosen sampling points represent the actual conditions and variations within the study area. For example, if a batch of samples was broken in transit to the laboratory or the samples were compromised in some fashion at the laboratory, a representative sampling event may not have occurred. If this were the case, the need for a resampling event would be considered.

Data representativeness of both field and laboratory systems will be addressed through field and analytical procedures. Trip blanks will be evaluated for detectable contaminant concentrations. If contamination is present in the blank samples, the representativeness of the concentration in the sample media may be affected. Representativeness in laboratory measurement systems will be addressed by the Project Hydrogeologist or other qualified personnel who will record that the laboratory is using the proper analytical procedures and meeting holding times.

11.1.5 Comparability

Comparability is an expression of the confidence with which one data set can be compared to another. The comparability objective is to collect and analyze samples in a method which will address that the data are comparable to data collected in previous and future investigations for this study area. The comparability of data is addressed by using standard protocols for the collection of field samples and by using standard methodologies for analytical procedures which were used in past investigations. If, for instance, it is determined that the laboratory used a different method than one specified, an evaluation will occur and document whether this compromised the comparability of data.

12.0 DATA USABILITY

The purpose of this QAPP is to outline a systematic process and structure for data quality such that the data will support decisions. The generation and use of quality data is important in the assessment of constituent impact on the site and, if necessary, in the selection of adequate responses to the analytical results. The function of the data verification process is to identify sampling and "analytical error" and not to make final determinations about the overall usability of the data for the project (U.S. EPA, 1996). The usability assessment, if necessary, will be conducted by the QAO and the results of the assessment will be reported to the Project Manager. The usability assessment will report how validated project data is reconciled with the project quality objectives and limitations, if any, of the data. Reconciliation may require resampling or recommending the use of selected data even through it did not meet the data quality objectives (DQOs).

For example, assume that a sample is analyzed for SVOCs by Method 8270. The QC for benzo(a)pyrene (BAP) is not acceptable, while the QC for all other SVOCs is acceptable. It is possible that the results may be usable for SVOCs excluding BAP.

Quality control issues will be discussed in the usability assessment and the QA Officer will recommend the use or rejection of the data. Ultimately, the end user will determine the usability of the data based on an understanding of the project data quality objectives and the results of the data verification process.

A Data Usability Summary Report (DUSR) will be provided in accordance with the NYSDEC draft DER-10 guidelines.

13.0 REFERENCES

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TABLES

Table A1
Standard Operating Procedures
Sample Collection
A.C. Dutton Lumber Yard Site

SOP # and Appendix Reference	Project Sampling SOPs
1B	Sampling Equipment
2B	Field Parameters
3B	Low—Flow Groundwater Sampling – Peristaltic Pumps
4B	Soil Sampling with Scoop
5B	Soil Sampling with Hand Auger
6B	Soil Sampling with Direct Push Technology
7B	Sediment Sampling – Surficial Samples
8B	Obtaining Soil Samples from the Bucket of an Excavator
9B	Field Decontamination

Table A2
Standard Operating Procedures
Field Equipment Calibration and Preventive Maintenance
A.C. Dutton Lumber Yard Site

SOP # and Appendix Reference	Project Equipment SOPs
1C	Fuss & O'Neill, Inc. SOP for Calibration and Maintenance of: YSI Model 85 DO + SCT Meter
2C	Fuss & O'Neill, Inc. SOP for Calibration and Maintenance of: YSI-600 Series Water Analyzer
3C	Fuss & O'Neill, Inc. SOP for Calibration and Maintenance of: Quanta Water Quality Monitoring System
4C	Fuss & O'Neill, Inc. SOP for Calibration and Maintenance of: HF Scientific DRT-15 C Portable Turbidimeter
5C	Fuss & O'Neill, Inc. SOP for Calibration and Maintenance of: Thermo Environmental Instruments Model OVM 580B **Organic Vapor Meter**
6C	Fuss & O'Neill, Inc. SOP for Operation and Maintenance of: Niton XLp-702 Multi-Element Soils Analyzer

Table A3
Field Equipment
Preventive Maintenance
A.C. Dutton Lumber Yard Site

Instrument	**Activity**	**Frequency**	**SOP Ref.**
YSI Model 63 SCT Meter	Battery replacement	As needed	1D
	pH probe cleaning	As needed	1D
	Specific conductivity and temperature sensor cleaning	Daily	1D
YSI Model 85 DO + SCT Meter	Battery replacement	As Needed	2D
	Sensor cleaning	Daily	2D
YSI-600 Series Water Analyzer	Probe or probe port replacement	As needed	3D
	Battery replacement	As needed	3D
	pH probe and ORP sensor cleaning	As needed	3D
	Specific conductivity and temperature sensor cleaning	Daily	3D
	DO sensor cleaning and membrane replacement	As needed	3D
Quanta Water Quality Monitoring System	Probe or probe port replacement	As needed	4D
	Battery replacement	As needed	4D
	pH probe and ORP sensor cleaning	As needed	4D
	Specific conductivity and temperature sensor cleaning	Daily	4D
	DO sensor cleaning and membrane replacement	As needed	4D
LaMotte 2020 Turbidimeter	Turbidity tube cleaning	Every use	6D
	Battery replacement	As needed	6D
	Lamp replacement	As needed	6D
HF Scientific DRT-15 C Portable Turbidimeter	Battery replacement	As needed	7D
	Lamp replacement	As needed	7D
Thermo Environmental OVM 580B	Lamp cleaning	Each calibration	8D
	Lamp replacement	As needed	8D
	Battery recharging	As needed	8D
	Filter replacement	As needed	8D

Table A4
Field Equipment
Calibration and Corrective Action
A.C. Dutton Lumber Yard Site

Instrument	Activity	Frequency	Acceptance Criteria	Corrective Action	SOP Ref.
YSI Model 63 SCT Meter	pH calibration	**Every use**	**±0.15 pH units**	**Recalibrate**	1D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	1D
YSI Model 85 DO + SCT Meter	DO calibration	Every use	**8 - 10 mg/L**	**Recalibrate**	2D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	2D
YSI-600 Series Water Analyzer	pH calibration	Every use	±0.15 pH units	Recalibrate	3D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	3D
	DO calibration	Every use	8 - 10 mg/L	Recalibrate	3D
	ORP calibration	Every use	±10 mV	Recalibrate	3D
Quanta Water Quality Monitoring System	pH calibration	Every use	±0.15 pH units	Recalibrate	4D
	SC calibration	Every use	±25 micromhos/cm	Recalibrate	4D
	DO calibration	Every use	8 - 10 mg/L	Recalibrate	4D
	ORP calibration	Every use	±10 mV	Recalibrate	4D
LaMotte 2020 Turbidimeter	Calibration	Every use	±5% of calibration solution	Recalibrate	5D
HF Scientific Turbidimeter	Calibration	Every use	±5% of calibration solution	Recalibrate	6D
Thermo Environmental OVM 580B	Calibration	Every use	**±5% of calibration gas**	Recalibrate	7D

Table A5
Sampling and Analytical Methods Requirements
A.C. Dutton Lumber Yard Site

Parameter	Matrix	No. of Samples(4,5)	Analytical Method	Container	Preservation	Hold Time
VOCs	Soil	10	8260	4 oz Glass/T	4°C	14 days
	Water	8	8260	2 x 40 mL VOC Vial	1:1 HCl pH<2, 4°C	
TOC	Soil	3	TAGM 4046 (Appendix B)	>40 mL Plastic or Glass	4°C	28 days / (6 months if frozen)
SVOCs	Soil	10	8270	4 oz Glass/T	4°C	14 days(x)/ 40 days
	Water	8	8270	2 x 1000 mL Glass/T	4°C	7 days(x)/ 40 days
Metals	Soil	64	6010	4 oz Glass	4°C	6 months
	Water	8	6010	500 mL Plastic	HNO_3 (pH<2), 4°C	
	Water	8	7471/7470	500 mL Plastic	HNO_3 (pH<2), 4°C	
TCLP Metals	Soil	8	1311/6010	4 oz Plastic or Glass	4°C	6 months

Notes:

1. All samples are to be stored at 4°C
2. T = Teflon lined cap
3. (x) indicates holding time prior to extraction
4. No. of samples = primary samples (additional QA/QC samples will be obtained at frequency specified in QAPP)
5. No. of samples subject to change based on results of field investigation and analytical results

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN CHECKLIST

Quality Assurance Project Plan Checklist
(Based on Quality Assurance Guidance for Conducting Brownfields Site Assessments)

QAPP title and date: **A.C. Dutton Lumber Yard Site, March 2005**
QAPP prepared by: **Fuss & O'Neill, Inc.**

PROJECT MANAGEMENT		Section
Form A	Title Page	1.0
Form B	Project Organization and Responsibility	2.0
Form C	Problem Definition	3.0
Form D	Project Description	3.1-3.3
MEASUREMENT DATA ACQUISITION		
Form E	Sampling Design	4.0
Form F-1	Sampling and Analytical Methods Requirements	5.0
Form F-2	Method and SOP Reference Table	Table 5.1
Form G	Preventative Maintenance – Field Equipment	5.1.1
Form H	Calibration and Corrective Action – Field Equipment	5.1.2
Form I	Preventative Maintenance – Laboratory Equipment	5.2.1
Form J	Calibration and Corrective Action – Laboratory Equipment	5.2.1
Form K	Sample Handling and Custody Requirements	6.0
Form L	Analytical Precision and Accuracy	11.1
Form M	Field Quality Control Requirements/Laboratory Quality Control Requirements	7.0
Form N	Data Management and Documentation	8.0
ASSESSMENT/OVERSIGHT		
Form O	Assessments and Response Actions	9.0
Form P	Project Reports	10.0
DATA VALIDATION AND USABILITY		
Form Q-1	Verification of Sampling Procedures	10.3
Form Q-1	Data Verification and Validation	11.0
Form R	Data Usability	12.0

QAPP Elements	Comments
PROJECT MANAGEMENT	
Form A – Title Page	Completed
• Project Title • Prepared for, prepared by • Plan date and revision number	
Form B – Project Organization and Responsibility	Completed
Identify key individuals in all organizations participating in the project, including: data users, decision makers, QA managers, leaders responsible of implementing the project, subcontractor leads, etc. (Chart, table, or text format acceptable, or any combination) • Identify the title/position, name of key individual, organization they work for, and contact information (telephone number and email). • Indicate lines of communication and authority between key individuals. • For complex projects, consider defining roles and responsibilities of key individuals.	
Form C – Problem Definition	Completed
• Provide sufficient background information from a historic, scientific, and/or regulatory perspective. • Identify specific primary contaminants of concern (i.e., lead as opposed to just metals), and indicate magnitude of contamination present. • Provide historic maps and summary data, as appropriate to illustrate problem. • Present the current understanding of the conceptual site model (CSM) for the project, and indicate how contamination may be acting in the environment. (Note, reference any important documents/reports used in development of the CSM and sampling design for the project.) • Clearly state the problem(s) to be solved, decision(s) to be made, and outcome(s) to be achieved.	★ Project information is provided in Section 3.0. Reference is made to event-specific field sampling plans that will address information contained in a CSM.
Form D – Project Description	Completed

QAPP Elements	Comments
• Provide an outline for tasks to be performed, including: • State the principle use of the data. • Identify the media and parameters being sampled. • Identify field measurements, field analytical and off-site laboratory testing. • Distinguish between the critical parameters on which decisions will be based (i.e., specific analytes or compounds of concern), and non-critical data used for supporting purposes. • Identify action levels to be met for known primary contaminants of concern that will drive decisions. • Define important conditions under which data should be collected (i.e., storm event, season, flow rate, etc.). • Cite relevant regulatory standards or criteria that data will be compared against. • Provide clear discussion on how project tasks relate to resolving problems/issues stated in background section. • Provide a projected timeline for field, laboratory and reporting activities to be completed. (Note, please allow for QAPP review and approval in timeline planning. A minimum of 3 weeks is recommended.)	★ Information to be provided in event-specific Field Sampling Plans.
MEASUREMENT DATA ACQUISITION	
Form E – Sampling Design	Completed
Provide the details and design elements to the various project tasks to be performed, including the anticipated samples to be collected and/or the experiment to be conducted. (Note, a thorough site reconnaissance should be performed and results incorporated into the plan.) • Explain the thought process behind the logic and rationale for the layout of the sample locations (discuss in terms of what individual locations are meant to represent, and globally in terms of what a set or series of samples are meant to represent). • Explain any design assumptions being made, and the importance of any particular compounds/analytes to the project (e.g., an indicator for other contaminants). • When sampling locations and/or choice of analytical parameters cannot be predetermined, document the decision logic or input that will be used in the field to make those decisions. • Include detailed sampling maps and sample summary tables (form F-1) that clarify and reflect the design text.	• Information to be provided in event-specific Field Sampling Plans
Form F-1 – Sampling and Analytical Methods Requirements	Completed

QAPP Elements	Comments
Included sample summary table that clarifies and reflects the design text. Note, the table (or tables) can be of your own design, but they need to include: • Sample Matrix • Parameter • Number of field samples to be collected for each parameter and matrix. • Number of each type of field QC sample to be collected with each parameter and matrix. • Analytical method reference (e.g., VOCs in soil – SW846 8260B) • Sampling Method reference (refer to Form F-2) • Sample containers (number per sample, size, and type) • Preservation (temperature, light, chemical) • Maximum holding times (preparation and analysis)	See Section 5.2 and Table A5. Also, event-specific Field Sampling Plans will contain the same information.
Form F-2 – Method and SOP Reference Table	Completed
Provide a table of references for the standardized procedures used to collect, prepare, and analyze the samples. Include: • The analytical method references for the preparation and analysis of the samples. Include document title, method name and number, revision number and date. • The corresponding laboratory SOP reference for each analytical procedure listed. Include document title, revision number, date and author (i.e., organization). • The field SOPs for sample collection, sample preservation, equipment decontamination, etc. Include document title, revision number, date and author (i.e., organization). • Provide appendices to the QAPP which includes copies of all field sampling and laboratory SOPs. • Note, if any project-specific modifications are to be incorporated into the standard procedures, then please document those changes in the QAPP or, better yet, modify the SOP to reflect the actual procedures being used. • For non-standard methods, attach the individual analytical SOPs.	See Section 5.2. Severn Trent Laboratories (STL) QA Manual Table A1 Appendices B-C, STL QA Manual
Form G – Preventative Maintenance – Field Equipment	Completed
List the inspection, acceptance testing, and preventative maintenance program for the various field equipment being used on the project. • Describes how problems are resolved and results documented.	See Section 5.1.1. Table A3
Form H – Calibration and Corrective Action – Field Equipment	Completed

QAPP Elements	Comments
Provide a field equipment calibration table for the various field equipment being used on the project that requires calibration. (Note, calibration records should be traceable to equipment.) Include: • Type of calibration check (e.g., initial calibration with number of standards, independent calibration checks, continuing calibration checks, blank checks, etc.) • Frequency • Acceptance criteria (control limits) • Corrective Actions when control limits are exceeded	See Appendix C Section 7.4, Table A4
Form I – Preventative Maintenance – Laboratory Equipment	Completed
Describe the inspection, acceptance testing and preventative maintenance program for the various laboratory instrumentation being used on the project. • Describes how problems are resolved and results documented.	See STL QA Manual See STL's SOPs for individual analytical methods and QC limits
Form J – Calibration and Corrective Action – Laboratory Equipment	Completed
Provide a laboratory instrument calibration table for the various laboratory instrumentation being used on the project that requires calibration. (Note, calibration records should be traceable to laboratory instrument.) Include: • Type of calibration check (e.g., initial calibration with number of standards, independent calibration check, continuing calibration checks, blank checks, internal standard checks, interference checks, etc.). • Frequency • Acceptance criteria (control limits) • Corrective actions when control limits are exceeded	See STL QA Manual See STL's SOPs for individual analytical methods and QC limits
Form K – Sample Handling and Custody Requirements	Completed
Describe chain-of-custody (COC) procedures between field preparation, transport, and laboratory receipt (can simply reference SOP, if available, and attach). • Describe the sample numbering scheme that will be used throughout the project (i.e., sample number code that identifies location, matrix, depth, etc.). • Provide example sample labels, COC forms, and custody seals.	See Section 6.0 Section 6.2 Appendix D and F
Form L – Analytical Precision and Accuracy	Completed

QAPP Elements	Comments
Complete an analytical precision and accuracy table for the various analyses being performed on the project. Include: • Analyte or parameter • Method reference (preparation and analysis) • Detection Limit (aqueous and/or soil) • Quantitation Limit (aqueous and/or soil) • Laboratory Precision (aqueous and/or soil) • Laboratory Accuracy (aqueous and/or soil) • Note 1: primary contaminants of concern for the site should be completed individually. Non-critical analytes may be listed by broad parameter, their detection limits can be referenced to an attachment, and precision and accuracy values can represent the board parameter. • Note 2: the Quantitation Limit, often called Reporting Limit, is the minimum concentration the laboratory feels confident in reporting at (as opposed to the detection limit which is determined statistically).	★ See STL's SOPs for individual analytical methods and QC limits
Form M – Field Quality Control	Completed
Provide a field sampling QC table. Break down by matrix and parameter as necessary to reflect actual project work. Include: • Type of QC sample: field duplicates, split samples (sent to different labs), trip blanks, equipment blanks, cooler temperature blanks, etc. (Note, for soil samples, document field duplicates as either collocated (adjacent to each other), or as split of a single homogenized sample. Collocated duplicates are used to evaluate variability within an area of soil.) • Frequency • Acceptance criteria (control limits) • Corrective Actions when control limits are exceeded	Event-specific Field Sampling Plans Sections 7.1-7.3 Section 7.4
Form M (Cont.) – Laboratory Quality Control	Completed
Provide an analytical QC table. Break down by method and matrix as necessary to reflect actual project work. Include: • Type of QC sample (lab duplicates, matrix spikes, matrix spike duplicates, surrogates, lab control samples, method blanks, etc.) • Frequency • Acceptance criteria (control limits) • Corrective actions when control limits are exceeded	Section 7.5 See Contest Laboratory's SOPs for individual analytical methods and QC limits and Table 7-1 (F&O Mobile Laboratory)
Form N – Data Management and Documentation	Completed

QAPP Elements	Comments
Describe the documentation and management of the data that is to be generated for the project, including field, laboratory, and final data manipulation.	
Field Documents and Records	
• Describe the routine procedures used for taking field notes.	Sections 8.1.1, 8.1.4 and 8.1.5
• List the remaining field documents and records that will be generated, collected, and managed in the project file.	
• Briefly describe the process for collection and review of the field notes and other records as they are generated (include any QA checks for completeness, consistency, accuracy, etc.).	Sections 8.2.1, 8.2.2
• Specify where the records will be stored and for how long.	
• Provide an Appendix to the QAPP which includes copies of all field forms and checklists to be used with the project.	Appendix E
Laboratory Documents and Records	
Specify the contents of the laboratory data package deliverable that the laboratory is responsible for providing (note, establish report expectations for both client and customer). Types of information to request from the laboratory:	
• Data Results Sheets	
• Method Blank Results	
• Surrogate Recoveries and Acceptance Limits	
• Matrix Spike/Matrix Spike Duplicate Results and Acceptance Limits	Section 5.3
• Spike/Duplicate Results and Acceptance Limits	
• Laboratory Control Sample Results and Acceptance Limits	
• Initial and Continuing Calibration Results and Acceptance Limits	
• All Raw Data and Logbook Sheets	
• Project Narrative which contains an explanation of any qualified data, and any observations or deviations encountered during analysis.	
Post Data Manipulation	
Describe the handling of electronic data (i.e., the flow of where it goes, and any data manipulation to transfer the data into tables, graphics, databases, models, etc.). Indicate where the data will be stored and identify applicable software as appropriate. Include:	Sections 8.2.2
• Field Data	
• Lab Data	
• Office Data (models, databases, etc.)	
• Describe any checks that will be performed to detect and correct errors, and to prevent loss of data during data reduction, data reporting and data entry into forms/reports/databases.	
ASSESSMENT/OVERSIGHT	
Form O – Assessments and Response Actions	Completed

QAPP Elements	Comments
Describe the assessment/oversight plan for the project, including: • Types of assessments and oversight that will be performed, • Frequency (approximate dates and/or timing), • Individuals responsible for performing the assessments and oversight (e.g., field leader, QA officer, LEP), • Individuals who will receive assessment/oversight report (indicate written or verbal) • Identify individuals responsible for dealing with corrective actions, and follow up on assessments and oversight.	Sections 9.0, 10.3 Note: small one-time projects should include, as a minimum, field oversight (early on in the project) by an experienced field leader knowledgeable in the project objectives. More complex projects, with multiple concerns, should increase the level of oversight and target key areas for examination. Also consider laboratory audits for important analytical parameters.
Form P – Project Reports	
Identify the types of reports (written and verbal) that will be provided to management for the project (e.g., status reports, interim reports, final reports, Performance Evaluation sample results, assessment/oversight findings, data quality assessments). Include: • Type of report • Frequency • Approximate due dates • Individuals responsible for preparing reports • Individuals and organizations receiving reports • Detail the specific contents of the final project report to establish appropriate expectations for both client and customer	Section 10.0 ★ Information to be provided in event-specific Field Sampling Plans.
DATA VALIDATION AND USABILITY	
Form Q-1 – Verification of Sampling Procedures	
Describe the final data evaluation process that will be performed on the data collected in the field (field notes, boring logs, field screening and field analytical data, etc.) • Indicate that all the field data will be collected and organized for the project file and reviewed to insure it is complete and compliant with the requirements specified in the QAPP. • Indicate who will perform this task and how it will be documented (e.g., cover letter plus field data evaluation report), including any observations, trends, conclusions and limitations concerning the field data.	Section 11.0
Form Q-2 – Data Verification and Validation	

QAPP Elements	Comments
Describe the final data evaluation process that will be performed on the laboratory data. • Indicate that all the laboratory data will be collected and organized for the project file and reviewed to insure it is complete and compliant with the requirements specified in the QAPP (Form N). • Indicate that the data will be evaluated to determine if the data met the precision, accuracy, bias, and sensitivity criteria supplied in Forms J, L, and M. (Note, data validation may also apply to field analytical data that is used in making critical decisions.) • Define any data qualifiers that will be applied to the data, should acceptance criteria (or control limits) not be met (i.e., U, J, UJ, R, B, etc.). • Indicate who will perform this task and how it will be documented (e.g., cover letter plus validation report), including any observations, trends, conclusions and limitations concerning the laboratory data.	Section 11.0
Form R – Data Usability	
Describe the project evaluation process that will be performed, using the complete data set as a whole, to determine if the objectives and criteria established for the project have been met. Including: • Describe the data tables, graphs and statistical evaluations that will be prepared/performed on the project data to illustrate trends, anomalies, and gaps in the data. • Indicate that important limitations on the use of the data, found during the data evaluation steps in Forms Q-1 and QC-2, will be documented and explained in the final report. • Indicate that the representativeness of the data will be evaluated and the results documented in the final report (i.e., does the data characterize the environment well (at locations, to areas, to the site as a whole), or are data gaps evident and more data needed). • Indicate the results of any comparability studies (i.e., data against data, data against regulatory standards, etc.) will be documented and explained in the final report. • Indicate that the data will be reviewed to determine if the sampling design met the project's objectives and the results documented in the final report. • Indicate that the overall usability of the data will be evaluated and the results documented in the final report. • Indicate that the final report will analyze the project data and present observations, draw conclusions, identify data gaps, and describe any limitations in the way the data should be used or interpreted. • Indicate who will be responsible for performing the project evaluation and reconciliation.	Section 12.0

APPENDIX B

STANDARD OPERATING PROCEDURES FOR SAMPLE COLLECTION

Project Sampling SOP 1B
Fuss & O'Neill, Inc. SOP for Sampling Equipment

The following list includes the equipment which may be necessary to perform groundwater, surface water, soil, and sediment sampling:

1. Documentation

- Field folders (maps, sampling and H&S plans, etc.)
- Bound, water-resistant field logbook
- Pen and permanent marker
- Field data forms
- Sample labels
- Analytical parameter request forms
- Chain-of-custody forms

2. Personal Equipment

- Disposable gloves
- Goggles or safety glasses
- Equipment and PPE required by Site Specific Health and Safety Plan
- Ruler or small tape measure
- Hand sprayers
- Paper towels
- Plastic garbage bags
- Bucket
- Scissors

3. Sampling Equipment

- Tape measure
- Water level measurement indicator
- Product/water interface probe
- Sample containers for field parameters
- Sample containers for laboratory parameters
- Sample preservatives
- Dedicated sampling scoops
- Sampling trowels
- Hand augers
- pH paper
- Field pH/specific conductance/temperature meters with probe, calibration solution, and control(s)
- Dissolved oxygen meter
- Turbidity meter

- Oxidation/reduction potential meter
- Photoionization detector (PID)
- Alpha horizontal water bottle
- Ponar® and Eckman grab samplers
- Wildco® core sampler
- Marsh-McBirney Current Meter
- Groundwater pumps (submersible, peristaltic, and/or bladder) with tubing and power source
- Stainless steel bailers
- Filter cartridges
- Coolers with ice packs or ice

4. Decontamination Equipment

- Non-phosphate detergent
- Nitric acid solution
- Methanol solution
- Deionized water
- Tap water
- Buckets
- Scrub brushes

Decontamination of equipment will be performed at the site when the equipment is to be used for the collection of multiple samples. Otherwise, decontamination will occur at Fuss & O'Neill, Inc. Decontamination will be performed in the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse followed by air drying.

Project Sampling SOP 2B
Fuss & O'Neill, Inc. SOP for
Field Parameters

Field parameters to be recorded during sampling events may include all or some of the following:

- Groundwater - pH, specific conductance, temperature, oxidation/reduction potential (ORP), dissolved oxygen, turbidity, and water
- Soil - organic vapor screening
- Sediment - sediment depth and sediment characterization (visual)
- Surface Water - pH, conductivity, temperature, dissolved oxygen, and water depth

The measurement of pH, specific conductance, temperature, ORP, DO, and turbidity will follow the instrument manufacturer's procedures, outlined in Appendix C.

Measurement of the water depth will be made at all sampling locations prior to groundwater sampling. The measurement of water depth will also be made inside and outside of river piezometers. The determination of the water depth will be made using a tape measure or electric water level indicator with graduations of 0.01 ft. The depth to water will be read from the survey reference point (top of well or piezometer pipe) and recorded on a Sampling Data Form.

For surface waters, measurement of water depth will be made at all surface water sampling locations prior to sampling. The determination of the water depth will be made using a tape measure with intervals of 0.01 ft.

Soil samples will be monitored for organic vapors during sample collection using an organic vapor meter (OVM). Monitoring of organic vapors will occur using the procedures presented in Appendix C. Volatile organic constituents will be analyzed by the laboratory at specific locations should information be available to indicate that organic compounds were managed or used at those specific locations. For other locations, soil samples will be screened using an OVM. Data collected from OVM screening will be used to help choose samples for laboratory analysis.

Project Sampling SOP 3B
Fuss & O'Neill, Inc. SOP for Low-Flow Groundwater Sampling – Peristaltic Pumps

The purpose of low-flow sampling is to obtain a representative sample of the groundwater quality that includes both the dissolved and colloidal fractions that are migrating. Low-flow sample collection is a technique that allows samples to be collected without the bias of suspended solids and includes colloids.

The technique is based on the fact that laminar flow occurs through a well screen when the well is undisturbed. Samples are collected from the screen interval at flow rates that will not disturb the laminar flow or the fine grained material within the well or filter pack. Pumping stresses are minimized through controlled sampling operations. Objective criteria are used to determine when sampling should begin, thus variability between sampling events is minimized.

Peristaltic Pumps

A peristaltic pump will be used for low-flow purging and sampling of wells at sampling well locations where the well diameter is too small for bladder pumps and may be used when the static water level in the well is sufficiently shallow to permit sampling by peristaltic pump (i.e., water levels shallower that 25 feet)..

The low-flow sampling system for peristaltic pumps is comprised of dedicated polyethylene tubing which is suspended in each of the sampling wells. The top of the tubing is connected to a stainless steel fitting secured to a milled PVC plastic cap which loosely fits the top of the PVC well casing and prevents the cap from sliding off the PVC. A small slot is cut into the side of the cap to allow for a water level measuring instrument to be lowered into the well without removal of the cap. This allows measurement of water levels without any disturbance of the sampling apparatus. A stainless steel fitting at the top of the cap allows connection of the sampling apparatus to peristaltic pump tubing.

The bottom of the tubing is centered at the midpoint of the screen and at a minimum of two feet above the well bottom to minimize disturbance of any fine-grained sediments that may have settled to the bottom of the well. The tubing is connected to a stainless steel fitting secured to a piece of PVC of a slightly smaller diameter than the well casing (a centralizer). The PVC centralizer and an additional piece of the PVC, which slides on the tubing, provide weight to keep the bottom of the tubing centered at the appropriate depth.

Groundwater is removed from the well through the tubing by suction provided by a peristaltic pump. The silicone tubing within the peristaltic pump is dedicated, of the same inside diameter as the well tubing, and is removed from the peristaltic pump after each use. The two types of tubing are joined with a tubing connector. The silicone tubing is stored in a plastic bag within the protective steel casing between each use.

WELL STABILIZATION

Prior to low flow purging, the tubing must first be purged of standing water. The determination of this purge volume is as follows:

Tubing radius = r = 0.0104 feet
Tubing volume (ft^3) = $V(ft^3)$ = $\pi r^2 \bullet$ length of tubing
Tubing volume (L) = $V(L)$ = $V(ft^3) \bullet 28.316$

Tubing Volume = Total Purge Volume

Begin purging the well at the minimum pumping rate. Slowly increase the pumping rate to a level that does not cause the well to drawdown more than 0.3 foot. Continue purging until the total purge volume has been met.

Continue to note and record any changes to the drawdown and pumping rate. Water levels in the well casing will be obtained with a water level indicator while pumping with the peristaltic pump is in progress. The variable speed of the peristaltic pump allows the pump to obtain flow rates as low as 0.1 liter per minute.

Begin monitoring designated indicator field parameters at 3 to 5 minute intervals with a flow-through cell. Stabilization parameters are pH, dissolved oxygen (DO), specific conductance, temperature, and turbidity. Oxidation/reduction potential (ORP) will be recorded during the stabilization process, but will not be used as a stabilization parameter. Research by Runnells and Lindberg (1990) and Whitfield (1974) has shown that there are limitations on monitoring ORP in the field.

The well is ready to sample when the designated field parameters have stabilized. Indicator field parameters have stabilized when three consecutive readings, taken at 3 to 5 minute intervals, satisfy the following criteria:

Temperature	± 3%
pH	± 0.1 unit
Specific Conductance	± 3%
DO	± 10%
Turbidity	± 10% for values greater than 5 NTU

Oxidation/reduction potential (ORP) will be recorded during the stabilization process, but will not be used as a stabilization parameter. Research by Runnells and Lindberg (1990) and Whitfield (1974) has shown that there are limitations on monitoring ORP in the field.

The target turbidity is less than or equal to 5 NTUs and three consecutive readings within 10%. Every effort should be made to attain these levels, including decreasing the pumping rate and extending the purge time. In some instances, due to geologic conditions, the sample turbidity may not decrease to the desired level. In these cases, and with the approval of the Project Manager or Site Manager, completion of well purging will be based upon stabilization of the indicator parameters without attainment of the targeted turbidity.

Due to the configuration of the turbidity meter, it cannot be connected with the multi-parameter meter. Turbidity screening; therefore, must be conducted separately. To collect samples for measuring turbidity, the two-way valve located at the bottom of the flow-through cell is turned so that water will flow out through the sampling line. The water is collected and the turbidity is measured.

If, after 1 hour of purging, the indicator field parameters have not stabilized, then discontinue purging and proceed to sample the water. A groundwater sample with a detection of metals in the unfiltered sample may be filtered using a 0.45 micron glass wool filter and reanalyzed. The reanalysis is to determine if the metal is actually present in the dissolved state in groundwater, or has adhered to sediment particles during sample collection. All efforts used to stabilize the parameters will be fully documented.

SAMPLING

The following procedure will be followed for the collection of groundwater samples.

After stabilization of indicator parameters or 1 hour of purging, record comments pertinent to the color and any obvious odors associated with the water.

Arrange and label necessary sample bottles and ensure that preservatives are added, as required. Labeling must include a unique sample number, time and date of sampling, the initials of the sampling personnel, and the identity of the sample fraction. Additionally, provide any information pertinent to the preservation materials or chemicals used in the sample. The pH of preserved samples should be checked to ensure that the proper sample pH has been attained. For VOC samples, collect a test sample to determine the adequacy of the amount of preservative in the pre-preserve sample bottles. Where needed, adjust the amount of preservative added to a sample bottle.

Make sure that the sampling tubing remains completely filled during sampling and that the water does not descend back into the well. Minimize turbulence when filling sample containers, especially VOCs, by allowing the liquid to run gently down the inside of the bottle. Fill the labeled sample bottles, and immediately seal each sample and place it on ice in a cooler to maintain sample integrity.

Once all sampling is completed, recover all sampling equipment and decontaminate or set aside for subsequent decontamination in accordance with the prescribed procedures. Close and secure the well site. Review all sampling records. Ensure that all necessary data is completed. Add additional information as needed.

Project Sampling SOP 4B
Fuss & O'Neill, Inc. SOP for Soil Sampling with Scoop

Scoops are either large stainless steel spoons or plastic disposable spoons. In general, a scoop will only be used where surficial samples are required, and where there is a need to obtain samples at hard to reach places.

a. Insert the scoop into the soil at a 0 to 45• angle from horizontal. This orientation minimizes the spillage of the sample from the sampler. Extraction of the sample might require tilting of the sample containers.

b. Slowly withdraw the scoop from the soil.

c. Transfer the sample into a suitable sample container with the aid of a spatula and/or brush.

d. Ensure that a Teflon® liner is present in the cap of the sample container.

e. Place all labeled sample containers in an iced cooler.

f. Record observations and soil type onto a Field Data Sheet.

g. Measure the total volatile concentration inside a plastic zip closure bag using an Organic Vapor Monitor. Record readings on the Field Data Sheet.

Project Sampling SOP 5B
Fuss & O'Neill, Inc. SOP for
Soil Sampling with Hand Auger

A hand auger is a common sampling tool for shallow soils. The tool is composed of a bucket auger which comes in various shapes and sizes, a shaft, and a T-bar handle. Extensions of the shaft are available to allow sampling at deeper internals. Typically, this tool is only effective to 5 feet since the sample hole usually begins to collapse at this depth.

a. Begin collection of the sample by applying a downward pressure while rotating the auger clockwise. When the auger is full of solid material it should be removed from the hole, and the material transferred into a stainless steel bowl using a stainless steel spoon. Continue sampling in this manner until the bottom of the sampling interval is reached.

b. At desired collection depths, collect the sample for VOC analysis immediately after removal from the auger and transfer to the appropriate glass container to minimize volatile loss.

c. Composite the remaining material in the sampling bowl by using the stainless steel spoon to break apart any large chunks of material, then mix and stir the material enough to thoroughly homogenize the sample.

d. Transfer the material into a labeled sample jar using the stainless steel spoon.

e. Place all labeled sample containers in an iced cooler.

f. Record observations and soil type onto a Field Data Sheet.

g. Measure the total volatile concentration inside a plastic zip closure bag using an Organic Vapor Monitor. Record readings on the Field Data Sheet.

Project Sampling SOP 6B
Fuss & O'Neill, Inc. SOP for Soil Sampling with Direct Push Technology

In general, direct-push technology will be employed using a Geoprobe® Soil Sampler. Direct-push technology will be used when the soil conditions are favorable (e.g., sandy soils), when the volume of soil required for analysis is less than 8 ounces, and when the depth of sampling does not extend more than 16 feet below ground level (BGL). The following procedure will be used.

a. Assemble the Geoprobe® soil sampler lined with an acetate sleeve.

b. The assembled sampler will be placed in the driving position beneath the anvil and driven using a slow throttle speed to ensure straight penetration of the sampler for the first two or four feet. In order to install the sampler, the throttle control will be adjusted for the remainder of the stroke as necessary to compensate for geologic conditions.

c. Additional lengths of rod will be attached to the sampler and driven until the desired depth of sample collection is obtained.

d. The stop pin will be removed by inserting extension rods inside the probe rods enabling the piston to retract into the sample tube while the sample is taken.

e. The soil sampler will be advanced to the bottom of the sample interval. Care will be taken not to over-drive the sampler, to avoid compacting the soil sample in the sampler tube.

f. The pull cap will be attached to the top of the drill string and lifted to remove the soil sampler from the ground.

g. The acetate sleeve will be removed from the soil sampler and cut lengthwise with a razor knife to collect the soil sample. The sample will be transferred into the necessary containers using a dedicated wooden tongue depressor or similar method (i.e. dedicated gloves). Care will be taken to minimize disturbance of the soil during transfer.

h. Sample labels will be attached to the sample containers. The containers will then be placed into a cooler and maintained at 4•C until they are delivered to the laboratory or the Fuss & O'Neill sample refrigerator. All information pertaining to the samples will be documented on field data sheets.

i. The geology of the sample will be recorded on a boring log.

j. The total VOC concentration of the excess soil will be measured inside a plastic zip closure bag using a photo-ionization detector (PID) or a flame-ionization detector (FID). This information will be recorded on the boring log.

Project Sampling SOP 7B
Fuss & O'Neill, Inc. SOP for Sediment Sampling – Surficial Samples

Surficial sediment samples can be obtained using either a simple scoop/dipper or a dredge sampler such as a Ponar® or Ekman dredge. The protocol for collecting surficial sediment samples using a scoop or dipper is as follows:

a. Affix a sample label to each container for that particular location immediately prior to sampling.

b. If sampling in a stream or flowing body of water, approach the sampling location from downstream, being careful not to disturb any underlying sediment. When two or more sediment samples from the same stream are to be collected, the first sample collected should be at the furthest downstream location, with subsequent samples collected in a sequence progressing upstream.

c. Push the scoop or dipper firmly downward into the sediment, then lift upward. Quickly lift the sampler out of the water.

d. Transfer the sediment from the scoop/dipper to the sample containers using a dedicated tongue depressor. For composite samples, transfer the sediment directly into a stainless steel bowl for homogenization. Materials such as surface vegetation (grass, leaves and plant stalks), roots, gravel, and artificial fill materials (e.g., asphalt, wood, brick, glass, ceramic, etc.) should not be included in the samples.

e. All labeled sample containers will be placed in an iced cooler.

A dredge sampler, such as a Ponar® or Ekman dredge, can be used to collect gross surficial, or bulk, sediment samples. Typically, a dredge sampler is used to obtain a sample from the first four inches of surficial sediments, those nearest the sediment-water interface. Collection of surficial sediment samples is typically performed for analysis of bulk sediment parameters such as benthic invertebrates, acid volatile sulfides and simultaneously extracted metals (AVS/SEM), and sediment toxicity.

The general procedure for collecting surficial sediment samples using a dredge sampler is as follows:

a. Affix a sample label to each container for that particular location immediately prior to sampling.

b. If sampling in a stream or flowing body of water, approach the sampling location from downstream, being careful not to disturb any underlying sediment. When two or more sediment samples from the same stream are to be collected, the first sample collected should be at the furthest downstream location, with subsequent samples collected in a sequence progressing upstream.

c. Hold the sampling pole so the open sampler jaws are positioned several inches above the surface of the sediment, then firmly thrust the sampler downward. Depress the button at the top of the sampling pole to release the spring loaded jaws.

d. Transfer the sediment from the dredge sampler to the sample containers using a dedicated tongue depressor. For composite samples, transfer the sediment directly into a stainless steel bowl for homogenization. Materials such as surface vegetation (grass, leaves and plant stalks), roots, gravel, and artificial fill materials (e.g., asphalt, wood, brick, glass, ceramic, etc.) should not be included in the samples.

e. All labeled sample containers will be placed in an iced cooler.

Standard operating procedures for collecting surficial sediment samples using the Ponar® and Ekman dredge samplers are attached.

Sediment samples will be described in the field following ASTM D2488-69 methods. The color of the sediment will be determined by consulting a Munsell Color Chart, while the description of grain size will be based on a particle size chart. This descriptive information, along with a thorough explanation of the sample location and sampling conditions, will be recorded on a field data sheet.

Project Sampling SOP 8B
Fuss & O'Neill, Inc. SOP for Obtaining Soil Samples from the Bucket of an Excavator

a. Affix a sample label to each container for that particular location immediately prior to sampling.

b. Scrape off the surface soil in the bucket using the scoop to ensure a fresh, non-volatilized sample.

c. Begin collecting the sample by applying a downward pressure on the scoop handle and then lift.

c. Transfer the soil directly to the sample container.

d. If a composite is being collected, a maximum of three discreet sample locations per bucket of soil will be used. Calculate the volume of soil needed to fill the appropriate sample containers for the required laboratory analysis. Collect equal aliquots of the calculated volume at each of the discreet sample locations and add it to a stainless steel bowl. After all of the aliquots are added to the stainless steel bowl, homogenize the soil with a dedicated wooden tongue depressor or dedicated spatula. Once the composite sample is appropriately homogenized, fill the appropriate sample container(s). No composite samples will be collected for VOCs.

e. Attach a sample label to the sample container(s) and place the sample into an iced cooler to maintain the temperature at 4• C.

Project Sampling SOP 9B
Fuss & O'Neill, Inc. SOP for
Field Decontamination

Field Decontamination of Personal Protective Equipment

All contaminated/soiled PPE will be discarded or decontaminated prior to leaving the site. The removal of this equipment will be undertaken outside of the exclusion zone, if one has been established, in the following order.

1. Tyvek suits will be removed and discarded.

2. Boots will be rinsed with water prior to being removed. The boot wash procedure will be upgraded depending on the nature of the contamination. Under some circumstances, disposable boots may be used and discarded prior to leaving the site.

3. When a respirator is utilized, it will be worn until all personal protective equipment except the gloves has been removed. The respirator will be washed with soap and water and wiped down with alcohol after use. Respirator cartridges will be discarded.

4. Gloves will be removed and discarded after all other personal protective equipment has been properly decontaminated and removed.

Field Decontamination of Sampling Equipment

Decontamination of field equipment must be conducted in the following two situations:

- when the same piece of sampling equipment is to be used at more than one sampling point
- prior to removing grossly contaminated equipment from a site

Decontamination of equipment will be performed at the site when the equipment is to be used for the collection of multiple samples. Otherwise, decontamination will occur at Fuss & O'Neill. General decontamination will be performed in the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse followed by air drying.

Equipment used for collecting samples containing VOCs will be decontaminated using the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse, methanol solution rinse, deionized water rinse followed by air drying.

Equipment used for collecting samples containing metals will be decontaminated using the following sequence: non-phosphate detergent wash, tap water rinse, deionized water rinse, nitric acid solution rinse, deionized water rinse followed by air drying.

In general, equipment must be disassembled in order to be adequately decontaminated.

APPENDIX C

STANDARD OPERATING PROCEDURES FOR FIELD EQUIPMENT OPERATION

Project Equipment SOP 1C
Fuss & O'Neill, Inc. SOP for
YSI Model 85 DO + SCT Meter

Principle of Operation

The YSI Model 85 is a portable, battery-powered, micro-processor based, digital meter, designed to measure salinity, conductivity, and temperature. The probe for the Model 85 is both a rugged plastic conductivity cell and a precision YSI thermistor temperature sensor with a dissolved oxygen probe, combined in a single unit.

YSI 85 Parameter Specifications

The YSI Model 85 SCT + DO has the following specific Work Specifications:

Ranges	Conductance:	User selected or Autoranging
		0 to 499.9 µS/cm
		0 to 4999 µS/cm
		0 to 49.99 mS/cm
		0 to 200.0 mS/cm
	Salinity:	0 to 80 PPT
	Temperature:	-5°C to +65°C
	Dissolved Oxygen:	Autoranging
		0 to 200% Air Saturation
		0 to 20 mg/L
Readability (Resolution):	Conductance:	0.1 µS/cm
		1.0 µS/cm
		.01 mS/cm
		0.1 mS/cm
	Salinity:	0.1 ppt
	Temperature:	0.1°C
	Dissolved Oxygen:	0.1% Air Saturation
		0.01 mg/L
Accuracy:	Conductance:	+/- 0.5% fs
	Salinity:	+/- 2% or +/-0.1 ppt
	Temperature:	+/- 0.1°C (+/- 1 lsd)
	Dissolved Oxygen:	+/- 2% Air Saturation
		+/- 0.3 mg/L
Temperature Compensation:		Calculated automatically
Adjustable Conductivity Reference Temperature:		15°C to 25°C
Adjustable Temperature Compensation Factor for Conductivity:		0% to 4%

Instrument Maintenance

The following daily calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- The instrument is inspected for physical damage or abnormalities and is then wiped down with a clean cloth dampened with deionized water. The probe is inspected and decontaminated with a solution of reagent grade methanol, HCl and deionized water.

- The instrument is calibrated with a known standard solution of KCl in water.

Daily Calibration Procedure for Conductivity and Dissolved Oxygen:

The following steps are used to calibrate the conductivity meter:

6. The instrument is cleaned with a cloth dampened with deionized water. The probe is rinsed with solutions of reagent grade hydrochloric acid, methanol, and deionized water. Then the probe is thoroughly rinsed with deionized water.

2. The temperature of the calibration solution is determined with a mercury-filled thermometer and this reading is noted in the calibration log book.

3. The probe is placed in a known calibration solution and the instrument is switched to the appropriate range.

4. Once the meter has reached a stable reading, the value observed is recorded in the calibration log book.

Daily Calibration Procedure for Dissolved Oxygen:

The following steps are used to calibrate the dissolved oxygen meter:

1. Insert probe into the cleaned calibration chamber with a clean wet sponge provided at the chambers bottom.

2. With instrument on, press the mode button until dissolved oxygen is displayed in mg/L or % and let reading stabilize. Fifteen minutes is usually required for stabilization of the temperature and dissolved oxygen readings.

3. With two fingers, press and release both the UP ARROW and DOWN ARROW buttons at the same time.

4. The display will prompt user to enter the local altitude in hundreds of feet (1 = 100ft). Press the arrow keys to increase or decrease the altitude. When the proper altitude appears on the display, press the ENTER button once.

5. CAL should now be at the lower left of the display, the calibration value should be displayed in the lower right of the display and the current % reading should be on the

main display. When the % reading is stable press the ENTER button. The display should read SAVE and return to the normal operation mode.

YSI 85 Meter Documentation

Daily calibration will be documented. The unit number, date, and calibration information will be recorded in a calibration log. The following information will be recorded on a standard field data sheet as the specific conductance data is obtained:

- Project name and number.
- Operator's name.
- Date and time of specific parameter measurement.
- Meter ID number.
- Sample code
- Conductivity reading
- Dissolved oxygen reading
- Temperature reading

Project Equipment SOP 2C
Fuss & O'Neill, Inc. SOP for
YSI-600 Series Water Analyzer

Principle of Operation

The YSI-600 Series Water Analyzer consists of a sonde, a monitoring device that is placed in water to gather water quality data that is measured by individual probes, the probes and a 610-D. The probes are fastened at the base of the sonde and take measurements of oxidation/reduction potential, dissolved oxygen, temperature, and temperature-compensated pH and specific conductance. Readings are displayed on the 610-D display unit in units of mV, mg/l, • C, S.U., and µMhos/cm (µS/cm) respectively.

Instrument Maintenance

The following calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- Calibration of the instrument will be performed as described in the calibration procedure.

- The Sonde must be thoroughly dried before removing or replacing a probe or probe port plug. When a probe or port are replaced, the connector port inside the Sonde is to be examined for moisture. If any moisture is found, the connector is to be completely dried. If any corrosion is found the unit will be replaced with another comparable unit. The cable connector port at the top of the Sonde should be covered at all times. Any moisture found in this area will be completely dried before continuing.

- The pH glass electrode and ORP platinum button, require maintenance only when obviously coated with sediment or biological growth. The glass and platinum can be cleaned by carefully removing the guard and wiping with a soft cloth soaked with soapy water and rinsed with clean water, followed by a routine decontamination process. The glass electrode is very delicate, be sure to wipe the electrode gently and do not put the probe down until the guard is replaced. Then a moistened cotton swab can remove any material that may be blocking the reference electrode junction of the sensor.

- The temperature and specific conductivity probe have openings that allow fluid access to the conductivity electrodes and must be cleaned regularly. This is accomplished by inserting a small cleaning brush into each hole several times using a mild detergent with the brush if necessary. After cleaning and decontamination, the probe will be checked with a calibration standard.

- Maintenance of the DO sensor is required when the instrument does not calibrate properly or when the membrane is dirty or damaged. Following cleaning and decontamination, recalibration is performed. The membrane and electrolyte is changed on a regular schedule to maximize the accuracy and life of the sensor.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill. Checks will be carried out in the field if there is a possibility that any memory has been cleared or readings seem anomalous.

When not in use, the YSI-600's sensors are protected with a screw on storage cup filled with tap water. This storage cap is utilized during all calibration procedures. A description of each calibration procedure is below.

1. pH Calibration

   The pH calibration is accomplished by pressing ESC and scrolling through the menu to CAL MODE , and pressing enter. The pH is then entered from the calibration menu. A three point calibration is chosen, the display then prompts the user to enter pH buffer that will be checked first, typically the 7.00 buffer. Buffer 7.00 is poured into the storage cup and placed under the probe, the user then presses enter, the unit will then prompt user to press enter again and to enter the next buffer for calibration. The sensor and storage cup are then rinsed with deionized water and the same procedure is followed using pH 4 or pH 10 buffers. Following these steps, calibration checks of all buffers will be conducted.

2. Specific Conductance Calibration

   The specific conductance calibration is accomplished by first rinsing the sensor and storage cup with deionized water several times, then filling the storage cup with KCl solution of a known standard molar concentration and specific conductance. When in CAL MODE the specific conductance, is chosen from the calibration menu and the known specific conductance value is entered in the display unit and the calibration is then saved. Following these steps, the storage cup is rinsed again with deionized water and then refilled with the standard KCl solution to recheck the calibration.

3. Dissolved Oxygen Calibration

   The dissolved oxygen calibration is accomplished by filling the storage cup with tap water to a level just below the membrane and then capping the storage cap. When in the CAL MODE the Barometer reading for the day is entered. These values are used to determine the correct calibration value to be entered into the display unit. Once the correct pressure has been entered, press the ENTER key to save the value.

4. ORP Calibration

   The ORP calibration is accomplished by filling the storage cup with Zobel solution to a level to cover the ORP probe, about one half inch. While in CAL MODE scroll to ORP and press enter. The unit will then prompt for a value to be entered (Zobel has a value of 225), after entering the value, press enter to calibrate.

When the values for all the parameters have all been entered for calibration, press ESC until the MAIN MENU is displayed. Scroll back to run and press enter. Check the calibration for all parameters before continuing.

YSI 600 Meter Documentation

Daily calibration will be documented. The unit #, date, and calibration information will be recorded in a calibration log. The following information will be recorded on a standard field data sheet as the specific conductance data is obtained:

- Project name and number.
- Operator's name.
- Date and time of specific parameter measurement.
- Meter ID number.
- Sample code
- Conductivity reading
- Dissolved oxygen reading
- Oxidation/Reduction potential reading
- pH reading
- Temperature reading

YSI 600 Component Specifications

600XL Sonde

Operating Environment	
Medium:	Fresh, sea, or polluted water
Temperature:	-5 to +45 • C
Depth:	0 to 200 feet (61 meters)
Storage Temperature:	-40 to +60 • C for sonde and all sensors except pH and ORP -20 to +60 • C for pH and ORP sensors
Material:	Polyurethane, PVC, Stainless Steel
Maximum Diameter:	1.6 inches (4.06 cm)
Maximum Length:	20.75 inches (52.7 cm)
Maximum Weight:	4.9 pounds (2.22 kg)
Internal logging memory size:	384 KB (150,000 individual parameter readings)
Computer Interface:	RS-232C, SDI-12
Power:	External 12 VDC (8 to 13.8 VDC)

Conductivity Probe

Sensor type	4 electrode cell with autoranging
Range	0 to 100 mS/cm
Accuracy	+/- 0.5 % of reading + 0.001 mS/cm
Resolution	0.001 mS/cm to 0.1 mS/cm (range dependent)
Depth	200 meters

Temperature	
Sensor Type	Thermistor
Range	-5 to 45 •C
Accuracy	+/- 0.15 •C
Resolution	0.01 •C
Depth	200 meters

Dissolved Oxygen, % saturation	
Sensor Type	Rapid Pulse-Clark type, polarografic
Range	0 to 500 % air saturation
Accuracy	0-200 % air saturation, +/- 2 % of the reading or 2% air saturation, whichever is greater 200-500 % air saturation, +/- 6 % of reading
Resolution	0.1 % air saturation
Depth	200 meters

Dissolved Oxygen, mg/L	(calculated from % air saturation, temperature and salinity)
Sensor Type	Rapid Pulse-Clark type, polarographic
Range	0 to 50 mg/L
Accuracy	0 to 20 mg/L, +/-2 % of the reading or 0.2 mg/L, whichever is greater 20 to 50 mg/L, +/- 6 % of the reading
Resolution	0.01 mg/L
Depth	200 meters

Salinity	
Sensor Type	Calculated from conductivity and temperature
Range	0 to 70 ppt
Accuracy	+/- 1.0 % of reading or 0.1 ppt, whichever is greater
Resolution	0.01 ppt

pH	
Sensor Type	Glass combination electrode
Range	0 to 14 units
Accuracy	+/- 0.2 units
Resolution	0.01 units
Depth	200 meters

ORP	
Sensor Type	Platinum button
Range	-999 to +999 mV
Accuracy	+/- 20 mV
Resolution	0.1 mV
Depth	200 meters

Project Equipment SOP 3C
Fuss & O'Neill, Inc. SOP for Quanta Water Quality Monitoring System

Principle of Operation

The Quanta Water Quality Monitoring System consists of a transmitter and a display screen. The transmitter is a monitoring device that is placed in water to gather water quality data that is measured by individual probes. The probes are fastened at the base of the transmitter and take measurements of oxidation/reduction potential, dissolved oxygen, temperature, pH, salinity/total dissolved solids (TDS), specific conductance, and barometric pressure. Readings are shown on the Quanta display screen in units of mV, mg/l, °C, PSS, µMhos/cm (µS/cm), and mmHg respectively.

Instrument Maintenance

The following calibration and maintenance procedures are conducted at Fuss & O'Neill before instruments are released for use.

- Calibrations of the instrument will be performed as described in the calibration procedure.
- The Transmitter must be thoroughly dried before removing or replacing a probe or probe port plug. When a probe or port is replaced, the connector port inside the transmitter is to be examined for moisture. If any moisture is found, the connector is to be completely dried. If any corrosion is found, the unit will be replaced with another comparable unit. The cable connector port at the top of the transmitter should be covered at all times. Any moisture found in this area will be completely dried before continuing.
- The pH glass electrode and ORP platinum band, require maintenance only when obviously coated with sediment, oil or biological growth. The glass and platinum are cleaned by carefully removing the guard and wiping with a soft cloth soaked with soapy water and rinsed with clean water, followed by routine decontamination process. The routine decontamination process we use consists of: methanol, de-ionized water, HCL, and de-ionized water again. The glass electrode is very delicate and is handled carefully. Then a moistened cotton swab can remove any material that may be blocking the reference electrode junction of the sensor.
- The specific conductivity, salinity, and TDS probe are cleaned with a mild detergent using a small non- abrasive brush and then rinsed with water. This is followed by the routine decontamination process. After cleaning and decontamination, the probe will be calibrated and checked with a calibration standard.
- Maintenance of the dissolved oxygen sensor is required when the instrument does not calibrate properly or when the membrane contains air bubbles. Following cleaning and decontamination and re-calibration is performed. The membrane and electrolyte is changed on a regular schedule to maximize the accuracy and life of the sensor.

- The temperature and probes are cleaned by using a mild detergent with a non-abrasive brush and then rinsed with water. This is followed by a routine decontamination process and calibration check.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill. Checks will be carried out in the field if there is a possibility that any memory has been cleared or readings seem anomalous.

When not in use, the Quanta sensors are protected with a screw on storage cup containing a sponge soaked with tap water. This storage cap is utilized during all calibration procedures and is always rinsed first. A description of each calibration procedure is below.

1. pH Calibration

This is a two point calibration therefore a pH standard between 6.8 and 7.2 is used and treated as zero, all other values are treated as slope. The pH buffer representing "zero" is poured into the cup and the probe is submersed in the solution. The pH calibration is accomplished by using the arrow key to scroll over to the CALIB button and pressing enter. Once on this screen, the cursor is used to scroll down to pH and selected by pressing enter. A new screen appears with the present pH value that the probe is reading. Utilizing the up/down arrow key the pH value is adjusted to read the value of the buffer solution that the probe is submersed in. Once the appropriate value is reached is reached the value is saved. The sensor and storage cup are then rinsed with de-ionized water and the same procedure is followed using pH 4 or pH 10 buffer. Once calibration is complete a check is done on the pH buffers just utilized.

2. Specific Conductance Calibration

The storage cup is filled with KCl solution of a known standard molar concentration and specific conductance (1000 is the standard usually used). The same steps are followed to reach the calibration screen as in the pH calibration. The up/down arrow key is used to scroll down to specific conductance and selected by pressing enter. A new screen appears showing the value that the probe is presently reading based on the calibration standard. This number is adjusted by using the up/down arrow key to reach the value that the standard equals. Once this value is reached the number is saved by pressing the enter key. Following these steps, the storage cup is rinsed again with de-ionized water and then refilled with the standard KCl solution to check the calibration.

3. Dissolved Oxygen Calibration

The barometric pressure is set at 760 mmHg as a default. The value of 8.4 mg/L is used as the calibration standard for dissolved oxygen. The dissolved oxygen calibration is accomplished by holding the probe in the ambient air. The same steps are followed for dissolved oxygen as for the other calibrations. Once the value reads 8.4 mg/L the enter button is pushed prompting 760mmHg to read on the screen, by pressing enter once more the 8.4mg/L value will be saved. This completes the calibration process. A check is now done to assure the operator that the value is saved.

4. ORP Calibration

The ORP calibration is accomplished by sufficient filling the storage cup with Zobel solution to cover the probe. While in CALIB mode scroll to ORP and press enter. Then, using the up/down arrow key the number is adjusted to 225 mV; the value of the solution . Press enter and the value will be saved. A check is now done to assure that the value is saved in the memory.

When the values for all the parameters have all been entered and saved, ESC is pressed. The screen will take 5 seconds to power up followed by the appearance of the original screen. Any values that did not save will be calibrated until the values are held in the database.

Quanta Meter Documentation

Daily calibration will be documented. The unit number, date, and calibration information will be recorded in a calibration log. The following information will be recorded on a standard field data sheet as data is obtained:

- Project name and number
- Operator's name
- Date and time of specific parameter measurement
- Meter ID number
- Sample code
- Conductivity reading
- Dissolved oxygen reading
- Oxidation/Reduction potential reading
- pH reading
- Temperature reading

Quanta Component Specifications

Operating Environment:	
Medium:	Fresh, sea, or polluted water
Temperature:	-5 to 50 °C
Depth:	0 to 328 feet (100 meters)
Materials Used:	Polyurethane, PVC, Stainless Steel
Transmitter Diameter:	7.6 cm (3 in)
Screen Width:	12.7 cm (5 in)
Handle Width:	6.4 cm (2.5 in)
Screen Size (diagonal):	8.9 cm (3.5 in)
Screen Length:	26.9 cm 10.6 in)

Transmitter Length:	22.9 cm (9 in)
Screen Weight (w/batteries):	0.95 kg (2.1 lbs)
Transmitter Weight:	1.3 kg (3 lbs)
Memory Size (1 frame stores all parameter values):	100 data frames (nonvolatile flash)
Batteries:	3C alkaline, >15 hour life
Waterproof Rating:	NEMA 6 (IP67)
Operating Voltage Range:	7 to 14 VDC
Conductivity Probe	
Range	0 to 100 mS/cm
Accuracy	+/- 1 % of reading +/- 1count
Resolution	4 digits
Temperature	
Range	-5 to 50°C
Accuracy	+/- 0.2°C
Resolution	0.01 °C
Dissolved Oxygen	
Range	0 to 50 mg/L
Accuracy	+/- 0.2 mg/L less than or equal to 20 mg/L +/- 0.6 mg/L > 20 mg/L
Resolution	0.01 mg/L
Salinity	
Range	0 to 70 PSS
Accuracy	+/- 1 % of reading +/- 1 count
Resolution	0.01 PSS
pH	
Range	2 to 12 units
Accuracy	+/- 0.2 units
Resolution	0.01 units
ORP	
Range	-999 to 999 mV
Accuracy	+/- 25 mV
Resolution	1 mV

Project Equipment SOP 4C
Fuss & O'Neill, Inc. SOP for
HF Scientific DRT-15 C Portable Turbidimeter

Introduction

The DRT Turbidimeter is a direct reading nephelometric instrument which measures scattered light from particles in suspension in a liquid. The optical signal is stabilized and amplified to energize a meter. The instrument uses solid state electronic components and resists thermal variation and lamp aging. Turbidity readings are given in Nephelometric Turbidity Units (NTU) which are comparable to Jackson Turbidity Units (JTU) and Formazin Turbidity Units (FTU).

Personnel who use the HF Scientific DRT-15 portable turbidimeter will have read the factory manual and received training on the proper usage of the instrument in the field.

Principle of Operation

Turbidity, or cloudiness in water, can be interpreted as an absence of clarity or brilliance. It is caused by suspended or colloidal particles such as clay, silt, organic/inorganic material, and microscopic organisms. In surface and groundwaters, turbidity is an indicator of quality and productivity.

Light passing through clear water will travel in a straight line. Particles in turbid water will scatter the light and cause it to look cloudy. The turbidity of a sample is the measure of the amount of scatter that occurs when light is passed through the sample. High turbidity indicates greater scattering of the light.

Nephelometers are turbidimeters that measure the scattered light at a 90• angle from the light source. A reference beam passes through the sample and is measured at a 180• angle. The ratio of these two readings is converted to a turbidity measurement in NTU.

Operation and Description

Cuvettes used for instrument calibration and sample measurement should be matched or indexed. For accurate measurements in the low range, rotate the cuvettes in the well to obtain the minimum reading. Mark the cuvette with an adhesive dot provided to ensure identical orientation of the cuvettes with each measurement. To operate the instrument, switch to the "20" range and place the Reference Standard (0.02 NTU) in the optical well. With the light shield in place over the well, adjust the Reference Adjust knob to cause the meter to read the reference standard value on the scale. The calibration of the instrument should be checked using a turbidity free sample as a control. The unit is now ready for use in either range.

To make a measurement of a sample, clean one of the cuvettes and fill to within approximately ½" of the top with the sample. Place the top on the cuvette and carefully clean the outside surface with a lint free wiper such as KimWipes. Place the sample in the well and place the light shield over the well. Select the appropriate range for best readability.

If the instrument has been subjected to cold (• 10• C), and then brought indoors, it should be allowed to warm up before use since condensation may form on the various lenses. The can be aided by leaving the case open and the instrument on for approximately 30 minutes.

The DRT-15C is shipped complete with a 0-1 mA recorder output. The jack is located on the right side of the chassis. To use, connect the ⅛" miniplug provided to your recorder. Adjust R11 to obtain full scale output compatible to a full scale reading. Once this adjustment is made, the DRT-15C will always be set up for the recorder.

The cuvette should be a 28 mm o.d. glass sample container with a cover. The critical measuring area is ¾" wide band which starts ⅝"from the bottom of the container. This area of the cuvette should be kept clean and free of scratches and abrasions.

Calibration Procedures

A complete calibration check will be performed before and after each sampling day at Fuss & O'Neill.

A. Standard Formazin Solutions

The calibration of this instrument is based upon Formazin, a material which can be synthesized and reproduced repeatedly within one percent. When properly mixed, the number, size and shape of molecules are identical, thus making it ideal as a turbidity standard. Calibration samples may be obtained by diluting Formazin stock suspension using "Turbidity-Free" water. Table 1 outlines the procedure for preparation of 198, 19.8 and 2.0 NTU stock calibration solutions.

TABLE 1
PROCEDURE FOR PREPARATION OF STANDARD FORMAZIN SOLUTIONS

Value	Pipettes Required	Amount to Pipette into a 200 mL Volumetric Flask
198 NTU	10 mL graduated in 0.1 mL	9.9 mL of 4000 NTU stock solution. Add low turbidity water to 200 mL mark.
19.8 NTU	20 mL volumetric	Pipette 20 mL of the 198 dilution into another 200 mL volumetric flask. Add low turbidity water to the 200 mL mark.
2.0 NTU	2.0 mL volumetric	Pipette 2.0 mL of the 198 dilution into a 200 mL volumetric flask. Add low turbidity water to the 200 mL mark. (NOTE: Value include 0.02 NTU added by the water.

NOTE: When the prepared samples start to flocculate, they are unreliable and fresh ones must be made. This will occur more rapidly for the lower value diluted solutions.

B. Electronic Calibration Using Freshly Prepared Formazin Solutions

1. Fill, cap, and label three cuvettes, one for each of the standard solutions (198, 19.8, 2.0 NTU).
2. Invert each cuvette several times to mix the contents before placing it in the Optical Well for a reading.
3. Center the Reference Adjust control on the top of the instrument.
4. Insert the reference standard and turn the range control to the "20" range". Adjust the "Coarse Zero" trimpot (R2) until a reading of 0.02 NTU is obtained.
5. Replace the reference standard with the 19.8 NTU standard and adjust the "20 Range Adjust" trimpot (R7) to obtain a reading of 19.8 NTU • 0.1 NTU.
6. Replace the 19.8 NTU standard with the reference standard and adjust the reference adjust control to obtain a reading of 0.02 NTU.
7. Repeat steps 6 and 7 until no further adjustments are necessary.
8. The 2.0 NTU Formazin Standard may be used to check the calibration for low readings.
9. Turn the range control to the 200 range. Insert the 198 NTU standard and adjust the "200 Range Adjust" trimpot to obtain a reading of 198 • 1 NTU.
10. Use a sample of turbidity free water as a control to verify the calibration of the instrument.

Trouble Shooting

Symptom	Possible Cause	Solution
Meter does not respond when a sample is set into the well.	1. Lamp is burned out.	Replace lamp** and recalibrate.
	2. Printed circuit board is faulty.	Replace printed circuit board and recalibrate.
	3. Battery is dead.	Replace battery.
Reference adjust knob does not have enough travel to adjust for the reference standard value.	1. Scratched or rubbed reference standard container or aged reference standard	Replace reference standard.
	2. Optics have aged.	Recalibrate.
	3. Faulty lamp.	Replace lamp** and recalibrate.
The display will not stabilize when the reference standard is in the well.	1. Light shield is incorrectly placed over the well.	Reposition light shield.
	2. Battery has lost its charge. (Low battery light should be on.)	Recharge battery.
	3. Cold sample causes condensation on the cuvette which affects the light reading being received by the detectors.	Allow sample to equilibrate to ambient conditions.
	4. Unit has not been given sufficient time to stabilize at ambient temperature conditions after a change of temperature.	Allow additional time for instrument temperature to equilibrate.

NOTE: The lamps used in this instrument have an extremely long life. Make sure the lamp is the problem before replacing.

Maintenance

A. Battery Replacement

Should the battery fail, it can be replaced. Make certain that the instrument is turned off. Remove all accessories from the foam holder. Remove the foam holder by placing fingers in the cuvette holes and pulling the rear of the foam forward, then up. Five Phillips head chassis screws should be removed then remove the chassis from the case by sliding the chassis all the way to the right and pulling up. The two screws on the right side of the chassis need to be removed to allow for the removal of the battery clamp and the old battery. Replace the battery by reversing the procedures described above. When connecting the battery, be certain to connect the red wire to the terminal marked (+) and the black wire to the terminal marked (-).

B. Lamp Replacement

The lamp source has an extremely long life. Before replacing the lamp, make certain that the battery is not in need of a charge and is not defective. To replace the lamp, remove the chassis as described above under "battery replacement". Remove the lamp wires at TB1 terminals numbers 9 and 10. To remove the lamp, loosen the two set screws on the outermost barrel with a 5/64" hex wrench and pull the lamp straight out. Replace the chassis in the case and recalibrate as described in calibration procedures.

Specifications

Ranges (NTU)	**0-20 and 0-200 NTU**
Linearity	• 1% of full scale on either range
Repeatability	• 1% of full scale on either range
Response	Virtually immediate in all ranges.

Project Equipment SOP 5C
Fuss & O'Neill, Inc. SOP for Thermo Environmental Instruments Model OVM 580B Organic Vapor Meter

Introduction

The Model 580B Organic Vapor Meter (OVM) is a portable micro-processor controlled, photoionization instrument which is used to detect and measure volatile organic compounds in various atmospheres.

The analyzer is a single, self-contained unit with the probe assembly, detector, amplifying and recording assembly all housed in a single self-contained unit.

Personnel who operate the OVM 580B will have read the factory manual and have received training on the proper usage of the instrument in the field. All calibrations of the OVM 580B will be conducted in-house at Fuss & O'Neill prior to use of the instrument in the field. Personnel will have a cylinder of isobutylene in the field to periodically verify instrument calibration.

Principle of Operation

The OVM 580B measures the concentration of trace volatile organic gases by the principle of photoionization. The general operation of the OVM 580B is in a non-compound specific mode. That is, the detector, which has been calibrated to isobutylene (a benzene equivalent), can accurately measure isobutylene or benzene, but when exposed to other volatile organic compounds, will measure them qualitatively and not quantitatively. If the measurement of a specific volatile organic compound is desired, then a conversion factor can be calculated in the lab for the VOC of interest. This conversion factor can then be programmed into the OVM 580B's memory in the lab or in the field. However, in this case a correction factor will not be applied to convert from the calibration compound to the compound of interest. The field screening data collected with the OVM is a quantitative assessment of total VOC concentrations to be used in comparison to other OVM data from the same boring collected during similar weather conditions via similar methods. The potential variability associated with field screening is too high to simply correlate and compare laboratory data.

Photoionization occurs when an atom or molecule absorbs light of sufficient energy to remove an electron, leaving a positively charged atom or electron. This process will occur in the OVM 580B when the ionization potential of a compound (the energy in eV required to remove an electron) is less than the energy of the lamp in the unit. The lamps which Fuss & O'Neill use have ionization potentials of 10.6. Therefore, any volatile organic compound which has an ionization potential of less than 10.6 eV can be detected by the OVM 580B. Within the detection chamber of the OVM 580B is a positive-biased electrode. This electrode causes the ionized molecules to travel to a collector in the chamber. Here the ions create a current proportional to the concentration at the collector. This current is then amplified and the signal displayed on the meter.

Daily Calibration Procedure

Daily calibration and maintenance involve the following procedures which are carried out in-house prior to releasing an instrument for field use.

1. The instrument is cleaned with a cloth dampened with deionized water and inspected for physical damage or abnormalities.

2. The probe is then visually inspected for any physical damage. The probe tip is opened and inspected for any clogging with dirt or sediment and cleaned if necessary. The filter located in the probe tip is also inspected for any clogging and cleaned if necessary.

3. The housing of the OVM 580B is opened and the high voltage power supply is removed.

4. The lamp is removed for cleaning.

5. The lamp is then cleaned with the cleaning compound supplied by Thermo Environmental Instruments as specified below under "Maintenance".

6. The lamp and the power supply are reinstalled.

7. The instrument is zeroed.

8. The analyzer is calibrated with a cylinder and a regulator. The cylinder contains a calibration gas consisting of a mixture of isobutylene in zero air. The analyzer is turned on, and the span setting is set to match the ppm reading stamped on the side of the cylinder. This reading will set the instrument to an isobutylene standard.

9. Verify the calibration of the instrument with a check standard (e.g. a standard gas with a different lot number).

OVM 580B Meter Documentation

Daily calibration is documented with the date and calibration information recorded in an equipment log book. The following information is recorded on a standard field data sheet as the OVM 580B data are obtained.

- Project name and number.
- Operator's name.
- Date and time of gas measurement.
- Data values obtained.

Maintenance

Routine maintenance of this instrument involves the calibration of the instrument (see above), cleaning the lamp and lamp window, and maintaining the battery charge.

1. Lamp Cleaning and Replacement

   Removal
   - Make sure the instrument is turned off.
   - Loosen the four screws holding the case top and bottom together. Place case bottom flat on the table and the top on its side next to the bottom.
   - Remove the high-voltage power supply by loosening the thumbscrews on each side and pulling the power supply towards the rear of the instrument.
   - Remove lamp by loosening the lamp nut.

   Cleaning
   - Clean the lens surface of the lamp using the aluminum oxide scouring powder provided by Thermo Environmental Instruments.
   - Place a small amount of aluminum oxide on the lens of the lamp.
   - Gently scour in a rotary type motion with a soft cloth or tissue.
   - Gently blow the remaining powder from the lens.
   - Thoroughly wipe the lamp lens with a clean tissue to remove the last traces of cleaning powder.

   Insertion
   - Place lamp flat against o-ring and fasten lamp nut to create a proper seal.
   - Insert the high-voltage power supply and tighten thumb screws. There are three pins protruding which should fit snugly into connectors located beneath the detector.
   - The lamp spring should make contact with the lamp ring.

2. Battery Recharging

   When there is a flashing "B" in the lower left corner of the display while the instrument is in the run mode, the battery is low.
   - The battery is recharged by plugging the charger into the RUN/CHARGE plug at the rear of the instrument.
   - The instrument will run while charging.
   - The charger has an LED which indicates the amount of current being drawn. The LED gets brighter as more current is drawn and can therefore be used as a rough indication of the charge on the battery.

Instrument Operation

1. Press "ON" to turn instrument on. This will indicate to the microprocessor to turn on the lamp and pump. The microprocessor will send power to the lamp and pump and check to make sure the lamp is lit. If it does not light, the microprocessor will try again. If after 14 seconds, the lamp does not light, a lamp out condition will be indicated. Once the lamp is lit, the display will show the PPM on the bottom line. The top line will be either a bar graph or the maximum reading.

2. There are two run modes available: Max Hold and Concentration. In concentration mode, the top line of the display is a bar graph. The bar graph is a logarithmic bar graph over the range of 0-2000 ppm which is intended as a rough visual indicator of the current ppm. The bottom line will indicate the exact ppm.

   In Max Hold mode, the top line of the display will indicate the maximum reading while the bottom line indicates the current ppm. Whenever a new maximum is seen, the top line will be updated. The Max Hold reading may be reset by pressing the RESET button while in the run mode.

3. The instrument has the capability to store up to 700 data points for review later. Each reading is assigned a date and time as well as a location code. This mode is entered by pressing the MODE/STORE switch while in the Run mode at which time the message "LOG THIS VALUE?" will appear on the top line and either ppm or max ppm will be on the bottom line.

Pressing "-/CRSR" will bring up the Main Menu.

4. Press "-/CRSR"again to enter the Parameters Mode. Press "-/CRSR" twice more to calibrate. Press RESET.

5. The instrument will ask whether you wish to restore backup. Press "-/CRSR".

6. Press RESET when ready to zero the gas. The display will read "Model 580 Zeroing" which will change to "Span ppm = 0098, "+" to continue". Make sure the span ppm = calgas ppm. Press "+/INC".

7. The message "Span Gas, Reset when ready" will appear. Attach the Tedlar bag of calgas to the probe. Press RESET. The display will show "Model 580 Calibrating". Press MODE/STORE.

8. You are now in "ready" mode. If the reading is not 5 percent of calgas, clean the bulb and check the filter for dirt.

OVM 580B Specifications

Detection Range:	0.1 to 2000 ppm by volume.
Ranges:	Digital readout (LCD) - auto ranging.
Resolution:	0.1 ppm 0-200 ppm range 1.0 ppm 200-2000 ppm range
Response Time:	2.0 seconds at 400 mL/min. sample flow.
Sampling Rate:	Nominal flow 400 mL/min.
Power Requirements:	Internal battery or AC.
Battery Operating Time:	8 hours on full charge

Project Equipment SOP 6C
Fuss & O'Neill, Inc. SOP for The Niton XL-309 XRF.

Instrument Precautions:

The Niton XRF contains a factory sealed Cadmium-109 radioactive source. This Cadmium-109 is an emitter of both gamma-rays and x-rays and should only be used in the analysis of environmental samples. Never open the shutter and point the unit at yourself or others and never look inside the unit at the source. Always remember that gamma-rays and x-rays are capable of penetrating solid surfaces and care should be exercised when operating this unit or any other radiation source.

Instrument Setup:

. Turn instrument on. The on switch is located on the back of the unit.
. Using the arrow keys point the cursor to Setup Menu and press clear/enter.
. Using the arrow keys scroll to Setup Paint Mode and press clear/enter.
. Using the arrow keys scroll to Standard Mode + Spectra and press clear/enter.
. Using the arrow keys scroll to Calibrate & Test and press clear/enter.

At this point the unit will go through a short verification of the internal calibration and source check and will, after completion, display Ready to Test.

The calibration of the instrument can be verified using the Lead paint cards supplied with the instrument. The unit is placed on the card and the shutter is opened and numerical value will be displayed. The Lead paint card shows the true value with a +/- range. The display value must fall within that range. If it fails to fall within that range start the calibration procedure over. If it fails again contact a Niton representative.

Instrument Operation With Barcode Reader:

. On the side of the XRF unit is a safety slide that prevents the accidental opening of the shutter. This slide must be pushed forward for the shutter to open.
. Attach the Barcode Data Entry System light pen to the serial port located on the rear of the unit. The XRF will automatically change to the barcode reader display.
. Strap the Velcro Barcode reader cards to your wrist.
. Before taking a reading scan the barcode reader cards with the light pen and input as much information as possible to describe the location of each reading.
. After the barcode reading has been input, place the XRF unit flat on the area to be read and press the shutter release button on the side. This will open up the shutter and the XRF will change screens to show the spectra and result.
. Readings and spectra are automatically stored in the unit and up to 1000 readings/spectra can be stored before the unit is at data capacity. (See section on downloading data.)
. Repeat steps 3 and 4 for each subsequent reading.
. Make all necessary documentation in the Lead Soil Data Sheets and/or the XRF logbook.

Standard Operating Procedure for The Niton XL-309 XRF. Test Soil, Bulk Samples-Direct Soil Contact.

Instrument Precautions:

The Niton XRF contains a factory sealed Cadmium-109 radioactive source. This Cadmium-109 is an emitter of both gamma-rays and x-rays and should only be used in the analysis of environmental samples. Never open the shutter and point the unit at yourself or others and never look inside the unit at the source. Always remember that gamma-rays and x-rays are capable of penetrating solid surfaces and care should be exercised when operating this unit or any other radiation source.

Instrument Setup:

. Turn instrument on. The on switch is located on the back of the unit.
. Let instrument warm up for 15 minutes.
. Using the arrow keys point the cursor to Setup Menu and press clear/enter.
. Using the arrow keys scroll to Test Soil, Bulk Samples and press clear/enter.
. Using the arrow keys scroll to Calibrate & Test and press clear/enter.

At this point the unit will go through a short verification of the internal calibration and source check and will, after completion, display Ready to Test.

The calibration of the instrument can be verified using the XRF cup filled with NIST certified standards supplied with the instrument. The unit is placed on the soil platform that contains the XRF cups and the shutter is opened and a numerical value will be displayed. The displayed value must fall within the range shown below. If it fails to fall within that range start the calibration procedure over. If it fails again contact a Niton representative.

Low Standard: 18.9 +/- 0.5
Med. Standard: 1162 +/- 31
High Standard: 5532 +/- 80

Instrument Operation-Direct Soil Contact:

. On the side of the XRF unit is a safety slide that prevents the accidental opening of the shutter. This slide must be pushed forward for the shutter to open.
. Place the Niton Soil Guard directly on the soil to be analyzed.
. Pace the XRF unit directly on the guard and press the shutter release button on the side of the unit.
. The display will give the spectra, concentration in ppm and the detection limit.
. Make all necessary documentation in the Lead Soil Data Sheets and/or the XRF logbook.

Standard Operating Procedure for The Niton XL-309 XRF. Test Soil, Bulk Samples Using XRF Sample Cups: Dried Sieved Samples.

Instrument Precautions:

The Niton XRF contains a factory sealed Cadmium-109 radioactive source. This Cadmium-109 is an emitter of both gamma-rays and x-rays and should only be used in the analysis of environmental

samples. Never open the shutter and point the unit at yourself or others and never look inside the unit at the source. Always remember that gamma-rays and x-rays are capable of penetrating solid surfaces and care should be exercised when operating this unit or any other radiation source.

XRF Data Comparison Study:

When possible a comparison study should be conducted to determine the most accurate means of soil analysis prior to the sampling event. A set of two identical soil samples should be collected with one set to be analyzed by a fixed laboratory and the second set analyzed by the XRF using both a wet and dry sample. A comparison of the two sets of data (fixed lab verses field) is then made to determine which of the two XRF data sets (wet verses dry) is the most accurate.

Instrument Setup:

. Turn instrument on. The on switch is located on the back of the unit.
. Let instrument warm up for 15 minutes.
. Using the arrow keys point the cursor to Setup Menu and press clear/enter.
. Using the arrow keys scroll to Test Soil, Bulk Samples and press clear/enter.
. Using the arrow keys scroll to Calibrate & Test and press clear/enter.

At this point the unit will go through a short verification of the internal calibration and source check and will, after completion, display Ready to Test.

The calibration of the instrument can be verified using the XRF cup filled with NIST certified standards supplied with the instrument. The unit is placed on the soil platform that contains the XRF cups and the shutter is opened and a numerical value will be displayed. The displayed value must fall within the range shown below. If it fails to fall within that range start the calibration procedure over. If it fails again contact a Niton representative.

Low Standard: 18.9 +/- 0.5
Med. Standard: 1162 +/- 31
High Standard: 5532 +/- 80

Standard Operating Procedure for The Niton XL-309 XRF.
Test Soil, Bulk Samples Using XRF Sample Cups: Dried Sieved Samples, cont.

Sample Preparation:

Equipment Needed: Dying Oven
Aluminum Weighing Boat
#60 Mesh Sieve
#120 Mesh Sieve
Mortar and Pestle

. In a aluminum weighing boat, aliquot between 50-100 grams of soil.
. Dry sample for 10-15 minutes in the drying oven.
. Break up clods of soil and paint chips.
. Sieve through a #10 mesh sieve and separate and discard any large pieces.

. Grind sample with the mortar and pestle.
. Sieve through a #60 mesh sieve.
. Sieve through a #120 mesh sieve.
. Mix the resulting sample until homogenous.
. Split sample for fixed lab analysis if applicable
. Place sample into the XRF cup.

XRF Sample Cup Preparation:

Equipment Needed: Mylar film
XRF sample cups
Cotton

. A cup is prepared by placing a piece of mylar film on the collar of the cup and snapping the body of the sample cup down onto the collar. Care must be exercised to prevent wrinkling of the mylar film.
. Place the sample into the body of the cup and insert a small amount of polyester fiber stuffing to hold the sample firmly in place.
. Fasten the cap onto the body to complete the cup assembly (See figure).
. The cup is then inserted mylar side up into the bulk testing platform cup holder and the XRF is placed flat on top of the cup. The shutter button is depressed and a reading is taken and the result in ppm and Method Detection Limit are displayed.
. Make all necessary documentation in the Lead Soil Data Sheets and/or the XRF logbook.

Standard Operating Procedure for The Niton XL-309 XRF.
Test Soil, Bulk Samples Using XRF Sample Cups: As Is Samples.

The Niton XRF contains a factory sealed Cadmium-109 radioactive source. This Cadmium-109 is an emitter of both gamma-rays and x-rays and should only be used in the analysis of environmental samples. Never open the shutter and point the unit at yourself or others and never look inside the unit at the source. Always remember that gamma-rays and x-rays are capable of penetrating solid surfaces and care should be exercised when operating this unit or any other radiation source.

XRF Data Comparison Study:

When possible a comparison study should be conducted to determine the most accurate means of soil analysis prior to the sampling event. A set of two identical soil samples should be collected with one set to be analyzed by a fixed laboratory and the second set analyzed by the XRF using both a wet and dry sample. A comparison of the two sets of data (fixed lab verses field) is then made to determine which of the two XRF data sets (wet verses dry) is the most accurate.

Instrument Setup:

. Turn instrument on. The on switch is located on the back of the unit.
. Let instrument warm up for 15 minutes.
. Using the arrow keys point the cursor to Setup Menu and press clear/enter.
. Using the arrow keys scroll to Test Soil, Bulk Samples and press clear/enter.
. Using the arrow keys scroll to Calibrate & Test and press clear/enter.

At this point the unit will go through a short verification of the internal calibration and source check and will, after completion, display Ready to Test.

The calibration of the instrument can be verified using the XRF cup filled with NIST certified standards supplied with the instrument. The unit is placed on the soil platform that contains the XRF cups and the shutter is opened and a numerical value will be displayed. The displayed value must fall within the range shown below. If it fails to fall within that range start the calibration procedure over. If it fails again contact a Niton representative.

Low Standard: 18.9 +/- 0.5
Med. Standard: 1162 +/- 31
High Standard: 5532 +/- 80

Standard Operating Procedure for The Niton XL-309 XRF.
Test Soil, Bulk Samples Using XRF Sample Cups: As Is Samples. Cont.

XRF Sample Cup Preparation:

Equipment Needed: Mylar film
XRF sample cups

. A cup is prepared by placing a piece of Mylar film on the collar of the cup and snapping the body of the sample cup down onto the collar. Care must be exercised to prevent wrinkling of the Mylar film.
. Place the sample into the body of the cup and insert a small amount of polyester fiber stuffing to hold the sample firmly in place.
. Fasten the cap onto the body to complete the cup assembly (See figure).
. The cup is then inserted Mylar side up into the bulk testing platform cup holder and the XRF is placed flat on top of the cup. The shutter button is depressed and a reading is taken and the result in ppm and Method Detection Limit are displayed.
. Make all necessary documentation in the Lead Soil Data Sheets and/or theXRF logbook.

Standard Operating Procedure for The Niton XL-309 XRF.
Test Soil, Bagged Bulk Samples.

Instrument Precautions:

The Niton XRF contains a factory sealed Cadmium-109 radioactive source. This Cadmium-109 is an emitter of both gamma-rays and x-rays and should only be used in the analysis of environmental samples. Never open the shutter and point the unit at yourself or others and never look inside the unit at the source. Always remember that gamma-rays and x-rays are capable of penetrating solid surfaces and care should be exercised when operating this unit or any other radiation source.

This method can be utilized as a quick screening method for the determination of lead in soil. It must be noted, however, that a result can be 5-10% lower than when analyzed using a dry sieved soil sample.

Instrument Setup:

. Turn instrument on. The on switch is located on the back of the unit.
. Let instrument warm up for 15 minutes.
. Using the arrow keys point the cursor to Setup Menu and press clear/enter.
. Using the arrow keys scroll to Test Soil, Bulk Samples and press clear/enter.
. Using the arrow keys scroll to Calibrate & Test and press clear/enter.

At this point the unit will go through a short verification of the internal calibration and source check and will, after completion, display Ready to Test.

The calibration of the instrument can be verified using the XRF cup filled with NIST certified standards supplied with the instrument. The unit is placed on the soil platform that contains the XRF cups and the shutter is opened and a numerical value will be displayed. The displayed value must fall within the range shown below. If it fails to fall within that range start the calibration procedure over. If it fails again contact a Niton representative.

Low Standard: 18.9 +/- 0.5
Med. Standard: 1162 +/- 31
High Standard: 5532 +/- 80

Instrument Operation-Bagged Bulk Sample:

. Obtain a composite sample from each area to be screened.
. Mix the sample and remove any large pieces or debris.
. Place between 50-100 grams of sample into a polyethylene bag.
. Shape the bag so it is a minimum 0.5" thick.

Standard Operating Procedure for The Niton XL-309 XRF. Test Soil, Bagged Bulk Samples cont.

. Attach the XRF unit to the soil test platform and place on top of the bag and press down firmly.*
. Push the safety slide back and squeeze the shutter release button.
. Perform the analysis for 20-30 seconds or until the desired level of accuracy is reached.
. Make all necessary documentation in the Lead Soil Data Sheets and/or the XRF logbook.

* Do not hold the bagged sample or any sample in your hand during analysis.

APPENDIX D

SAMPLE LABEL FORMAT

FUSS & O'NEILL, INC., ENVIRONMENTAL SERVICES
80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

Date: Preservative: ICE / Hcl / HNO3 / H2SO4 / FHN03
Project: Sampler:
Location: Time:
Project #: Sample ID:

FUSS & O'NEILL, INC., ENVIRONMENTAL SERVICES
80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

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80 Washington Street – Suite 301
Poughkeepsie, NY 12601
(845) 452-6801

Date: Preservative: ICE / Hcl / HNO3 / H2SO4 / FHN03
Project: Sampler:
Location: Time:
Project #: Sample ID:

APPENDIX E

SAMPLE FIELD DATA FORMS

Monitoring Well Sample Log

Low Flow Sampling

Client/Project Name:		**FUSS & O'NEILL** **of New York, PC**
Project Location:	***PROJECT #:***	
Sample#:	***WELL ID:***	

Purge Data Sample Data

Date:

Start time:__________________***Stop time:***__________________***Sample time:***_____

Pump Rate:__________________ *(ml/m)* ***Depth Sampled:***_____

Total time purged:__________________ ***Sampler:***_____

Volume Purged:__________________*(ltr)*

Purge Device: *Dedicated / Nondedicated* ***Weather:***_____

Device Type: *Bladder / Peristaltic / Submersible*

Appearance:

Well Yield: *High / Moderate / Low / Dry*

Comments:

Container	***Quantity***	***Preservative***

Field Parameter Data

Instrument ID#

Water Level (ft)	*Time*	*Turbidity (ntu)*	*Dissolved Oxygen (mg/L)*	*pH*	*Temp. (deg C)*	*Specific Conductivity (uS)*	*ORP(mV)*

Well Condition Checklist *(circle appropriate item(s), cross out if not applicable]*

General Condition: *Good / Needs Repair*
Protective Steel: *OK / Cracked / Leaking / Bent / Loose/ None*
Well # Visible?: *Y / N*
Well Cap: *Good / Broken / None*
Evidence of rain water between steel and PVC?: *Y / N*
Evidence of ponding around well?: *Y / N*
Gopher type holes around collar?: *Y / N*
Comments:

Is well plumb?: *Y / N*
Lock: *Good / Broken / None*
Rust around cap: *Y / N*
PVC Riser: *Good / Damaged / None*
Concrete colar: OK / Cracked / Leaking / None
Other evidence of: *Rodents / Insects / None*
Curb Box: *N / Y (key is: Hex / Pent / Other)*

Sediment Sampling Field Data

Client/Project Name:		FUSS & O'NEILL of New York, PC
Project Location:	**PROJECT #:**	
Sample#:	Sampling Location	

Sample Location Info

Sample Data

Date:____________________ Time:____________

Sampler:____________________ Weather:____________

Sampling Device: Auger / Core Sampler / Shovel / Ponar Dredge /

Eckman Dredge / Other ______

Field decon: Yes / No / Dedicated

Type of Sample: Grab / Composite / Other __________

Sample Depth: _______________

Container	Quantity	Preservative

Comments:

Trip Blank Field Data

Client/Project Name: Project Location:	**PROJECT #:**	FUSS & O'NEILL of New York, PC
Sample#:	**Well ID** Trip Blank	

Sample Data

	Container	Quantity	Preservative
Date:__________ Time:__________ Sampler:__________ Weather:__________	Voa	2	HCl
Blank Water Supplied By: Lab / F&O / Other __________ Comments:			

Comments:

Equipment Blank Field Data

Client/Project Name: Project Location:	**PROJECT #:**	FUSS & O'NEILL of New York, PC
Sample#:	**Well ID** Equip Blank	

Sample Data

Date:________________ Time:________________

Sampler:________________ Weather:________________

Blank Water Supplied By: Lab / F&O / Other __________

Equipment Used: Bailer / Filter / Pump / Other __________

Filtered in Field? No / @ Vehicle

Method of Filtration: Pressure / Vacuum / Syringe

Pump ID #: ☐

Filter: Disposable / Other __________

Appearance:

Comments:

Container	Quantity	Preservative

* - *Organic-free DI water used in these containers.*

Comments:

FUSS & O'NEILL, INC. CONSULTING ENGINEERS MANCHESTER, CT 06040	BORING LOG **PROJECT:** **LOCATION:**	**SITE ID:** **SHEET:** **of** **PROJECT NO:**

CONTRACTOR:
OPERATOR:
F&O REPRESENTATIVE:
DRILLING METHOD:
SAMPLING METHOD:
HAMMER WT: HAMMER FALL (IN)
BORING LOCATION:
GROUND ELEVATION:
DATE STARTED: DATE FINISHED:
SAMPLE PREFIX:

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME

Time and Date of Completion:

DEPTH (FT)	**SAMPLE NO.**	**SAMPLE DEPTH (FT)**	**REC/ PEN**	**BLOWS 6"**	**SAMPLE DESCRIPTION**	**STRATA CHANGE**	**LITHO-LOGIC CODE**	**FIELD TESTING**

BORING DIAMETER	**BORING METHOD**	**DEPTH**

PROPORTIONS USED:

TRACE	**0 to 10%**	**SOME**	**20 to 35%**
Little	**10 5o 20%**	**AND**	**35 TO 50%**

REMARKS

Field Instrument =

If refusal is encountered, describe all efforts used to confirm.

Reviewed by Staff:

BACKFILL

Native Material		To	See Monitoring Well
Bentonite Grout/Chips		To	Completion Report
Concrete/Asphalt		To	
Other		To	

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: ______________________________

Site ID (Boring/Well ID): ______________

Project Location: ______________________________

Project No.: ______________

F&O Engineer/Geologist: ______________________________

Ground Surface Elevation: ______________

Date of Completion: ______________________________

Permit #: ______________

Boring Location: ______________________________

El Top of Steel Casing: ______________

Drilling Contractor: ______________________________

El Top of PVC Casing: ______________

Drilling Method: ______________________________

Measuring Point: TPS / PVC
Well Cover (see codes): ______________

WELL CONSTRUCTION

Well Casing/Riser

Diameter: ________in.

Type: __________

Stick-up: ________ft.

Sump (below screen)

Diameter: ________in.

Type: __________

Length: ________in.

Protective Casing

Diameter: ______________in.

Type: ______________

Stick-up: ______________ft

Depth to Bottom: ________ft

Seal Material: ______________________

Screen Intervals

Screen Interval: ______________ ft

Diameter: ______________in.

Slot Size: ______________in.

Description: PVC / Other: ______________________________

Type: Perforated / Slotted / Wire-Wrap / Other: ______________________________

ANNULAR FILL

Surface Seal

(Approximate volumes if available)

Interval: ______________________ft.

Tremied: Y / N

Volume: ______________bags

Description: Concrete / Other: ______________________________

Backfill

Interval: ______________________ft.

Tremied: Y / N

Volume: ______________

Description: Bentonite Grout / Fill / Other: ______________________________

Lower Seal

Interval: ______________________ft.

Tremied: Y / N

Volume: ______________bags

Description: Bentonite / Bentonite Pellets / Grout / Other: ______________________

Filter

Interval: ______________________ft.

Tremied: Y / N

Volume: ______________bags

Description: Sand Filter (type: ______________) / Other: ______________

Lower Backfill

Interval: ______________________ft.

Tremied: Y / N

Volume: ______________bags

Description: Bentonite Grout / Fill / Other: ______________________________

Soil Sampling Field Data

Client/Project Name:
Project Location:
Date: Weather:

PROJECT #:

FUSS & O'NEILL
of New York, PC

Sample #:
Sample Location:

Sampler: ________________Time:____________________
Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other ________
Field decon: Yes / No / Dedicated
Type of Sample: Grab / Composite / Other ______________________
Generic Soil Description:_________________________
Sample Depth: ________________
PetroFLAG / OVM________________

Container	Quantity	Preservative

Sample #:
Sample Location:

Sampler: ________________Time: ____________________
Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other ________
Field decon: Yes / No / Dedicated
Type of Sample: Grab / Composite / Other ______________________
Generic Soil Description:_________________________
Sample Depth: ________________
PetroFLAG / OVM________________

Container	Quantity	Preservative

Sample #:
Sample Location:

Sampler: ________________Time:____________________
Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other ________
Field decon: Yes / No / Dedicated
Type of Sample: Grab / Composite / Other ______________________
Generic Soil Description:_________________________
Sample Depth: ________________
PetroFLAG / OVM________________

Container	Quantity	Preservative

Sample #:
Sample Location:

Sampler: ________________Time:____________________
Sampling Device: Auger / Geoprobe / Core Sampler / Shovel / Split Spoon / Scoop/ Other ________
Field decon: Yes / No / Dedicated
Type of Sample: Grab / Composite / Other ______________________
Generic Soil Description:_________________________
Sample Depth: ________________
PetroFLAG / OVM________________

Container	Quantity	Preservative

Analytical Parameter Request

Project #:	Date Sampled:	FUSS & O'NEILL of New York, PC
Project Name:	Date Submitted:	
Laboratory	Submittor: Fuss & O'Neill, Inc.	

Report To:	Attention:

Invoice to: Mailing Address: City, State, Zip: Special Instructions:	Attention: Phone #:

COC #	Sample ID	COC #	Sample ID	COC #	Sample ID

Comments:		
		Blank(s) included in sample
		Duplicate(s) included in sample

Requested Parameters

APPENDIX F

SAMPLE CHAIN-OF-CUSTODY FORMS

Fuss & O'Neill Inc.
consulting engineers
Environmental Field Services

CHAIN-OF-CUSTODY RECORD № 56269

FUSS & O'NEILL, INC.
146 HARTFORD ROAD
MANCHESTER, CT 06040
(860) 646-2469

PROJECT NAME	PROJECT LOCATION	PROJECT NUMBER	LABORATORY

REPORT TO:

INVOICE TO:

P. O. #:

Source Codes:
MW=Monitor Well
RO=Run Off
T=Treatment Facility
X= Other, Specify
B=Bottom Sediment
O=Outfall
S=Soil
W=Well
L=Lake/Pond/Ocean
PW=Potable Water
SG=Sludge
LF=Landfill
R=River/Stream
ST=Septic Tank

ITEM NUMBER	SAMPLE NUMBER	SOURCE CODE	CONTAINER				ANALYSIS REQUIRED	COMMENTS	TRANSFER NUMBER & CHECK			
			NO.	TYPE	SIZE	PRESERV.			1	2	3	4

Container Code: P=Plastic V=VOA Vial C=Cube G=Glass A=Amber Glass T=Teflon Lid B=Bacteria Bottle

Preservative Code: I=Iced F=Filtered N=Nitric Acid [HNO_3] H=Hydrochloric Acid [HCl] S=Sodium Hydroxide [$NaOH$] T=Sodium Thiosulfate [$Na_2S_2O_3$] B=Sodium Bisulfate [$NaHSO_4$] O=Sulfuric Acid [H_2SO_4] A=Ascorbic Acid [$C_6H_8O_6$] X=Other, Specify

Sampler's Signature	Affiliation	Date	Time

ADDITIONAL COMMENTS:

TRANSFER NUMBER	ITEM NUMBER	TRANSFERS RELINQUISHED BY	ACCEPTED BY	DATE	TIME
1					
2					
3					
4					

F&O 500

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET, POUGHKEEPSIE
DUTCHESS COUNTY, NEW YORK

NYSDEC Site No. C314081

Prepared for:
The O'Neill Group - Dutton, LLC

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

July 2005

Fuss & O' Neill OF New York, P. C. does not guarantee the health or safety of any person entering the site. Due to the potential hazards of this site and the activity occurring thereon, it is not possible to discover, evaluate and provide protection for all possible hazards which may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, not eliminate, the potential for injury at this site. The site-specific information in the plan was prepared specifically for this site and should not be used on any other site without prior research and evaluation by trained health and safety specialists.

This note applies to all personnel legally required to be covered under this HASP pursuant to OSHA regulation 29 CFR 1910.120 and 29 CFR 1926.65, as determined by their employer. Those personnel working within the Exclusion Zone as defined by the HASP must be trained and engaged in a medical surveillance program in accordance with the requirements of 29 CFR 1910.120 and 29 CFR 1926.65.

SITE HEALTH & SAFETY PLAN
A.C. DUTTON LUMBER YARD SITE
POUGHKEEPSIE, NEW YORK

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SITE HEALTH & SAFETY PLAN
A.C. DUTTON LUMBER YARD SITE
POUGHKEEPSIE, NEW YORK

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SECTION

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LIST OF APPENDICES

1.0 GENERAL

1.1 Introduction

This Site Health and Safety Plan (HASP) was developed as part of the Fuss & O' Neill of New York, P. C. (Fuss & O'Neill) Site Investigation Work Plan (SIWP) at the Former A.C. Dutton Lumber Yard Site in Poughkeepsie, New York.

This HASP has been developed for Fuss & O'Neill personnel. All on-site contractors not associated with Fuss & O'Neill must develop their own HASP, applicable to their work activities.

The procedures and protocols in this plan have also been established to provide a mechanism to protect project personnel from potential exposure to known site contaminants encountered during site activities. This plan addresses activities conducted by Fuss & O' Neill and its subcontractors. Compliance with this HASP is required of all authorized Fuss & O'Neill project personnel who enter the working areas of this project. Fuss & O' Neill will provide resources and personnel for the implementation of this HASP. As such, Fuss & O' Neill will make recommendations to those personnel not working under contract with Fuss & O'Neill pertaining to the safe execution of the proposed scope of work, as warranted. No one may enter an established exclusion zone without meeting the requirements of an appropriate HASP.

This HASP meets applicable requirements of Occupational Safety and Health Administration (OSHA) safety and health standards: OSHA 29 CFR 1926 Construction Industry and OSHA 29 CFR 1910 General Industry. This HASP is designed to cover those special and/or unique health and safety procedures arising from actual or potential contact with contaminated materials and those requirements pursuant to OSHA 29 CFR 1910.120 and 1926.65, Final Rule "Hazardous Waste Operations and Emergency Response".

The content of this HASP may change or undergo revision based upon additional information made available to health and safety (H&S) personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed by designated Fuss & O' Neill and other Project Personnel as specified in the pertinent contract.

1.2 Project Personnel

Project Personnel - refers to all Fuss & O' Neill, Inc. operations and project management personnel, including Fuss & O' Neill subcontractors whose responsibilities are to conduct construction activities within the work site.

Project Personnel are divided into two categories: Contact Project Personnel and Non Contact Project Personnel.

Contact Project Personnel - Refers to Project Personnel who may come into contact with hazardous materials (contaminated soil & water which may pose an unacceptable health risk potential). The specific job task will be evaluated to determine personnel classifications. The Health and Safety Manager (HSM) and/or the Health and Safety Supervisor (HSS) will assist with this determination.

Non Contact Project Personnel - Refers to Project Personnel who are not expected to come into contact with hazardous materials. The specific job task will be evaluated to determine personnel classifications. The HSM and/or the HSS will assist with this determination.

Project Support Personnel and Visitors - refers to all other persons who may enter the work site such as truck drivers, public officials, public utility workers, and emergency crews (police, fire, ambulance) as well as any other personnel designated as a project visitor.

Project Personnel Assignments

Fuss &O'Neill of New York, P.C.

Fuss & O' Neill Health and Safety Manager (HSM):

- Kurt Knotts: (845) 452-6801 (Ext. 5525)

Fuss & O' Neill Project Director and Alternate HSM:

- James D. McIver, Jr.: (845) 452-6801 (Ext. 4205)

Fuss & O'Neill Corporate Health and Safety Officer:

- Kevin W. Miller, Ph.D.: (845) 452-6801 (Ext. 5201)

Fuss & O' Neill Site Health and Safety Supervisor:

- Gregory A. Toothill: (845) 452-6801 (Ext. 4203)

Fuss & O' Neill Site Health and Safety Officer:

- Lisa Gwiazdowski: (845) 452-6801 (Ext. 4107)

Site Owner Contact:

- Stephen Gallo: (201) 845-5552

Medical Consultant:

CorpCare Occupational Health Center, an affiliate of Manchester Memorial Hospital, located in Manchester, Connecticut.

1.3 Emergency Phone

Fuss & O' Neill Site Phone: To be determined

Emergency		911
Local Police		911
Fire Department:		911
EMS:		911
Hospital:	St Francis Hospital 241 North Rd Poughkeepsie, NY 12601	845-483-5000 (non-emergency)

Poison Control Center:	1-800-343-2722
USCG/DOT National Response Center:	1-800-424-8802

A route map for the listed emergency facility is provided in Appendix A.

2.0 HEALTH AND SAFETY PERSONNEL

2.1 Health and Safety Personnel Designations

The following briefly describes the health and safety designations and general responsibilities which may be employed for this project.

2.2 Site Health and Safety Manager (HSM) – Kurt Knotts

The Health and Safety Manager will be the Fuss & O'Neill point of contact for safety concerns at the project. The HSM has overall responsibility for the development and implementation of the site-specific HASP in conjunction with the other Fuss & O'Neill project personnel. Although the writing of the HASP may be delegated to another member of the team, the HSM shall approve any changes in the plan. This individual has the overall responsibility for the Contractor′ s performance.

The HSM is also responsible for the following:

1. Discussing any unusual safety and health concerns with the Company Health and Safety Officer prior to completion of the HASP.
2. Assuring that all personnel on-site have been made aware of the potential hazards and are provided appropriate personal protective equipment.
3. Monitoring the performance of personnel and the compliance with this HASP on a periodic basis, and correcting deficiencies.
4. Submit all project reports, including: progress, accident, incident and contractual. A copy of the Supervisor=s Report of Accident Investigation form is located in Appendix B.

The alternate HSM is James D. McIver, Jr. who is the project director. The alternate HSM will be available if the primary HSM is unavailable during the project activities.

2.3 Site Health and Safety Supervisor (HSS)

The Site Health and Safety Supervisor (HSS) will be the field scientist, field chemist, engineer or hydrogeologist or other staff member, who will be involved in the on-site activities. The HSS shall be on-site for all work covered by this HASP. He will supervise activities at every phase of work taking place on the project. He will establish and maintain lines of communication at the job site. Before personnel may work in designated exclusion zones, he will obtain the appropriate documentation meeting the medical and health and safety training requirements specified in OSHA 29 CFR 1910.120 and 1926.65 (Hazardous Waste Operations and Emergency Response).

The HSS has the stop-work authorization which he will execute upon his determination of an imminent safety hazard, emergency situation, or other potentially dangerous situations, such as extreme weather conditions. Authorization to proceed with work will be issued by the HSM after such action. The HSS will initiate and execute all contact with support facilities and personnel when this action is appropriate.

The HSS responsibilities will include:

1. Overall responsibility for oversight and day to day enforcement of this HASP.
2. Conduct the initial site specific training of project personnel.
3. Evaluating air monitoring data and recommending changes to engineering controls, work practices and PPE.
4. Daily review of safety operations on-site and completion of a daily record of site activities. A copy of the Daily Record of Site Activities form is located in Appendix C.
5. Reporting and investigation of all accidents or incidents occurring on the site. Reporting of any unsafe acts or conditions. All incidents must be reported to the HSM.
6. Follow up of any corrective action required to reduce identified hazards.

2.4 Site Health and Safety Officer (HSO)

The Site Health and Safety Officer (HSO) may be appointed by the HSM or HSS to conduct some of the daily duties of the HSS.

2.5 Corporate Health and Safety Officer

The Corporate Health and Safety Officer helped develop the health and safety plan. The corporate health and safety officer will provide support and guidance to other project personnel on health and safety issues during the completion of site work.

2.6 Medical Consultant (MC) CorpCare

The MC meets the requirements of OSHA 29 CFR 1910.120 and 1926.65. The MC will be available to consult with local emergency medical services and will be available, as necessary, to provide medical examinations of project personnel.

3.0 SITE HISTORY AND PHYSICAL DESCRIPTION

3.1 Site History and Physical Description

The site currently consists of two tax parcels making up approximately 15 acres. The majority of the 15 acres falls in the City of Poughkeepsie and the remaining 3.65 acres lies in the Town of Poughkeepsie. The portion of the site located in the City of Poughkeepsie is zoned 1-2, General Industrial District. The portion of the site located in the Town of Poughkeepsie is located in the WD2 (Waterfront District 2) and zoned IH (Heavy Industry). The tax parcels are as follows:

City of Poughkeepsie (11.35 acres)	31-6062-59-766443-00
Town of Poughkeepsie (3.65 acres)	14-6062-02-763508-00

There are currently seven buildings remaining on the property in varying states of disrepair. There are two warehouse buildings located in the southern portion of the property. The plant offices and the newest pressure treatment facility occupy the south central portion of the property, and another warehouse and older pressure treatment facility occupy the northern portion of the property. One partially collapsing two story brick building exists on the western border of the property. There is also a "fuel" building, which is a covered containment cell for a petroleum bulk storage tank located in the southeast portion of the site adjacent to the office building. There is also a rail bed located along the western side of the property.

According to a 1987 Phase I Investigation report prepared by EnviroPlan Associates, Inc. of Poughkeepsie, NY that included the area of subject site, the parcel has been in industrial use since the mid-1800s. The A.C. Dutton Lumber Corporation operated a wholesale lumber operation at the site beginning in 1913 and the on-site pressure treatment of lumber using copper-chromate-arsenate (CCA) reportedly began in 1966. Prior to 1913, site uses included an iron works and a glass works plant. The former glass works plant was reportedly located at the southern end of the parcel.

At the A.C. Dutton facility, raw materials were brought to the site by truck, boat, and rail, processed in either the two treatment plants, temporarily stored in a sheltered drip pad area and allowed to dry, and then stored outside prior to commercial resale. It is suspected that storage of treated lumber has not always occurred on impervious surfaces.

The last known Petroleum Bulk Storage (PBS) registration (#3-175935) expired on 6/30/02. The PBS registration certificates were available going back to 1991 and show five tanks at the facility registered as aboveground storage tanks (ASTs). The PBS registration certificates do not show closed tanks. Other information in the files further describe the tank numbers, sizes, and materials stored as follows: #1 is a 3,000-gallon Diesel AST; #2 is a 1,500-gallon No. 2 Fuel Oil AST; #3 is a 3,000-gallon No. 2 fuel Oil AST; #4 is two 275-gallon No. 2 fuel oil ASTs that are manifolded together and registered as one tank; and #5 is a 275-gallon No. 2 Fuel Oil AST.

During site investigations performed by Ecosystem Strategies, Inc. (ESI) in 2002, both ASTs and underground storage tanks (USTs) were identified in the field. Above grade tanks included a 3,000-gallon AST located adjacent to the northern pressure treatment plant, 3,000-gallon AST located in a concrete enclosure south of the main office building, and two 275-gallon ASTs located in the brick warehouse building at the southern end of the parcel. Regarding underground tanks, a suspected UST of unknown size was identified beneath the concrete slab adjacent to the southern brick warehouse building, 1,500-gallon UST located beneath the main office building, a 20,000-gallon UST located at the northeast corner of the southern pressure treatment plant, and a 1,000-gallon UST located beneath the western brick building. The 20,000-gallon and 1,000-gallon USTs were identified through a ground penetrating radar survey performed by ESI.

A site map showing site features is provided in the Site Investigation Work Plan.

3.2 Site Air Monitoring

Field activities associated with the site investigation at the site may pose hazardous conditions, such as the release of hazardous substances into the workers' breathing zone. These substances may be in the form of vapors, dusts, or mists that can enter the body through ingestion, inhalation, or direct contact with the skin or eyes. If the Health and Safety Officer, relying on observations and odor, determines that a condition exists in which workers may be exposed to airborne hazardous materials, monitoring will be performed to determine appropriate personal protective measures.

The following describes the monitoring parameters to be evaluated during the initial walk-through. All instruments to be used during site activities will meet the established requirements set forth by OSHA, NIOSH, and state agencies where applicable.

3.2.1 Initial Determinations

Observations will be made during the site walk-through with direct reading organic vapor meters, combustible gas indicators, and/or oxygen detectors as necessary to assess the background or initial conditions.

All site monitoring will be conducted by or under the direction of the Site Health and Safety Officer or designated representative. All readings obtained will be recorded in a dedicated site notebook maintained by the Field Operations Leader/HSS. The Field Operations Leader/HSS will maintain all monitoring instruments throughout the site investigation to maintain their reliability and proper operation.

3.3 Scope of Work

The portion of work covered by this HASP includes environmental sampling.
The tasks covered by this HASP include the following:

- * *Environmental Sampling – Soil, Groundwater, and Sediment*
- * *Test Pits, Soil Borings, Well Installations, and Staff Gauge Installation*

3.4 Results of Past Investigations

Past investigations have revealed that the subsurface beneath the site may be contaminated with petroleum hydrocarbons, and select metals. Some possible chemical contaminants at the site and the exposure limit for each contaminate of concern are presented in Appendix D.

Symptoms of exposure to hazardous wastes and in particular to the contaminants above will be reviewed with all site personnel. Symptoms of both acute and chronic exposures will be covered. In addition, the on-site coordinators will be advised to watch for outward evidence of changes in workers' health. These outward symptoms may include fatigue, loss of appetite, nervousness or irritability, skin irritation or discoloration, eye irritation, or muscular soreness.

Note that the number and nature of potential contaminants mandate that contact of waste materials with the exposed skin must not be allowed to occur under any circumstances.

4.0 HAZARD ASSESSMENT

4.1 Introduction

As discussed previously in Section 3.4, there may be areas where contaminated soil or water may be encountered. The probability of worker exposure to a chemical hazard varies with the job task. The job tasks that involve contact with potentially contaminated soil are expected to have a greater potential for exposure than job tasks that do not come into contact with the soil. Site workers may be exposed to chemicals by inhalation, ingestion, and/or dermal contact. To protect potentially exposed personnel, dust control measures may be implemented, respirators and personal protective equipment may be worn, and decontamination procedures will be followed.

The following is a general discussion of the hazards that may be encountered on-site. A list of specific compounds detected on-site is found in Appendix D.

4.2 Task Specific Hazard Assessment

Because the potential for coming into contact with contaminated site media will vary with each job task, the probability of exposure will be assessed on an individual task basis. To simplify the hazard assessment two categories will be established; it is anticipated each job task will fit in one of the two categories. The site HSS will assist with determinations as necessary.

Category 1 Construction Activities; Limited Soil Contact:

It is anticipated that the following activities require minimal contact with contaminated media, and presents a low risk of exposure to potentially contaminated site media. These activities should not require additional health and safety considerations beyond good practices already in place for this type of construction project. These tasks may include:

* Construction of an access road
* Grade work area
* Air sampling
* Delivery of Supplies
* Site Walkovers

Potential exposure to contaminated site media is not anticipated; however these operations will be evaluated and monitored by the HSS. Access to the work zone is limited to Project Personnel, Project Support Personnel, and Authorized Visitors.

Personnel must meet the training requirements as defined in this HASP. Personal protective clothing will not be required unless exclusion zones are established or as determined by the HSS.

Category 2 Construction Activities; Contact with Soil and/or Groundwater:

It is anticipated that personnel working in the following activities have some reasonable potential to come into contact with potentially contaminated site media. These activities may include:

* Environmental Sampling - Soil, Water, Containers.
* Decontamination of Equipment and Personnel
* GeoPush
* Drilling
* Soil Gas Surveys

These activities may result in potential exposures to contaminated site media. These activities will be evaluated and monitored by the HSS and exclusion zones established as required. All Contact Project Personnel required to work in designated exclusion zones must meet the training requirements for working in an exclusion zone as outlined in this HASP. Personal protective clothing will be worn as determined by the HSS.

TASK DESCRIPTION	POTENTIAL CHEMICAL HAZARDS
Environmental Sampling for Soil	*Inhalation and absorption hazards associated with contacting contaminated soil.*
Soil Excavation and displacement	*Inhalation and absorption hazards associated with contacting contaminated soil.*

5.0 ZONES/SITE CONTROL

5.1 Site Control

Three zones will be used to restrict access to construction areas where potential contamination may be present and to prevent the accidental spread of contaminated materials. The three zones are identified as 1) the construction work zone, 2) the construction exclusion zone, and 3) the contamination reduction zone (CRZ). Initially, exclusion zones will not be established for the site construction activities. Exclusion zones will be established if certain conditions are met, including the exceeding of project air monitoring action levels or the encountering of odorous or visibly contaminated materials. The designation of project zones will be by the HSS. If used, these zones will be monitored by the HSS.

5.2 Construction Work Zone (Restricted Area)

The construction work zone is the entire project work area or construction area. All project work activities will be conducted within the construction work zone. The construction work zone is restricted to project (contact and non contact) personnel, and project support personnel and visitors as defined in this document. Unauthorized people will be prohibited from entering the site.

All personnel (project personnel, project support personnel, visitors) entering the construction work zone will be briefed by the HSS prior to their initial entry. All Contact Project Personnel entering the construction work zone must meet the Training and Medical requirements as outlined in Sections 10.0 and Section 15.0. The protective work clothing and equipment to be worn is defined in Section 6.0 or as required by the HSS. All Contact Project Personnel and equipment exiting the construction work zone must clean-up before leaving the site or as determined by the HSS. These are general good health and safety work practices.

Activities defined as Category 1 will be performed within the construction work zone. The HSS will monitor those activities which may have an unacceptable hazard potential. Construction exclusion zones will be established for these operations by the HSS or designee if the action levels listed in Section 7.0 are exceeded, if there are visible signs of contamination and/or if there are changes in operations or the knowledge of the site, which would increase the probability of worker exposure.

5.3 Construction Exclusion Zones

A Construction Exclusion Zone will be established within the construction work zone for 1) tasks and operations occurring on or around areas of known contamination, 2) operations that significantly disturb the subsurface soil, and 3) operations where personnel will come into contact with the subsurface soil and or groundwater. Construction Exclusion Zones will be established during all Category 2 activities and/or as designated by the HSM or HSS. The HSS will monitor all construction exclusion zone activities.

Exclusion Zones will be established around work areas where there is a realistic probability of exposure to hazardous contaminants.

The area will be marked and isolated using barriers, tape, or other appropriate markers. Entry to this area will be only through the contamination reduction zone (CRZ). Air monitoring will take place in all exclusion zones as described in Section 7.0. All personnel working in an exclusion zone must meet the training and medical requirements as outlined in Section 10.0 and Section 15.0. All personnel and equipment exiting the exclusion zone will go through field decontamination (Section 12.0) before exiting the exclusion zone and the contaminant reduction zone. Once the excavation or designated operation has been completed, the exclusion zone may be removed by the HSS pursuant to the air monitoring protocols in Section 7.0.

Access to a construction exclusion zone will be limited to Contact Project Personnel that meet the Training and Medical requirements as outlined in Section 10.0 and Section 15.0. All Contact Project Personnel entering the construction exclusion zones will be briefed by the HSS prior to their initial entry into the exclusion area.

The protective work clothing and equipment to be worn is defined in Section 6.0 or as required by the HSS. All personnel and equipment exiting the construction exclusion zone will be decontaminated (Section 12.0) in the CRZ as exiting the construction exclusion zone or as the HSS determines is necessary.

Once the excavation or designated operation has been completed, the construction exclusion zone will be removed by the HSS or designee.

5.4 Contamination Reduction Zone (CRZ)

The CRZ is the transition area between the contaminated area and the clean area. The CRZ is marked off as a corridor between the exclusion zone and the support zone where personnel go through decontamination. There is one Access Control Point where personnel enter and exit the exclusion zone through the CRZ. When personnel exit the exclusion zone, they must go through field decontamination which is set up in the CRZ. Access to this zone will be limited to Contact Project Personnel exiting the Construction Exclusion Zone and Decontamination Technicians assisting with decontamination.

6.0 PERSONNEL LEVELS OF PROTECTION

6.1 General

In accordance with 29 CFR 1910.120 and 1926.65(g)(5), Fuss & O'Neill, Inc. has developed a written Personal Protective Equipment (PPE) program which addresses the elements listed in the regulation. This document is attached as Appendix E. A Respiratory Protection Program which meets the requirements of 29 CFR 1910.134 and 1926.103 can be found in Appendix E. The level of protection to be utilized is determined by the task-specific hazard and will be determined by the HSS. It is expected that initially all site work where the employee may come into contact with potentially contaminated soil or ground water will be performed utilizing Modified Level D protection in an exclusion zone.

Safety equipment and protective clothing shall be used as directed by the Site Health and Safety Officer. All such equipment and clothing will be cleaned and maintained in proper condition by the personnel. The Site Health and Safety Officer will monitor the maintenance of personnel protective equipment.

Modified Level D is the minimum accepted level of protection for this site. Modified Level D provides minimal dermal protection. Respiratory protection is optional unless air-monitoring data indicated otherwise. Modified Level D includes:

Shirt
Tyvek suits (optional)
Nitrile, PVC, or vitron gloves (when water or soil contact)
Boots/shoes, leather or chemical resistant (steel toe and shank optional)
Approved industrial safety glasses or chemical splash goggles
Hard hat (during drilling and when overhead fall or bump hazard exist)
Hearing protection (during drilling or jackhammering operations)

If circumstances warrant upgrading to Level C, the following is required:

Full-face, air purifying respirator with a combination type acid/gas/organic vapor and particulate filter

Chemical resistant coveralls
Gloves (outer), chemical resistant
Gloves (inner), chemical resistant
Boots (inner), leather work shoe with steel toe and shank.
Boots (outer), chemical resistant
Hard Hat (during drilling and when overhead fall or bump hazard exist)
Taping between suit and gloves, and suit and boots

Action levels found in Table 1 in Section 7.0 determine levels of respiratory protection only. The level of protection of PPE for each job task is determined visually by the HSS.

Procedures for the proper donning and doffing of PPE are provided in Appendix E.

Tasks or locations which require level A or B protection will not be entered by Fuss & O'Neill employees.

The On-Site Safety Officer may make changes to the levels of protection required based on the identification of known substances and any required changes to the scope of work. The Site Safety Officer will revise those levels of protection, up or down, based on air monitoring results and on-site assessment of actual exposures.

6.2 Definition of Levels of Protection

***Respirators*:**

Level D:	No respirator is required.
Level D Modified:	No respirator is required
Level C:	Full face, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor/acid gas cartridges.

***PPE*:**

Level D:	Coveralls/dedicated work clothing Gloves Boots/shoes* Hardhat Safety Glasses or chemical splash goggles

*May be substituted with work boots with chemically resistant outer boots or chemically resistant rubber boots.

Level D Modified:	Tyvek disposable coveralls or equivalent Coveralls/dedicated work clothing Boots/shoes inner

	Boots outer, chemically resistant (may be disposable) Gloves inner, surgical Gloves outer, chemically resistant Hardhat Safety glasses or chemical splash goggles
Level C:	Polytyvek disposable coveralls or equivalent Coveralls/dedicated work clothing Boots/shoes inner Boots outer, chemically resistant (may be disposable) Gloves inner, surgical Gloves outer, chemically resistant Hardhat Safety glasses or chemical splash goggles

7.0 MONITORING PROCEDURES AND ENGINEERING CONTROLS

7.1 Monitoring Procedures

Atmospheric air monitoring results are used by the HSS to provide data in determining when exclusion zones are established and when certain levels of personal protective equipment are required. For all instruments there are site specific action level criteria which are used by the HSS as guidelines in making field health and safety determinations. Other data, such as the visible presence of contamination and/or the steady state nature of air contaminant concentration, is also used by the HSS in making field health and safety decisions. Therefore it is possible that the HSM and HSS may establish exclusion zones and/or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established action levels. HASP action levels are located in Table 1

Monitoring will be performed by the HSS. Air monitoring instrumentation will be utilized in all site work areas to monitor the worker breathing zone. Personal air sampling for specific airborne contaminants may be performed at the direction of and under the supervision of the HSS. The types of instruments used and the contaminants they can detect are illustrated in Table 2. All air monitoring will be recorded on the Field Air Monitoring Logs located in Appendix F. This information will also be recorded daily by the HSS in the Daily Record of Site Activities in Appendix C.

Table 1. Instrumentation Action Levels:

INSTRUMENT	ACTION LEVEL	LEVEL OF PROTECTION OR ACTION REQUIRED
PID	>Bkgd - <5 ppm (5 min)**	Level D Respiratory Protection
PID	5 ppm - <30 ppm (5 min)**	Level C Respiratory Protection, establish an exclusion zone[a].
PID	>30 ppm**	Leave the area, monitor continuously.
O_2	<19.5%**	Leave the area; provide ventilation.
HAM	>1.5 mg/m^3 (5 min)	Implement dust control measures or Level C Respiratory Protection.

Sampling Locations
* samples taken at the excavation area.
** samples taken at the breathing zone relative to organic interference.
*** samples taken next to sources of ignition.
NOTE[a]- If a zone has not yet been established.

Table 2. Air Monitoring Instrumentation

Air Monitoring Instrument Name	Acronym	Contaminant(s) Monitored
Detector Tubes		Gases, Organic vapors, others
Photoionization Detector	PID(OVM)	Organic Vapors
Handheld Aerosol Monitor	HAM	Dust, Particulate Material
Flame Ionization Detector	FID(OVA)	Organic Vapors

Exclusion Zone Monitoring

The frequency of real-time monitoring in exclusion zone work areas will be determined by the HSS and/or according to the task being conducted and whether potentially hazardous soil or contaminated groundwater will be contacted/disturbed. Real-time monitoring in the exclusion zone work areas will be conducted daily and minimally under the following conditions: during an activity which would have the highest probability of worker exposure as determined by the HSS; visible presence of contamination; or at the discretion of the HSS. Engineering controls as discussed in Section 7.2 may be implemented to reduce worker exposure potential in the exclusion zones.

Construction Work Zone (Restricted Area)

The frequency of real-time monitoring in restricted zone work areas will be determined by the HSS. Real-time monitoring in restricted zone work areas will be conducted under the following conditions: prior to the beginning of any new job task; prior to the beginning of a job task in any new area; periodically for a long-term job task; during an activity which would have the highest probability of worker exposure as determined by the HSS; visible presence of contamination; or at the discretion of the HSS.

Background Monitoring

Real-time monitoring will occur at locations such as in the main staging area as part of determining atmospheric background levels. Background levels will be established before conducting real-time monitoring in any restricted or exclusion zone work area.

Instrument Calibration and Maintenance

All monitoring equipment will be calibrated minimally once per day before each day's use. The calibration results will be recorded using the Calibration Log in Appendix F. Monitoring equipment will be maintained on a schedule corresponding to the manufacturer's suggested maintenance schedule.

7.2 Engineering Controls

When airborne contaminants are detected in the breathing zone of workers or when LEL readings on the CGI are greater than 10%, engineering controls may be utilized to reduce the exposure potential to the worker and to prevent shutting down an operation. Various types of engineering controls may be utilized on a project such as this. Some available methods are listed below; however, this list does not provide the only types of engineering controls that may be available. Other methods may be implemented that are more effective and/or efficient than the ones listed below.

Utilization of water to soak down area to minimize dust
Utilization of intrinsically safe blowers to provide ventilation
Utilization of polysheeting to cover stockpiles
Utilization of calcium chloride

It is more desirable to reduce employee exposure potential than to increase levels of employee personal and respiratory protection. The implementation of engineering controls will reduce employee exposure potential and not require a greater level of protection of workers.

7.3 Dust Suppression Techniques

Dust suppression may include utilization of water . The exclusion zone areas and access roads can be wetted when required by visible reference or as an action level is approached or exceeded.

During intrusive activities, such as soil sampling, project team members will conduct air monitoring in the working zone utilizing a photo-ionization detector (PID). If PID readings in the work zone indicate concentrations of volatile organic vapors of 5 parts per million for a sustained period of 5 minutes, that activity will be shut down until field conditions stabilize and mitigation arrangements can be made to upgrade to an appropriate safety level. If warranted, field personnel will don splash protective clothing, including tyvek suits, chemical resistant gloves and boot covers, and safety glasses equipped with side shields.

Dust control measures including applying water to work areas will be implemented to control dust levels.

The approach for air monitoring and the establishment of appropriate action levels will be determined prior to commencement of work at the site.

8.0 SAFETY EQUIPMENT AND COMMUNICATIONS

8.1 Safety Equipment

Basic emergency and first aid equipment will be available at each exclusion zone. This shall include at a minimum: first aid kit; emergency eyewash; and fire extinguisher.

8.2 Communications

Communications will be maintained between work being performed in the exclusion zones and the restricted zone utilizing hand-held radios, cellular phone, or other appropriate form of communications.

9.0 COMMUNITY AIR MONITORING PROGRAM

This section describes activities, equipment, and procedures employed to combat hazards to the health and safety associated with the site as they pertain to local residents, tenants of the site, and nearby businesses.

9.1 Ground Intrusive Activities

For on-site ground intrusive activities, including drilling, jack-hammering, and any activity disturbing normal surface and subsurface conditions, the following air monitoring activities will be conducted to assess potential emissions to the ambient air, which may impact local residents, tenants of the site, and nearby businesses in addition to site workers.

Volatile organic compounds: Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 parts per million (ppm) above background levels, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan (Section 9.3). All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

Particulates: Particulates should be monitored continuously upwind, downwind, and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

9.2 Non-Intrusive Activities

For non-intrusive activities on-site, with the exception of drilling, jack-hammering, and any activity disturbing normal surface and subsurface conditions, air monitoring activities will be conducted to assess emissions to the ambient air, which may impact local residents, tenants of the site, and nearby businesses in addition to site workers.

All procedures, identified under the ground intrusive activities to this section, apply except that volatile organic compounds must be monitored at the downwind perimeter of the work area daily at 2 hour intervals (as opposed to continuously).

9.3 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background levels at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background levels, work activities can resume. If the organic vapor levels are greater than 5 ppm above background levels but less than 25 ppm above background levels at the perimeter of the work area, activities can resume provided:

The organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm above background levels.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring, as directed by the HSO, will be implemented to assess vapor emission, which may impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission: If any organic levels greater than 5 ppm above background levels are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If following the cessation of the work activities, or as the result of an emergency, organic levels persist above background levels 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect; if organic vapor levels are approaching 5 ppm above background levels.

However, the Major Vapor Emission Response Plan shall immediately be placed into effect if organic vapor levels are greater than 10 ppm above background levels.

Major Vapor Emission Response Plan:
Upon activation, the following activities will be undertaken:

Emergency services will be notified. Emergency phone numbers are identified in the Emergency Services section on page 2 of this Plan.

The local police authorities will immediately be contacted by the HSO and advised of the situation.

Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

10.0 TRAINING

10.1 Basic Training Required

All contact project personnel that are required to work within exclusion zones are required to have received a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor pursuant to OSHA 29 CFR 1910.120(e) and 1926.65. Non contact personnel are not required to meet these initial training requirements unless directed otherwise by the HSS.

All personnel above are required to have successfully completed refresher training requirements pursuant to OSHA 29 CFR 1910.120(e) and 1926.65. All "supervisory" personnel as identified by Fuss & O' Neill will be required to have successfully met the supervisory training requirement pursuant to OSHA 29 CFR 1910.120(e) and 1926.65.

Fuss & O'Neill personnel shall have completed 40 hours of OSHA training and be current with their 8 hour refreshers in accordance with 29 CFR 1910.120. On–site personnel must also be familiar with the procedures and requirement of this HASP. In the event of conflicting safety procedures/requirements, personnel must implement those safety practices that afford the highest level of protection.

The objectives of the training program are to: communicate the potential hazards workers may encounter; provide the knowledge and skills necessary to perform the work with minimal risk to worker's health and safety; communicate the purpose and limitations of safety equipment; and communicate an emergency plan.

All employees and contractors engaged in site field work must sign an acknowledgement form to indicate that they have read this HASP, understand the content of this HASP, and agree to abide by the precautionary measures stated in this HASP. The Project Manager, Field Operations Leader, and Health and Safety Officer shall also sign-off on this HASP to verify that the content is factual.

Documentation of theses employees training certificates are to be maintained by F&O.

10.2 Site-Specific Training

10.2.1 Initial

All project personnel are required to have initial site-specific training while the potential for exclusion zone activities exist. This training will be provided on-site for all project personnel by the HSS prior to commencement of on-site field activities. The training will address the activities, procedures, monitoring, and equipment for the site operations. It will include site layout, chemical hazards (identification of, detection of, and physiological responses to), physical hazards and emergency services at the site, and will detail all provisions contained within this HASP.

All personnel **must** sign the Field Team Member form in Appendix G following the site specific training and review of the HASP. Personnel who do not receive initial site training will not be permitted to enter the restricted, CRZ or exclusion, zones.

10.2.2 Periodic Safety Briefings

The HSS will conduct daily safety briefings for site workers conducting operations in the restricted zone or in any exclusion zone. These informal briefings will generally be held in the support areas of the designated work areas. The content of these briefings will change as directed by the HSS and will generally include relevant health and safety topics affecting that day's operations.

11.0 PHYSICAL HAZARDS AND SAFETY CONSIDERATIONS FOR SITE OPERATIONS

11.1 Weather

The site activities may proceed through all seasons; therefore, precautions are to be taken to address both heat and cold stress. Monitoring of site personnel for the symptoms associated with each will be continuous.

If severe weather occurs that may affect the safety of site workers, the HSS shall stop such field operations. The HSS will resume operations when weather conditions improve to acceptable levels.

11.2 Heat Stress/Cold Stress

Heat and/or cold stress may be a potential problem for this project. The HSS may implement heat and cold stress programs and recommend that adequate rest breaks and liquid (i.e., water, Gatorade) consumption occur. The heat and cold stress program is in Appendix H.

The proposed work/rest schedule will be dependent upon the weather conditions encountered and the level of personal protective equipment being utilized by on-site personnel. There will be a designated break area. The work/rest schedule will be established and adjusted by the HSS.

11.3 Slip, Trip and Fall Hazards

In any work area it is expected that the ground may be uneven, with platforms and other obstacles existing in the midst of the work environment. Therefore, the potential for slipping, tripping and falling is high, especially considering that respirators may be used, which can impede vision.

11.4 Confined Space

If entering a confined space is required at any time during this project, the HSS will ensure that appropriate confined space entry procedures are followed by appropriately trained confined space individuals in accordance with OSHA 29 CFR 1910.146 (Appendix I).

11.5 Electrical Hazards

To control the potential for electrical hazards, procedures will be followed in accordance with OSHA 29 CFR 1926 Subpart K.

Ground-Fault Circuit Interrupters (GFCI) shall be used on all sites that have temporary wiring or a power supply per 29 CFR 1926.400 (h)(2). All 120-volt, single-phase 15- and 20-ampere receptacle outlets on-sites, which are not part of the permanent wiring of the building or structure **and are in use by Fuss & O'Neill employees or subcontractors to Fuss & O'Neill** shall have UL7 approved GFCI for personal protection.

11.6 Trenching, Shoring and Excavations

Excavations will be in accordance with OSHA 29 CFR 1926 Subpart P. Prior to excavating, utility companies and other responsible authorities will be contacted to locate and mark the locations of underground installations.

11.7 Traffic

Different types of traffic (trains, delivery vehicles and heavy equipment) may be present at the job site. All work will be performed in accordance with State and Federal laws.

Vehicular traffic may be a hazard during the work covered by this HASP. Traffic cones will be used to block off areas around roadways to protect personnel and equipment. All signs shall meet the State and Local regulations regarding traffic safety. During work along highways or congested roadways, personnel shall wear orange safety vests and hard hats.

11.8 Pathogens

Although not expected, if pathogenic wastes (i.e. suspect medical wastes, sharps) are encountered during this project, workers will stop work in that area and inform the HSS.

11.9 Explosives

If explosives are encountered during this project workers will immediately stop work and qualified explosive handling personnel will be contacted.

11.10 Smoking Policy

Under no circumstances will smoking be permitted inside any established Exclusion Zone.

11.11 Hearing Protection

Hearing protection will be available to all site workers/visitors.

11.12 Drum/Container Handling

The procedures utilized for the movement and disposal of drums will comply with 29 CFR 1910.120(j) and 1926.65. This section specifies that drums and other containers of hazardous materials be handled in a manner to reduce possible rupture and minimize the potential for a spill.

11.13 Guarding of Machinery and Equipment

Machinery and equipment guarding will be installed and maintained in accordance with 29 CFR 1910 and 1926. Various OSHA standards specify machine and equipment guarding that must be in place to reduce potential injuries. All manufacturer=s machine guards will remain intact and not be removed by any employee. Any damaged or missing guard will be replaced and the equipment will not be operated until the proper protection is provided.

11.14 Illumination

If work activities occur before sunrise or after sunset, sufficient lighting will be provided to meet the requirements of 29 CFR 1910.120(m) and 1926.65. Table H-120.1 - Minimum Illumination Intensities in Foot-Candles should be used as a guide for providing proper lighting in site operations. These minimums range from 3 to 30 foot-candles, depending on the area or operation performed.

11.15 Spill Cleanup

If a spill occurs the HSS will immediately notify the HSM. Immediate containment actions will be implemented to minimize the effects of a leak or spill. All cleanup procedures will be in accordance with applicable local, state and federal regulations. Spill clean up kits will be available on-site.

11.16 Drilling and other Underground Operations

The HSM shall contact New York Dig Safely (NYDS) prior to any drilling or digging activities. Fuss & O'Neill, Inc. three business days notification is required prior to starting work. The following Required Location Request Information is needed: Town, Street Address, and Nearest Street intersection, Type of Work, Name of Caller & Company, Phone Number, and Start Date & Time.

Documentation of the NYDS list, confirmation #, date, time and the person who called should be recorded on the form in Appendix J.

12.0 DECONTAMINATION/WASH-UP PROCEDURES

This section can be classified into four areas: 1) procedures for decontaminating heavy equipment that has entered exclusion zones; 2) decontamination procedures for personnel exiting exclusion zones; 3) wash-up procedures for all personnel; and 4) instrument decontamination.

12.1 Heavy Equipment Decontamination

Heavy equipment that has entered exclusion zones shall be clean on arrival and will be decontaminated prior to leaving the site. As necessary, equipment that has been in contaminated areas of the project site will be decontaminated before leaving the project site. The water that is generated as part of decontamination may be allowed to drain back into the pre-existing site soil (not onto the clean soil). The decontamination area will be located in a known contaminated area of the site.

12.2 Personnel Field Decontamination

Personnel field decontamination facilities will exist at the exits to all established exclusion zones in contamination reduction zones (CRZs). If possible, these field decontamination facilities will be located upwind of the exclusion zone. The field decontamination facilities will be under the control of the HSS. The detailed extent of the decontamination will be a site-specific decision by the HSS based on the extent of personnel contamination.

Once removed, disposable PPE will be collected at the field decontamination-site in a drum or large plastic bag. The drum or plastic bag will be secured in order to prevent the accidental spread of contamination. Disposable PPE that has been worn in an exclusion zone must be removed and placed in the disposal container before leaving the CRZ. Disposable PPE may not be re-used.

12.3 Wash-up Facility

A portable wash-up apparatus and/or facility will exist in the main support area of the construction work zone. The facility will be under the control of the HSS.

After exiting a field decontamination facility, personnel may now use the "wash up" setup. All personnel working at the site must wash their hands and faces prior to eating, drinking or smoking and practice good personal hygiene. Potable water will be available at the site.

12.4 Instrument Decontamination

Instruments will be decontaminated whenever they have contacted soil or dust. Instrument decontamination will occur in the same area for personnel decontamination and will consist of the removal of any dust or soil from the surfaces of the instruments.

13.0 DISPOSAL PROCEDURES

13.1 General

A waste staging area will be located on-site in an area approved by Fuss & O' Neill. This area will be segregated from the support areas to control the potential for waste migration beyond the perimeter of this area. The area will be considered an exclusion zone requiring periodic air monitoring as deemed necessary and the appropriate level of protection pursuant to the protocols in this plan.

All waste materials shall be handled in such a way to avoid potentially spreading contamination, creating a hazard or littering the site. All disposable PPE will be placed in plastic bags during decontamination and site activities for disposal.

All disposal will be in accordance with local, state, and federal hazardous waste regulations, as well as the Resource Conservation and Recovery Act (RCRA).

13.2 Soil/Sludge

Generation of soil/sludge requiring management is not anticipated. All soil that has visible signs of contamination will be classified by the HSS as potentially contaminated material and will be stockpiled. The stockpiled soil will remain in place until the analytical results of samples collected by Fuss & O'Neill are made available to the Contractor. Within 30 days of waste classification finding the soil unsuitable for re-use the soil will be removed and disposed.

13.3 Water

Generation of decontamination liquids requiring management is not anticipated. All dewatering liquids will be containerized, stored in the staging area and/or disposed onsite if appropriate. Waste classifications will be made by F&O. The liquids will be disposed of or treated with methods approved by F&O.

14.0 EMERGENCY PLAN

14.1 General

All operations required have the potential to create an emergency situation. Emergency situations can be characterized as a Fire or Explosion; Environmental Release (spill or cloud); or Accident and/or Injury to one of the field personnel.

14.2 Site Emergency Coordinator

The Site Emergency Coordinator is: HSS

The emergency coordinator or alternate will be on-site during all working hours. The emergency coordinator shall implement the emergency plan whenever conditions at the site warrant such action. The coordinator will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel as necessary, and notification of emergency response units and the appropriate project and management staff designated in Section 1.0.

14.3 Evacuation

In the event of an emergency situation, a specific emergency signal (such as air horn blasts) will sound and all personnel in all work zones will evacuate and assemble near the entrance of the construction work zone or other support area location determined prior to the beginning of the daily operating tasks.

For efficient and safe site evacuation and assessment of the emergency situation, the emergency coordinator will have authority to initiate proper action when outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the construction work zone once the emergency signal has been given. The emergency coordinator will ensure that access for emergency equipment is provided and that all combustion apparatus (e.g.; operating machinery) has been shut down once the alarm has been sounded. The emergency coordinator will notify the Fire Department and other emergency response organizations by telephone of the emergency.

The emergency coordinator or designee will make a headcount of all site personnel at the assembly point. If a worker or site visitor is unaccounted for, the emergency coordinator will report this information to the emergency responders. The site evacuation plan shall be rehearsed as part of the overall training program for site operations.

14.4 Incipient Firefighting

Fire extinguishers will be located at every exclusion zone. Appropriate contractor project personnel will be trained in the use of fire extinguishers. All fire extinguishers will be inspected daily to make sure it is fully charged and in working order.

Fuss & O' Neill employees may fight incipient fires (small, just starting that can be extinguished easily with a portable fire extinguisher, like a garbage can fire) and clean up incidental spills (usually less than 1 gallon) that occur while working on-site. If a fire or spill of this type becomes larger and there is a potential for a hazardous substance release, Fuss & O'Neill employees will sound the emergency alarm and evacuate the area immediately. Emergency Coordinator will contact the responsible party in the event the emergency response is beyond their competency level.

14.5 Emergency Response Coordination

The emergency coordinator or designee will report any emergency immediately to the local emergency response organizations and will be available to brief them immediately upon their arrival as to the location of the emergency, nature and extent of the emergency, personnel involved, hazardous substances involved, and any other pertinent information.

14.6 Personnel Injury/Personnel Exposure/First Aid

Any minor cuts or abrasions are to be washed and treated immediately. First aid shall be given on-site as deemed necessary. If needed the individual will be decontaminated and transported to the nearest medical facility. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. In any life-threatening situation, the life-saving treatment of personnel is the immediate priority. The emergency coordinator or designee will be available to brief the rescue squad immediately upon their arrival as to the location of the injured person(s), nature and extent of the injury(ies), personnel involved, hazardous substances involved, and any other pertinent information. The HSS will supply medical data sheets and chemical hazard information to appropriate medical personnel and complete an incident report on the accident or injury.

In case of personnel exposure, the following procedures are to be provided:

SKIN CONTACT: Use copious amounts of water. Wash/rinse affected area thoroughly and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water.

INHALATION: Move to fresh air and/or, if necessary decontaminate/transport to hospital.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate, if possible and transport to emergency medical facility.

15.0 MEDICAL SURVEILLANCE:

All contact project personnel that are designated to work in the exclusion zones outlined in section V are required to meet the medical surveillance requirements of OSHA 29 CFR 1910.120 and 1926.65 and OSHA 29 CFR 1926.103 (respiratory protection), and to furnish documentation to that effect. In addition, a medical data sheet in Appendix K must be completed prior to beginning work on the site. The medical data sheet shall be kept on-site with the HSS and will accompany the employee whenever medical treatment is required.

All examining physicians must meet the requirements of 1910.120 and 1926.65. The physician performing medical examinations will determine the specific requirements of the physical. The employees must be given the results of their examination. Attached as Appendix K is the Fuss & O'Neill Written Medical Surveillance Program.

16.0 RECORDKEEPING

The HSS will maintain Health and Safety Records for the site. The following information will be recorded on the Daily Record form in Appendix C):

! Weather conditions (temp., wind speed and direction, precipitation)
! Air monitoring equipment calibration records
! Air monitoring results (date, time, location, data, instrument, person conducting sampling)
! Description of operation(s)
! Level of PPE
! Non-compliance with the HASP
! Personnel exposure incidents
! Description of accident(s) (OSHA 200 log)

All accidents and personnel exposures, regardless of the extent, will be reported to the HSS, who will complete a Supervisor=s Report (Appendix B) on the incident.

17.0 AUTHORIZATIONS

Personnel authorized to enter the construction work zones and construction exclusion zones at this site must be approved by the HSS. Authorization will involve completion of appropriate training courses and medical examination requirements as stipulated by this HASP, and review and approval of this HASP.

18.0 SIGNATURES

This plan was reviewed and approved by:

Project Director – James D. McIver, Jr. Date:

Project Manager – Richard Totino Date:

Corporate Health and Safety Officer – Kevin W. Miller, Ph.D. Date: 10/31/05

APPENDIX A

SITE MAPS
(IN WORK PLAN)

APPENDIX B

SUPERVISOR'S REPORT OF ACCIDENT INFORMATION

Fuss & O'Neill of New York, P.C.

SUPERVISOR'S (HSS) REPORT OF ACCIDENT INVESTIGATION

Injured Employee ______________________ Date of Report ____________
Occupation ______________________ Age ________ Sex ________
Length of Employment Years __________ Months ______________
Date of Accident ______________________ Time of Accident __________
Exact Location? ____

Description of Accident (Detail what employee was doing and what tools, equipment, structures or fixtures where involved.)

____
____
____
____

Description of Injuries ______________________________
____
____

Date Reported to Supervisor and First Aid ______________________

Date First Aid Received ______________________________

Delayed? ________Yes ________No
If Yes, Why? ______________________________
____

Type of First Aid Received? ______________________________

Circle Accident Cause Listed Below that Apply:

Struck by/Against **Chemical Contact/Burn**
Slip, Trip and/or Fall Lifting/Lowering
Caught in/by Motor Vehicle Accident

What would you recommend to prevent the recurrence of this type of accident in the future?

____
____
____
____
____
____

SUPERVISOR'S (HSS) REPORT OF ACCIDENT INVESTIGATION CONTINUED

Are recommendations above being implemented? ______________________________

____

Supervisor's Comments: ______________________________________

____

____

____

____

Supervisor's Signature ______________________________________

Date: ____________________

APPENDIX C

DAILY RECORD OF SITE ACTIVITIES

DAILY RECORD OF SITE ACTIVITIES

SITE: ________________________________ DATE: ______________

PROJECT NO.: __________________________

TASK PERFORMED: ____

____

PERSONNEL ON-SITE: ______________________________________

A. WEATHER CONDITIONS: __________________________________

____

____

B. EQUIPMENT LIST (TYPE OF INSTRUMENT(S), PERSON(S) CONDUCTING SAMPLING AND DATA COLLECTION): ________________

____

____

____

____

____

C: LEVEL OF PPE:

____

____

D. TASK:

____

____

E. NONCOMPLIANCE TO THE HASP GUIDELINES:

____

____

____

____

F. PERSONNEL EXPOSURE INCIDENTS:

____

____

G: ACCIDENT DESCRIPTION (if any):

____

____

____

APPENDIX D

CONTAMINATION CHARACTERIZATION

(TO BE PROVIDED)

APPENDIX E

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

PERSONAL PROTECTION PROGRAM

Overview

Personal Protective Equipment (PPE), such as, clothing and respiratory protection help control on-site workers from coming in contact with contaminants and other hazards. It is imperative that PPE be appropriate to protect against the known potential hazards for each investigation and each work site. The selection of PPE will be based upon the types, concentrations, and routes of personal exposure that may be encountered. The appropriate level of protection for initial site entry will be based upon a conservative assessment of the best available site contamination information. The NIOSH Pocket Guide to Chemical Hazards is supplied to the HSS and field scientists that have completed the 40-hour and 8-hour health and safety training courses for use as a source of general industrial hygiene and medical surveillance information. The responsibility of selecting the proper PPE, including respiratory protection, is that of the HSM and HSS. During field activities, the HSS has the authority to upgrade or downgrade the current PPE and respiratory protection.

In responding to an incident where the type(s) and concentration(s) in the ambient atmosphere of substances injurious to human health are unknown, a determination must first be made by the HSM and HSS if it is necessary to have personnel enter the site (close proximity to the potential source of exposure). A requirement for on-site operations necessitates that personnel initially enter the site to characterize and define the hazardous environment that potentially exists.

Until qualitative and quantitative information is available for assessing the ambient atmosphere at a site, levels of protection may have to be based on the site hazard Assessment and gross measurements from portable instruments for organic vapor analysis (i.e. photoionizer detector (PID), organic vapor analyzer or monitor (OVA or OVM), gas chromatograph (GC)). A Field Air Monitoring Log and Air Monitoring Instrument Calibration Log to be completed at the site.

The following criteria will be used as a Guide to determine the level of PPE. It is emphasized that the following values should not be the sole criteria for selecting levels of protection. The level should be selected case-by-case, with special emphasis on potential exposure and chemical and toxicological characteristics of the known or suggested material. These criteria are established from prior experience at the site under investigation and current assessments of site hazards.

- Level C: If ambient breathing zone background concentrations are background to five (5) ppm (one (1) ppm for benzene or vinyl chloride) and meet the level C criteria listed in this document.
- Level D: If ambient background concentrations are at background. Total atmospheric vapor/gas concentrations are used for determining the appropriate level of protection. The background concentration will be measured prior to the commencement of field operations each day, and checked periodically through the day in the support zone to account for any variation resulting from the weather or other external factors.

There are four levels of personal protection recommended by the United States Environmental Protection Agency (USEPA). They range from Level D, used when little or no potential for exposure to contaminants exist; upgrading to Level C, when contamination levels require protection levels from bodily contact and the filtering of breathing air; to Level B when contamination requires protection from bodily contact and the use of a supplied breathable air source; to Level A, which is used when the contamination levels require the highest available protection from bodily contact, respiratory and eye irritation. F&O personnel are supplied with equipment for Levels C and D. If conditions on site require upgrading to Levels A or B, personnel will be required to leave the area. The criteria for Levels C and D are provided below.

Level D

Level D protection is primarily a work uniform, though Tyvek™ could be used if conditions are i.e. muddy, dusty. Dust respirators are available if dusty conditions (modified level D) exist on site.

Level D Equipment

a) Coverals;

b) Leather or chemical-resistant boots or shoes, steel toe and shank;

c) Hard hat (face shield optional);

d) Options as required:

    1) Gloves (nitrile, neoprene);
    2) Disposable overboots (latex);
    3) Safety glasses or chemical splash goggles.

Criteria for Use

a) No indication of airborne health hazards present.

b) Frequent air monitoring with field instrument(s) to confirm ambient background concentrations.

c) Frequent visual observations of field personnel to prevent against i.e. heat stroke.

d) Normal work operations are not expected to create splashes, immersion or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level C

Level C protection will be selected when the types and concentrations of respirable material are known, or reasonably known not to exceed the equipments rated/NIOSH approval capabilities, and exposure to the unprotected areas of the body (i.e. neck and back of head) is unlikely to cause harm.

A range of background to greater than 5 ppm (1 ppm if benzene or vinyl chloride is present) above ambient background breathing zone concentrations of vapors/gas (non-methane) in the atmosphere has been established as guidance by USEPA for selecting Level C protection. Concentrations of unidentified total vapors/gases approaching or exceeding 5 ppm in the breathing zone would warrant upgrading respiratory protection to a self-contained breathing apparatus (Level B) or shut down and evacuation. Wind direction and atmospheric conditions (i.e. humidity) should be established prior to taking background readings with the field instrument(s).

Level C Equipment

a) Full-face piece or half-face, though USEPA recommends full-face, air-purifying canister equipped respirator with appropriate chemical cartridge (i.e. organic vapor/acid gas/HEPA/dust/mist) that is MSHA/NIOSH approved. Splash shield and/or goggles if half-face respirator is used.

b) Tyvek™ clothing or polylaminated Tyvek™, if liquid splash is an issue, with long sleeves and elastic at the wrists and ankles.

c) Inner disposable gloves (i.e. vinyl or nitrile) and outer chemical-resistant gloves (i.e. nitrile or neoprene).

d) Leather or chemical-resistant boots or shoes, steel toe and shank.

e) Hard hat

f) Options as required:

   1. Coveralls
   2. Disposable overboots (i.e. latex)

Criteria for Use

a) Site is known to contain potential hazards not to exceed:

   1) Atmospheric contaminants, liquid splashes, or other direct contact that will not adversely affect or be absorbed through any exposed skin.

2) Types and classes of air contaminants have been identified, concentrations measured, and an approved canister respirator is available that can remove the contaminants.

3) Well-documented, reliable history of site or prior entry.

4) No evidence of acute or chronic effects to exposed personnel.

5) All criteria for the use of air-purifying respirators are met (i.e. no IDLH, no oxygen deficiency).

Total vapor readings are between 0 ppm and 5 ppm (0 ppm to 1 ppm for benzene or vinyl chloride) above ambient background concentrations on field instruments (i.e. PID, FID, gas chromatograph) as measured in the breathing zone.

Frequent air or personnel monitoring should occur while wearing Level C protection.

Respirator Maintenance Program

Respirators shall be inspected after each use by checking the condition of the face piece and all its parts. Parts should be inspected for pliability and signs of deterioration. Once a respirator has been used the wearer must clean it. All detachable parts such as straps, valves and gaskets are removed and cleaned separately. Cartridges cannot be cleaned. They can be used again if their service life has not been exhausted; however, it is recommended that on hazardous waste sites, worn cartridges be discarded at the end of each day.

The parts should go through two water rinses and left to air dry. When dry, parts are reassembled and the respirator is put in a clean plastic bag and stored where it will be protected from conditions that could alter the shape of the mask, such as extreme temperatures or very dusty environments. DO NOT store respirators in direct sunlight or the trunk of a vehicle. At times when the above maintenance cannot be performed, the face piece and other parts can be washed with respirator cleansing wipes provided in individual packs.

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or make adjustments or repairs beyond the manufacturer's recommendations. Any parts that require replacement will be returned by F&O to the manufacturer for repair. The manufacturer's instructions furnished with each respirator shall be read prior to field use.

APPENDIX F

FIELD AIR MONITORING LOG AND CALIBRATION LOG

FIELD AIR MONITORING LOG

DATE: ______________ SITE: __________________________ PAGE ___OF ___

SITE SAFETY OFFICER:____

SAFETY MONITORS: ____

WEATHER CONDITIONS:____

INSTRUMENTATION CONDITION: ____

ACTIVITY/REASON FOR MONITORING	LOCATION	TIME	READING	INITIALS

AIR MONITORING INSTRUMENT CALIBRATION LOG

Page _____of_____

PROJECT NAME: ____________________________ JOB NUMBER: _________

PROJECT LOCATION: ____

INSTRUMENT TYPE: __________________ INSTRUMENT NUMBER: _________

Date Name	Cal Gas Conc.	Instrument Reading	Adjusted (Y/N/)	New Setting	New Reading	Maintenance Notes

APPENDIX G

FIELD TEAM MEMBER FORM

FIELD TEAM MEMBER FORM

Each field team member shall sign this section following review of the HASP and site training before being permitted to work on site.

I have read and understand the HASP and had the required health and safety training pursuant to OSHA 1910.120 and will comply with the provisions contained herein.

NAME PRINTED	SIGNATURE	DATE

APPENDIX H

HEAT AND COLD STRESS PROGRAM

THERMAL EXPOSURE

Overview

Adverse weather conditions are important considerations in planning and conducting site operations. Extremes in hot and cold weather can cause physical discomfort, loss of efficiency, and personal injury.

Heat Stress

Heat stress can result from working in a hot environment both indoors and outdoors whether protective clothing is or is not worn. Working under various levels of personal protection may require the wearing of low permeability disposable suits, gloves and boots. This type of clothing will prevent most natural body ventilation thereby causing discomfort due to increased sweating and eventually heat stress. Recommendations to reduce heat stress are to:

a) Drink plenty of fluids (water or Gatorade^{TM}) to replace loss through sweating, and eat light foods.

b) Wear cotton undergarments to act as a wick to absorb moisture and maximize natural cooling.

c) Make adequate shelter available for taking rest breaks in order to cool off.

d) The HSS shall develop an adequate and appropriate work and rest schedule for the field crew as needed.

For extremely hot weather, these additional recommendations should be followed:

a) Install portable showers or hose down field crew to cool clothing and body.

b) Shift working hours to early morning and early evening thereby avoiding the hottest part of the day.

c) Rotate field crews wearing the protective clothing into a work versus rest schedule.

d) Wear cooling devices to aid in ventilation (the additional weight may affect efficiency).

Some guidelines:

Ambient Temperature (°F)	Action Work Time (min/hr) Level C Clothing
75 or less	50
80	40
85	30
90	20
100	0

The following discusses the three types of heat stress: 1) Heat Exhaustion; 2) Heat Cramps; and 3) Heat Stroke.

Heat Exhaustion

Heat Exhaustion is brought about by the concentration of blood in the vessels of the skin. This condition may lead to an inadequate return of blood to the heart, and eventually, to physical collapse. The symptoms are:

- General weakness
- Excessive perspiration
- Dizziness
- Pale and clammy skin
- Weak pulse
- Rapid and shallow breathing
- Appearance of having fainted

To treat for heat exhaustion, place the individual in a cool place and remove as much clothing as possible. The individual should drink cool water, Gatorade™ drink, or similar liquids. The individual should be fanned; however, do not over cool or allow chilling. Treat the individual for shock and remove to a medical facility if condition persists.

Heat Cramps

Heat Cramps are usually caused by loss of salt when an individual has perspired a great deal. Cramps usually in the leg and abdominal muscles can also be caused by drinking iced liquids quickly or in large amounts. The symptoms of cramps are as follows:

- Pain and cramps in legs or abdomen
- Faintness
- Profuse perspiration

Heat Stroke

Heat Stroke is a breakdown of the body's heat-regulating mechanism causing high fever and collapse. This condition, which is an IDLH (Immediately Dangerous to Life and Health) condition, can result in unconsciousness, convulsions, and even death. Persons in poor physical condition or of advanced age are particularly susceptible. The symptoms of heat stroke are:

- Muscle twitching or convulsions
- Dry hot skin
- Flushed skin
- High body temperature
- Loss of consciousness
- Deep breathing, then shallow or absent
- Dilated pupils

Heat stroke is a medical emergency situation. Medical emergency personnel should be contacted immediately in order that the person can be transported to a medical facility. In the interim, steps can be taken by the HSS. The individual should be removed to a cool environment and the body temperature reduced immediately by dousing the body with water or by wrapping in a wet sheet. If ice is available, it should be placed under arms and around the neck and ankles. If the victim is conscious, Gatorade™ drink or other similar liquids containing electrolytes should be provided. Intake of these liquids will be monitored by the HSS so as not to be excessive. Steps should be taken to protect the victim from injury in the event of convulsions, such as removing any objects in the area of the victim.

To avoid problems from heat stress during conditions of high temperature and humidity, the HSS should assure that the field crew drink plenty of electrolyte fluids before and during field activities, breaks should be provided pursuant to the schedule outlined by the HSS, and should revise work schedules as necessary to take advantage of the cooler parts of the day.

Cold Exposure

Cold exposure can occur in temperatures at or below freezing. If prolonged exposure to cold occurs without proper protection, the effects of cold exposure can occur in temperatures above freezing. Exposure to cold can cause severe injury (frostbite) or overall drop in body temperatures (hypothermia). The extremities (fingers, toes and ears) are most susceptible to frostbite.

Both the outdoor temperature and the wind velocity play a part in cold injuries. Wind chill is used to describe the chilling effect of moving air in combination with low temperatures. Cold exposure can be a serious threat to a field crew that removes protective clothing and exposes perspiration soaked underclothing to the cool air. Water conducts heat 240 times faster than air, thus rapidly cooling the body. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Cold exposure symptoms (hypothermia) are usually seen in the following five stages:

1) Shivering
2) Apathy, listlessness, sleepiness and rapid body cooling
3) Unconsciousness, glassy stare, slow pulse and respiratory rates
4) Freezing of the extremities
5) Death

Recommended actions to avoid suffering the effects of cold exposure are:

a) Wear cotton, or even better, wool or synthetics (polypropylene) undergarments to absorb perspiration from the body.

b) Wear additional layers of light clothing as needed for warmth. The layering effect holds in air, trapping body heat, and some layers could be removed as the temperature rises during the day.

c) Pay close attention to body signals and feelings (hypothermia symptoms), especially to the extremities. Correct any problem indications by breaking from the work activity and moving to a rest area to warm up and add additional clothing.

d) Install a wind break at the drill site to minimize cold winds from blowing directly at the drilling crew.

e) Maintain good eating and drinking habits enabling the body to operate at top capacity.

f) Provide a sheltered area for resting and warming up.

APPENDIX I

CONFINED SPACE ENTRY PROCEDURE

CONFINED SPACE ENTRY PROCEDURE

1) OSHA defines a "Permit-Required" confined space as:

   - An area large enough for an employee to enter and perform work;
   - An area with limited or restricted means for entry or exit; and,
   - An area that is not designed for continuous human occupancy.

2) The characteristics of a Permit-Required confined space are:

   - The space or area contains, or has a known potential to contain, a hazardous atmosphere;
   - The space or area contains a material with the potential to engulf an entrant;
   - The area has an internal configuration such that an entrant could be trapped by inwardly converging walls or a floor that slopes downward and tapers to a smaller cross-section; and,
   - The area contains any other recognized serious hazard.

Upon establishing that the area is a confined space or Permit-Required confined space and may contain one or more of the above characteristics, initial and subsequent atmospheric monitoring of the confined space shall be implemented prior to entry.

Monitoring shall be conducted using instruments that measure gases. Examples would be an oxygen meter and explosimeter. The need for respiratory protection and other protective equipment such as head protection, retrieval systems or self-contained or airline supply breathing apparatus shall be established through air monitoring.

1) Evaluation - This includes the initial monitoring of a confined space for harmful gases or vapors with instruments that measure gases in the area. Evaluation also includes determining how monitoring will be performed by employees and if any respiratory protection is required. Additional protective equipment may include head protection, retrieval systems or self-contained or airline supply breathing apparatus.

2) Control - This step involves the design of a confined space area. Industries with a permit-required confined space may want to consider controlling the space by changing its design, if possible. For example, a company could add ventilation to improve air quality in spaces that contain hazardous gases.

3) Monitoring - Ongoing monitoring is needed to assess the atmospheric quality for workers in confined spaces. Through monitoring, industries can verify the results of their initial evaluations to ensure worker protection.

Monitoring shall be conducted in the order listed:

1) Measure oxygen deficiencies. OSHA's standards call for a minimum oxygen (O_2) level of 19.5% by volume and a maximum of oxygen (O_2) level 23.5%.

2) Measure combustible gases. OSHA standards state that employees must not enter a confined space containing more than 10% of the lower explosive limit (LEL). Note that for combustible gases to cause an explosion, the vapors must be within the limits of the LEL and the upper explosive limit (UEL).

NOTE: Even if a combustible level is below the 10% LEL, the combustible gas can still present a toxic hazard. To help ensure a combustible gas measurement is correct, it is important to take oxygen measurements first, since low levels of oxygen, below approximately 10% by volume, can cause erroneous combustible gas readings. This level is far below what are safe atmospheric conditions for human life.

Safety equipment needed for confined space entry may include the following:

a) Confined Space Entry Permit
b) Oxygen Deficiency Meter (Gastec)
c) Hardhat with Flashlight
d) Ladder (folding)
e) Tripod with recovery system, Body Harness and Safety Line
f) Propane powered blower and ventilation duct work

Safety procedures before entering a confined space:

1) Check oxygen (O_2), carbon monoxide (CO), lower explosive limit levels (LEL) and hydrogen sulfide (H_2S) in the confined space by lowering the meter or sampling tube as low as possible to the bottom of the space.

2) Record in a field book and on the Confined Space Entry Permit form.

Record: Time, Readings: % Oxygen _____; % LEL ____; carbon monoxide ______ PPM; and hydrogen sulfide ______ PPM;
If % LEL and carbon monoxide values are 0.0, record 0.

3) Remove sampling tube from the confined space; take a reading in ambient air and record values.
4) One person is to remain out of the confined space (attendant) at all times to observe and watch the person(s) (entrant) working in the confined space.

5) Instrument (oxygen meter) is to be left operating while entrant(s) is (are) in the confined space.

6) If a problem arises, the person(s) working in the confined space must leave immediately.

7) If work has ceased within the confined space for more than 15 minutes, repeat Steps 1 through 3 above to insure that no harmful gases/vapors have collected in the confined space before entering again.

8) At the end of the work shift, submit a copy of the air monitoring test information and Confined Space Entry Permit to the HSS and/or HSS.

NOTE: For confined space entry work conducted at a facility that has a confined space entry program, the HSS shall insure compliance with that program.

APPENDIX J

NY DIG SAFELY

Confirmation No.___________________
Date___
Time___________________
Person Called___________________

NY Dig Safely

These companies shall be called in case of an **EMERGENCY. DO NOT CALL**, NY Dig Safely. NY Dig Safely may dictate additional and/or different utility companies than listed. The list below is intended as guidance only.

UTILITY COMPANY	
ELECTRIC COMPANY	
TELEPHONE	
GAS	
CABLE TV	
LOCAL WATER AND SEWER	
Local Water Co.	
Municipal Depart. of Public Works	
On-Site Utility Clearance	

APPENDIX K

MEDICAL SURVEILLANCE PROGRAM
MEDICAL DATA SHEET

MEDICAL SURVEILLANCE PROGRAM

Federal regulations and F&O policy require all employees who participate in field activities in situations where there is a potential exposure to hazardous materials, with or without a respirator; 30 days or more per year must undergo physical examinations, including a base and termination exam. At a minimum, the physical exam complies with the requirements of OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response.

The following tests are performed under the supervision of a licensed physician:

a) Physical exam
b) Hearing (base and as needed)
c) Chest x-ray (base and as deemed necessary by the attending physician)
d) Electrocardiogram (base and as needed)
e) Pulmonary function (base and as needed)
f) Urine analysis
g) Complete blood count

In the event F&O personnel are exposed to hazardous constituents, the person(s) would immediately go through the necessary exams for those particular constituents. An arranged physical exam pursuant to OSHA 29 CFR 1910.120 program has been developed between F&O and A medical data sheet, attached, must be completed by all company field personnel prior to working on-site. One copy of the form should be kept by the HSS, and a second copy by the HSS. Field personnel must be informed of the location of the medical data sheet while working on-site. Copies of employee physical exam reports are maintained at F&O by the HSM CorpCare Occupational Health Center, an affiliate of Manchester Memorial Hospital, located in Manchester, Connecticut.

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all on-site personnel and kept at the site during field operations. This data sheet must accompany personnel when medical assistance is needed or if transport to hospital facilities is required.

PROJECT NAME: ______________________________

PROJECT LOCATION: ______________________________

NAME: ______________________________
HOME TELEPHONE: ______________________________
ADDRESS: ______________________________
AGE: ______________________________
HEIGHT: ______________________________ WEIGHT: ______________________________

IN CASE OF EMERGENCY, NOTIFY:

SPOUSE OR FAMILY CONTACT: ______________________________
PHONE: ______________________________
SPOUSE OR FAMILY CONTACT: ______________________________
PHONE: ______________________________

ALLERGIES INCLUDING PRESCRIPTION MEDICATION: ______________________________
____

PARTICULAR SENSITIVITIES: ______________________________
____

DO YOU WEAR CONTACTS: ______________________________

ANY PREVIOUS ILLNESSES OR EXPOSURE TO HAZARDS CHEMICALS (EXPLAIN):
____
____

PERSONAL PHYSICIAN:
NAME: ______________________________
PHONE: ______________________________
ADDRESS: ______________________________
____

I am the individual described above:

______________________________ ______________________________
Signature Date

APPENDIX C

Citizen Participation Plan

BCP CITIZEN PARTICIPATION PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET
POUGHKEEPSIE, NEW YORK

NYSDEC Site – C314081

Prepared For:
The O'Neill Group - Dutton, LLC

September 2005

For submittal to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

BCP CITIZEN PARTICIPATION PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET
POUGHKEEPSIE, NEW YORK

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BCP CITIZEN PARTICIPATION PLAN
FORMER A.C. DUTTON LUMBER YARD SITE
HOFFMAN STREET
POUGHKEEPSIE, NEW YORK

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APPENDICES

1.0 INTRODUCTION

This document presents the site-specific Citizen Participation Plan (CPP) for the Former A.C. Dutton Lumber Facility located in the City and Town of Poughkeepsie, Dutchess County, New York (Figure 1). This plan was generated to meet the requirements for citizen participation as outlined in Section 8 of the Draft Brownfield Cleanup Program Guide dated May 2004. The intent of this Citizen Participation Plan is to promote public understanding of the New York State Department of Environmental Conservation's (Department) responsibilities, planning activities, and remedial activities at its Brownfield Cleanup Program (BCP) sites. The Citizen Participation process provides an opportunity for the Department to learn from the public and provides the public with information that will enable the Department to be certain that the investigation and selected remedial alternative are sufficiently protective of the public health and the environment.

1.1 Site History

The former A.C. Dutton facility manufactured pressure treated lumber. A site location map is presented in Figure 1. Raw materials were brought in by truck, boat or rail car, processed in either of the two treatment plants, temporarily stored in a sheltered drip pad area and allowed to dry and then stored outside prior to commercial resale. There are currently seven buildings remaining on the property in varying states of disrepair. There are two warehouse buildings located in the southern portion of the property. The plant offices and the newest pressure treatment facility occupy the south central portion of the property, and another warehouse and older pressure treatment facility occupy the northern portion of the site. One partially collapsing two story brick building exists on the western border of the property. There is also a "fuel" building which is a covered containment cell for a petroleum bulk storage tank located in the southeast portion of the site adjacent to the office building. There is also a rail bed located along the western side of the property. These features are depicted on the Site Plan (Figure 2) attached to this CPP.

The site is occupied by an inactive lumber wholesaling and pressure treatment facility operated by the A.C. Dutton Corporation for many years. Prior to those activities, portions of the site were reportedly occupied by a foundry and a glass manufacturing facility.

Several investigations have been performed on the property. The results of the investigations indicated that past use of the property to create pressure treated lumber using Copper Chromate Arsenate (CCA) has resulted in impacts to soil and to a lesser extent, groundwater.

The information contained in the available studies for the property indicates that additional site investigation be conducted. The BCP application, available at the document repositories listed below, includes copies of the recent investigations. Based on the findings contained in the reports, the Department believes that the site may be an eligible brownfield site and that a Site Investigative and Alternative Analysis work plan must be submitted for Department review and the investigations conducted. The work will be done through the NYSDEC's Brownfield Cleanup Program (BCP). The current site owner, The O'Neill Group, Dutton, LLC, intends to revitalize the site with a mixture of commercial, residential, and limited recreational use. The

The O'Neill Group, Dutton, LLC is simultaneously going through the site plan approval process with the various City and Town reviewing agencies before constructing the facilities.

2.0 SITE BACKGROUND

2.1 Site Setting

The former A.C. Dutton Lumber Facility is located on Hoffman Street in the Town and City of Poughkeepsie, Dutchess County, New York. The property is an irregularly-shaped parcel, which has approximately 371 feet of frontage on the northern side of Dutchess Avenue and approximately 213 feet of frontage on the Northern side of Hoffman Street. The 15-acre site consists of 3.65 acres located in the Town of Poughkeepsie and 11.35 acres located in the City of Poughkeepsie. The site is approximately half a mile north of the Metro North Poughkeepsie railroad station and the Mid-Hudson Bridge.

The site currently consists of two tax parcels making up approximately 15 acres. The tax parcels are identified as follows:

Parcel and Acreage	Tax I.D.
City of Poughkeepsie (11.35 acres)	31-6062-59-766443-00
Town of Poughkeepsie (3.65 acres)	14-6062-02-763508-00

There are currently seven buildings remaining on the property in varying states of disrepair. There are two warehouse buildings located in the southern portion of the property. The plant offices and the newest pressure treatment facility occupy the south central portion of the property. Another warehouse and older pressure treatment facility occupy the northern portion of the property. One partially collapsing two story brick building exists on the western border of the property. There is also a "fuel" building, which is a covered containment cell for a petroleum bulk storage tank which is located in the southeast portion of the site adjacent to the office building; a rail bed can also be found along the western side of the property.

2.2 History

2.2.1 Historic and Future Use of the Site

The most recent use on the site was lumber treatment yard and petroleum bulk storage, operated by A.C. Dutton Lumber Corporation in the City of Poughkeepsie. The site is zoned 1-2, General Industrial District. In the Town, it is located in the WD2 (Waterfront District 2) and zoned IH (Heavy Industry). The former A.C. Dutton facility manufactured pressure treated lumber. Raw materials were brought in by truck, boat, and rail and processed in either the two treatment plants. The materials were then temporarily stored in a sheltered drip pad area and allowed to dry and then stored outside prior to commercial resale. Prior to the lumber yard activities the site was occupied by a foundry and a glass manufacturing facility.

Several limited investigations have been performed on the property. The most recent reports indicate that the subsurface investigations conducted by Ecosystems Strategies, Inc (ESI) in 2002 found contaminants consistent with the use of the property as a pressure treated lumber manufacturer. The shallow soil and to a lesser extent groundwater was found to be contaminated

with copper-chromate-arsenate (CCA); in some locations at fairly significant levels. Copper-chromate-arsenate is used in the lumber treatment process.

There are a number of other issues related to the treatment of lumber at this facility. The Hazardous Substance Bulk Storage (HSBS) registration shows at least seven storage tanks at the facility dating back as far as 1991 and the registration does not show the tanks as closed even though many are gone from the site and all are no longer used. All seven tanks are registered to contain arsenic acid, the largest percentage hazardous component in the Copper Chromate Arsenate (CCA) liquid. The tanks are identified by their location with acronyms NTP (New Treatment Process) and OTP (Old Treatment Process). The The O'Neill Group, Dutton, LLC will renew the HSBS registration and properly abandon the tanks as part of the BCP process.

The site also had petroleum storage tanks and was registered as a petroleum bulk storage (PBS) facility. There are five registered PBS locations on file for the site. The PBS permit (registration #3-175935) expired 6/30/02. The existing permit shows the tanks as aboveground storage tanks (ASTs). The The O'Neill Group, Dutton, LLC will renew the PBS permit and properly abandon the tanks as part of the BCP process.

A historic spills search was done pertaining to this site. The search revealed on the NYSDEC Spill Incidents Database (through the internet) that Spill No. 0206848 was called in on October 2, 2002 and is still open. The spill relates to the discovery of petroleum-impacted soil detected near an onsite fuel tank. The The O'Neill Group, Dutton, LLC will investigate the nature and extent of the petroleum-impacted soil as part of the Site Investigation and Remedial Alternative Selection process, for which the public will have the opportunity to comment on as part of the CPP.

The applicant's future intent for the property is to build multi-story residential units with commercial businesses and parking or other amenities located at the ground floor level. This will consist of approximately 300 to 400 apartments or condominiums as well as some commercial and recreational facilities to provide needed housing and services for the residents and City of Poughkeepsie. Portions of the site are located within the 100-year flood plain so the site will be engineered accordingly.

3.0 SITE DESCRIPTION

3.1 Geology of Site

The Surficial Geologic Map of New York, prepared by Cadwell (1989), identifies unconsolidated deposits in the vicinity of the site as fluvial sand and gravel deposits (adjacent to the Hudson River) and glacial till consisting of sand, silt and gravel and exhibiting variable texture. The Dutchess County Soil Conservation Survey (2002) depicts the soils as being Urban Lands, which typically consist of reworked native material or fill covered extensively by impervious surface. Overall, material encountered by ESI during subsurface investigation at the site in 2002 can be interpreted as fill material, which is consistent with the soil survey findings. In those instances when native soils were encountered, the material was described as silty-sand with gravel. Historically, areas of the site received fill that was placed along western portions of the property to level and extend the shoreline of the Hudson River westward.

According to the Geologic Map of New York, Lower Hudson Sheet, prepared by Fisher et al. (1970), bedrock in the vicinity of the site consists of the Taconic Melange Formation and the Austin Glen Formation. The Taconic Melange is described as a chaotic mix of pebble to block sized Cambrian to Middle Ordivician Age rocks in a pelitic matrix. The Austin Glen formation consists of interbedded layers of greywacke and shale. Outcrops observed on the eastern margin of the site contain competent siltstone layers interbedded with less competent shale.

3.2 Hydrogeology of Site

During investigations conducted by ESI, groundwater was typically encountered within unconsolidated deposits at depths of four to six feet below the ground surface. Given regional topography and the location of surface water bodies, it is assumed that shallow groundwater flows from east to west across the site and discharges to the Hudson River. Because the reach of the Hudson River adjacent to the site is tidally influenced, it is possible that groundwater flow at the site is in part influenced by tides.

Groundwater in the area of the site is not used as a drinking water resource. The site is served by municipal water and sewer. Further assessments of groundwater quality at the site will be performed as part of the proposed investigation. Possible off-gassing or vapor intrusion from impacted groundwater into future structures also will be assessed during the investigation.

4.0 PROJECT DESCRIPTION

A preliminary schedule for this project is presented in Figure 3. The first phase of the project will consist of a Remedial Investigation (RI). The RI includes procedures to characterize surface and subsurface soil, sediment, groundwater and surface water. The data will be used in public health and environmental impact evaluations and provide the basis for an Alternative Analysis Report and Remedial Work Plan. Based on the Remedial Investigation Report, an appropriate draft remedial work plan will be developed. The public will be advised of the availability of the Remedial Work Plan and have the opportunity to comment on it.

After the Department has considered any comments provided by the public, remedial action can begin.

4.1 Objectives of the remedial program

The project objectives are to determine whether contaminants, hazardous materials or wastes have been or may be released from the Former A.C. Dutton Lumber Facility Site and to determine a cleanup program based on the findings that is sufficiently protective of human health and the environment, is consistent with the proposed re-use of the property and can be implemented by The O'Neill Group, Dutton, LLC.

4.2 Key Decision Points

Milestones in the BCP process are summarized below:

- Acceptance into the BCP/BCP Agreement
- Development and Approval of the Remedial Investigation Work Plan
- 30 Day Comment Period and Fact Sheet
- Department accepts RIWP
- Complete Remedial Investigation & Submit Remedial Investigation Report
- Department Reviews and Accepts Report
- 45 Day Comment Period and Fact Sheet on Draft Remedial Work Plan
- Remedial Action Work Plan Finalized
- Construction Fact Sheet and Construction Begins
- Fact Sheet; Remedial Action completed, Report under Review
- Engineers Report and Fact Sheet
- OM&M Plan (if required)
- Certificate of Completion and IC/EC Fact Sheet (as warranted)

As warranted, the Department may present the findings of any of the above stages to the public through Citizens Participation meetings.

4.3 Available Documents

The following list documents the reports and submittals that are currently available in the document repositories:

- The BCP Application which includes as attachments:

- A Phase II Environmental Site Assessment and Supplemental Subsurface Investigation (Ecosystems Strategies, Inc., 2002)

- Draft Remedial Investigation Work Plan – RIWP (Fuss & O'Neill, 2005)

5.0 BROWNFIELD SITE CONTACT LIST

The following section presents the project contact list. Questions, comments or other information about the project is available from the following contacts:

- *Environmental Concerns* - Mr. Bradley Brown - NYSDEC Project Manager
  NYSDEC Central Office, 11th Floor, 625 Broadway, Albany, NY 12233
  (518) 402-9564, Hours 8-4 by appointment

- *Health Related Concerns* – Ms. Kristin Kulow – NYSDOH Public Health Specialist II,
  NYSDOH, 28 Hill Street, Suite 201, Oneonta, NY 13820-9804

- *Citizen Participation* - Mr. Michael J. Knipfing – NYSDEC Region 3 Office, 21 South Putt Corners Road, New Paltz, NY 12561, (845) 256-3154, Hours 9-4 by appointment

6.0 PUBLIC MAILING LIST

A summary of the site mailing list is provided below and a complete contact list is provided in Appendix A.

Recipient	**Number of Mailings**	**Type of Mailing**
Federal Representatives	4	Fact Sheets
State Representatives	3	Fact Sheets
Dutchess County Representatives/Officials	12	Fact Sheets
Town of Poughkeepsie	4	Fact Sheets
City of Poughkeepsie	18	Fact Sheets
NYSDEC & NYSDOH	19	Fact Sheets
Environmental Groups	7	Fact Sheets
Media Outlets	58	Fact Sheets
Adjacent Property Owners	13	Fact Sheets
Repositories	3	Fact Sheets, Reports, Work Plans and other documents of public record
TOTAL	141	

7.0 IDENTIFICATION OF DOCUMENT REPOSITORIES

Documents related to the remedial program for the Site are available for public review at the locations listed below. As documents are created during the remediation process, they will be added to the repositories.

NYSDEC Central Office 11th Floor, 625 Broadway Albany, New York 12233 Attn: Mr. Bradley Brown (518) 402-9564 Hours: 8-4 By Appointment	NYSDEC Region 3 Office 21 South Putt Corners Road New Paltz, New York 12561 Attn: Mr. Michael Knipfing (845) 256-3154 Hours: M-F, 9-4 By Appointment
Adriance Memorial Library 93 Market Street Poughkeepsie, NY 12601 Attn: Ms. Jean Hojnacki Head of Reference (845) 485- 3445 M-Th: 9 a.m. to 9 p.m. Fri & Sat: 9 a.m. to 5 p.m. Sun: 1 p.m. to 5 pm.	

8.0 DESCRIPTION OF SPECIFIC CITIZEN PARTICIPATION ACTIVITIES

NYSDEC and NYSDOH are committed to keeping the public informed and involved throughout the process of site investigation and alternative analysis of this site. At the minimum, the Citizen Participation Activities will include:

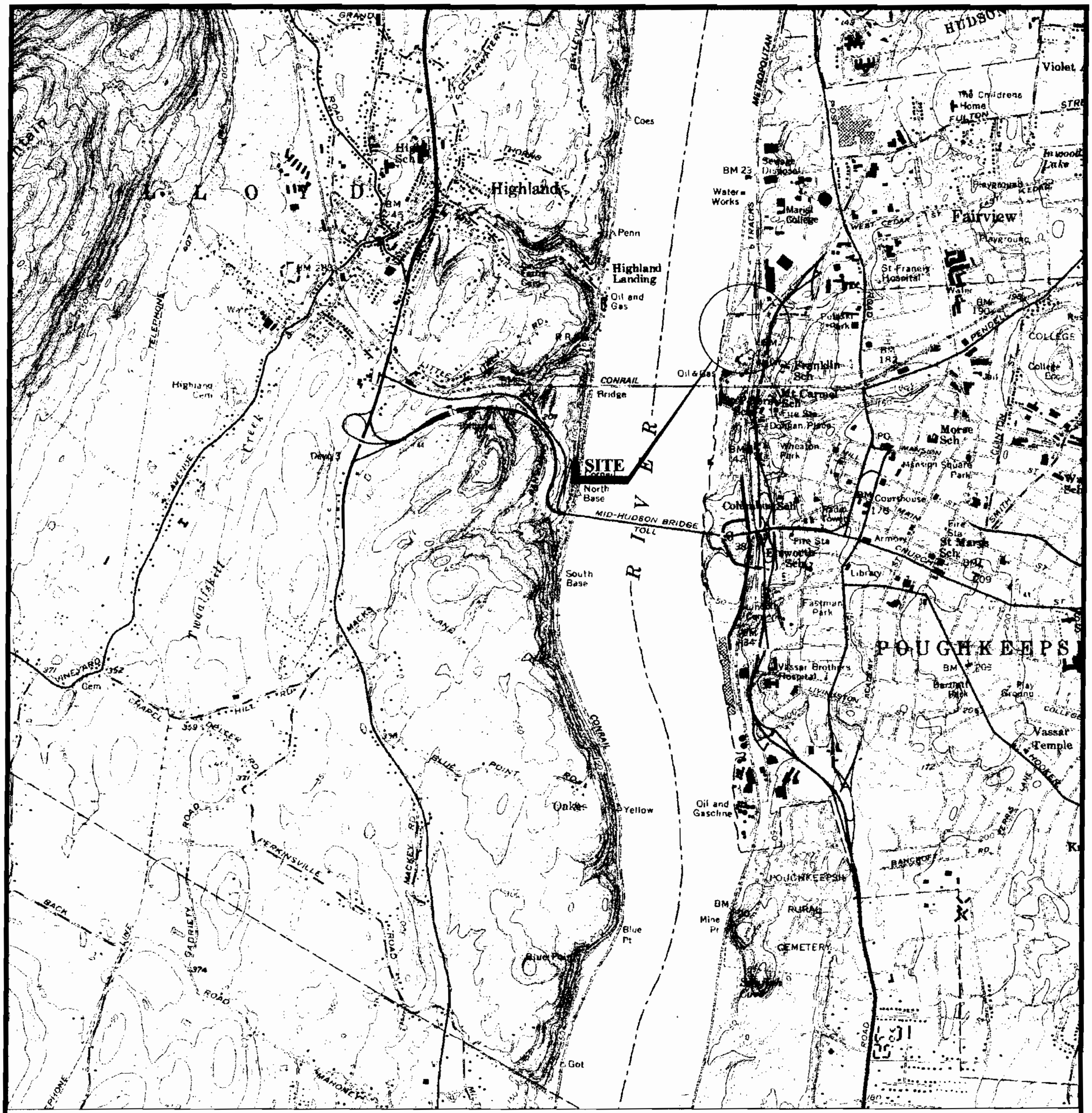
- Establishment of document repositories.
- Creation of this Citizen Participation (CP) Plan with inclusion of a Public Mailing List and a contact list of persons the public can contact for further information.
- Other meeting or Fact Sheets as warranted by the NYSDEC

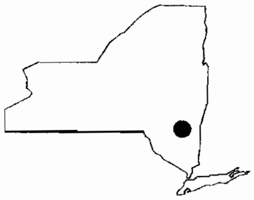
A citizen participation fact sheet summarizing CP milestones during the project is provided in Appendix B.

At any time during the remediation process, the public is encouraged to contact the officials listed in Section 5.0 of the CP Plan to express any concerns or questions they may have regarding this project.

FIGURE 1

Site Location Map





MAP REFERENCE

THIS MAP WAS PREPARED FROM THE FOLLOWING 7.5 MINUTE USGS MAP:
Poughkeepsie, 1957 Photorevised 1982.

SCALE:	
HORZ: 1" = 2000'	
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

0 1000 2000
GRAPHIC SCALE

FUSS & O'NEILL OF NEW YORK, P.C.
Consulting Engineers
80 WASHINGTON STREET SUITE 301, POUGHKEEPSIE, NY 12601
845.452.8801
www.FandO.com

A.C. DUTTON (ONEKEY, LLC.)
USGS LOCATION MAP
2 HOFFMAN DRIVE
CITY OF POUGHKEEPSIE DUTCHESS COUNTY, NEW YORK

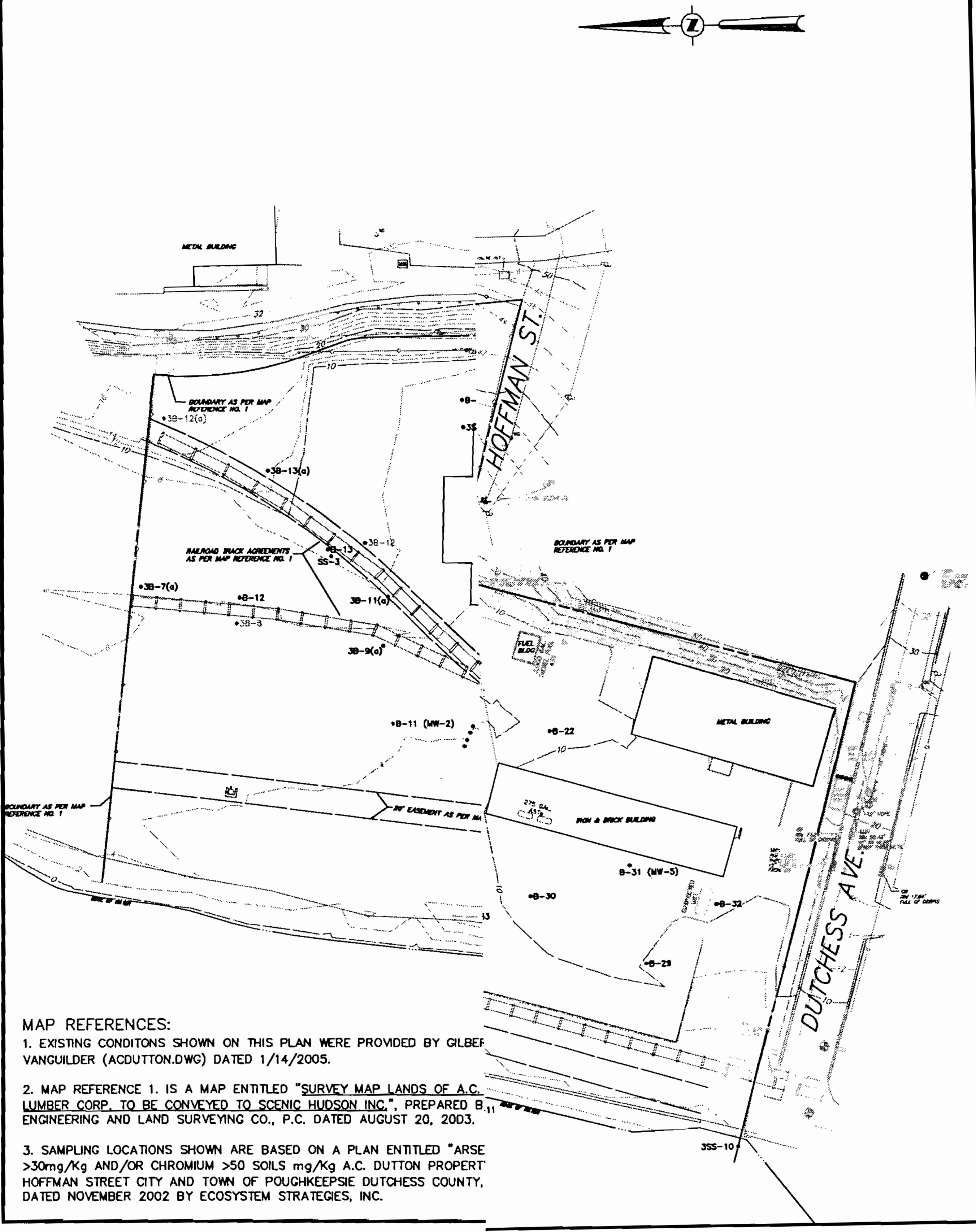
PROJ. No.: 20040764A1N
DATE: JUNE 2005

FIG. 1

UCS:
MB VIEW:
LMAN:
CTB:

FIGURE 2

Site Plan



MAP REFERENCES:

1. EXISTING CONDITONS SHOWN ON THIS PLAN WERE PROVIDED BY GILBEF VANGUILDER (ACDUTTON.DWG) DATED 1/14/2005.

2. MAP REFERENCE 1. IS A MAP ENTITLED "SURVEY MAP LANDS OF A.C. LUMBER CORP. TO BE CONVEYED TO SCENIC HUDSON INC.", PREPARED B ENGINEERING AND LAND SURVEYING CO., P.C. DATED AUGUST 20, 2003.

3. SAMPLING LOCATIONS SHOWN ARE BASED ON A PLAN ENTITLED "ARSE >30mg/Kg AND/OR CHROMIUM >50 SOILS mg/Kg A.C. DUTTON PROPERT HOFFMAN STREET CITY AND TOWN OF POUGHKEEPSIE DUTCHESS COUNTY, DATED NOVEMBER 2002 BY ECOSYSTEM STRATEGIES, INC.

No.	DATE	DESCRIPTION	BY
1.			

REVISIONS

PROJ. MANAGER:
CHIEF DESIGNER:
REVIEWED BY: DATE

A.C. DUTTON
SITE PLAN
SITE INVESTIGATION WORK PLAN
NEW YORK

PROJ. No.: 20040764.A1N
DATE: MARCH, 2005

FIG. 2

UCS: WRLD | MS VIEW: 100 | LMAN: EXIST SAMPLES-0305 | CTB: F&O Standard (Half)
H:\DWG\P2004\0764\A1N\Plan\040764A1NSTP001.dwg, EX-11x17, 3/23/2005 10:45:36 AM, scottw, AcroPlot050x050, 1:1

FIGURE 3

Preliminary Project Schedule

FIGURE 3 PRELIMINARY PROJECT SCHEDULE

A summary of proposed key milestones for the Remedial Investigation is presented below. Note that the schedule is subject to change based on results of field assessment activities and conditions encountered in the field.

	Months after Authorization																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Task																		
BCP Program																		
1) BCP Application	■	■	■															
2) Supplemental RI and Report			■	■	■	■	■											
3) Remedy Scoping & RAWP			■	■	■	■	■	■	■									
4)Site Remediation										■	■	■	■	■	■	■	■	■
5)Engineers Report and Certification																		■

APPENDIX A

Contact List of Interested/Affected Public

Contact list of interested/affected public

Brownfield Site Contact List

The Brownfield Site Contact List (BSCL) (below) summarizes at a minimum persons to be contacted about the Environmental Investigation and Remediation for the Former A.C Dutton Lumber Facility:

FEDERAL REPRESENTATIVES

Senator Charles E. Schumer
757 3rd Avenue, Suite 1702
New York, NY 10017

Senator Hillary Rodham Clinton
780 3rd Avenue, Suite 2601
New York, NY 10017-2024

Congressman, 22nd District
Maurice Hinchey
291 Wall Street
Kingston, NY 12401

Hon. Sue Kelly
21 Old Main Street
Suite 107
Fishkill, NY 12524

STATE REPRESENTATIVES

Assemblyman Thomas Kirwan
100th District
190 South Plank Road
Newburgh, NY 12550

Senator Stephen M. Saland
41st District
3 Neptune Road, Suite A19B
Poughkeepsie, NY 12601

Assemblyman Joel Miller
3 Neptune Road
Suite A19E
Poughkeepsie, NY 12601

DUTCHESS COUNTY REPRESENTATIVES/OFFICIALS

Chairman of Legislature
Bradford Kendall
27 Market Street
Poughkeepsie, NY 12601

Clerk of Legislature
Patricia J. Hohmann
22 Market Street
Poughkeepsie, NY 12601

District 8-City/Town of Poughkeepsie
Honorable Robert G. Rolison-R
4 Arnold Boulevard, Poughkeepsie, NY
12603

District 9- City of Poughkeepsie
Honorable Fred Knapp-D
4 Barnard Avenue, Poughkeepsie, NY
12601

District 10- City of Poughkeepsie
Honorable Barbara Jeter-Jackson-D
43 Lent Street, Poughkeepsie, NY 12601

County Executive
William R. Steinhaus-R
22 Market Street
Poughkeepsie, NY 12601

County Clerk
Colette Lafuente-R
22 Market Street
Poughkeepsie, NY 12601

Planning and Development
Roger P. Akeley, Commissioner
22 Market Street,
Poughkeepsie, NY 12601

Health
Dr. Michael C. Caldwell, Commissioner
22 Market Street, Poughkeepsie, NY 12601

Water and Wastewater Authority
Scott Chase, Manager
27 High Street,
Poughkeepsie, NY 12601

Public Works
Michael P. Murphy, Commissioner
22 Market Street,
Poughkeepsie, NY 12601

Economic Development
Ronald W. Coan, Director
3 Neptune Road,
Poughkeepsie, NY 12601

Patrick Nesbit
District 1
7 West Cedar Street
Poughkeepsie, NY 12601

TOWN OF POUGHKEEPSIE REPRESENTATIVES/OFFICIALS

Supervisor
Joseph Davis
Town of Poughkeepsie
One Overocker Road
Poughkeepsie, NY 12603

Town Clerk
Susan Miller
Town of Poughkeepsie
One Overocker Road
Poughkeepsie, NY 12603

Michael Cifone
Ward 4
One Overocker Road
Poughkeepsie, NY 12603

Chairman
Town Conservation Advisory Committee
One Overocker Road
Poughkeepsie, NY 12603

CITY OF POUGHKEEPSIE REPRESENTATIVES/OFFICIALS

Nancy Cozean, Mayor
City of Poughkeepsie
P.O. Box 300
Poughkeepsie, NY 12602

Stephen Miko, Public Works
City of Poughkeepsie
P.O. Box 300
Poughkeepsie, NY 12602

Ed Murphy, Development Director
City of Poughkeepsie
P.O. Box 300
Poughkeepsie, NY 12602

Councilman Gary Bashor
Eighth Ward
City of Poughkeepsie
PO BOX 300
Poughkeepsie, NY 12602

PURA Real Estate Consultant
Ralph P. Cautela
PO BOX 300
Poughkeepsie, NY 12602

Councilman John Lawrence
Second Ward
PO BOX 300
Poughkeepsie, NY 12602

Councilwoman Rita NeNiff
Fourth Ward
PO BOX 300
Poughkeepsie, NY 12602

Office of Economic Development
Municipal Building
Edmond Murphy- Development Director
62 Civic Center Plaza
Poughkeepsie, NY 12601

James A. Marquette, City Administrator
City of Poughkeepsie
P.O. Box 300
Poughkeepsie, NY 12602

Richard Dupilka, City Engineer
City of Poughkeepsie
P.O. Box 300
Poughkeepsie, NY 12602

Councilman Frank M. Mora
First Ward
PO BOX 300
Poughkeepsie, NY 12602

Councilman John C. Tkazyik
Third Ward
PO BOX 300
Poughkeepsie, NY 12602

Councilwoman Penny Lewis
Fifth Ward
PO BOX 300
Poughkeepsie, NY 12602

Councilman Arnold Baratta
Seventh Ward
PO BOX 300
Poughkeepsie, NY 12602

Councilman Steven Horning
Sixth Ward
PO BOX 300
Poughkeepsie, NY 12602

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND NEW YORK STATE DEPARTMENT OF HEALTH

Marc Moran, Regional Director
NYSDEC
21 S. Putt Corners Road
New Paltz, NY 12561

Wendy Rosenbach
Public Affairs Officer
NYSDEC
21 S. Putt Corners Road
New Paltz, NY 12561

Richard Baldwin
NYSDEC
21 South Putt Corners Rd.
New Paltz, NY 12561

Ram Pergadia
NYSDEC
21 S. Putt Corners Road
New Paltz, NY 12561

Rosalie Rusinko, Esq.
NYSDEC
200 White Plains Road, 5th floor
Tarrytown, NY 10591-5805

Richard Morse
NYS Assembly Waste Commissions
Agency Building 4, 5th Floor, ESP
Albany, NY 12248

Gary Litwin
NYSDOH
547 River Street
Troy, NY 12180

Harold Evans
NYSDEC
625 Broadway
Albany, NY 12233

Mary vonWergers, Esq.
NYSDEC
625 Broadway
Albany, NY 12233

Sal Ervolina
NYSDEC
625 Broadway
Albany, NY 12233

Mary Young
NYSDEC
625 Broadway
Albany, NY 12233

Fran Dunwell
NYSDEC
21 S. Putt Corners Road
New Paltz, NY 12561

Michael J. Knipfing
Citizen Participation Specialist
NYSDEC
21. S. Putt Corners Road
New Paltz, NY 12561

Ms. Kristin Kulow
Public Health Specialist II
NYS Department of Health
28 Hill Street, Suite 201
Oneonta, NY 13820-9804

Ms. Bonnie A. Devine
Coastal Resources Specialist
Department of State
Division of Coastal Resources
41 State Street
Albany, NY 12231-0001

Peg Duke
NYSDEC
21 South Putt Corners Road
New Paltz, NY 12561

Betsy Blair
HRNERR
Bard College Field Station
Annandale-on-Hudson, NY 12504

DUTCHESS COUNTY ENVIRONMENTAL GROUPS

Scenic Hudson
1 Civic Center Plaza
Poughkeepsie, NY 12601

Greenway Conservancy
Capitol Building
Capitol Station, Rm 254
Albany, NY 12224

Laura Haight
NYPIRG
107 Washington Ave.
Albany, NY 12210

Environmental Citizens Coalition
33 Central Avenue
Albany, NY 12210

The Nature Conservancy
Eastern NY Chapter
19 N. Moger Avenue
Mt. Kisco, NY 10549

Hudson River Keeper
P.O.Box 130
Garrison, NY 10525

Executive Director
Dutchess County EMC
2715 Route 44, Suite 2
Millbrook, NY 12545

MEDIA OUTLETS

The Weekly Beat
316 Main Street
Poughkeepsie, New York 12601

City Editor
Woodstock Times
P.O.Box 808
Woodstock, NY 12498

City Editor
Beacon Light
P.O.Box 608
Mahopac, NY 10541

City Editor
Hudson Valley Business Journal
86 E. Main Street
Wappinger's Falls, NY 12590

City Editor
Beacon Free Press
84 E. Main Street
Wappingers Falls, NY 12590

City Editor
East Fishkill Record
P.O.Box 608
Mahopac, NY 10541

City Editor
Fishkill Standard
P.O.Box 608
Mahopac, NY 10541

City Editor
Harlem Valley Times
P.O.Box H
Amenia, NY 12501

City Editor
LaGrange Independent
P.O. Box 608
Mahopac, NY 10541

City Editor
Pawling News Chronicle
3 Memorial Drive
Pawling, NY 12564

City Editor
Poughkeepsie Beat
1 Garden Street
Poughkeepsie, NY 12601

City Editor
Southern Dutchess News
84 E. Main Street
Wappingers Falls, NY 12590

City Editor
Spackenkill Sentinel
84 E. Main Street
Wappingers Falls, NY 12590

City Editor
The Millerton News
P.O.Box 1688
Lakeville, CT 06039

City Editor
Wappingers Falls Shopper
84 East Main Street
Wappingers Falls, NY 12590

City Editor
Gazette Advertiser
P.O.Box 227
Rhinebeck, NY 12572

City Editor
Hyde Park Townsman
P.O .Box 227
Rhinebeck, NY 12572

City Editor
Millbrook Round Table
P.O. Box 316
Millbrook, NY 12545

City Editor
Pine Plains Register Herald
P.O. Box 316
Millbrook, NY 12545

Dan Shapley
Poughkeepsie Journal
P.O.Box 1231
Poughkeepsie, NY 12602

City Editor
Daily Freeman
79-97 Hurley Avenue
Kingston, NY 12401

City Editor
Taconic Press
P.O.Box 316
Millbrook, NY 12545

City Editor
Voice Ledger
P.O.Box 316
Millbrook, NY 12545

News Director
WAXB/WPUT
1004 Federal Road
Brookfield, CT 06804

News Director
WBNR/WHUD/WLNA/WSPK
P. O. Box 310
Beacon, NY 12508

Hank Gross
Mid Hudson News Network
42 Marcy Lane
Middletown, NY 10941

News Director
WDST
P. O. Box 367
Woodstock, NY 12498

News Director
WKIP/WRNQ
20 Tucker Drive
Poughkeepsie, NY 12603

News Director
WLJP/WRPJ/WFGB
P.O.Box 777
Lake Katrine, NY 12449

News Director
WRWD/WBWZ
80 Washington St., Suite 300
Poughkeepsie, NY 12601

News Director
PANDA
P. O. Box 191
Rhinebeck, NY 12572

News Director
WRNN TV
721 Broadway
Kingston, NY 12401

Lisa Phillips, Bureau Chief
WAMC
44 Main Street
Kingston, NY 12401

News Director
WCKL/WCTW/WHUC/WTHC
5620 Rte. 9G
Hudson, NY 12534

News Director
WEOK/WPDH/WCZX
P.O.Box 416
Poughkeepsie, NY 12602

News Director
WHVW
316 Main Mall
Poughkeepsie, NY 12603

News Director
WKZE
7 Main Street
Sharon, CT 06069

News Director
WGNY
P.O.Box 2307
Newburgh, NY 12550

Mary Ann Ondish
News Center 6
719 Old Route 9
Wappingers Falls, NY 12590

News Director
Time Warner Cable
2 Reservoir Square
Poughkeepsie, NY 12601

News Director
WTBY-TV
P.O.Box 534
Fishkill, NY 12524

Bill Connors
686 Traver Road
Pleasant Valley, NY 12569

Poughkeepsie Journal
85 Civic Center Plaza
Poughkeepsie, NY 12601

News Director
WPDH Radio Station
PO BOX 416
Poughkeepsie, NY 12602

News Director
women's e news
395 Hudson Street
New York, NY 10014

ADJACENT PROPERTY OWNERS AND OTHER INTERESTED PARTIES

MTA
347 Madison Avenue
New York, NY 10017

Vassar College President
Frances D. Fergusson
Raymond Avenue
Poughkeepsie, NY 12604

Thomas Allen
Vassar College
Executive Director - Buildings & Grounds Services, Box 704
124 Raymond Avenue
Poughkeepsie, NY 12604

Jeffrey Horst
Vassar College
Associate Executive Director - Buildings & Grounds Services, Box 704
124 Raymond Avenue
Poughkeepsie, NY 12604

Conrail
P.O Box 8499
Philadelphia, PA 19109

Henry C. Meager
Netherwood Road
Hyde Park, NY 12538

Central Hudson Gas & Electric Corporation
Administration
284 South Avenue
Poughkeepsie, NY 12601

Raymond Meagher Jr.
Welwyn Road
Millbrook, NY 12601

Donald and Anna Morrison
141 North Water Street
Poughkeepsie, NY 12601

Mechanical Construction Corporation
North Water Street
Poughkeepsie, NY 12601

Kelly & Meenagh, Esqs
135 North Water Street
Poughkeepsie, NY 12601

George Dubraski
9 Dutchess Avenue
Poughkeepsie, NY 12601

MTA Metro North Railroad
Chief Dispatcher
Grand Central Terminal, 6-D
15 Vanderbilt Avenue
New York, NY 10017

Metro North Railroad
Director of Environmental Compliance
Karen Timco
347 Madison Avenue
New York, NY 10017

Dennis Murray
President
Marist College
North Road
Poughkeepsie, NY 12601

Adrianne Memorial Library
93 Market Street
Poughkeepsie, NY 12601
Attn: Ms. Jean Hojnacki
Head of Reference

APPENDIX B

Citizen Participation Fact Sheet

FACT SHEET

Brownfields Cleanup Program (BCP) CITIZEN PARTICIPATION

(see also ECL §27-1417)

Citizen participation activities occur at several milestones during a BCP project.

When BCP Application Deemed Complete

- Develop public contact list and establish a document repository;
- Publish a notice of Applicant's request to participate in the BCP in a local newspaper, the Environmental Notice Bulletin (ENB), and to those on the public contact list;
- 30-day public comment period; and
- Develop FSP Plan before beginning investigation and alternative analysis.

Before NYSDEC DER Finalizes Site Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing plan, and
- 30-day public comment period.

Before NYSDEC DER Approves Proposed Site Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing the site investigation and alternative analysis work plan.

Before NYSDEC DER Finalizes Proposed Site Investigation and Alternative Analysis Work Plan

- Notice and fact sheet to contact list describing plan;
- 45-day public comment period; and
- Public meeting, if requested.

Before Applicant Starts Construction

- Notice to contact list announcing the start of investigation and alternative analysis.

Before NYSDEC DER Approves Final Engineering Report

- Notice and fact sheet to contact list describing the engineering report (the report describes any institutional or engineering controls included in the site investigation and alternative analysis).

Certificate of Completion (when institutional/engineering controls are used)

- Notice and fact sheet to contact list describing such controls within 10 days of issuance of certificate.

Technical Assistance Grants (TAGs)

- TAGs of up to $50,000 are available to qualifying community groups to obtain independent technical assistance for significant threat BCP sites.