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October 31, 2007

Our Ref.: 013-6054-001

Emergency and Remedial Response Division
U.S. Environmental Protection Agency
2890 Woodridge Avenue
Edison, New Jersey 08837-3679

Attn: Ms. David Rosoff, On-Scene Coordinator

**RE: REVISED WORK PLAN FOR SOIL SOURCE REMOVAL
LIGHTMAN DRUM SUPERFUND SITE
WINSLOW TOWNSHIP, CAMDEN COUNTY, NEW JERSEY**

Dear Mr. Rosoff:

On behalf of the Lightman Drum Source Removal Group (Group), we enclose the Soil Source Area Removal Work Plan (Work Plan) for the above site. Two copies of the Work Plan have also been transmitted directly to the NJDEP. This Work Plan expands upon and supersedes the Work Plan for Soil Source Removal submitted October 15, 2007.

This Work Plan is submitted pursuant to Paragraph 36 of the Administrative Order on Consent for Removal Action (AOC) dated September 13, 2007 and effective on September 17, 2007. Golder Associates Inc. (Golder) will serve as the Remedial Designer/Quality Assurance Officer. Compass Environmental, Inc. (Compass) has been selected as the Remedial Contractor. A Site Health and Safety Plan (HASP) prepared by Compass is included as part of this Work Plan in accordance with Paragraph 36 of the AOC.

As you know, we are scheduled to commence field mobilization on October 29, 2007 and so your expedited review of this Work Plan will be much appreciated. Please do not hesitate to contact me if any questions arise during your review.

Very truly yours,

GOLDER ASSOCIATES INC.

P. Stephen Finn, C.Eng.
Project Coordinator

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SOIL SOURCE AREA REMOVAL WORK PLAN
LIGHTMAN DRUM SUPERFUND SITE
WINSLOW TOWNSHIP
CAMDEN COUNTY, NEW JERSEY

Prepared by:

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October 30, 2007

Project No.: 013-6054-001

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Appendix B	Former Waste Storage Tank Area Boring and Well Installation Logs
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1.0 INTRODUCTION

This Soil Source Removal Work Plan (Work Plan) has been prepared by Golder Associates Inc. (Golder) on behalf of the Lightman Drum Source Removal Group (Group) for the localized removal of contaminated soils in the vicinity of the former Waste Storage Tank Area (Source Area) at the Lightman Drum Site in Winslow Township, New Jersey (Site). This Work Plan is submitted pursuant to Paragraph 36 of the Administrative Settlement Agreement and Order on Consent (AOC), dated September 13, 2007 between USEPA and the Group that became effective on September 17, 2007.

The RI/FS for the Site is being conducted under an Administrative Order on Consent (AOC) executed by the USEPA in November 2000. The Remedial Investigation (RI) for the Site was conducted between August 2002 and May 2006 pursuant to an approved Work Plan (Golder, 2002) and associated Addenda (May 2006 and May 2007). The results were summarized in the *Site Characterization Summary Report* (Golder, 2005) and the *Remedial Investigation Report* (Golder, August 2006). The results from soil sampling conducted as part of the RI indicated that seasonally saturated soils in a localized zone close to the water table in the former Waste Storage Tank Area remain contaminated with volatile organic compounds (VOCs) and continue to constitute a source for contaminated groundwater leaving the Site.

Source removal of saturated soils was identified in the Remedial Action Objectives and Remedial Alternatives Screening Memorandum (RAO Memorandum) submitted to USEPA on October 31, 2006 as a potential remedial alternative (Alternative SC-2: Shallow Saturated Soil Excavation at the Former Waste Storage Tank Area). USEPA concurred with this alternative to address saturated soil contamination in letters to Golder dated December 5, 2006, and March 6, 2007

This Work Plan describes the activities necessary to implement the soil source removal action in the former Waste Storage Tank Area. This action is anticipated to be the final action for saturated soils. The following activities are included in this Work Plan:

- Temporary Excavation Support Systems;
- Excavation of contaminated soils;
- Staging of excavated soils;
- Contaminated groundwater management;
- Waste Characterization and Disposal;
- Erosion and sediment control;
- Backfilling and restoration;

- Construction Quality Assurance;
- Health and Safety Planning, including plans for air monitoring and control;
- Permitting ; and
- Scheduling.

Addendum No. 3 to the RI/FS Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), which describes the procedures to be used for the sampling and analysis of soil and water as part of the source removal action is included as Appendix A. Boring and Well Installation Logs from the Former Waste Storage Tank Area are included in Appendix B, and Appendix C provides a Summary of Saturated Soil Sampling Detections (from Remedial Investigation Report, Golder, August 2006).

Compass Environmental, Inc (Compass) has been selected as the Remedial Contractor. A Remedial Construction Work Plan and project specific Health and Safety Plan, prepared by Compass are included as Appendix D and E, respectively. The Remedial Construction Work Plan includes the following as required by the AOC Statement of Work:

- Maps depicting, to the extent known and determined, all work and safety zones, including but not limited to: exclusion zones, contaminant reduction zones, staging and sampling areas, waste segregation areas, and command posts, all located from fixed reference points and plotted approximately to scale (Paragraph 3a);
- A description of any potential dewatering activities, should it prove necessary. The description includes a description of how the water will be stored during removal of the soil as well as a description of the final disposition of the water (Paragraph 3f);
- Transportation and Disposal Plan outlining procedures for transporting and disposing of hazardous substances, hazardous waste and other solid waste generated during the work. These procedures include measures taken to mitigate potential spills during the work. The plan includes identification of proposed disposal facilities for all waste streams (Paragraph 3d);
- A plan to ensure that all fill material used to backfill the excavated area is free from chemical and radiological contamination and is consistent with background soil levels for the Pinelands area. All backfill material from off-site sources shall be screened for radiological contamination using a Ludlum Model 19 low level gamma meter to ensure that the Gamma Exposure Rate shall be less than 30 microRoetgens per hour ($\mu\text{R/hr}$). This plan also includes a description of how the area will be restored (Paragraph 3e); and
- A plan for providing Site security including, but not limited to, measures to be taken to keep unauthorized personnel from entering restricted work areas (Paragraph 3g).

2.0 BACKGROUND

2.1 Site History

The Lightman Drum Company property (Property) covers approximately 15 acres and is located in Winslow Township, Camden County, New Jersey (Figure 1). The Property is narrow (approximately 300 feet wide) with access from Route 73. The majority of Property is wooded as shown on Figure 2. There is very little topographic relief across the property with a maximum elevation range of 15 feet.

A portion of the Property is currently used as a drum brokerage business, operating under the name United Cooperage, with operations located in the eastern portion of the property. Drums are stored in truck trailers and in open areas, and a small office is located near the Property entrance. A large concrete slab is located adjacent to the office, which served as the foundation for a former storage warehouse.

A previous investigation was conducted in two phases by INTEX on behalf of Lightman Drum Company (INTEX, 1989; INTEX, 1990) which focused on delineating the extent of contamination in soil and groundwater. The investigations were concentrated in known waste storage areas which included the former location of two 5,000 gallon underground storage tanks previously located in the north-central area of the Site (i.e. the former Waste Storage Tank Area). The tanks were reportedly used to store waste paint pigments, ink sludges, and thinners, and were reportedly in use under a Temporary Operation Authority between November 2, 1978 and April 30, 1979 (INTEX, 1989). According to the findings of the AOC, NJDEP observed the removal of the tanks in 1984.

The Remedial Investigation (RI) for the Lightman Drum Site (Site) was conducted between 2002 and 2007 and included a comprehensive soil and groundwater investigation. The results from the groundwater investigation indicate that groundwater has been impacted with chlorinated VOCs, namely trichloroethene (TCE) and tetrachloroethene (PCE), as well as aromatic (BTEX) compounds. There are two main plumes present, one originating from the former Waste Storage Tank area, and a smaller plume from the former Unlined Waste Disposal Pit Area in the western part of the Property. Soil sampling results from the unsaturated zone were compared to the NJDEP Residential and Non-Residential Direct Contact Soil Cleanup Criteria (SCC) and the NJDEP Impact to Groundwater SCC for screening purposes. There were no exceedances of any of the SCC levels. Pursuant to comments from the United States Environmental Protection Agency (USEPA) on the Site Characterization Report dated November 16, 2005, additional on-property soil sampling was conducted in the

saturated zone to complete the source area investigation. These results indicated the presence of saturated soils in the former Waste Storage Tank Area above the NJDEP Impact to Groundwater SCC and potential residual product (NAPL) based on field tests. The results of the saturated soil sampling were presented in the Remedial Investigation Report (Golder; August, 2006) and are summarized below.

2.2 Remedial Investigation - Saturated Soil

In April and May, 2006, 18 additional soil borings were undertaken in accordance with the Revised Addendum Remedial Investigation/Feasibility Study Work Plan (Golder Associates, May 2006) to assess the potential presence of residual product soil contamination in the seasonally saturated zone at the former Waste Storage Tank Area, the former southwest Drum Storage Area, and the former Unlined Waste Disposal Pit area.

The soil borings were conducted utilizing a Geoprobe® to obtain continuous core samples. Each core sample was screened at 6-inch intervals with a photoionization detector (PID) commencing approximately 3 feet above the water table and extending until PID readings were below background, subject to a minimum depth of 20 feet below the water table. Headspace PID readings were also taken over every two-foot interval; samples with headspace PID readings greater than 50 ppm were also field screened for the presence of NAPL using a ultraviolet (UV) lamp method and the hydrophobic dye “Oil Red O” method. Three samples for laboratory analysis were taken from each boring: one sample from the bottom of the boring, and two from the discrete 2-foot intervals that indicated the greatest potential for residual NAPL. Each soil sample was analyzed for target compound list (TCL) VOC analytes and for 1,4-dioxane. The most impacted sample, based on field screening, was also analyzed for target analyte list (TAL) metals in order to provide comprehensive analytical data for the most impacted sample.

Thirteen borings were completed in the area of the former Waste Storage Tanks (SZ6 to SZ15 and PTB1, PTB2, and PTB4), three borings in the former Unlined Waste Disposal Pit (SZ1 to SZ3) and two borings in the former Southwest Drum Storage Area near monitoring wells MW-8A/8B (SZ4 and SZ5).

There were no detections of 1,4-dioxane in any of the samples. There were also no positive results from the UV lamp test. The laboratory results were compared to the NJDEP Residential and Non-Residential Direct Contact Soil Cleanup Criteria (SCC) and the NJDEP Impact to Groundwater SCC

for screening purposes. There were no inorganic parameters that exceeded the NJDEP SCC values. The VOCs detected included chlorinated ethanes, chlorinated ethenes, and aromatic compounds. There were no exceedances for organic or inorganic parameters in borings taken in the former Unlined Waste Disposal Pit Area or the former Southwest Drum Storage Area.

Positive results from the “Oil Red O” test were obtained in three borings taken at the water table in the former Waste Storage Tank Area (PTB2-14, PTB2-16, SZ9-18, and SZ12-14), illustrated in Figure 3. Three VOCs (ethylbenzene, tetrachloroethene, and total xylenes) exceeded the most stringent of the NJDEP SCC (Impact to Groundwater) in four samples from two borings located in the former Waste Storage Tank Area (PTB2 and SZ7). Boring logs associated with the soil investigation in the former Waste Storage Tank Area and monitoring wells in the same area are included in Appendix A. Analytical results from the saturated soil investigation, taken from the RI Report, are reproduced in Appendix C.

The RI concluded that the seasonally saturated soils in a localized zone close to the water table in the former Waste Storage Tank Area remain contaminated with VOCs and continue to provide a source for contaminated groundwater. Excavation of these contaminated soils will, therefore, mitigate the source of groundwater contamination in this area.

3.0 SCOPE OF WORK

3.1 Overview

As illustrated in Figure 3, the proposed area of excavation is approximately 33 foot by 16 foot in plan dimensions and encompasses those borings where there was a positive field test result for residual product and borings that contained samples that exceeded the most stringent New Jersey Soil Cleanup Criteria (NJDEP SCC) in the Former Waste Solvent Tank Area.

Figures 3 through 5 show that the highest levels of VOC contamination are between 12-18 feet below ground surface (ft bgs). There is a distinct decrease in PID readings between 18 and 20 feet and the vast majority of the PID readings drop to below 10 ppm at depths greater than 20 feet. Consistent with the PID readings, the positive results from the “Oil Red O” test were found in samples taken from depths ranging from 12 to 18 ft bgs (sample numbers PTB2-14, PTB2-16, SZ9-18, and SZ12-14). All samples taken below 20 feet were non-detect or detected only trace levels of VOCs. The proposed excavation will extend to a depth of 25 feet. This depth corresponds to the excavation capacity of standard construction equipment.

In general, the excavation will be conducted by initially installing a temporary excavation support system, consisting of an interlocking sheet pile barrier, around the zone of excavation in order to isolate the excavation from surrounding soils and control groundwater seepage. The unsaturated soils that were determined not to be contaminated subject to a maximum depth of 12-feet¹ will be staged on-site in a controlled manner, for potential later re-use as backfill. Soils will be excavated from 12-feet below ground surface or the saturated-unsaturated interface, whichever is encountered first, down to a depth of 25-feet and stockpiled on a temporary containment pad. The containment pad will be designed to capture contaminated pore water drained from the stockpiled soil, and will be covered to prevent wind dispersion of soil and contact with rain water. The collected water will be containerized and characterized for off-site disposal, as necessary. Excavated contaminated soil will be sampled for waste classification purposes prior to off-site transportation and disposal, as necessary. The excavation will be backfilled with imported clean soil and unsaturated soils removed from the excavation that are not contaminated, and the area restored. Monitoring wells displaced during the excavation will be replaced. All work will be conducted under a Health and Safety Plan (Appendix E).

¹ 12 feet below ground surface corresponds with the depth where significant VOC contamination was first detected and accounts for potential seasonal fluctuation of the water table below this depth.

A SAP has been prepared for the sampling and analysis of soil and water during the source removal activities and is included as Appendix A.

These activities are further described below and in detailed specifications provided to the Remedial Contractor.

3.2 Well Decommissioning and Replacement

Three monitoring wells (MW-2A, MW-2B, and MW-21) located in the vicinity of the planned work will be decommissioned prior to excavation activities in accordance with NJDEP well abandonment procedures and the New Jersey Administrative Code (N.J.A.C.) 7:9D. Following completion of the soil excavation and restoration of the site, replacement wells will be installed at the approximate locations of the decommissioned wells according to the procedures in Section A.2.4 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002). The replacement wells will be designated MW-2AR, MW-2BR, and MW-21R. The well decommissioning and replacement will be performed by a New Jersey licensed drilling firm. Upon completion of the replacement well installation, the wells will be developed and will be surveyed for horizontal and vertical location by a New Jersey licensed surveyor. Applicable permits will be obtained by the drilling firm and Well Forms A and B will be filed with the NJDEP.

3.3 Temporary Excavation Support System

Temporary excavation support sheet piling will be installed to facilitate the soil removal procedure and will be of a cross-section and penetration suitable to allow for the removal of soil down to 25 ft bgs. Design of the temporary excavation support system is the responsibility of the Remedial Contractor as discussed in Appendix D. The Remedial Contractor will submit a design for a temporary excavation support system to the Remedial Designer for review prior to installation. Upon receipt, and in advance of the support system installation, the Remedial Designer will submit a copy of the temporary excavation support system to the USEPA for review. Upon completion of the soil excavation (Section 3.4), the support system will be removed in conjunction with engineered backfilling of the excavation (Section 3.7) so as to prevent collapse of the excavation side walls.

3.4 Soil Excavation

Soil will be excavated to a depth of 25 feet using standard excavation equipment. It is anticipated that the excavation of saturated soil will be performed in the wet (i.e., groundwater that accumulates in the

excavation will not be pumped out). If groundwater removal is necessary, the Remedial Contractor will containerize the water for subsequent characterization and disposal.

The New Jersey technical requirements for Site Remediation (N.J.A.C. 7:26E-6.4) recommend one post-excavation sample for excavations 20-300 feet in perimeter for every 900 ft² of bottom area. The proposed excavation will be less than 900 ft² and will be performed within a temporary excavation support system to depths below the water table. Notwithstanding the small size of the excavation relative to NJDEP recommendation, the excavation will be segregated into four quadrants with one sample taken from the center of each quadrant. The lateral extent of contamination was delineated by 13 borings, as reported in the Remedial Investigation Report (Golder Associates, August 2006) and so sidewall sampling is not necessary.

Basal samples will be collected from the excavator bucket, taking care to minimize volatilization from the sampled material according to the procedures in the SAP for source removal included as Appendix A of this Work Plan. In general, the excavator will remove additional volume of soil from each quadrant and VOC samples and the associated Quality Assurance samples will be promptly collected at the ground surface from the interior of the material in the excavator bucket using EnCore samples so as to minimize loss of volatiles. Samples will be analyzed for TCL VOCs using the methods specified in the SAP for source removal included as Appendix A of this Work Plan, so as to document the quality of the remaining saturated soil.

3.5 Soil Staging

The unsaturated soils are not contaminated based on previous investigations and will be segregated from seasonally saturated soils for re-use as backfill (clean stockpile). Unsaturated soils will be screened from the ground surface to a depth of 12 feet or the water table, whichever is encountered first, with an organic vapor meter using a photo-ionization detector (PID) according to the SAP for source removal included as Appendix A of this work plan. If PID readings greater than 50 ppm are encountered, the associated soils will be separated and staged as contaminated soil with the soils below 12 feet (contaminated stockpile). As a further confirmation, the clean soil stockpile will be sampled for TCL VOCs and SVOCs and TAL metals prior to backfilling as described in Section 3.7.

Excavated soils will be staged on site in a controlled manner. The unsaturated soil will be stockpiled on plastic sheeting in a staging area re-contoured with perimeter berms to prevent surface water contact. The contaminated soil stockpile will be staged on a temporary containment pad to collect

pore water that drains from the excavated soils and will also have a perimeter berms to prevent surface water contact. All stockpiles will be covered to mitigate wind dispersal and rain water contact and appropriate erosion and sediment controls will be implemented around each stockpile. Details of the unsaturated soil staging area and the saturated soil containment pad construction are provided in Appendix D. Water collected from the contaminated soil containment pad will be containerized for characterization and subsequent off-site disposal as described in Appendix D.

3.6 Waste Characterization and Disposal

Contaminated soils and collected groundwater drained from these soils will be sampled and characterized for disposal at appropriate off-site facilities.

Soil samples will be collected from the contaminated soil staging pile according to New Jersey Administrative Code (N.J.A.C.) 7:26G and *Guidance Document for Waste Classification*, which provides applicable requirements, in terms of sampling frequency, analysis, and quality assurance for sampling. Disposal of waste will be in accordance with USEPA's *Management of Remediation Waste Under RCRA* (EPA 530-F-98-026). The methods used for collection of the soil samples will also be in accordance with "Characterization of Hazardous Waste Sites - A Methods Manual, Volume I - Site Characterization, and Volume II - Available Sampling Methods", August 1985 and December 1984 and Chapter 6 (Waste Pile Sampling) of the NJDEP's Field Sampling Procedures Manual, August 2005 (FSPM). Methods for the collection of the waste pile soil samples are included in the SAP (Appendix A of this work plan).

The frequency of sample collection will also be dependent on the selected disposal facility's permit and other requirements. Based on the anticipated staging pile size of approximately 200 cubic yards, not less than two samples will be collected.

Samples will be analyzed according to the SAP (Appendix A) for RCRA Waste Characteristics including ignitability, corrosivity, reactivity, and toxicity according to the most current version of SW-846 Methods published by the USEPA's Office of Solid Waste. A Toxicity Characteristic Leaching Procedure (TCLP) analysis will be performed with the TCLP extract analyzed for appropriate VOCs, SVOCs, and Metals². A paint filter liquids test (SW-846, Method 9095B) will also be performed to assess the amount of free liquids in the soil. All analyses will be conducted by a New Jersey certified laboratory.

If the testing results indicate that the soil is a hazardous waste based on characteristics (ignitability, corrosivity, reactivity, or toxicity) then the soil will be disposed at a hazardous waste facility that is permitted to handle such wastes. If the soil does not exhibit characteristics of hazardous waste then the soil will be disposed of as non-regulated waste in accordance with applicable solid waste regulations. Based on the maximum concentrations (total constituent analysis) of soil identified during the RI, it is uncertain as to whether the soil will be characteristically hazardous, and so plans will be made for both hazardous and non-hazardous disposal so as to remove the soil from the Site in a timely manner. Analytical results for the waste characterization will be provided to the USEPA prior to selection of a disposal facility and the USEPA will be notified which disposal facility has been selected.

A sample of the water collected from the contaminated soil containment pad and equipment decontamination fluids will be collected and analyzed for TCL VOCs and SVOCs, and TAL metals and any additional parameters that may be required by the disposal facility. The methods used for collection of the water samples will be in accordance with "Characterization of Hazardous Waste Sites - A Methods Manual, Volume I - Site Characterization, and Volume II - Available Sampling Methods", August 1985 and December 1984 and Chapter 6 of the NJDEP's FSPM. Methods for the collection of the water samples are included in the SAP included in Appendix A of this work plan. An appropriate disposal method will be selected based on the results of the analysis of the water and the USEPA and NJDEP guidance cited above. Analytical results of the contained water will be provided to the USEPA prior to selection of a disposal facility and the USEPA will be notified which disposal facility has been selected.

A Transportation and Disposal Plan prepared by the selected Remedial Contractor is included in Appendix D.

3.7 Backfill

The unsaturated soils removed from the excavation that are not contaminated will be used, together with clean imported material, to backfill the excavated area. Imported backfill material will be environmentally clean soil from a known off-site borrow source located within the Pinelands and shall be a granular type material.

² Based on the extensive RI sampling, pesticides and PCBs are not present.

To verify that the excavated unsaturated soils have not been impacted, a sample shall be collected and analyzed prior to re-use as backfill. The sample of the excavated unsaturated soils from the stockpile shall be analyzed for TCL VOCs and SVOCs and TAL metals. Results of the analyses from the unsaturated soil samples will be compared to the NJDEP Residential and Non-Residential Direct Contact Soil Cleanup Criteria (SCC) and the NJDEP Impact to Groundwater SCC for screening purposes.

Before shipping any backfill material to the site, the Remedial Contractor shall submit the name and location of the source of all backfill material (including common fill, crushed stone, screened gravel, and topsoil) to the Group and USEPA for approval.

The Remedial Contractor shall certify that all imported off-Site materials are environmentally clean, in accordance with N.J.A.C. 7:26E. A Backfill Material Verification Plan to ensure the backfill material is free from chemical and radiological contamination and is consistent with background soil levels for the Pinelands area is included as part of the Remedial Construction Work Plan which is provided in Appendix D. Compass has indicated that the borrow source will be natural soils located within the Pinelands area, and therefore background soil levels will be achieved. Radiological screening will be conducted at the source using a hand held instrument as described in Appendix A. The certification for the off-site borrow material will be provided to the Group and USEPA by the Remedial Contractor prior to use of the backfill.

Any borrow material proposed for use as backfill material will be composed of naturally occurring, granular soil and shall be free of deleterious and organic matter. The backfill will be placed by mechanical equipment (excavator) in approximate 12-inch loose lifts and compacted with the bucket of the excavator. Material placed below the water table shall be suitable granular material so that extensive compaction is not required. The temporary support of the excavation will be removed in conjunction with backfilling the excavation to prevent collapse of the excavation sidewalls. Following backfilling, the excavation area will be monitored over a 6-month period and if settlement is observed then the remedial contractor shall provide additional backfill to restore the area to the surrounding grade.

3.8 Restoration

The excavation area will be restored with topsoil and seeding or the installation of a gravel surface layer.

3.9 Erosion and Sediment Control

The Remedial Contractor has submitted an Erosion and Sediment Control Plan exemption request on October 19, 2007 to the Camden County, New Jersey Soil Conservation District since the area to be disturbed will be less than 5,000 square feet.

3.10 VOC Emissions Monitoring and Control

The Remedial Contractor's Site-specific, Health and Safety Plan (HASP) includes performance of on-Site air monitoring to ensure the health and safety of the on-site workers and potential off-site receptors and to provide contingencies for any VOC controls that may be necessary. At a minimum, worker breathing zone and perimeter air monitoring for VOCs will be conducted with appropriate action levels to upgrade worker respiratory protection and/or provide vapor controls. Vapor controls may include forced ventilation, reducing the rate of excavation, and application of soil or foam barriers to stockpiled material.

3.11 Site Security

As Site Security Plan is included in the Remedial Construction Work Plan which is provided in Appendix D

4.0 CONSTRUCTION QUALITY ASSURANCE

The proposed activities will be subject to on-Site inspection and oversight by the Remedial Designer to document that activities are being conducted in conformance to this Work Plan. Activities requiring construction quality assurance include, but are not limited to, the following sections.

4.1 Decommissioning of Wells in Activity Area

The Remedial Contractor will be required to submit to the Remedial Designer the name and qualifications of the proposed licensed driller and drilling firm for decommissioning of the monitoring wells in the remediation area. The decommissioning of the monitoring wells will be observed to confirm that the appropriate decommissioning procedures are being followed by the drilling contractor.

4.2 Installation of Temporary Excavation Support System

The installation of the temporary support structure will be monitored to confirm that the source area delineated as part of the saturated soil investigation will be within the structure both horizontally and vertically. The installation will also be monitored for consistency with the Remedial Contractor's design.

4.3 Construction of Soil Staging Area

Construction and operation of the staging areas will be monitored for consistency with the Remedial Contractor's design and the applicable Erosion and Sediment Control Plan requirements. The construction and maintenance of the staging areas for unsaturated soil and saturated soil will be monitored to confirm that water draining from the soil stockpiles is contained and that the soil stockpiles are covered to prevent dispersal of soil due to wind or rainwater.

Following removal of the saturated soil from the containment pad, the underlying liner will be observed for evidence of leakage. If evidence of liner penetration is observed then the soil immediately below the liner will visually inspected and screened with a PID. If the soil is observed to be impacted, it will be placed with the contaminated soil stockpile for off-site disposal.

4.4 Excavation of Unsaturated and Saturated Soils

The excavation and screening of the unsaturated and saturated soil by the Remedial Contractor will be monitored to confirm that unsaturated non-impacted and impacted soils are segregated. The excavation will also be monitored to confirm that upon reaching of the water table/saturated soil the saturated impacted soil will be segregated from the unsaturated non-impacted soil.

4.5 Backfill Verification

Golder will request the proposed borrow source pit operator to provide historical soil testing performed at the facility. If available, this information will be provided to the USEPA prior to any fill material being brought to the Site.

Samples of off-site borrow source to be used as backfill shall be analyzed to document that all fill material used to backfill the excavated area is free from chemical and radiological contamination and is consistent with background soil levels for the Pinelands area. No fill will be shipped to the site until all analytical results have been submitted to the USEPA for review.

Sample location information (i.e. sample map) will be provided to the USEPA along with the soil analytical results. This information will include a certification statement indicating that the soil excavated from the borrow source and sent to the site for backfill will be from the area of the borrow pit where the samples were collected.

The Remedial Designer will visit the borrow pit periodically during excavation and loading of the soil that will be brought to the Site to observe and document that the soil being brought to the Site is from the area that samples were collected.

4.6 Backfilling and Compaction of Excavation

The backfilling compaction and temporary excavation support removal will be monitored to confirm that the Remedial Contractor is following the reviewed procedures from the construction work plan .

4.7 Installation of Replacement Wells

The Remedial Contractor will be required to submit to the Remedial Designer the name and qualifications of the proposed licensed driller and drilling firm for replacement of the monitoring

wells in the remediation area. The replacement of the monitoring wells will be observed to confirm that the appropriate installation procedures are being followed by the drilling contractor.

4.8 Post-Excavation Sampling

Post excavation samples will be collected by the Remedial Contractor from the base of the excavation (Section 3.4) to characterize the remaining saturated soil in the source area. The sampling of the base of the excavation will be monitored for consistency with the specification and the results will be reviewed by the Remedial Designer to determine if additional excavation is required.

4.9 Waste Characterization and Disposal

Sampling of excavated soil will be monitored to verify that the Remedial Contractor is following this Work Plan and applicable New Jersey and USEPA guidance. The Remedial Designer will review the testing results to confirm that the Contractor's proposed disposal methods are appropriate.

At least five (5) days before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-site location, USEPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440 shall be obtained. Hazardous substances, pollutants, or contaminants shall only be sent from the Site to an off-site facility that complies with the requirements of the statutory provisions and regulations cited in the preceding sentence.

Prior to contracting for the services of any transportation and disposal company, the following documentation will be provided to the USEPA:

- i. The valid RCRA transporter and disposal identification numbers for each transporter and disposal company;
- ii. The most recent six-month State or EPA regulatory inspection results of each disposal company; and
- iii. The date of the most recent State or EPA regulatory inspection, and any special provisions or conditions attached to the RCRA disposal permits as a result of the most recent inspection.

5.0 REMOVAL ACTION HEALTH AND SAFETY PLAN

The Remedial Contractor's activity specific Health and Safety Plan (HASP) is included as Appendix E. The contractor's plan complies with Safety and Health Regulations promulgated by the U.S. Department of Labor: 29 CFR Part 1904 - Recording and Reporting Occupational Injuries and Illness, 29 CFR Part 1910 - Occupational Safety and Health Standards, and 29 CFR Part 1926 - Safety and Health Regulations for Construction and with EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992).

6.0 PERMITTING

Compass has submitted an Erosion and Sediment Control Plan exemption request to the Camden County, New Jersey Soil Conservation District since the area to be disturbed will be less than 5,000 square feet.

Additional permit equivalencies may be necessary due to the site's location within the Pinelands National Reserve. The New Jersey Pinelands Commission will be contacted to evaluate the potential permit equivalency needs for the source removal.

The appropriate well-decommissioning and replacement permits will likewise be in place prior to decommissioning and installation of monitoring wells. These permits will be the responsibility of the New Jersey licensed driller engaged to do the work.

7.0 SCHEDULE AND REPORTING

The proposed schedule for remedial activities is included as Figure 6.

Monthly Progress Reporting

Commencing 30 days after the Effective Date, the Group's Representative shall submit written monthly progress reports to the USEPA detailing activities performed during the previous month and detailing activities planned for the following month.

Weekly Progress Reporting

During field activities, the Group's Representative will submit written progress reports to the USEPA concerning actions undertaken pursuant to the Order. Each Friday, the Group's Representative will submit to USEPA a report that details the activities planned to be undertaken by Group for the following week. Each Monday, the Group's Representative will submit to USEPA a report that details the activities that were performed during the previous week.

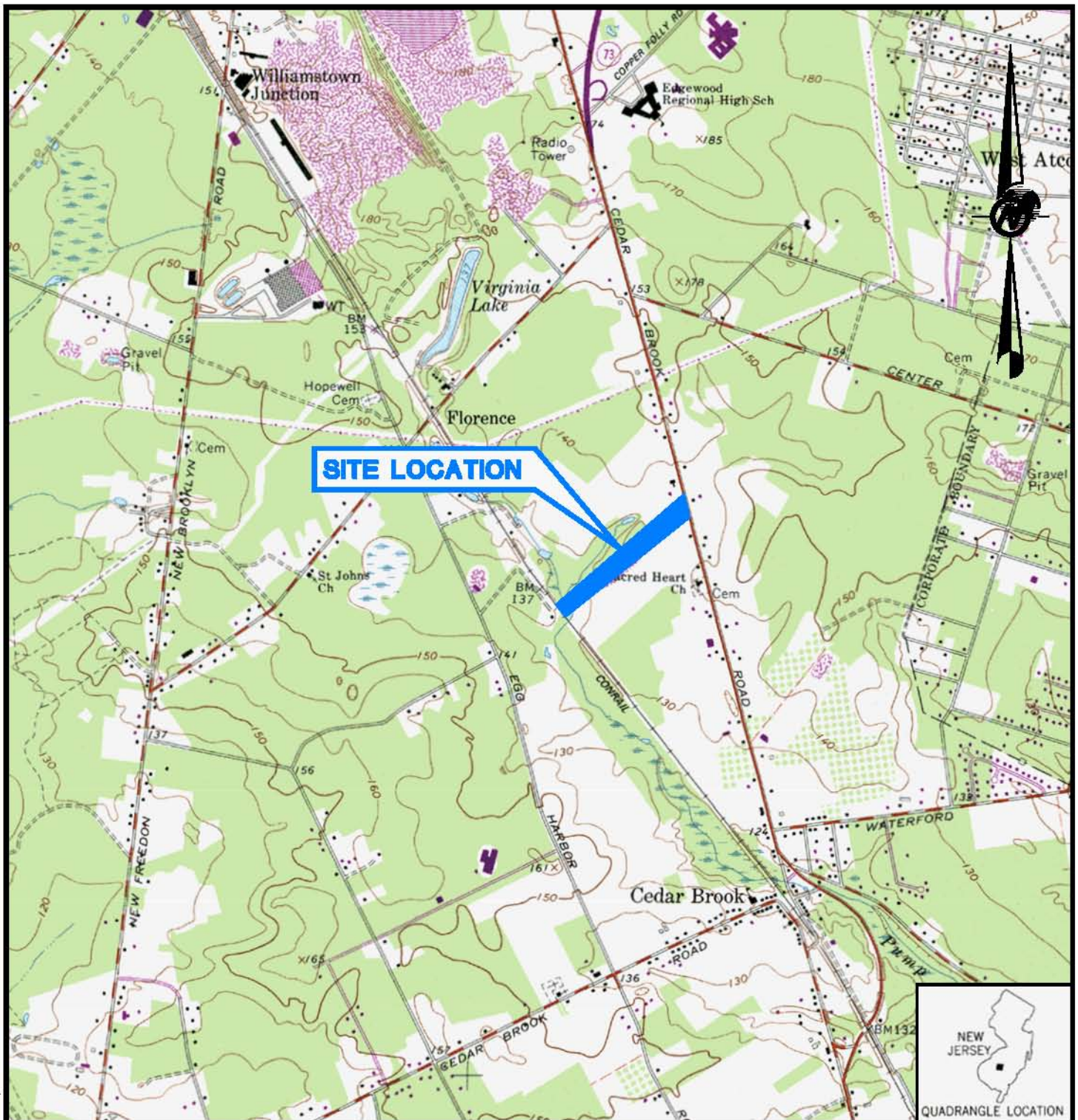
Final Report

A construction completion report on the source removal activities will be submitted 30 days following completion of all work. The report will include a description of site activities, photographs, post-excavation sampling data, permit information, waste characterization and manifests, and other supporting documentation. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports."

8.0 REFERENCES

- Golder Associates Inc., 2002. Remedial Investigation/Feasibility Study Work Plan, Lightman Drum Company Site, Winslow Township, New Jersey, July 2002.
- Golder Associates Inc., 2005. Site Characterization Summary Report, Lightman Drum Company Site, Winslow Township, New Jersey, May 2005.
- Golder Associates Inc., 2006. Revised Addendum Remedial Investigation/Feasibility Study Work Plan, Lightman Drum Company Site, Winslow Township, New Jersey, May 2006
- Golder Associates Inc., 2006. Remedial Investigation Report, Lightman Drum Company Site, Winslow Township, New Jersey, August 2006
- Golder Associates Inc., 2006. Remedial Action Objectives and Remedial Alternatives Screening Memorandum, Lightman Drum Company Site, Winslow Township, New Jersey, October 2006
- INTEX 1989 Remedial Investigation, Lightman Drum Company, Winslow Township, NJ, September 1989
- INTEX 1990 Phase II Remedial Investigation, Lightman Drum Company, Winslow Township, NJ, October 1990
- NJDEP, 2005. Field Sampling Procedures Manual. August 2005
- NJDEP, Guidance Document for Waste Classification as found at:
<http://www.state.nj.us/dep/dshw/resource/hwm009.htm> on 1/25/2007
- USEPA, Management of Remediation Waste Under RCRA, October 1998; EPA 530-F98-026.

Drawing file: 0136054T001.dwg Oct 15, 2007 - 4:43pm



REFERENCES

- 1.) MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF WILLIAMSTOWN, NEW JERSEY, DATED 1981.

2000 0 2000
SCALE FEET



SCALE	AS SHOWN
DATE	10/15/07
DESIGN	HAL
CADD	RG
CHECK	RJI
REVIEW	PSF

TITLE

SITE LOCATION MAP

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PROJECT No.	013-6054
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LIGHTMAN DRUM SITE

FIGURE 1

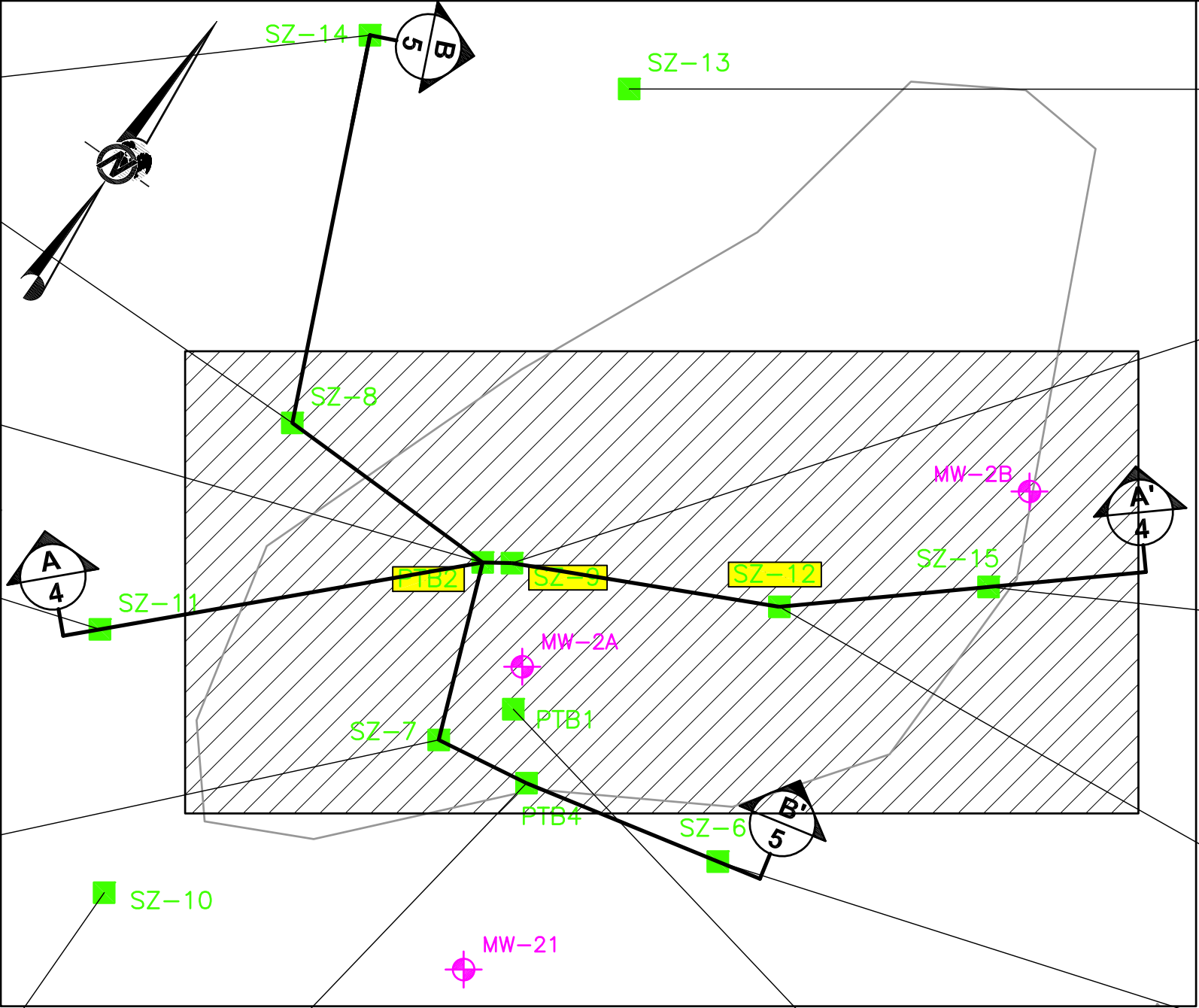
Drawing file: 0136054T003.dwg Oct 15, 2007 - 4:42pm

SZ-14	14'-16'	TOTAL VOCs	0.009
		PCE	0.005
		TCE	0.004
	24'-26'	TOTAL VOCs	ND
SZ-8	14'-16'	TCE	0.190
		TOTAL VOCs	2.71
		BTEX	2.29
	16'-18'	TOTAL VOCs	1.25
		BTEX	1.07
	34'-36'	TOTAL VOCs	ND
PTB2	12'-14'	TOTAL VOCs	705.30
		BTEX	669.00
		PCE	20.00
	14'-16'	TOTAL VOCs	408.10
		BTEX	398.00
SZ-11	14'-16'	PCE	0.007
		TCE	0.003
		TOTAL VOCs	0.010
	20'-22'	PCE	0.004
		TCE	0.002
		TOTAL VOCs	0.006
	34'-36'	TOTAL VOCs	ND
SZ-7	14'-16'	TOTAL VOCs	803.20
		BTEX	783.09
		PCE	17.00
		TCE	0.08
	18'-20'	TOTAL VOCs	1,895.60
		BTEX	1,856.60
		PCE	39.00
		TOTAL VOCs	ND
SZ-10	14'-16'	BTEX	2.40
		TOTAL VOCs	2.40
	18'-20'	BTEX	0.72
		PCE	0.01
		TCE	0.006
	TOTAL VOCs		0.75
		TOTAL VOCs	ND

LEGEND

- ▲

SOIL BORING LOCATION
- SURFACE SOIL SAMPLING LOCATION
- SATURATED SOIL BORING LOCATIONS
- EXISTING MONITORING WELL
- BORINGS WITH A POSITIVE "OIL RED O" RESULT
- EXCEEDS NJDEP IGW SCC
- LIMITS OF EXCAVATION



PTB4	14'-16'	TOTAL VOCs	2.94
		BTEX	2.67

PTB1	14'-16'	TOTAL VOCs	2.08
		BTEX	1.90

NOTE

- 1.) SATURATED SOIL BORING LOCATIONS BASED ON MEASUREMENTS TO SURVEYED MONITORING WELLS.
- 2.) CONCENTRATIONS ARE EXPRESSED IN mg/kg.

REFERENCES

- 1.) BASE MAP TAKEN FROM FILE 2702-01.DWG, TITLED "PLAN OF SURVEY", PROVIDED BY JAMES M. STEWART, INC.
- 2.) UNSATURATED SOIL BORING AND SOIL SAMPLE LOCATIONS SURVEYED BY JAMES M. STEWART, INC., NOVEMBER 2002.
- 3.) MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC.

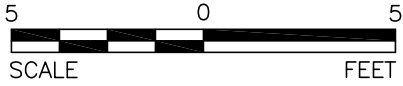
SZ-13	14'-16'	BTEX	10.90
		PCE	0.28
		TOTAL VOCs	11.18
	16'-18'	BTEX	4.22
		TOTAL VOCs	4.22
		TOTAL VOCs	ND

SZ-9	14'-16'	BTEX	35.00
		PCE	0.93
		TCE	0.22
		TOTAL VOCs	36.15
	16'-18'	BTEX	0.395
		PCE	0.05
		TCE	0.01
		TOTAL VOCs	0.51
		TOTAL VOCs	ND

SZ-15	14'-16'	BTEX	3.34
		PCE	0.24
		TCE	0.87
		TOTAL VOCs	4.52
	18'-20'	BTEX	1.39
		PCE	0.31
		TCE	0.410
		TOTAL VOCs	2.13
		TOTAL VOCs	ND

SZ-12	12'-14'	BTEX	27.10
		PCE	0.85
		TOTAL VOCs	27.95
	14'-16'	BTEX	7.99
		TCE	0.32
		TOTAL VOCs	8.31
		TOTAL VOCs	ND

SZ-6	14'-16'	TOTAL VOCs	1.45
		BTEX	1.26
		PCE	0.04
		TCE	0.01
	16'-18'	TOTAL VOCs	0.85
		BTEX	0.51
		PCE	0.03
		TCE	0.003
		TOTAL VOCs	ND



FILE No.

0136054T003

PROJECT No.

013-6054

REV.

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SCALE

AS SHOWN

DATE

10/15/07

DESIGN

HAL

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RG

CHECK

RJI

REVIEW

PSF

TITLE

SATURATED SOURCE
AREA SOIL RESULTS

LIGHTMAN DRUM SITE

FIGURE 3

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LEGEND

- SZ-11

←

BOREHOLE LABEL
- 3.9

←

BOTTOM OF BOREHOLE
- 3.9

←

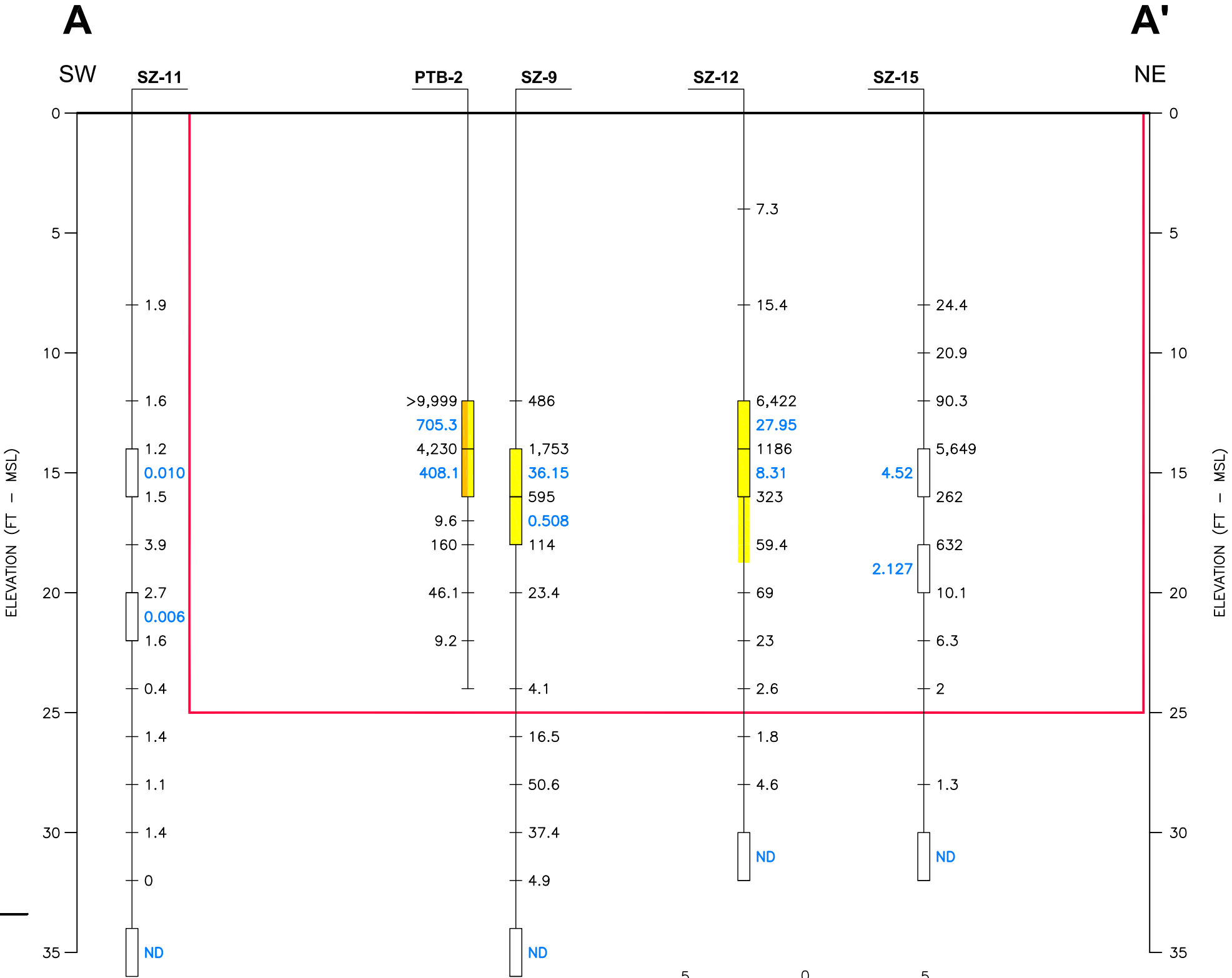
PID HEADSPACE READING
- ←

LABORATORY SOIL SAMPLE INTERVAL
- ←

DEPTH OF EXCAVATION
- ←

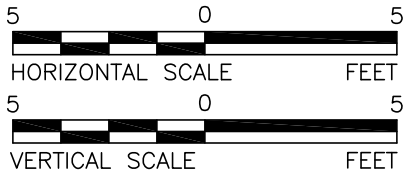
BORINGS WITH A POSITIVE "OIL RED O" RESULT
- ←

EXCEEDS NJDEP IGW SCC



NOTES

- 1.) PID HEADSPACE READING UNITS IN PPM.
- 2.) ND = NON DETECT
- 3.) 36.15 LABORATORY CONCENTRATION IN mg/kg (TOTAL VOCs).
- 4.) CROSS SECTION LOCATIONS SHOWN ON FIGURE 1.



FILE No.

0136054T004

PROJECT No.

013-6054

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SCALE

AS SHOWN

DATE

10/15/07

DESIGN

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CHECK

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REVIEW

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REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

TITLE

CROSS SECTION A-A'

LIGHTMAN DRUM SITE

FIGURE 4

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LEGEND

- SZ-11

←

BOREHOLE LABEL
- 3.9

←

BOTTOM OF BOREHOLE
- 3.9

PID HEADSPACE READING
- LABORATORY
SOIL SAMPLE INTERVAL
- DEPTH OF EXCAVATION
- BORINGS WITH A POSITIVE "OIL
RED O" RESULT
- EXCEEDS NJDEP IGW SCC

NOTE

- 1.) PID HEADSPACE READING UNITS IN PPM.
- 2.) ND = NON DETECT
- 3.) 36.15 LABORATORY CONCENTRATION IN mg/kg (TOTAL VOCs).
- 4.) CROSS SECTION LOCATIONS SHOWN ON FIGURE 1.

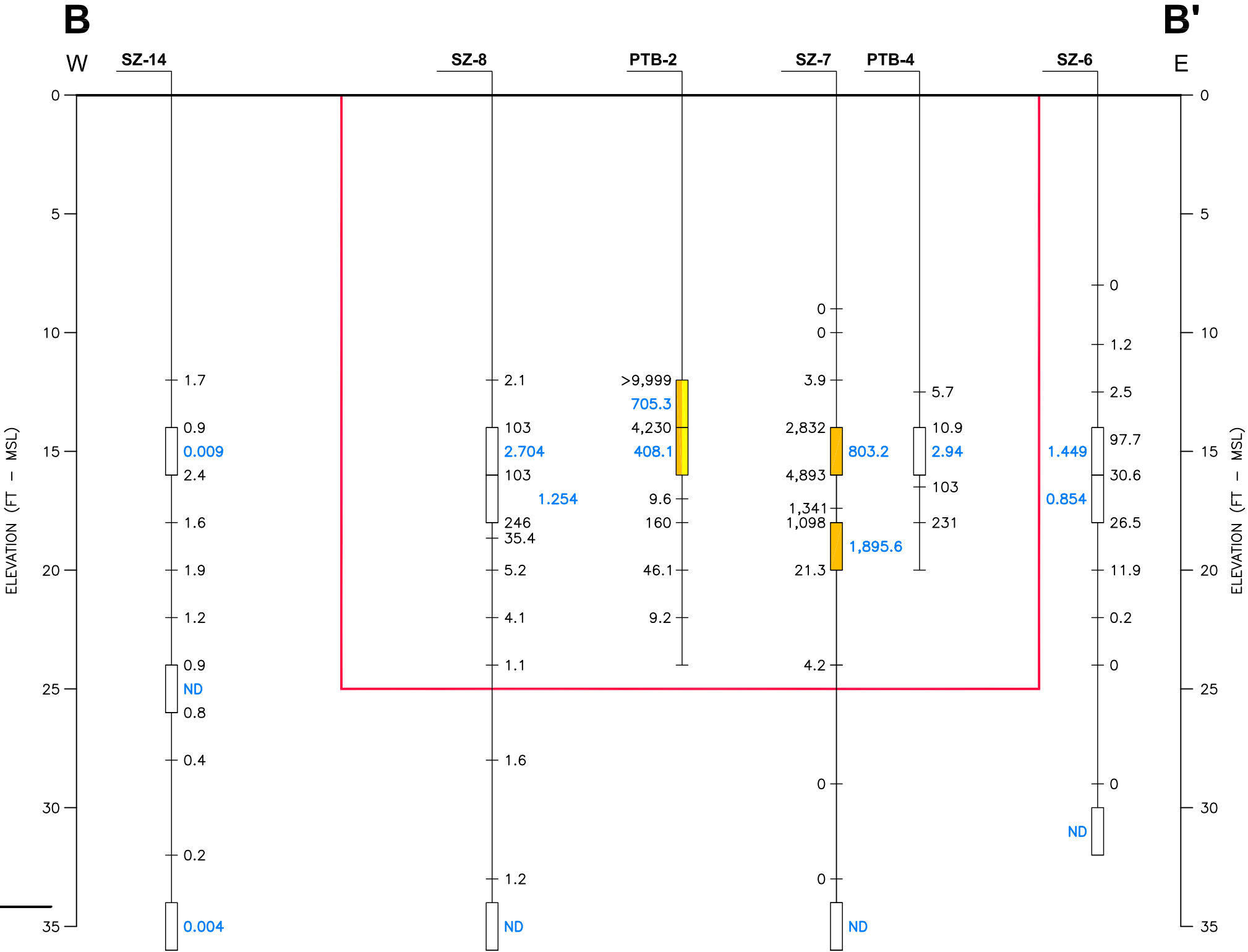
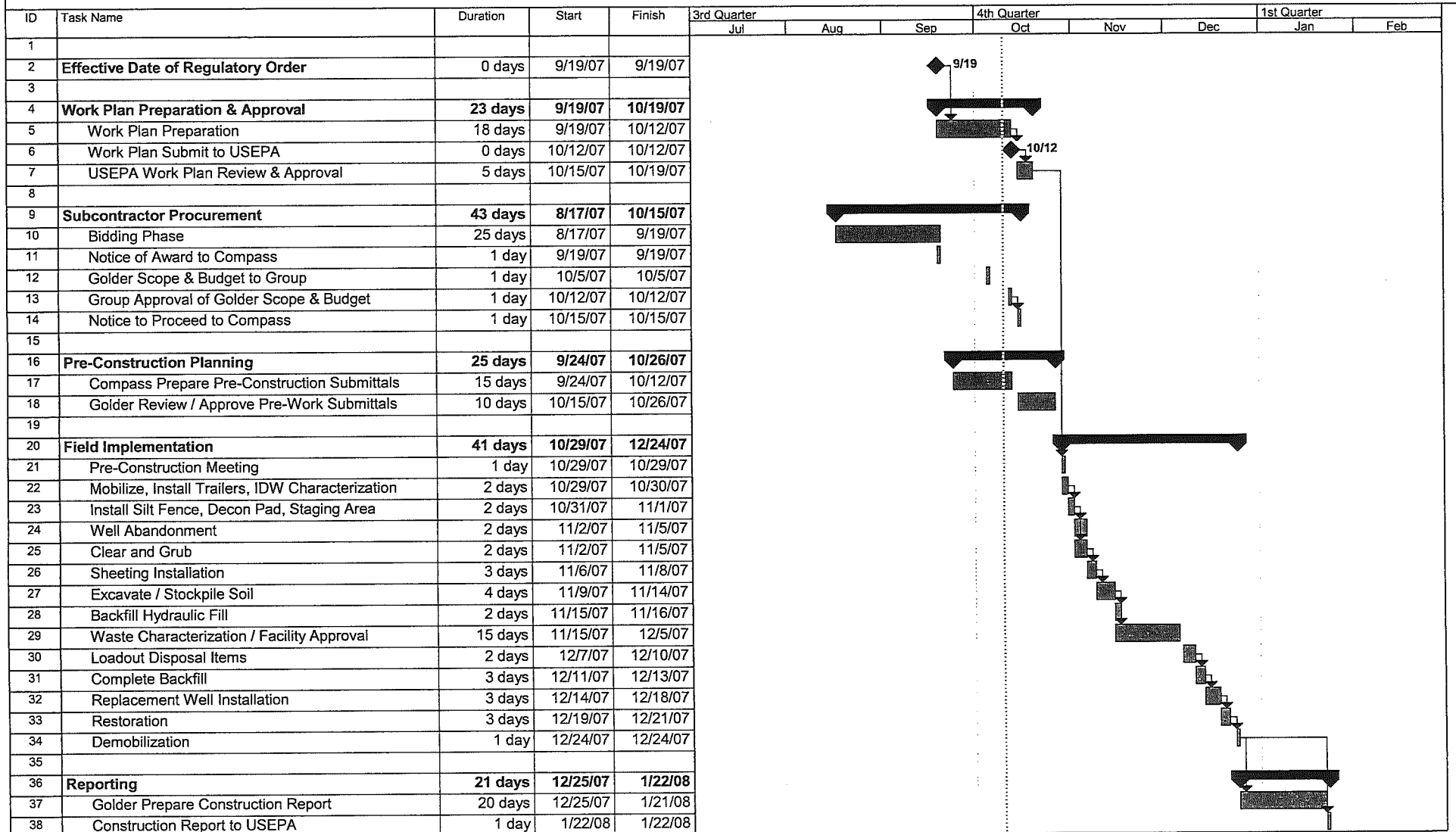


FIGURE 6
Construction Schedule
Soil Source Area Removal & Disposal
Lightman Drum Superfund Site
Windslow Township, New Jersey



Project: Lightman Drum Site
 Golder Schedule: 10/10/07

Task
 Split

Progress
 Milestone

Summary
 Project Summary

External Tasks
 External Milestone

Deadline



APPENDIX A

**ADDENDUM NUMBER THREE
TO THE SAP FOR THE RI/FS WORK PLAN
SAMPLING AND ANALYSIS PLAN FOR SOURCE REMOVAL**

APPENDIX A

**ADDENDUM NUMBER THREE
SAMPLING AND ANALYSIS PLAN
FOR THE
SOURCE REMOVAL WORK PLAN
LIGHTMAN DRUM COMPANY SITE
WINSLOW TOWNSHIP, NEW JERSEY**

October 2007

Revision #0

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Table A-9	Analytical Methods, Sample Containers, Preservation and Analytical Hold Times for Soil Samples

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1 Copy	Lightman Drum Source Removal Group
2 Copies	Golder Associates Inc.

A.1.0 PROJECT MANAGEMENT

A.1.1 Project Background

This Addendum Number Three (No. 3) to the Sampling and Analysis Plan has been prepared by Golder Associates Inc. (Golder Associates) on behalf of the Lightman Drum Source Removal Group (Group) to amend the existing Sampling and Analysis Plan (SAP) and Revised Addendum SAP (Golder, March 2007) included as part of the approved Remedial Investigation/Feasibility Study RI/FS Work Plan (Golder, 2002). This SAP addendum supports the Work Plan for Soil Source Removal and describes field, sampling, analytical and quality assurance/quality control (QA/QC) procedures for remedial investigation field activities not addressed in the original SAP and revisions based on additions to the procedures and changes to key project personnel.

A.1.2 Project Organization

Contact information for the project team members are provided in Table A-1. Notably the listed project team members have primary responsibility for the project, although other individuals within their respective organizations will be involved.

The lead regulatory Agency for the Site is USEPA Region II. Ms. Renee Gelbat is USEPA's Remedial Project Manager (RPM). Mr. David Rosoff is USEPA's On-Scene Coordinator (OSC) for the source removal. The New Jersey Department of Environmental Protection (NJDEP) will also provide regulatory oversight on this project.

Golder Associates Inc. will serve as the Remedial Designer/Quality Assurance Officer. The Remedial Contractor will be Compass Environmental, Inc. (Compass), of Windsor, New Jersey. Severn Trent Laboratories, Inc. (STL) in Edison, New Jersey will provide analytical services for sampled media. Drilling services will be provided by Tabasco Drilling, Inc., a New Jersey licensed driller. USEPA will be notified of the selected driller prior to initiating fieldwork. If at any time during this project, the identity or role of any of these key organizations or personnel changes, the USEPA would be notified.

A.1.3 Project Description

As illustrated in Figure 3 of the Soil Source Removal Work Plan, the proposed area of excavation is approximately 33 foot by 16 foot in plan dimensions and encompasses those borings where there was a positive field test result for residual product and borings that contained samples that exceeded the most stringent New Jersey Soil Cleanup Criteria (NJDEP SCC) in the Former Waste Solvent Tank Area.

Figures 3 through 5 of the Source Removal Work Plan show that the highest levels of VOC contamination are between 12-18 feet below ground surface (ft bgs). There is a distinct decrease in PID readings between 18 and 20 feet and the vast majority of the PID readings drop to below 10 ppm at depths greater than 20 feet. Consistent with the PID readings, the positive results from the "Oil Red O" test were found in samples taken from depths ranging from 12 to 18 ft bgs (sample numbers PTB2-14, PTB2-16, SZ9-18, and SZ12-14). All samples taken below 20 feet were non-detect or detected only trace levels of VOCs. The proposed excavation will extend to a depth of 25 feet. This depth also corresponds to the excavation capacity of standard construction equipment.

In general, the excavation will be conducted by initially installing a temporary excavation support system, such as an interlocking sheet pile barrier, around the zone of excavation in order to isolate the excavation from surrounding soils and control groundwater seepage. The unsaturated soils that were determined not to be contaminated subject to a maximum depth of 12-feet¹ will be staged on-site in a controlled manner, for later re-use as backfill. Soils will be excavated from 12-feet below ground surface or the saturated-unsaturated interface, whichever is encountered first, down to a maximum depth of 25-feet and stockpiled on a temporary containment pad. The containment pad will be designed to capture contaminated pore water drained from the stockpiled soil, and will be covered to prevent wind dispersion of soil and contact with rain water. The collected water will be containerized and characterized for off-site disposal, as necessary. Excavated contaminated soil will be sampled for waste classification purposes prior to off-site transportation and disposal, as necessary. The excavation will be backfilled with imported clean soil and unsaturated soils removed from the excavation that are not contaminated, and the area

¹ 12 feet below ground surface corresponds with the depth where significant VOC contamination was first detected and accounts for potential seasonal fluctuation of the water table below this depth.

restored. Monitoring wells displaced during the excavation will be replaced. All work will be conducted under a Health and Safety Plan compliant with OSHA requirements including 29 CFR 1910.120.

These activities are further described in the Soil Source Removal Work Plan.

A.1.4 Quality Assurance Objectives for Measurement

The USEPA Data Quality Objectives (DQO) Guidance document specifies that the sampling program be designed in order to meet the requirements of the investigation and achieve the DQOs. Part of this process is to determine what data is being collected and how it will be used in assessing Site conditions. For the purposes of this project, two types of data will be produced. Definitive data will be collected from samples that are submitted to an approved laboratory for analysis. Screening data will be produced using field measurement instruments.

As part of the evaluation component of the QA program, results are compared with certain data quality indicators. These data quality indicators are part of the overall DQOs for the project. DQOs for field and laboratory analysis are provided in Table A-2. Tables A-3 through A-6 provide details regarding the planned chemical analyses and the quality criteria used to assess the data.

QA program objectives for the analytical laboratory are in the laboratory's QAP. In general, data quality indicators include precision, accuracy, representativeness, completeness, and comparability (PARCC).

Samples collected during the project will be analyzed for the parameters outlined in Tables A-2, A-3, A-5, and A-7. The DQOs, as summarized by the PARCC criteria in Tables A-3 through A-6, may not always be achievable. The USEPA Region II data validation guidelines provide direction for the determination of data usability. Qualified data can often provide useful information, although the degree of certainty associated with the results may not be as planned. Professional judgment will be used to determine data usability with respect to project goals.

A.2.0 MEASUREMENT/DATA ACQUISITION

A.2.1 Source Removal Activities

This section presents a description of the Soil Source Removal activities as described in Section 3.0 through 7.0 of the Soil Source Removal WP. Specific sections of the Source Removal WP are referenced below to avoid potential conflicts with the Soil Source Removal WP text:

- Well Decommissioning and Replacement Well Installation are described in Section 3.2 of the Soil Source Removal WP;
- Temporary Excavation Support Systems are described in Section 3.3 of the Soil Source Removal WP;
- Excavation of contaminated soils are described in Section 3.4 of the Soil Source Removal WP;
- Staging of excavated soils and contaminated groundwater management are described in Section 3.5 of the Soil Source Removal WP;
- Waste Characterization and Disposal are described in Section 3.6 of the Soil Source Removal WP;
- Backfilling and restoration are described in Sections 3.7 and 3.8 of the Soil Source Removal WP;
- Erosion and sediment control are described in Section 3.9 of the Soil Source Removal WP;
- Health and Safety plans, including plans for air monitoring and control are described in Sections 3.10 and 5.0 of the Soil Source Removal WP;
- Construction Quality Assurance are described in Section 4.0 of the Soil Source Removal WP;
- Permitting and scheduling are described in Section 6.0 of the Soil Source Removal WP.

A.2.2 Groundwater Monitoring Well Decommissioning

Three monitoring wells (MW-2A, MW-2B, and MW-21) located in the vicinity of the planned source removal work area will be decommissioned prior to excavation activities in accordance with NJDEP well abandonment procedures and the New Jersey Administrative Code (N.J.A.C.) 7:9D.

A.2.3 Groundwater Monitoring Well Installation/Development

Following completion of the soil excavation and restoration of the site, replacement wells will be installed at the approximate locations and depths of the decommissioned wells according to the procedures in Section A.2.4 of Appendix A (SAP) of the RI Work Plan (Golder, July 2002). The replacement wells will be designated MW-2AR, MW-2BR, and MW-21R. The well decommissioning and replacement will be performed by a New Jersey licensed drilling firm. Upon completion of the replacement well installation, the wells will be developed and will be surveyed for horizontal and vertical location by a New Jersey licensed surveyor. Applicable permits will be obtained by the drilling firm and Well Forms A and B will be filed with the NJDEP.

A.2.4 Sampling Method Requirements/Procedures

A.2.4.1 Soil Excavation and Soil Screening

The unsaturated soils are not contaminated based on previous investigations and will be segregated from seasonally saturated soils for re-use as backfill (clean stockpile). As a further confirmation, unsaturated soils will be screened from the ground surface to a depth of 12 feet or the water table, whichever is encountered first, with an organic vapor meter using a photo-ionization detector (PID). If PID readings greater than 50 ppm are encountered, the associated soils will be separated and staged as contaminated soil with the soils below 12 feet (contaminated stockpile).

Screening will be performed by obtaining soil from the excavation bucket from approximately each one foot interval of excavation down to 12 feet or the water table, whichever is encountered first.

Equipment

- PID;
- Latex and/or nitrile gloves;
- Field Notebook;
- Stainless steel knife;
- Stainless steel spatula;
- Stainless steel Sampling Trier;
- Sealable Plastic Bag; and

- Paper toweling.

A sampling trier will be used for sampling soils in the excavators bucket. A typical sampling trier is a long tube with a slot that extends almost its entire length. The tip and edges of the tube slot are sharpened to allow the trier to cut a core of the material to be sampled when rotated after insertion into the material. Sampling triers shall be made of stainless steel with wooden handles and should be about 61 to 100 cm (24 to 40 in.) long and 1.27 to 2.54 cm (1/2 to 1 in.) in diameter.

Procedures for Use:

- i. Insert the trier into the soil material to be sampled at a 0° to 45° angle from horizontal. This orientation minimizes the spillage of sample from the sampler. Extraction of samples might require tilting of the container.
- ii. Rotate the trier once or twice to cut a core of material.
- iii. Slowly withdraw the trier, making sure that the slot is facing upward.
- iv. Transfer the sample into a sealable plastic bag with the aid of a spatula.

The temperature of the sample will be allowed to equilibrate with the ambient air temperature. Screening of the soil sample will be performed by inserting the tip of the PID into the bag and recording the maximum reading. If the headspace analysis is greater than 50 ppm then the soil will be staged as contaminated soil.

Procedures for field documentation, decontamination, and calibration of the PID are provided in Sections A.2.9, A.2.10, and A.2.15, respectively, of Appendix A of the RI/FS Work Plan (Golder, July 2002).

A.2.4.2 Excavation Base Soil Sampling Procedure

A description of the sampling of the excavation base at 25 feet below ground surface is provided in Section 3.4 of the Soil Source Removal Work Plan and in Section A.2.7.2.1 (Encore Sampling Methods for VOCs) of the RI/FS Work Plan SAP.

Equipment

- PID;
- Latex and/or nitrile gloves;
- Field Notebook;

- COC form;
- Stainless steel knife;
- Stainless steel spatula;
- Stainless steel Sampling Trier;
- EnCore® samplers and T-handle;
- Paper toweling;
- Temperature blank; and
- Cooler with ice.

The samples will be collected from the interior of the soil in the excavator bucket removed from each quadrant of the bottom of the excavation at a depth of 25 feet by using a sampling trier as described above according to the following procedures:

Procedures for Use:

- i. Insert the sampler into the soil material being sampled at 0° to 45° from horizontal.
- ii. Rotate the sampler two or three times in order to cut a core of the material.
- iii. Slowly withdraw the sampler, making sure that the slot is facing upward.
- iv. Transfer the sample according to the EnCore® Sampling Methodology included in Section A.2.7.2.1 of Appendix A of the RI/FS Work Plan (Golder, July 2002).
- v. Follow procedures for preservation and transport in Table A-9 of this addendum and those included in Section A.2.11 of Appendix A of the RI/FS Work Plan (Golder, July 2002).

The soil samples will be analyzed for VOCs according to the Tables A-5 and A-9 of this addendum. Procedures for decontamination and field documentation are provided in Sections A.2.9 and A.2.10, respectively, of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Immediately after sample collection, sample bottles will be placed on ice and maintained at approximately 4° Celsius (C). Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Quality-Control samples will be used to monitor sampling and laboratory performance and will include duplicates, spikes, and blanks. Quality control and quality assurance (QA/QC) procedures are described in Section 2.13 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

A.2.4.3 Impacted Soil/Waste Soil Pile Sampling Procedure

Sampling procedures for the contaminated soil staging pile are included Section 3.6 of the Soil Source Removal Work Plan and below and include VOC sampling procedures in Section A.2.7.2.1 (Encore Sampling Methods for VOCs) and Section A.2.7.2.2 (Soil Sampling for Parameters Other than VOCs) of Appendix A of the RI/FS Work Plan (Golder, July 2002).

Equipment

- PID;
- latex and/or nitrile gloves;
- COC form;
- Field notebook
- Stainless steel knife;
- EnCore® samplers and T-handle (If doing Totals);
- Sampling Trier;
- Stainless steel mixing bowls and spoons;
- Appropriate sample bottles;
- Temperature blank; and
- Cooler with ice.

Samples will be collected of the staged contaminated soil removed from the excavation for waste characterization for transportation and disposal purposes. Not less than two composite soil samples will be collected for analyses. Four sub-sample locations will be selected and sampled for each composite sample. A Waste Pile Sampler or Sampling Trier will be used for the collection of samples being analyzed for RCRA Waste Characteristics of Ignitability, Corrosivity, Reactivity, and Toxicity.

Sampling procedures for soil for TCLP volatile fraction analysis will utilize an EnCore™ sampler and will be those specified in Section 2.7.2.1 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Soil for non-VOC analyses will be removed from the waste pile sampler according to the procedures below (Section A.2.4.3.1) or sampling trier (Section 2.4.2) with a stainless steel spoon and will be placed into a decontaminated stainless steel mixing bowl and homogenized.

Homogenization of the soil will be performed in the stainless steel mixing bowl. Large rocks, twigs, roots, and leaves will be removed. The soil will be homogenized with a decontaminated stainless steel spoon according to the procedure below:

- The sample will be scraped from the sides, bottom, and any corners of the bowl and rolled into the middle of the mass using the stainless steel spoon.
- The mass of the sample will be mixed thoroughly. The sample will then be divided into four quarters, which will be moved to separate parts of the bowl. Each quarter will be individually mixed. Then the four quarters will be recombined and the entire sample mass mixed again.
- Sample jars for non-VOC parameters will be filled following homogenization.

Required amounts of sample are listed in Table A-9. The appropriate amount of soil for each parameter will be placed into sampling jars. The jars will then be labeled and put into a cooler with ice. All samples will be stored and shipped at 4° C. A laboratory-supplied temperature blank will be included in each cooler so that the laboratory can perform a temperature check upon receipt.

Immediately after sample collection, sample bottles will be placed on ice and maintained at approximately 4° Celsius (C). Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Quality-Control samples will be used to monitor sampling and laboratory performance and will include duplicates, spikes, and blanks. Quality control and quality assurance (QA/QC) procedures are described in Section 2.13 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Additionally, sufficient sample will be collected to demonstrate the absence or presence of free liquids in either a containerized or a bulk was. The following test will be used: Method 9095B (Paint Filter Liquids Test) as described in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846.

A.2.4.3.1 Waste Pile Sampler

The waste pile sampler is used for sampling wastes in large heaps with cross-sectional diameters greater than 1 m (39.4 in.). It can also be used for sampling granular or powdered wastes or materials in large bins, barges, or soils where the grain sampler or sampling trier is not long enough.

This sampler is essentially a large sampling trier. It is commercially available but it can be easily fabricated from sheet metal or plastic pipe. A length of PVC pipe 1.52 m (5 ft.) long by 3.2 cm (1 1/4 in.) in diameter by 0.32 cm (1/8 in.) wall thickness is adequate. The pipe is sawed lengthwise (about 60/40 split) until the last 10 cm (4-in.). The narrower piece is sawed-off and hence forms a slot in the pipe. The edges of the slot and the tip of the pipe can be sharpened to permit the sampler to slide into the waste material being sampled. The un-split length of the pipe serves as the handle.

Procedures for Use:

- i. Insert the sampler into the waste material being sampled at 0° to 45° from horizontal.
- ii. Rotate the sampler two or three times in order to cut a core of the material.
- iii. Slowly withdraw the sampler, making sure that the slot is facing upward.
- iv. Transfer the sample into a laboratory cleaned sample container with the aid of a spatula and/or brush or into stainless steel bowl for homogenization.
- v. Follow procedures for preservation and transport in Table A-9 of this addendum and those included in Section A.2.11 of Appendix A of the RI/FS Work Plan (Golder, July 2002).

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

A.2.4.4 Contained Water Sampling Procedure

Water removed from the excavation during the soil removal process and/or pore-water draining from the staged contaminated soil pile will be placed into a large storage tank. A minimum of one composite sample from the storage tank will be collected for analysis for disposal characterization. The sample will be analyzed for TCL organics, TAL metals, and any additional analytes required by the disposal facility.

Equipment

- PID;
- Latex and/or nitrile gloves;
- Field Notebook;
- COC form;
- Norwell® disposable polypropylene Dipstik (3 feet 4 inches or 7 feet);
- Paper toweling;
- Sample bottles and preservatives;
- Temperature blank; and
- Cooler with ice.

A Norwell® Polypropylene Dipstik™ Universal Drum and Tank Sampler will be used to sample the storage tank. The Disposable Dipstick (Polypropylene) is manufactured in two lengths of 3 feet 4 inches or 7 feet. The Norwell Universal Drum and Tank samplers are designed for sampling of liquid and sludge from the most common sources - 55 gallon drums, truck and rail tank cars, large tanks, streams, lakes, rivers, and lagoons.

Sampling Methodology

To use, open the safety pouring top and unique push/seal bottom and insert into tank. Allow sufficient time for sampling tube to fill, close top and push the bottom against the bottom of tank until seal closes, trapping sample inside. Fill appropriate bottles using the Controlled-Flow Valve and minimize agitation.

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

A.2.4.5 Unsaturated Soil Backfill Sampling Procedures

To verify that the excavated unsaturated soils have not been impacted, a sample shall be collected and analyzed prior to re-use as backfill. The sample of the excavated unsaturated soils from the stockpile shall be analyzed for TCL organics and TAL metals according to Tables 2, 5, 6, and 9 of this SAP. The samples shall be collected from the stockpiled material. The samples of the unsaturated soil stockpile will be collected using the procedures above in Section A.2.4.3.

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

A.2.4.6 Backfill Borrow Source Sampling Procedure

Samples of off-site borrow source to be used as backfill shall be sampled and analyzed to ensure that all fill material used to backfill the excavated area is free from chemical and radiological contamination and is consistent with background soil levels for the Pinelands area.

Samples of off-site backfill material will be analyzed at a minimum for TCL organics, TAL metals, and radiological analyses (Gamma Radiation Exposure Rate) according to Tables 2, 5, 6, and 9 of this SAP. The samples shall be collected at the source. Samples will be collected and analyzed at minimum rate of one sample per 2,000 cubic yards of material for chemical and radiological parameters. The backfill samples will be collected using the procedures above in Section A.2.4.3.

Immediately after sample collection, sample bottles must be placed in a cooler with wet ice and completed COC form. The samples must be maintained at approximately 4°C after collection. Further information on sample handling is included in Section A.2.11 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

Backfill samples shall be screened at the source for gamma radiation with a Ludlum Measurements, Inc. Ludlum 19 MircorR Meter with Built-In 1" X 1" NaI(Tl) Gamma Scintillator with a total range from 0 - 5,000 µR/hr. The manufacturer's procedures shall be followed for

calibration and use. Readings shall be collected near the source area for use as background readings prior to scanning the borrow source samples.

A.2.4.7 Sample Identification

All samples shall be adequately marked according to Section A.2.11.3 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002) for identification from the time of collection and packaging through shipping and storage. Marking shall be on a sample label attached to the sample container. Sample identification for the source removal samples shall include:

- SE Excavation Base Soil Sample;
- SP Waste Pile Composite Soil Sample;
- SF Off-Site Borrow Soil; and
- CW Contained Water Sample(s).

A.3.0 ASSESSMENT/OVERSIGHT

As described in the guidance documents, assessment includes surveillance, peer review, management systems review, readiness review, technical systems audit, performance evaluation, data quality audit, and data quality assessment. For performance monitoring, the following assessment activities are planned:

- Surveillance;
- Peer review;
- Technical systems audit; and,
- Data quality assessment

Details on assessment and oversight are provided in Section A.3.0 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

A.4.0 DATA VALIDATION AND USABILITY

Accurate data reduction, validation and reporting methods will support decision analysis. The laboratory chosen for this project will have further data reduction, validation and reporting procedures which will be described in the laboratory QAP or SOPs. Data reduction techniques for both field and laboratory activities are described in this Section A.4.0 of Appendix A (SAP) of the RI/FS Work Plan (Golder, July 2002).

**TABLE A-1
PROJECT PERSONNEL
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN**

USEPA Remedial Project Manager:	Renee Gelblat USEPA Region II New Jersey Remediation Branch 290 Broadway 19th Floor NY, NY 10007-1866 Telephone: (212) 637-4975 Facsimile: (212) 637-4429
USEPA On-Scene Coordinator ("OSC")	David Rosoff (alternate: Joseph Cosentino) Removal Action Branch, Region 2 2890 Woodbridge Avenue Edison, New Jersey 08837-3679 (732) 549-7665
NJDEP Project Manager:	James DeNoble NJ Department of Environmental Protection Site Remediation Program 401 East State Street, 5th Floor P.O. Box 028 Trenton, NJ 08625 Telephone: (609) 777-4101 Facsimile: (609) 633-1439
Project Coordinator:	P. Stephen Finn, C.Eng. (Alternate : Robert J. Illes) Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006
Source Removal Manager	David B. Walsh, P.E. Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006
RI Consultant Project Manager:	Robert J. Illes, P.G. Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006
RI Manager and Site HSC:	Jonathan P. Rizzo Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006

**TABLE A-1
PROJECT PERSONNEL
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN**

RI Quality Assurance Manager:	Peter Guy Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006
RI Laboratory Coordinator and Data Validator:	Cindi Lucas Golder Associates Inc 200 Century Parkway, Suite C Mount Laurel, NJ 08054 Telephone: (856) 856-2005 Facsimile: (856) 856-2006
CompuChem Project Manager: Alternate Laboratory Project Manager:	Mitch Zimmerman Cathy Dover CompuChem 501 Madison Ave Cary, NC 27513 Telephone: (919) 379-4013 Facsimile: (919) 379-4040
CompuChem Quality Assurance Director:	Robert Meierer CompuChem 501 Madison Ave Cary, NC 27513 Telephone: (919) 379-4004 Facsimile: (919) 379-4050
Remedial Contractor	Kevin Corradino Compass Environmental, Inc. 92 North Main Street Unit 20B PO Box 10 Windsor, New Jersey 08561 Phone: 609.371.7500 Fax: 609.371.7508
Drilling Services	Tabasco Drilling Corporation PO Box 1676 Mt Laurel, NJ 08054 tele: 856 722-5593 fax: 856 727-1052

**TABLE A-1
PROJECT PERSONNEL
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN**

Disposal Facility	Eldredge, Inc. 898 Fernhill Road West Chester, PA 19380-4256 Disposal-Non-hazardous Water Chemical Waste Management 1550 Balmer Road Model City, NY 14107 Disposal-RCRA Hazardous Soils Soil Safe, Inc. 378 Route 130 Logan Township, NJ 08085-4523 Disposal-Non-hazardous Soils Dupont Route 130 and Canal Road Deepwater, NJ 08023 Disposal-Hazardous Liquids
Surveyor	B&B Hi-Tech Solutions, LLC 409 Bloomfield Drive, Suite 3 West Berlin, New Jersey 08091 Telephone: (856) 719-1911 Facsimile: (856) 719-8877

**TABLE A-2
DATA QUALITY OBJECTIVES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN**

Source Removal Activity	Matrix	Number of Samples	Parameters of Interest	Frequency of Monitoring	Purpose/Objective of Activity
Soil Screening	Soil (0-12 ft bgs)	12	Total VOCs	per foot	During excavation to assure that unsaturated soil down to 12 ft bgs surface that contains TVOCs greater than 50 ppm is segregated and will be disposed off-site with the impacted saturated soil removed from the excavation.
Excavation Base Soil Characterization	Soil	4 or 8	TCL VOCs	Once	Collect samples at 20 ft bgs to evaluate whether remaining VOC levels in soil are less than SCC levels. Additional excavation if VOC levels in soil are greater than SCC levels. Sampling of soil at 25 ft bgs to obtain data on VOC levels in soil at base of excavation.
Saturated Soil Stockpile Characterization	Soil	2	RCRA Characteristics TCLP Paint Filter Test	Once	Characterization of removal impacted soil for acceptance and disposal at waste disposal facility.
Unsaturated Soil Stockpile Characterization	Soil	2	TCL - VOCs and SVOCs TAL - Metals	Once	Verify that unsaturated soil excavated and stockpiled is free of impacts prior to re-use as backfill for the excavation.
Contained Water Characterization	Water	1	TCL - VOCs and SVOCs TAL - Metals	Once	Characterization of contained water from source removal action for disposal.
Backfill Borrow Source Characterization	Soil	1 per source	TCL - VOCs, SVOCs, PCBs, and Pesticides TAL - Metals Gamma radiation screening	1	Ensure that all fill material used to backfill the excavated area is free from chemical and radiological contamination and is consistent with background soil levels for the Pinelands area.

Notes:

1. The Target Compound List (TCL) VOC, SVOC, Pesticide and PCB lists are defined in CLP Statements of Work OLM04.3. The Target Analyte List (TAL) parameters are listed in CLP Statement of Work ILM05.4.
2. RCRA Characteristics include ignitability, corrosivity, reactivity, and toxicity. TCLP extract will be analyzed for TCL VOCs, TCL SVOCs, and TAL metals. Based on extensive RI sampling, pesticides and PCBs are not present.
3. The methodologies that will be used for analysis are listed in SAP Tables A-3 and A-5.
4. Quality control samples will be collected per matrix at the following frequency : 1 field duplicate per twenty primary samples; 1 MS/MSD pair per twenty primary + field duplicate samples; 1 rinse blank per day per type of decontamination event where non-dedicated equipment is used. 1 trip blank per day when aqueous VOC samples are collected.
5. Field parameters for soil screening include: VOC vapors and visual characteristics.
6. NJDEP Residential and Non-Residential Direct Contact Soil Cleanup Criteria (SCC)
7. Gamma radiation screening will be performed using a Ludlum Model 19 MicroR meter at the source.
8. Disposal facilities for soil and water may require additional analyses.

TABLE A-3
PARCC DATA FOR AQUEOUS SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

MEASUREMENT PARAMETER	METHOD REFERENCE	LABORATORY PRECISION	FIELD & LABORATORY PRECISION	ACCURACY	COMPLETENESS (a)
TCL Volatile Organics	CLP SOW OLM04.3	see Table A-4	<u>+50%</u>	see Table A-4	85%
TCL Semi-Volatile Organics	CLP SOW OLM04.3	see Table A-4	<u>+50%</u>	see Table A-4	85%
TCL Pesticides/PCBs	CLP SOW OLM04.3	see Table A-4	<u>+50%</u>	see Table A-4	85%
TAL Metals	CLP SOW ILM05.4	see Table A-4	<u>+50%</u>	see Table A-4	85%
TAL Cyanide	CLP SOW ILM05.4	see Table A-4	<u>+50%</u>	see Table A-4	85%

NOTES:

(a) While the goal for completeness of laboratory measurements is 90%, the goal for total completeness (sampling and analytical) is 85%.

1. PARCC = Precision, Accuracy, Representativeness, Comparability, and Completeness
2. TCL = CLP Target Compound List, see CLP Statement of Work OLM04.3; TAL = CLP Target Analyte List, see CLP Statement of Work ILM05.4. See Table A-7
3. Precision expressed as either percent relative standard deviation (%RSD) or relative percent difference (%RPD).
4. Accuracy expressed as percent recovery of a surrogate, matrix spike or laboratory control sample.
5. Precision and accuracy for TCL/TAL parameters provided in Table A-4.
6. Representativeness and Comparability are non-quantitative parameters.
7. Accuracy and precision criteria for laboratory measurements will be consistent with the criteria cited in the individual methodologies for the natural attenuation parameters.

TABLE A-4
LABORATORY PRECISION AND ACCURACY CRITERIA FOR AQUEOUS TCL/TAL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

VOLATILE ORGANICS:		<u>QC LIMITS</u>
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
1,1-Dichloroethene	61%-145%	0%-14%
Trichloroethene	71%-120%	0%-14%
Benzene	76%-127%	0%-11%
Toluene	76%-125%	0%-13%
Chlorobenzene	75%-130%	0%-13%
<u>Surrogate Compound</u>		
Toluene-d8	88%-110%	Not Applicable
Bromofluorobenzene	86%-115%	Not Applicable
1,2-Dichloroethane-d4	76%-114%	Not Applicable
SEMI-VOLATILE ORGANICS:		<u>QC LIMITS</u>
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
Phenol	12%-110%	0%-42%
2-Chlorophenol	27%-123%	0%-40%
N-Nitroso-di-n-propylamine	41%-116%	0%-38%
4-Chloro-3-methylphenol	23%-97%	0%-42%
Acenaphthene	46%-118%	0%-31%
4-Nitrophenol	10%-80%	0%-50%
2,4-Dinitrotoluene	24%-96%	0%-38%
Pentachlorophenol	9%-103%	0%-50%
Pyrene	26%-127%	0%-31%
1,4-Dioxane	10%-90%	0%-50%
<u>Surrogate Compound</u>		
Nitrobenzene-d5	35%-114%	Not Applicable
2-Fluorobiphenyl	43%-116%	Not Applicable
Terphenyl-d14	33%-141%	Not Applicable
Phenol-d5	10%-110%	Not Applicable
2-Fluorophenol	21%-110%	Not Applicable
2,4,6-Tribromophenol	10%-123%	Not Applicable
2-Chlorophenol-d4 (advisory)	33%-110%	Not Applicable
1,2-Dichlorobenzene-d4 (advisory)	16%-110%	Not Applicable
PESTICIDES:		<u>QC LIMITS</u>
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
gamma-BHC	56%-123%	0%-15%
Heptachlor	40%-131%	0%-20%
Aldrin	40%-120%	0%-22%
Dieldrin	52%-126%	0%-18%
Endrin	56%-121%	0%-21%
4,4'-DDT	38%-127%	0%-27%
<u>Surrogate Compound</u>		
Tetrachloro-m-xylene	30%-150%	Not Applicable
Decachlorobiphenyl	30%-150%	Not Applicable
POLYCHLORINATED BIPHENYLS:		<u>QC LIMITS</u>
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
Aroclor 1254	50%-100%	0%-20%
<u>Surrogate Compound</u>		
Tetrachloro-m-xylene	30%-150%	Not Applicable
Decachlorobiphenyl	30%-150%	Not Applicable

TABLE A-4
LABORATORY PRECISION AND ACCURACY CRITERIA FOR AQUEOUS TCL/TAL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

TARGET ANALYTE LIST:		<u>QC LIMITS</u>	
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>	
Metals	75%-125%	+20%	
Cyanide	75%-125%	+20%	

NOTES:

1. VOC, SVOC, and Pesticide accuracy and precision criteria based upon CLP SOW OLM04.3.
2. PCB accuracy and precision criteria based upon CompuChem established limits.
3. TAL accuracy and precision criteria based upon CLP SOW ILM05.4

TABLE A-5
PARCC DATA FOR SOIL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

MEASUREMENT PARAMETER	METHOD REFERENCE	LABORATORY PRECISION	FIELD & LABORATORY PRECISION	ACCURACY	COMPLETENESS (a)
TCL Volatile Organics	CLP SOW OLM04.3	see Table A-6	±100%	see Table A-6	85%
TCL Semi-Volatile Organics	CLP SOW OLM04.3	see Table A-6	±100%	see Table A-6	85%
TCL Pesticides/PCBs	CLP SOW OLM04.3	see Table A-6	±100%	see Table A-6	85%
TAL Metals	CLP SOW ILM05.4	see Table A-6	±100%	see Table A-6	85%
TAL Cyanide	CLP SOW ILM05.4	see Table A-6	±100%	see Table A-6	85%
Paint Filter Liquids Test	SW864 9095B	Not Applicable	Not Applicable	Not Applicable	85%

NOTES:

(a) While the goal for completeness of laboratory measurements is 90%, the goal for total completeness (sampling and analytical) is 85%.

1. PARCC = Precision, Accuracy, Representativeness, Comparability, and Completeness
2. TCL = CLP Target Compound List, see CLP Statement of Work OLM04.3; TAL = CLP Target Analyte List, see CLP Statement of Work ILM05.4. See Table A-7
3. Precision expressed as either percent relative standard deviation (%RSD) or relative percent difference (%RPD).
4. Accuracy expressed as percent recovery of matrix spike or laboratory control sample.
5. Precision and accuracy for TCL/TAL parameters provided in Table A-6.
6. Representativeness and Comparability are non-quantitative parameters.
7. PARCC Data for the aqueous extract of soil samples for TCLP are provided in Tables A-3 and A-4

TABLE A-6
LABORATORY PRECISION AND ACCURACY CRITERIA FOR SOIL TCL/TAL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

VOLATILE ORGANICS:		QC LIMITS
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
1,1-Dichloroethene	52%-172%	0%-22%
Trichloroethene	62%-137%	0%-24%
Benzene	66%-142%	0%-21%
Toluene	59%-139%	0%-21%
Chlorobenzene	60%-133%	0%-21%
Surrogate Compound		
Toluene-d8	84%-138%	Not Applicable
Bromofluorobenzene	59%-113%	Not Applicable
1,2-Dichloroethane-d4	70%-121%	Not Applicable
SEMI-VOLATILE ORGANICS:		QC LIMITS
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
Phenol	26%-90%	0%-35%
2-Chlorophenol	25%-102%	0%-50%
N-Nitroso-di-n-propylamine	41%-126%	0%-38%
4-Chloro-3-methylphenol	26%-103%	0%-33%
Acenaphthene	31%-137%	0%-19%
4-Nitrophenol	11%-114%	0%-50%
2,4-Dinitrotoluene	28%-89%	0%-47%
Pentachlorophenol	17%-109%	0%-47%
Pyrene	35%-142%	0%-36%
Surrogate Compound		
Nitrobenzene-d5	23%-120%	Not Applicable
2-Fluorobiphenyl	30%-115%	Not Applicable
Terphenyl-d14	18%-137%	Not Applicable
Phenol-d5	24%-113%	Not Applicable
2-Fluorophenol	25%-121%	Not Applicable
2,4,6-Tribromophenol	19%-122%	Not Applicable
2-Chlorophenol-d4 (advisory)	20%-110%	Not Applicable
1,2-Dichlorobenzene-d4 (advisory)	20%-110%	Not Applicable
PESTICIDES:		QC LIMITS
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
gamma-BHC	46%-127%	0%-50%
Heptachlor	35%-130%	0%-31%
Aldrin	34%-132%	0%-43%
Dieldrin	31%-134%	0%-38%
Endrin	42%-139%	0%-45%
4,4'-DDT	23%-134%	0%-50%
Surrogate Compound		
Tetrachloro-m-xylene	30%-150%	Not Applicable
Decachlorobiphenyl	30%-150%	Not Applicable
POLYCHLORINATED BIPHENYLS:		QC LIMITS
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
Aroclor 1254	50%-100%	0%-20%

TABLE A-6
LABORATORY PRECISION AND ACCURACY CRITERIA FOR SOIL TCL/TAL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

<u>Surrogate Compound</u>		
Tetrachloro-m-xylene	30%-150%	Not Applicable
Decachlorobiphenyl	30%-150%	Not Applicable
TARGET ANALYTE LIST:		
		<u>QC LIMITS</u>
<u>Target Spike Compound</u>	<u>% Recovery</u>	<u>% RPD</u>
Metals	75%-125%	+20%
Cyanide	75%-125%	+20%

NOTES:

1. VOC, SVOC, and Pesticide accuracy and precision criteria based upon CLP SOW OLM04.3.
2. PCB accuracy and precision criteria based upon CompuChem established limits.
3. TAL accuracy and precision criteria based upon CLP SOW ILM05.4

TABLE A-7
TARGET COMPOUNDS/ANALYTES OF INTEREST
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

TARGET PARAMETERS	AQUEOUS REPORTING LIMITS [ug/l]	SOLID REPORTING LIMITS [ug/kg]
<u>Volatile Organic Compounds</u>		
Dichlorodifluoromethane	10	10
Chloromethane	10	10
Bromomethane	10	10
Vinyl chloride	10	10
Chloroethane	10	10
Trichlorofluoromethane	10	10
1,1,2-Trichloro-1,2,2-trifluoroethane	10	10
Methyl acetate	10	10
Methylene chloride	10	10
Acetone	10	10
Carbon disulfide	10	10
<i>tert</i> -Butyl methyl ether	10	10
1,1-Dichloroethene	10	10
1,1-Dichloroethane	10	10
<i>cis</i> -1,2-Dichloroethene	10	10
<i>trans</i> -1,2-Dichloroethene	10	10
Chloroform	10	10
1,2-Dichloroethane	10	10
2-Butanone	10	10
Bromochloromethane	NA	10
1,1,1-Trichloroethane	10	10
Cyclohexane	10	10
Carbon Tetrachloride	10	10
Bromodichloromethane	10	10
1,2-Dichloropropane	10	10
<i>cis</i> -1,3-Dichloropropene	10	10
Trichloroethene	10	10
Methylcyclohexane	10	10
Dibromochloromethane	10	10
1,1,2-Trichloroethane	10	10
Benzene	10	10
<i>trans</i> -1,3-Dichloropropene	10	10
Bromoform	10	10
4-Methyl-2-pentanone	10	10
2-Hexanone	10	10
Tetrachloroethene	10	10
Isopropylbenzene	10	10
1,1,2,2-Tetrachloroethane	10	10
1-2-Dibromoethane	10	10
Toluene	10	10
Chlorobenzene	10	10
Ethylbenzene	10	10
Styrene	10	10
Xylenes (total)	10	10
1,3-Dichlorobenzene	10	10
1,4-Dichlorobenzene	10	10
1,2-Dichlorobenzene	10	10

TABLE A-7
TARGET COMPOUNDS/ANALYTES OF INTEREST
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

TARGET PARAMETERS	AQUEOUS REPORTING LIMITS [ug/l]	SOLID REPORTING LIMITS [ug/kg]
1,2-Dibromo-3-chloropropane	10	10
1,2,4-Trichlorobenzene	10	10
<u>Semi-Volatile Organic Compounds</u>		
Benzaldehyde	10	330
Phenol	10	330
bis-(2-Chloroethyl)ether	10	330
2-Chlorophenol	10	330
2-Methylphenol	10	330
2,2'-oxybis(1-Chloropropane)	10	330
Acetophenone	10	330
4-Methylphenol	10	330
N-Nitroso-di-n-propylamine	10	330
Hexachloroethane	10	330
Nitrobenzene	10	330
Isophorone	10	330
2-Nitrophenol	10	330
2,4-Dimethylphenol	10	330
bis-(2-Chloroethoxy) methane	10	330
2,4-Dichlorophenol	10	330
Naphthalene	10	330
4-Chloroaniline	10	330
Hexachlorobutadiene	10	330
Caprolactam	10	330
4-Chloro-3-methylphenol	10	330
2-Methylnaphthalene	10	330
Hexachlorocyclopentadiene	10	330
2,4,6-Trichlorophenol	10	330
2,4,5-Trichlorophenol	25	830
1,1'-Biphenyl	10	330
2-Chloronaphthalene	10	330
2-Nitroaniline	25	830
Dimethylphthalate	10	330
2,6-Dinitrotoluene	10	330
Acenaphthylene	10	330
3-Nitroaniline	25	830
Acenaphthene	10	330
2,4-Dinitrophenol	25	830
4-Nitrophenol	25	830
Dibenzofuran	10	330
2,4-Dinitrotoluene	10	330
Diethylphthalate	10	330
Fluorene	10	330
4-Chlorophenyl-phenyl ether	10	330
4-Nitroaniline	25	830
4,6-Dinitro-2-methylphenol	25	830
N-Nitroso-diphenylamine	10	330
4-Bromophenyl-phenyl ether	10	330
Hexachlorobenzene	10	330

TABLE A-7
TARGET COMPOUNDS/ANALYTES OF INTEREST
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

TARGET PARAMETERS	AQUEOUS REPORTING LIMITS [ug/l]	SOLID REPORTING LIMITS [ug/kg]
Atrazine	10	330
Pentachlorophenol	25	830
Phenanthrene	10	330
Anthracene	10	330
Carbazole	10	330
Di-n-butyl phthalate	10	330
Fluoranthene	10	330
Pyrene	10	330
Butylbenzyl phthalate	10	330
3,3'-Dichlorobenzidine	10	330
Benzo(a)anthracene	10	330
Chrysene	10	330
bis-(2-Ethylhexyl) phthalate	10	330
Di-n-octylphthalate	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(a)pyrene	10	330
Indeno(1,2,3-cd)pyrene	10	330
Dibenzo(a,h)anthracene	10	330
Benzo(g,h,i)perylene	10	330
<u>Pesticides/PCBs</u>		
alpha-BHC	0.05	1.7
beta-BHC	0.05	1.7
delta-BHC	0.05	1.7
gamma-BHC	0.05	1.7
Heptachlor	0.05	1.7
Aldrin	0.05	1.7
Heptachlor epoxide	0.05	1.7
Endosulfan I	0.05	1.7
Dieldrin	0.1	3.3
4,4'-DDE	0.1	3.3
Endrin	0.1	3.3
Endosulfan II	0.1	3.3
4,4'-DDD	0.1	3.3
Endosulfan sulfate	0.1	3.3
4,4'-DDT	0.1	3.3
Methoxychlor	0.5	17
Endrin ketone	0.1	3.3
Endrin aldehyde	0.1	3.3
alpha-Chlordane	0.05	1.7
gamma-Chlordane	0.05	1.7
Toxaphene	5.0	17
Aroclor-1016	1.0	33
Aroclor-1221	2.0	67
Aroclor-1232	1.0	33
Aroclor-1242	1.0	33
Aroclor-1248	1.0	33
Aroclor-1254	1.0	33

TABLE A-7
TARGET COMPOUNDS/ANALYTES OF INTEREST
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

TARGET PARAMETERS	AQUEOUS REPORTING LIMITS [ug/l]	SOLID REPORTING LIMITS [ug/kg]
Aroclor-1260	1.0	33
<u>Target Analyte List</u>	<u>[ug/l]</u>	<u>[mg/kg]</u>
Aluminum	200	20
Antimony	60	6
Arsenic	10	1
Barium	200	20
Beryllium	5	0.5
Cadmium	5	0.5
Calcium	5000	500
Chromium	10	1
Cobalt	50	5
Copper	25	2.5
Iron	100	10
Lead	10	1
Magnesium	5000	500
Manganese	15	1.5
Mercury	0.2	0.1
Nickel	40	4
Potassium	5000	500
Selenium	35	3.5
Silver	10	1
Sodium	5000	500
Thallium	25	2.5
Vanadium	50	5
Zinc	60	6
Cyanide	10	2.5

ug/l = micrograms per liter or parts per billion (ppb)

ug/kg = micrograms per kilogram or ppb

mg/kg = milligrams per kilogram or parts per million (ppm)

VOC, SVOC, Pesticide and PCB Lists from CLP SOW OLM04.3

TAL Metals List from CLP SOW ILM05.4

The Reporting Limits shown for the Target Analyte List are the maximum reporting limits that may be used for an undiluted sample. The laboratory will report results to the Instrument Detection Limit (IDL) which are generated every quarter.

Reporting Limits will be modified on an individual sample basis depending upon dilution, percent solids, and sample matrix considerations.

TABLE A-8
ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATION AND ANALYTICAL HOLD TIMES FOR AQUEOUS SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

PARAMETER	METHODOLOGY	CONTAINER	MINIMUM SAMPLE	PRESERVATION ⁽¹⁾	HOLD TIME ⁽²⁾
TCL Volatile Organics	CLP SOW OLM04.3	3-40 ml G	3 - 40 ml	Cool 4°C; HCl, pH<2	14 days ⁽³⁾
TCL Semi-Volatile Organics	CLP SOW OLM04.3	2-1000ml G	1000ml	Cool 4°C	7 days ⁽⁴⁾
TCL Pesticides/PCBs	CLP SOW OLM04.3	2-1000ml G	1000ml	Cool 4°C	7 days ⁽⁴⁾
TAL Metals	CLP SOW ILM05.4	1-500 ml P	250 ml	Cool 4°C; HNO ₃ , pH<2	180 days ⁽⁵⁾
TAL Cyanide	CLP SOW ILM05.4	1-1000ml P	500ml	Cool 4°C; NaOH, pH>12	14 days

Notes:

1. Sample preservation is performed by sampler immediately upon sample collection.
2. Hold time based upon day of sample collection.
3. If sample cannot be preserved due to foaming, unpreserved sample will be analyzed within 7 days.
4. Hold time is 7 days until start of sample extraction, 40 days following extraction for analysis.
5. Hold Time for metals is 180 days, except for Mercury which is 28 days.
6. Vials that have specially designed, teflon lined septa to prevent loss of light hydrocarbons will be used.
P indicates that a Plastic bottle should be used.
G indicates that a Glass bottle should be used.

TABLE A-9
ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATION AND ANALYTICAL HOLD TIMES FOR SOIL SAMPLES
LIGHTMAN DRUM SOURCE REMOVAL WORK PLAN
SAMPLING AND ANALYSIS PLAN

PARAMETER	METHODOLOGY	CONTAINER	MINIMUM SAMPLE	PRESERVATION ⁽¹⁾	HOLD TIME ⁽²⁾
TCL Volatile Organics	CLP SOW OLM04.3	4 EnCore samplers	20 gm	Cool 4 °C	14 days ⁽³⁾
TCL Semi-Volatile Organics	CLP SOW OLM04.3	4 oz G	30 gm	Cool 4 °C	7 days ⁽⁴⁾
TCL Pesticides/PCBs	CLP SOW OLM04.3	4 oz G	30 gm	Cool 4 °C	7 days ⁽⁴⁾
TAL Metals	CLP SOW ILM05.4	4 oz G	30 gm	Cool 4 °C	180 days ⁽⁵⁾
TAL Cyanide	CLP SOW ILM05.4	4 oz G	30 gm	Cool 4 °C	14 days
Ignitability	EPA Method 1030	16 oz G	50 gm	None	14 days
Corrosivity	EPA Method 9040	16 oz G	50 gm	None	14 days
Reactivity (sulfide)	SW 7.3.3 or SW7.3.4	16 oz G	50 gm	None	14 days
Toxicity (TCLP) Volatile Fraction	SW 1311/ SW846 8260B	16 oz G	500 gm	None	14 days/7 days/40 days ⁽⁷⁾
Toxicity (TCLP) Extractable Fraction	SW 1311/ SW846 8270C	16 oz G	500 gm	None	14 days / NA /14 days ⁽⁷⁾
TCLP Inorganic Fraction	SW 1311/ SW846 6010B	16 oz G	500 gm	None	180 days / NA /180 days ⁽⁷⁾
Paint Filter Liquid Test	SW846 9095B	4 oz G	100 gm	None	None

Notes:

1. Sample Preservation is performed by sampler immediately upon sample collection except for VOCs which is performed by laboratory upon receipt (see Note 3).
2. Hold time based upon day of sample collection.
3. Hold time is 48 hours for preservation using methanol and/or sodium bisulfate and 14 days to analysis.
4. Hold Time for SVOCs, Pesticides/PCBs is 7 days for extraction and 40 days for analysis.
5. Hold Time for metals is 180 days, except for Mercury which is 28 days.
G indicates that a Glass bottle should be used.
6. CWM - Clear wide-mouth glass jar(s) with Teflon-lined lid(s).
7. Holding times shown: from collection to toxicity characteristic leaching procedure (TCLP) extraction/from TCLP extraction to preparative procedure/from preparative procedure to analysis.

APPENDIX B

FORMER WASTE STORAGE TANK AREA BORING AND WELL INSTALLATION LOGS

**TABLE 3-1
WELL AND STAFF GAGE CONSTRUCTION SUMMARY
LIGHTMAN DRUM RI/FS**

Investigation	WELL I.D.	Date Installed	Coordinates (Feet)		Ground Surface [ft MSL]	Inner Casing (ft MSL)	Outer Casing (ft MSL)	Top of Screen (ft BGS)	Top of Screen (ft MSL)	Bottom of Screen (ft BGS)	Bottom of Screen (ft MSL)
			(Y) North	(X) East							
1989 RI (Intex, 1989)	MW-1	4/18/1989	326714.19	377909.94	136.23	138.39	138.70	14.00	122.23	24.00	112.23
	MW-2A	4/12/1989	326275.44	377200.20	134.85	137.80	138.06	11.00	123.85	21.00	113.85
	MW-3	4/14/1989	325952.12	376895.15	131.51	133.70	134.01	9.00	122.51	19.00	112.51
	MW-4	4/11/1989	325726.46	376525.37	125.22	127.24	127.52	28.00	97.22	48.00	77.22
	MW-5	4/13/1989	326327.11	377496.67	136.12	138.89	139.17	13.00	123.12	23.00	113.12
	MW-6	4/13/1989	326640.54	377571.33	136.45	138.44	138.76	14.00	122.45	24.00	112.45
Phase II RI (Intex, 1990)	MW-2B	1/1/1990	326290.48	377211.10	134.51	135.76	136.96	30.00	104.51	40.00	94.51
	MW-7	1/1/1990	325943.86	376929.29	131.75	133.35	133.61	3.00	128.75	16.00	115.75
	MW-8A	1/1/1990	326146.61	377266.74	135.34	137.43	137.94	9.00	126.34	16.00	119.34
	MW-8B	1/1/1990	326141.99	377255.48	135.28	137.37	137.74	28.00	107.28	16.00	119.28
	MW-9	1/1/1990	326093.68	377200.35	134.31	137.03	137.22	9.00	125.31	16.00	118.31
	MW-10	1/1/1990	326192.43	377326.26	135.67	137.90	138.17	9.00	126.67	19.00	116.67
RIR (Golder, 2006)	MW-11	8/21/2002	326360.28	377134.57	135.67	138.29	138.60	15.00	120.67	25.00	110.67
	MW-12	9/26/2003	325574.94	377404.03	132.49	135.62	135.74	35.00	97.49	45.00	87.49
	MW-13	9/25/2003	325182.40	377815.51	135.06	137.18	137.49	45.00	90.06	55.00	80.06
	MW-14	9/26/2003	324827.42	377366.17	131.09	132.99	133.30	45.00	86.09	55.00	76.09
	MW-15	9/24/2003	324380.37	377870.66	128.92	131.39	131.70	50.00	78.92	60.00	68.92
	MW-16	1/5/2005	323680.24	378018.94	123.30	125.54	126.10	55.00	68.30	65.00	58.30
	MW-16 (5)	4/12/2006	323680.24	378018.94	123.24	125.15	125.44	55.00	68.24	65.00	58.24
	MW-17	1/10/2005	322709.90	378517.59	118.81	120.89	121.06	55.00	63.81	65.00	53.81
	MW-18	1/17/2005	322052.84	377577.28	135.50	135.38	135.82	83.00	52.50	93.00	42.50
	MW-19	1/3/2005	325170.63	377022.03	131.04	133.05	133.31	35.00	96.04	45.00	86.04
	MW-20	1/6/2005	324637.95	377098.66	128.40	130.57	131.09	45.00	83.40	55.00	73.40
	MW-21	1/12/2005	326265.69	377204.55	135.37	137.53	137.99	11.00	124.37	21.00	114.37
	TPZ-1	8/20/2002	326354.22	377674.65	134.73	137.04	NA	5.00	129.73	25.00	109.73
	TPZ-2	8/20/2002	326074.29	377433.46	135.73	137.84	NA	5.00	130.73	25.00	110.73
	TPZ-3	8/20/2002	325825.53	377015.76	132.41	134.69	NA	5.00	127.41	25.00	107.41
	TPZ-4	9/29/2003	323516.22	378418.07	126.60	129.05	129.27	15.00	111.60	25.00	101.60
	TPZ-5	9/29/2003	323414.72	377974.70	120.92	123.37	123.45	15.00	105.92	25.00	95.92
	TPZ-6	9/29/2003	323213.09	377253.79	132.81	135.21	135.25	15.00	117.81	25.00	107.81
	TPZ-7	9/29/2003	322616.89	377674.84	130.55	133.13	133.24	15.00	115.55	25.00	105.55
	TPZ-8	9/29/2003	322856.74	378404.27	120.59	122.94	123.05	10.00	110.59	20.00	100.59
	TPZ-6R	1/28/2005	323018.70	377031.51	135.70	135.70	135.88	18.00	117.70	28.00	107.70
	TPZ-7R	1/28/2005	322480.35	377438.30	136.11	136.11	136.28	18.00	118.11	28.00	108.11
	SG-1	11/6/2003	321998.29	378970.79	106.32	NA	NA	NA	NA	NA	NA

Notes:

- 1) ft BGS - feet below ground surface
- 2) ft MSL - feet above Mean Sea Level
- 3) NA - Not Applicable
- 4) Ground surface elevation refers to 0.0 mark on Staff Gage
- 5) MW-16 and TPZ-4 were repaired and resurveyed in April 2006. There was no change in elevation to TPZ-4 after repair.

WELL CONSTRUCTION SUMMARY

WELL: MW#2
PROJECT: Lightman Drum Co

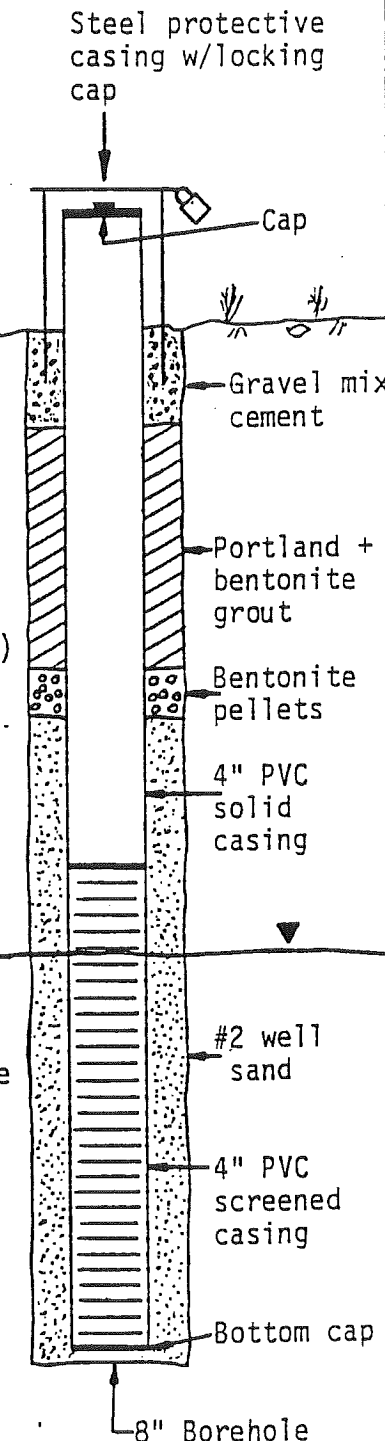
Well
depth

Geology

Well Cross Section
with water zones

Construction Details

- 2' Brown silty medium sand, some small pebbles. (Hnu in split spoon: 0.6 ppm)
- 4' Brown silty medium sand, some small pebbles. (Hnu spoon: 1.0 ppm)
- 6' Brown silty medium sand, some purplish fine deposit at contact of brown sand & a white coarse sand w/some clay. (Hnu spoon: 2.5 ppm, in hole 0-6' left by split spoon: 38 ppm).
- 8' White coarse sand (Hnu spoon: 1.0 ppm).
- 10' White medium-fine sand, 1/8" rust colored banding present. (Hnu spoon: 1.4 ppm)
- 12' White coarse sand to 11.6', then orange-brown fine-medium sand (Hnu spoon: 40 ppm, 1' down auger stem: 12 ppm, cuttings: 2 ppm, 1' above auger stem: background).
- 14' White medium sand, solvent smell (Hnu spoon: 420 ppm).
- 16' Orange-brown fine to coarse sand, some small pebbles, solvent smell (Hnu spoon: 18 ppm, 1' down auger stem: 54 ppm, 4" above auger stem: 1.4 ppm).
- 18' Orange-brown very fine to medium sand, some small pebbles (Hnu spoon: 10 ppm)
- 20' (1' blowback up auger stem, so sample is from 19-20'). Brown fine to coarse sand some small pebbles (Hnu spoon: 180 ppm, 1' down auger stem: 3 ppm, 1' above stem: 0.8 ppm, cuttings: 18 ppm).
- 23' White coarse sand, brown



SCALE

Vertical: 1" = 4'

Horizontal: 1" = 1'

Location: Cedarbrook Twp., NJ

Driller: J. Mathes & Assoc., Inc.

Date Started: 4/11/89

Date Completed: 4/12/89

Driller's file name:

George Volosky

Yield: 3 gpm

How Determined: Pump, bucket & stopwatch

Total Well Depth: 21'

Static Water Level: 15.80' BTC
Date: 4/13/89

Casings:

Diameter	Depth
4" PVC	0 - 11'
4" PVC Screened	11' - 21'
6" Steel Protec-	+2.8 - 1.2'

tive

Grouting Details: 4 bgs. #2 sand: 21-8', 1' bentonite pellets, 4 bgs. portland + 1 bg. bentonite: 7-2', 1 bg. gravel mix: 2-0'.

Water Bearing Zones:

Depths

Yield

WATER QUALITY:

Temperature: 15°C

pH: 4.8

Conductivity: 125 umhos/cm

Water Quality:

Data provided by:



INTERNATIONAL EXPLORATION, INC.

377 SACKETTSFORD ROAD

WARMINSTER, PA 18874-1398

(215) 598-7137

Date:

REF. NO. 6, p. 62 of 81

WELL LOG DESCRIPTIONS, LIGHTMAN DRUM CO. WELLS

MONITORING WELL #1

From the surface to 20' below the surface, the sand of monitoring well #1 was orange-brown in color, coarse to very coarse grained, slightly rounded, with generally poor sorting, except the first 7', which was uniformly coarse. This zone contained some small pebbles and traces of dark minerals.

The next zone, from 20' to 52', was tan in color. At 20' to 35', the sand was coarse to medium, and very poorly sorted. From 35' to 52', the sand became medium grained with good sorting. All sand in the 20' to 52' range was slightly rounded, containing small traces of dark minerals. Only the 50' to 52' zone yielded any pebbles; those were 2 mm to 3 mm in size.

MONITORING WELL #2

The top five feet of monitoring well #2 consisted of a brown silty sand. The sand was medium grained and fairly sorted, with some 5 mm pebbles.

The layer from 5' to 14' consisted of a white coarse sand, very poorly sorted. This white sand was interrupted from 8' to 10' by some 1/8" rust colored banding, and again at 11.5' by a 6" bed of medium grained, poorly sorted, orange-brown sand. Traces of clay were found in the upper portion of the white sand zone.

From 14' to 23', the sand was orange-brown in color and medium to coarse grained, with very poor sorting. This zone contained some 5 mm pebbles and

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traces of clay were found in the 18' to 20' range.

All sands of monitoring well #2 contained at least traces of dark minerals.

MONITORING WELL #3

A brown, medium grained, poorly sorted sand was found in the top 4' of monitoring well #3. The sand contained some 1 mm to 2 mm pebbles, and traces of dark minerals, and was also slightly rounded.

The rest of the sand in the well, from 4' to 20' was tan in color. The zone from 4' to 11' was medium grained with generally fair sorting, except from 4' to 6', which was poorly sorted. This zone exhibits slight rounding, and contained traces of dark minerals and pebbles in the 2 mm to 5 mm range. After 11', the sand became fine grained, with sorting starting off good at 11' to 13', and going to poor sorting at the bottom of the well at 20'. The sand in this zone was slightly rounded, contained traces of dark minerals, and 1 mm pebbles only at 14' to 16'. From 19' to 20', some brown banding was encountered.

MONITORING WELL #4

From the surface to 4.5', the sand of well #4 was brown, coarse grained, poorly sorted and contained some 5 mm pebbles. After 4.5', continuing to 35', the sand turns to orange-brown. This zone is coarse grained and poorly sorted, except for the 15' to 20' layer, which is medium grained and poorly sorted, and the 30' to 35' layer, which is fine grained and fairly sorted. Sand in the zone was slightly rounded with traces of dark minerals and pebbles in the 2 mm to 5 mm range.

REF. NO. 6, p. 73 of 81

in a truly downgradient direction.

2. Well MW2b was placed adjacent to MW2, and screened at a depth of 33-48 feet, in order to monitor the vertical migration of organic compounds encountered in MW2, which was screened at the water table.

3. Wells MW8a and MW8b were placed in a directly downgradient direction from the excavated underground storage tank area, at the property boundary. These wells were intended to monitor the water quality as a possible contaminant plume traversed the site boundary. Well MW8a was screened at the water table, and MW8b was screened at a depth of 30-40 feet, to monitor vertical migration of compounds.

4. Well MW9 was placed at the property boundary, approximately 80 feet from the MW8 pair, in order to monitor the horizontal extent of a possible contaminant plume.

5. Well MW10 was placed at the property boundary downgradient from an area defined by the Phase I sampling as containing elevated levels of volatile and semivolatile compounds in the soil. The well was intended to monitor possible groundwater contamination from the compounds present in the soil. It is also located about 90 feet from the MW8 well pair.

Well construction summaries and permits are contained in Appendix 2. Well construction details are listed in Table 1.

Table 1

Monitoring Well Construction Details

Well #	Well Depth	Casing Diameter	Screened Interval	Materials Encountered
2b	50 feet	4" PVC	30-40 feet	fine to coarse grained sand
7	21 feet	4" PVC	3-16 feet	fine to coarse grained sand
8a	19.5 feet	4" PVC	9-19 feet	fine to coarse grained sand
8b	41 feet	4" PVC	28-40 feet	fine to coarse grained sand; minor clay
9	21 feet	4" PVC	9-19 feet	fine to coarse grained sand; some pebbles
10	21 feet	4" PVC	9-19 feet	fine to coarse sand; thin clay layers

WELL LOG DESCRIPTIONS, LIGHTMAN DRUM CO. WELLS

MONITORING WELL #1

From the surface to 20' below the surface, the sand of monitoring well #1 was orange-brown in color, coarse to very coarse grained, slightly rounded, with generally poor sorting, except the first 7', which was uniformly coarse. This zone contained some small pebbles and traces of dark minerals.

The next zone, from 20' to 52', was tan in color. At 20' to 35', the sand was coarse to medium, and very poorly sorted. From 35' to 52', the sand became medium grained with good sorting. All sand in the 20' to 52' range was slightly rounded, containing small traces of dark minerals. Only the 50' to 52' zone yielded any pebbles; those were 2 mm to 3 mm in size.

MONITORING WELL #2

The top five feet of monitoring well #2 consisted of a brown silty sand. The sand was medium grained and fairly sorted, with some 5 mm pebbles.

The layer from 5' to 14' consisted of a white coarse sand, very poorly sorted. This white sand was interrupted from 8' to 10' by some 1/8" rust colored banding, and again at 11.5' by a 6" bed of medium grained, poorly sorted, orange-brown sand. Traces of clay were found in the upper portion of the white sand zone.

From 14' to 23', the sand was orange-brown in color and medium to coarse grained, with very poor sorting. This zone contained some 5 mm pebbles and

REF. NO. 16, p. 72 of 81

traces of clay were found in the 18' to 20' range.

All sands of monitoring well #2 contained at least traces of dark minerals.

MONITORING WELL #3

A brown, medium grained, poorly sorted sand was found in the top 4' of monitoring well #3. The sand contained some 1 mm to 2 mm pebbles, and traces of dark minerals, and was also slightly rounded.

The rest of the sand in the well, from 4' to 20' was tan in color. The zone from 4' to 11' was medium grained with generally fair sorting, except from 4' to 6', which was poorly sorted. This zone exhibits slight rounding, and contained traces of dark minerals and pebbles in the 2 mm to 5 mm range. After 11', the sand became fine grained, with sorting starting off good at 11' to 13', and going to poor sorting at the bottom of the well at 20'. The sand in this zone was slightly rounded, contained traces of dark minerals, and 1 mm pebbles only at 14' to 16'. From 19' to 20', some brown banding was encountered.

MONITORING WELL #4

From the surface to 4.5', the sand of well #4 was brown, coarse grained, poorly sorted and contained some 5 mm pebbles. After 4.5', continuing to 35', the sand turns to orange-brown. This zone is coarse grained and poorly sorted, except for the 15' to 20' layer, which is medium grained and poorly sorted, and the 30' to 35' layer, which is fine grained and fairly sorted. Sand in the zone was slightly rounded with traces of dark minerals and pebbles in the 2 mm to 5 mm range.

REF. NO. 6, p. 73 of 81

in a truly downgradient direction.

2. Well MW2b was placed adjacent to MW2, and screened at a depth of 33-48 feet, in order to monitor the vertical migration of organic compounds encountered in MW2, which was screened at the water table.

3. Wells MW8a and MW8b were placed in a directly downgradient direction from the excavated underground storage tank area, at the property boundary. These wells were intended to monitor the water quality as a possible contaminant plume traversed the site boundary. Well MW8a was screened at the water table, and MW8b was screened at a depth of 30-40 feet, to monitor vertical migration of compounds.

4. Well MW9 was placed at the property boundary, approximately 80 feet from the MW8 pair, in order to monitor the horizontal extent of a possible contaminant plume.

5. Well MW10 was placed at the property boundary downgradient from an area defined by the Phase I sampling as containing elevated levels of volatile and semivolatile compounds in the soil. The well was intended to monitor possible groundwater contamination from the compounds present in the soil. It is also located about 90 feet from the MW8 well pair.

Well construction summaries and permits are contained in Appendix 2. Well construction details are listed in Table 1.

Table 1

Monitoring Well Construction Details

Well #	Well Depth	Casing Diameter	Screened Interval	Materials Encountered
2b	50 feet	4" PVC	30-40 feet	fine to coarse grained sand
7	21 feet	4" PVC	3-16 feet	fine to coarse grained sand
8a	19.5 feet	4" PVC	9-19 feet	fine to coarse grained sand
8b	41 feet	4" PVC	28-40 feet	fine to coarse grained sand; minor clay
9	21 feet	4" PVC	9-19 feet	fine to coarse grained sand; some pebbles
10	21 feet	4" PVC	9-19 feet	fine to coarse sand; thin clay layers

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION

Name of Owner:

Jerry Lightman

Name of Facility:

Lightman Drum

Location:

139 N. State Route 73, Cedarbrook, NJ

UST Registration No.:

BUST case No.:

CERTIFICATION

Well Permit Number: 31-0006921-3

Owner's Well Number

MW-21

Well Completion Date: 11/2/05

Lithologic Log:

Attach

Distance from Top of Casing (cap off) to
ground surface (one-hundredth of a foot):

+2.5
21

Total Depth of Well to the nearest 1/2 foot:

Depth to Top of Screen (or Top of Open Hole)

11

From Top of Casing (one-hundredth of a foot):

Screen Length (or length of open hole) in feet:

10

Screen or Slot Size:

.010

Screen or Slot Material:

stainless steel

Casing Material: (PVC, Steel or Other-Specify):

stainless steel

Casing Diameter (inches):

2"

Static Water Level From Top of Casing at the Time
of Installation (one-hundredth of a foot):

13

Yield (gallons per minute):

2

Development Technique (specify):

Pumping

Length of Time Well is Developed/Pumped or Bailed:

1 Hours Minutes

Authentication

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Technical Certification:

Dennis C. Moore

Name (Type or Print)

Signature

President

Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative:

Name (Type or Print)

Signature

Date

Title:

MONITORING WELL CERTIFICATION FORM B LOCATION CERTIFICATION

Name of Owner: Lightman Drum Company
Name of Facility: Lightman Drum
Location: Winslow Township - New Jersey
Case Number(s): CERCLIS # NJDO14743678

LAND SURVEYOR'S CERTIFICATION

Project#: 2702

Well Permit Number

(this number must be permanently affixed to- the well casing.)

3100069213

Owner Well Number (As shown on application or plans):

MW-21

Geographic Coordinates NAD 83 (to nearest 1/10 of a second):

Longitude: West 74 ° 54 ' 31.024 "

Latitude: North 39 ° 43 ' 42.403 "

New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 326266

East 377205

Elevation of Top of Inner Casing (cap off) at
Reference mark Nearest 0.01':

NAVD 88

137.53

Sources of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify, here, assumed datum of 100', and give approximated actual elevation.)

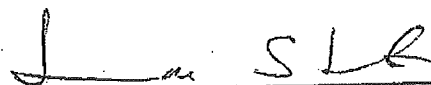
Horizontal= NGS CORS (NJGC, PARL, NJTW) Vertical= NGS U 62

Significant observations and notes:

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of these individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL



PROFESSIONAL LAND SURVEYOR'S SIGNATURE

March 4, 2005

DATE

James M. Stewart - License # GS26108

PROFESSIONAL LAND SURVEYOR'S NAME AND LICENSE NUMBER

9622 Evans Street, Philadelphia, Pa., 19115, 215-969-1577

PROFESSIONAL LAND SURVEYOR'S ADDRESS AND PHONE NUMBER

RECORD OF BOREHOLE MW-21

SHEET 1 of 2

PROJECT: Lightman Drum
PROJECT NUMBER: 013-8054
DRILLED DEPTH: 21.5 ft
AZIMUTH: N/A
LOCATION: Lightman Property 10 ft S MW-21

DRILL METHOD: Hollow-stem auger
DRILL RIG: Mobile 8-58
DATE STARTED: 1/12/05
DATE COMPLETED: 1/12/05
WEATHER: Light Rain

DATUM: Local
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION:
TEMPERATURE: 40-45 F

INCLINATION: -90
DEPTH W.L.: 14.9 ft
ELEVATION W.L.:
DATE W.L.: 1/12/05
TIME W.L.: 9:50 am

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES										MONITORING WELL / PIEZOMETER DIAGRAM AND NOTES	WELL CONSTRUCTION DETAILS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	TYPE	BLOWS per 6 in	REC / ATT	PID per 6" (ppm)	Sample Interval	Laboratory Sample ID	Date/Time Collected	Analyses	Peak PID Reading per SS (ppm)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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0		0.0 - 15.0 Tan yellow compact F-M SAND, trace F rounded gravel, moist / slight odor																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

Log continued on next page

LOG SCALE: 1 in to 3 ft
DRILLING COMPANY: Ameridrill
DRILLER: Andre Boutoille

GA INSPECTOR: JLH
CHECKED BY: 
DATE: 5/26/05



RECORD OF BOREHOLE MW-21

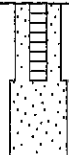
SHEET 2 of 2

PROJECT: Lightman Drum
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 21.5 ft
AZIMUTH: N/A
LOCATION: Lightman Property 10 ft S MW-21

DRILL METHOD: Hollow-stem auger
DRILL RIG: Mobile B-58
DATE STARTED: 1/12/05
DATE COMPLETED: 1/12/05
WEATHER: Light Rain

DATUM: Local
COORDS: not surveyed
GS ELEVATION:
TOC ELEVATION:
TEMPERATURE: 40-45 F

INCLINATION: -90
DEPTH W.L.: 14.9 ft
ELEVATION W.L.:
DATE W.L.: 1/12/05
TIME W.L.: 9:50 am

		SOIL PROFILE				SAMPLES								MONITORING WELL / PIEZOMETER DIAGRAM and NOTES		WELL CONSTRUCTION DETAILS	
DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	TYPE	BLOWS per 6 in	REC / ATT	PID per 6" (ppm)	Sample Interval	Laboratory Sample ID Date/Time Collected	Analyses	Peak PID Reading per SS (ppm)				
20		20.0 - 22.0 Orange to Grey brown compact Clayey F-VF SAND (Varve like bedding)	SC		20.0	ss	8 8 7 6	1.7 2.0	33 25 10					100 200		WELL CASING Interval: 0-11 ft bgs Material: Stainless Steel Diameter: 2 inch Joint Type: Threaded WELL SCREEN Interval: 11-21 ft bgs Material: Stainless Steel Diameter: 2 inch Slot Size: 0.010 End Cap: Threaded FILTER PACK Interval: 8-21 ft bgs Type: #1 Sand Quantity: 2x100 lb FILTER PACK SEAL Interval: 8-8 ft bgs Type: #00 Sand Quantity: 1x 50 lb ANNULUS SEAL Interval: 0-8 ft bgs Type: Cement Grout Quantity: BOREHOLE DIAMETER:	
		Boring completed at 21.5 ft			22.0												
25																	
30																	
35																	
40																	

LOG SCALE: 1 in to 3 ft
DRILLING COMPANY: Ameridrill
DRILLER: Andre Boutoille

GA INSPECTOR: JLH
CHECKED BY: 
DATE: 5/26/05



RECORD OF BOREHOLE PTB-01

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 24.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 4/26/06
DATE COMPLETED: 4/26/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.: 12.9 ft
ELEVATION W.L.:
DATE W.L.: 4/26/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					Sample Notes
		DESCRIPTION	USCS	GRAPHIC LOG DEPTH (ft)	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag	
0		0.0 - 4.0 moist brown silty SAND with GRAVEL	GM		0.0 0.0 0.2 0.2	1	MACRO CORE	2.5 4.0		
5		4.0 - 5.8 dark brown silty SAND with GRAVEL with dark patches	GM		4.0					
		5.8 - 6.2 brown medium grained SAND	SW		0.0	2	MACRO CORE	2.5 4.0		
		6.2 - 8.0 light brown coarse grained SAND	SW							
		8.0 - 8.2 dark brown SAND	SW							
		8.2 - 8.6 brown coarse grained SAND	SW		8.9					
10		8.6 - 8.9 tan coarse grained SAND	SW			3	MACRO CORE	4.0 4.0		2.3
		8.9 - 12.7 tan fine grained SAND	SW							
		12.7 - 12.9 dark brown silty SAND	SM		12.9					32.5
		<1" black fine SAND horizon at base of unit	SW		0.0	4	MACRO CORE	1.3 4.0		83.2
15		12.9 - 15.0 brown medium fine grained SAND	SW		15.0					
		15.0 - 16.0 dark brown fine grained sand with black <1" horizons	SW							
		16.0 - 16.5 brown to black fine grained SAND with pebbles	SP		16.0					
		16.5 - 16.8 coarse grained SAND	SW		16.8					
		16.8 - 20.0 light brown fine grained SAND with pebbles	SP			5	MACRO CORE	1.2 4.0		88.5
20		20.0 - 20.3 black and brown clayey fine grained SAND	SC							
		20.3 - 20.7 gray to brown fine grained SAND	SW		20.7					19.2
		20.7 - 21.1 brown medium grained SAND	SW		21.1					
		21.1 - 21.7 brown fine grained SAND	SW		21.8	6	MACRO CORE	2.5 4.0		24.2
		21.7 - 21.8 tan fine grained SAND	SW							
25		21.8 - 24.0 brown fine grained SAND								
		Boring completed at 24.0 ft								

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Joe

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE PTB-04

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 20.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 4/26/06
DATE COMPLETED: 4/26/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag			
					DEPTH (ft)								
0		0.0 - 0.2 dark brown organic matter	SP		0.2								
		0.2 - 6.0 dark brown medium SAND with PEBBLES					0.0	1	MACRO CORE	2.3 4.0			
5							3.8 3.8 2.4 1.1 0.5	2	MACRO CORE	2.8 4.0			
		6.0 - 8.0 tan medium to fine grained SAND	SW		6.0								
		8.0 - 9.2 tan medium grained SAND	SW		8.0								
10		9.2 - 16.6 brown fine grained SAND	SW		9.2								
							0.3 0.2 0.0 0.0	3	MACRO CORE	2.8 4.0			
15							2.4 3.0 2.8 4.8 15.9	4	MACRO CORE	2.7 4.0	5.7 10.9		
		16.6 - 17.5 brown clayey SAND	SC		16.6	202 137 287 239	5	MACRO CORE	2.3 4.0	103	UV test negative/ Oil-Red-0 Test negative		
		17.5 - 20.0 brown fine grained SAND	SW		17.5					231	UV test negative/ Oil-Red-0 Test negative		
20		Boring completed at 20.0 ft											
25													
30													
35													
40													

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-08.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Joe

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-06

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 32.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 4/25/06
DATE COMPLETED: 4/25/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: 11.9 ft
ELEVATION W.L.:
DATE W.L.: 4/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					Sample Notes			
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT		PID Bag		
					DEPTH (ft)								
0		0.0 - 0.2 dark brown organic matter	SP		0.2	0.6	1	MACRO CORE	2.7 4.0		UV test negative/ Oil-Red-0 Test negative		
		0.2 - 1.0 brown SAND with PEBBLES	SP		1.2	0.5							
		1.0 - 1.2 tan SAND with PEBBLES	SC		2.0	0.3							
		1.2 - 1.8 brown clayey SAND	SW		0.0								
		1.8 - 2.0 tan SAND	SC		0.0								
5		2.0 - 4.0 brown clayey SAND	SP		4.2	0.0	2	MACRO CORE	2.4 4.0				
		4.0 - 4.2 brown clayey SAND with PEBBLES	SC		4.9	1.5							
		4.2 - 4.8 brown clayey SAND	SP		5.9	1.9							
		4.8 - 4.9 dark brown SAND	SP		0.3								
		4.9 - 5.9 brown silty SAND with GRAVEL	CT		8.2	0.0							
10		5.9 - 8.0 tan SAND with PEBBLES	SW		9.0	0.2	3	MACRO CORE	4.0 4.0	0			
		8.0 - 8.2 brown CLAY	SW		9.9	0.5							
		8.2 - 9.0 tan coarse grained SAND	SM		10.8	1.3							
		9.0 - 9.9 tan medium grained SAND	SC		0.4								
		9.9 - 10.5 brown fine grained SAND	SW		0.3								
15		10.5 - 10.8 tan medium grained SAND	SM		0.1	4	MACRO CORE	4.0 4.0	2.8				
		10.8 - 11.8 brown silty SAND	CL		13.3					3.6			
		11.8 - 12.0 brown clayey SAND	SW		2.9					17.6			
		12.0 - 12.4 black to brown medium grained SAND	SW		14.4					134			
		12.4 - 12.7 brown silty SAND	CL		15.5					13.9			
20		12.7 - 12.8 dark brown silty SAND	SW		16.0	7.6	5	MACRO CORE	2.6 4.0	26.5			
		12.8 - 13.2 brown clayey SAND	SW		16.8	19.6							
		13.2 - 13.3 tan CLAY	SM		4.3								
		13.3 - 14.1 tan medium grained SAND	SW		24.8								
		14.1 - 14.3 brown silty SAND	SW		15.4								
25		14.3 - 14.4 tan CLAY	SW		4.3	6	MACRO CORE	2.2 4.0	0.2				
		14.4 - 15.3 brown fine grained SAND	CLS		20.3					9.2			
		15.3 - 15.5 tan coarse grained SAND	ML		21.4					1.8			
		15.5 - 16.0 brown silty SAND	ML		22.0					0.0			
		16.0 - 16.8 brown fine grained SAND	CLS		24.2					0.0			
30		16.8 - 20.0 tan fine grained SAND	SW			7	MACRO CORE	1.7 4.0	0				
		20.0 - 20.3 brown clayey SAND	SW							0.0			
		20.3 - 21.3 brown fine grained silty SAND	SW							0.0			
		21.3 - 21.4 red SILT	SW							0.0			
		21.4 - 22.0 brown silty SAND	SW							0.0			
35		22.0 - 24.0 red clayey SILT with 0.5" SILT band at top of section	SW			8	MACRO CORE	1.7 4.0	0				
		24.0 - 24.2 red and brown mottled sandy CLAY	SW							0.0			
		24.2 - 32.0 brown fine grained SAND	SW							0.0			
		Boring completed at 32.0 ft											
40													

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDBER NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Joe

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-07

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 4/25/06
DATE COMPLETED: 4/25/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 60 F

INCLINATION: -90
DEPTH W.L.: 12.7 ft
ELEVATION W.L.:
DATE W.L.: 4/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					Sample Notes		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT		PID Bag	
					DEPTH (ft)							
0		0.0 - 0.1 dark brown organic matter	SP		0.1							
		0.1 - 1.0 brown silty SAND with PEBBLES	SP									
		1.0 - 1.4 brown SAND with GRAVEL	SM		1.4	0.0	1	MACRO CORE	3.0 4.0			
		1.4 - 2.8 brown silty SAND	SP		2.8							
		2.8 - 4.0 brown silty SAND with GRAVEL	SM		4.0							
5		4.0 - 4.5 brown silty SAND	SP		4.6							
		4.5 - 4.6 brown silty SAND with GRAVEL	SM		5.5	0.0	2	MACRO CORE	3.0 4.0			
		4.6 - 5.5 brown silty SAND	CLS									
		5.5 - 6.3 brown fine grained SAND with PEBBLES	SM		6.7							
		6.3 - 6.5 dark brown sandy CLAY	SW		8.3							
		6.5 - 6.7 brown silty SAND	SW		8.8							0
10		6.7 - 8.0 tan coarse grained SAND	SW		9.7	0.0	3	MACRO CORE	3.7 4.0			0
		8.0 - 8.2 brown fine grained SAND	SW									
		8.2 - 8.3 dark brown clayey SAND	SW			2.6						
		8.3 - 8.8 tan coarse grained SAND	SW		12.7	0.0					3.9	
		8.8 - 9.7 tan medium grained SAND	SW		13.4	0.0						
15		9.7 - 12.3 tan to gray fine SAND with black streaking in top of section	SC			13.6		4	MACRO CORE	4.0 4.0		
		12.3 - 12.7 brown medium grained SAND	SC			152						
		12.7 - 13.4 tan to gray fine grained SAND	SW			189.1						
		13.4 - 16.8 brown clayey SAND	SW		16.8	841		9	MACRO CORE	1.3 4.0		
		16.8 - 20.0 brown SAND	SW								1098	
20		20.0 - 20.9 brown clayey SAND	SC		20.0	0.0						
		20.9 - 21.0 tan CLAY	CL		21.0	0.0						
		21.0 - 24.0 brown clayey SAND 0.5" brown CLAY lens at 21.8'	SC			0.5		5	MACRO CORE	2.4 4.0	21.3	
25		24.0 - 28.0 red brown clayey fine grained SAND	SC		24.0	0.3 0.0 0.0 0.0		6	MACRO CORE	2.2 4.0	4.2	
		28.0 - 32.0 brown fine to medium grained SAND	SW		28.0							
30		32.0 - 36.0 brown medium grained SAND	SW		32.0	2.8 0.0 0.0 0.0 0.0		7	MACRO CORE	2.4 4.0	0	
35								8	MACRO CORE	1.3 4.0	0	
40		Boring completed at 36.0 ft										

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Joe

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-08

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 4/24/06
DATE COMPLETED: 4/24/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.: 13.5 ft
ELEVATION W.L.:
DATE W.L.: 4/24/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag		
					DEPTH (ft)							
0		0.0 - 0.2 dark brown organic matter	SP		0.2	2.9						PID Background = 0.2
		0.2 - 0.8 tan to brown SAND with PEBBLES	SP		0.8	0.8						
		0.8 - 1.7 brown SAND with GRAVEL			1.7	0.7	1	MACRO CORE	2.2 4.0	0.2		
		1.7 - 4.0 brown fine grained SAND	SW									
		4.0 - 4.5 dark brown SAND with PEBBLES and black areas	SP		4.0	0.5						
5		4.5 - 5.8 brown medium to fine grained SAND	SW		4.5	0.5						
		5.8 - 6.2 gray to brown silty SAND with PEBBLES	SP		6.2	1.2	2	MACRO CORE	2.8 4.0			
		6.2 - 8.2 brown fine grained SAND	SW			0.7						
		8.2 - 9.0 gray to brown clayey SAND	SC		8.2	0.6						
		9.0 - 12.0 mottled gray to brown silty SAND with <1" layers of red brown fine grained SAND			9.0	0.2						
10			SM			0.2	3	MACRO CORE	2.8 4.0			
						0.5						
		12.0 - 12.3 tan fine grained SAND	SW			1.0						UV test negative/ Oil-Red-0 Test negative
		12.3 - 12.7 gray to black silty SAND	SM			1.9				2.1		
		12.7 - 13.0 brown fine grained SAND	SW		13.2	1.9	4	MACRO CORE	4.0 4.0			
		13.0 - 13.1 dark brown clayey SAND	CL-ML			1.1						
15		13.1 - 13.2 brown silty CLAY	SW		14.6	1.4					103	UV test negative/ Oil-Red-0 Test negative
		13.2 - 13.7 tan fine grained SAND (wet)	SC			5.9						
		13.7 - 14.0 brown clayey SAND	SW			4.3						
		14.0 - 14.2 gray fine grained SAND	SC			154						
		14.2 - 14.6 brown clayey SAND			16.9	21.1	5	MACRO CORE	2.7 4.0	245		
		14.6 - 16.9 light brown clayey SAND				34.4						
		16.9 - 20.0 gray brown clayey silty SAND	SC			5.1				35.4		
		20.0 - 21.0 brown silty SAND with GRAVEL				3.1						
20		21.0 - 24.0 light brown silty SAND with red streaks	SP		20.0	0.2						
		24.0 - 28.0 brown silty SAND			21.0	0.2				5.2		
			SM			0.3	6	MACRO CORE	2.5 4.0	4.1		
						0.7						
						0.2						
25					24.0		7	MACRO CORE	2.0 4.0	1.1		
			SM			0.0						
		28.0 - 36.0 brown SAND			28.0		8	MACRO CORE	1.4 4.0	1.6		
30						0.0						
			SW				9	MACRO CORE	1.4 4.0	1.2		
						0.0						
35												
40		Boring completed at 36.0 ft										

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Joe

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-09

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/24/06
DATE COMPLETED: 5/24/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.: 12.8 ft
ELEVATION W.L.:
DATE W.L.: 5/24/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag	
					DEPTH (ft)						
0		0.0 - 0.2 dark brown organic matter	GM		0.2	0.4	1	MACRO CORE	2.2 4.0		
		0.2 - 4.0 dark brown silty GRAVEL				0.2					
						2.2					
						2.0					
5		4.0 - 8.0 brown medium to fine grained SAND	SW		4.0	3.7	2	MACRO CORE	1.5 4.0		
						5.2					
						4.5					
10		8.0 - 8.2 brown medium grained SAND	SW		8.2	0.4	3	MACRO CORE	2.7 4.0		2.0
		8.2 - 12.0 gray fine grained SAND	SW			1.1					
						14.1					
						11.3					
15		12.0 - 12.5 gray to light brown fine grained SAND	SW		12.0	4.4	4	MACRO CORE	2.3 4.0		486 UV test negative/ Oil-Red-0 Test negative
		12.5 - 12.7 dark brown fine grained SAND	CL		12.8	20.3					
		12.7 - 12.8 gray CLAY	SC			995					
		12.8 - 13.4 brown clayey SAND	SW		13.7	340					
		13.4 - 13.7 brown medium grained SAND	SW		16.0	105	5	MACRO CORE	3.4 4.0		595 UV test negative/ Oil-Red-0 Test positive
		13.7 - 16.0 light brown clayey SAND	SW		16.7	1218					
		16.0 - 16.5 mottled gray to dark brown fine grained SAND	SW		17.7	964					
		16.5 - 16.7 dark brown medium SAND				54.1					
20		16.7 - 17.7 light brown medium grained SAND	SC				6	MACRO CORE	1.6 4.0		114 UV test negative/ Oil-Red-0 Test negative
		17.7 - 24.0 light brown clayey SAND (wet)									
											23.4
25		24.0 - 24.5 light brown silty SAND	SM		24.0		7	MACRO CORE	2.2 4.0		4.1
		24.5 - 28.0 light brown clayey SAND	SC		24.5						
											16.5
30		28.0 - 32.0 brown medium to fine grained SAND	SW		28.0		8	MACRO CORE	1.7 4.0		50.6 UV test negative/ Oil-Red-0 Test negative
											37.4
35		32.0 - 33.5 light brown medium to coarse grained SAND	SW		32.0		9	MACRO CORE	1.8 4.0		4.9
		33.5 - 36.0 light brown fine grained SAND	SW		33.5						
		Boring completed at 36.0 ft									
40											

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDER NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Bob

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-10

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/24/06
DATE COMPLETED: 5/24/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 75 F

INCLINATION: -90
DEPTH W.L.: 13.7 ft
ELEVATION W.L.:
DATE W.L.: 5/24/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag		
					DEPTH (ft)							
0		0.0 - 2.0 Brown, SILTY SAND.	SM			3.1						
		2.0 - 5.0 Dry, orange-brown, fine to medium SAND.	SW		2.0	4.0	1	MACRO CORE	2.8 4.0			
						3.1						
						3.9						
5		5.0 - 7.0 Dry, light brown, fine to medium SAND.	SW		5.0	3.0	2	MACRO CORE	2.9 4.0			
		7.0 - 11.0 Dry, white to light brown, fine to medium SAND.	SW		7.0	2.1						
						2.3						
						2.0						
10						2.8						
						3.5	3	MACRO CORE	3.5 4.0			
		11.0 - 12.0 Dry, gray, fine to medium SAND.	SW		11.0	3.3				5.0		
		12.0 - 13.0 Dry, gray/orange, fine to medium SAND.	SW		12.0	3.1						
		13.0 - 16.0 Moist, orange brown and gray, fine to medium SAND.	SW		13.0	2.9	4	MACRO CORE	3.3 4.0	5.1		
						2.3						
15						1.9				96.1	UV test negative/ Oil-Red-0 Test negative	
						2.2						
		16.0 - 17.0 Gray and white, medium to coarse SAND.	SW		16.0	10.6				11.8		
		17.0 - 21.0 Wet, gray and orange, fine to medium SAND.	SW		17.0	7.6	5	MACRO CORE	3.0 4.0	114	UV test negative/ Oil-Red-0 Test negative	
						18.6						
20						10.8						
		21.0 - 28.0 Wet, orange and gray, fine to medium SAND.	SW		21.0	34.3	6	MACRO CORE	3.0 4.0	54	UV test negative/ Oil-Red-0 Test negative	
						68.1						
						29.4				15.4		
						5.8						
25						5						
						2.2	7	MACRO CORE	1.0 4.0	10.6		
						2.0						
						2.4						
30		28.0 - 36.0 Orange and gray, medium SAND, trace GRAVEL	SP		28.0		8	MACRO CORE	1.8 4.0			
						1.9						
						2.0	9	MACRO CORE	1.8 4.0	19.4		
						1.8						
						1.8						
		Boring completed at 36.0 ft										
40												

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDER NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dave

GA INSPECTOR: LM
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-11

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/25/06
DATE COMPLETED: 5/25/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 75 F

INCLINATION: -90
DEPTH W.L.: 13.0 ft
ELEVATION W.L.:
DATE W.L.: 5/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag		
					DEPTH (ft)							
0		0.0 - 1.0 Dry, dark brown, fine to medium SAND.	SW									
		1.0 - 2.0 Brown, medium SAND with trace quartz and some small rocks.	SP		1.0	0.0	1	MACRO CORE	2.9 4.0			
		2.0 - 5.0 Light brown, fine SAND.	SW		2.0	0.0						
						0.6						
						0.0						
5		5.0 - 9.0 Light brown and white, fine to medium SAND. Some orange sand.	SW		5.0	0.0	2	MACRO CORE	2.9 4.0			
						0.0						
						0.1						
10		9.0 - 13.0 White and gray fine SAND.	SW		9.0	1.2	3	MACRO CORE	3.4 4.0	1.9		
						0.9						
						0.0						
						0.0						
		13.0 - 13.5 Wet, gray and white, fine to medium SAND.	SW		13.0					1.6		
		13.5 - 16.0 Wet, orange, fine to medium SAND.	SW		13.5	0.0	4	MACRO CORE	3.4 4.0	1.2		
15												
		16.0 - 30.0 Wet, yellow and light brown, fine to medium SAND.	SW		16.0	0.0	5	MACRO CORE	2.3 4.0	1.5		
										3.9		
20												
						0.0	6	MACRO CORE	2.1 4.0	2.7		
										1.6		
25												
						0.0	7	MACRO CORE	2.1 4.0	0.4		
										1.4		
30		30.0 - 36.0 Light brown, medium SAND.	SW		30.0	0.0	8	MACRO CORE	2.0 4.0	1.1		
										1.4		
						0.0	9	MACRO CORE	2.0 4.0	0		
35												
		Boring completed at 36.0 ft										
40												

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dave

GA INSPECTOR: LM
CHECKED BY: K.M.
DATE: 8/17/06



AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-06.GDT 8/17/06

RECORD OF BOREHOLE SZ-12

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 32.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/25/06
DATE COMPLETED: 5/25/06
WEATHER: Overcast

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.: 10.0 ft
ELEVATION W.L.:
DATE W.L.: 5/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					Sample Notes		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT		PID Bag	
					DEPTH (ft)							
0		0.0 - 1.0 Dark brown, medium to coarse SAND.	SP									
		1.0 - 5.0 Dark brown and orange, medium to coarse SAND with trace of quartz and some small rocks.	SP		1.0	0.0	1	MACRO CORE	2.5 4.0			
5		5.0 - 8.5 Brown and yellow, medium to coarse SAND with some quartz.	SP		5.0	2.9 5.1 1.6 9.2	2	MACRO CORE	2.3 4.0		7.3	
		8.5 - 11.5 Wet, light brown and yellow, fine to medium SAND.	SW		8.5	0.7 3.5 2.5	3	MACRO CORE	2.6 4.0		15.4	
10		11.5 - 13.0 White and gray, fine to medium SAND.	SW		11.5	6.0 0.1 0.7					6422	UV test negative/ Oil-Red-0 Test positive
		13.0 - 14.0 Gray and orange, medium to coarse SAND with some quartz.	SW		13.0	228 53.3 69.3 608 147 78.7 17.7	4	MACRO CORE	4.0 4.0		1186	UV test negative/ Oil-Red-0 Test positive
15		14.0 - 16.0 Orange, fine to medium SAND.	SW		14.0							
		16.0 - 19.0 Gray and orange, fine to medium SAND.	SW		16.0	4.1 62.6	5	MACRO CORE	3.0 4.0		323	UV test negative/ Oil-Red-0 Test positive
20		19.0 - 23.5 Orange, fine to medium SAND. 2" of red sand at 23.5'.	SW		19.0	110 33.3					59.4	UV test negative/ Oil-Red-0 Test positive
		23.5 - 25.0 Gray-orange, fine to medium SAND.	SW		23.5	2.6 1.3 1.9	6	MACRO CORE	2.6 4.0		69 23	
25		25.0 - 28.0 Light brown and orange, fine to medium SAND.	SW		25.0	0.3 0.2 0.4					2.6	
		28.0 - 30.0 White and gray, fine to medium SAND.	SW		28.0	0.0 0.0 0.0	7	MACRO CORE	2.6 4.0		1.8	
30		30.0 - 32.0 Light brown and orange, fine to medium SAND.	SW		30.0	3.0 0.0 0.0	8	MACRO CORE	1.8 4.0		4.6	
		32.0: CLAY at 32'. Boring completed at 32.0 ft	CL									
35												
40												

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDER NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dan

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



RECORD OF BOREHOLE SZ-13

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 32.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/25/06
DATE COMPLETED: 5/25/06
WEATHER: Overcast

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 70 F

INCLINATION: -90
DEPTH W.L.: 12.8 ft
ELEVATION W.L.:
DATE W.L.: 5/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag	
					DEPTH (ft)						
0		0.0 - 3.0 Dark brown, fine to medium SAND, with some p-gravel, and trace quartz.	SP			0.2	1	MACRO CORE	2.8 4.0		
					0.9						
					0.6						
		3.0 - 7.0 Light brown and yellow, fine to medium SAND with trace quartz.	SW		3.0	0.0	2	MACRO CORE	3.0 4.0		
					5.6						
					2.2						
5		7.0 - 8.0 Light brown and white, fine to medium SAND.	SW		7.0	0.0	3	MACRO CORE	4.0 4.0		5.3
		8.0 - 9.0 Gray, fine to medium SAND.	SW		8.0	0.2					
		9.0 - 11.5 Yellow and white, fine SAND.	SW		9.0	3.9					
10						0.5	4	MACRO CORE	4.0 4.0		5.1
					0.0						
					0.4						
		11.5 - 12.5 Light brown and orange, fine to medium SAND.	SW		11.5	0.3	5	MACRO CORE	3.9 4.0		9.2
		12.5 - 13.5 Dark gray and brown, fine to medium SAND with trace quartz.	SW		12.5	0.2					
		13.5 - 15.0 Gray and orange, fine to medium SAND.	SW		13.5	2.0					
15						0.4	6	MACRO CORE	2.4 4.0		797
		15.0 - 16.6 Light brown and orange, fine to medium SAND.	SW		15.0	0.6					
					0.3						
		16.6 - 17.9 Light brown, coarse silty SAND.	SM		16.6	1.6	7	MACRO CORE	3.2 4.0		304
		17.9 - 18.5 Light beige to brown, fine silty SAND.	SM		17.9	20.9					
		18.5 - 24.0 Light red-brown, medium to coarse SAND.	SW		18.5	21.3					
20						4.8	8	MACRO CORE	1.6 4.0		0.7
					0.3						
					0.0						
						0.0	7	MACRO CORE	2.2 4.0		
					0.0						
					0.0						
25		24.0 - 30.0 Wet, light brown and orange, fine to medium SAND, with trace red sand and a 2" brown/orange clay layer at 27.5.	SP		24.0	0.0	8	MACRO CORE	1.6 4.0		0.7
30		30.0 - 32.0 Brown and orange, medume to coarse SAND.	SW		30.0	0.0	8	MACRO CORE	1.6 4.0		0.7
		Boring completed at 32.0 ft									
35											
40											

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dan

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDER NJ-PA 05-24-06.GDT 8/17/06

RECORD OF BOREHOLE SZ-14

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 36.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/25/06
DATE COMPLETED: 5/25/06
WEATHER: Partly Cloudy

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 80 F

SHEET 1 of 1
INCLINATION: -90
DEPTH W.L.: 13.9 ft
ELEVATION W.L.:
DATE W.L.: 5/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					Sample Notes		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT		PID Bag	
					DEPTH (ft)							
0		0.0 - 0.6 dark brown organic matter										
		0.6 - 1.8 dark brown to red brown medium to fine grained SAND	SW		0.6							
		1.8 - 2.4 red brown medium to fine grained SAND	SW		1.8	0	1	MACRO CORE	3.0 4.0			
		2.4 - 2.7 red brown medium grained SAND	SW		2.7							
		2.7 - 4.0 light brown medium grained SAND			4.0							
5		4.0 - 5.0 light brown fine grained SAND	SW		5.0							
		5.0 - 5.7 light brown to beige fine grained SAND	SW		5.7	0	2	MACRO CORE	3.3 4.0			
		5.7 - 6.3 gray fine grained SAND	SP		6.4							
		6.3 - 6.4 gray SAND with PEBBLES	SW									
		6.4 - 8.0 light brown to beige medium grained SAND	SW		8.0	2.8 0 0 0 0						
		8.0 - 8.7 dark brown fine grained SAND			8.7							
10		8.7 - 12.0 gray fine grained SAND	SW				3	MACRO CORE	4.0 4.0			
		12.0 - 12.9 brown CLAY	CL		12.0	0 3.1 0.4 0.1 1.3 1.9 0						
		12.9 - 13.7 light brown fine grained SAND	SW		12.9						1.7	
		13.7 - 16.0 gray medium grained SAND	SW		13.7		4	MACRO CORE	2.8 4.0			
15		16.0 - 20.0 brown silty SAND			16.0						0.9	
			SM				5	MACRO CORE	2.2 4.0			
											2.4	
											1.6	
20		20.0 - 28.0 light brown silty medium grained SAND			20.0	0 0 0 0.9 0.1 0						
			SM				6	MACRO CORE	2.5 4.0			
											1.9	
											1.2	
25												
							7	MACRO CORE	3.0 4.0			
											0.9	
											0.8	
30		28.0 - 36.0 light brown fine grained SAND			28.0							
			SW				8	MACRO CORE	1.3 4.0			
											0.4	
35												
							9	MACRO CORE	2.0 4.0			
											0.2	
												
		Boring completed at 36.0 ft										
40												

Boring completed at 36.0 ft

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dan

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDER NJ-PA 05-24-06.GDT 8/18/06

RECORD OF BOREHOLE SZ-15

SHEET 1 of 1

PROJECT: Lightman Drum Property
PROJECT NUMBER: 013-6054
DRILLED DEPTH: 32.0 ft
AZIMUTH: N/A
LOCATION: Winslow Township, NJ

DRILL METHOD: Geoprobe
DRILL RIG: 6610 DT
DATE STARTED: 5/25/06
DATE COMPLETED: 5/25/06
WEATHER: Sunny

DATUM: N/A
COORDS: not surveyed
GS ELEVATION: N/A
TOC ELEVATION: N/A
TEMPERATURE: 75 F

INCLINATION: -90
DEPTH W.L.: 11.5 ft
ELEVATION W.L.:
DATE W.L.: 5/25/06
TIME W.L.: N/A

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					Sample Notes
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	PID (ppm)	NUMBER	TYPE	REC / ATT	PID Bag	
					DEPTH (ft)						
0		0.0 - 4.0 Dark brown, silty SAND with trace rocks and little quartz.	SM			0.0 0.0 0.6	1	MACRO CORE	2.7 4.0		
5		4.0 - 5.0 Orange and light brown, fine to medium SAND with trace quartz.	SW		4.0	0.7					
		5.0 - 8.0 Light brown, fine to medium SAND with little quartz.	SW		5.0	0.0	2	MACRO CORE	2.7 4.0		
						1.1 1.7					
10		8.0 - 14.0 White and gray, fine to medium SAND.	SW		8.0	1.8 7.8 3.6 4.0 4.3 2.3 3.6	3	MACRO CORE	4.0 4.0	24.4	
						0.4 7.8 16.1 10.7 307 196 78.5	4	MACRO CORE	4.0 4.0	5649	UV test negative/ Oil-Red-0 Test negative
15		14.0 - 19.0 Wet, orange and gray, fine to medium SAND.	SW		14.0	249					UV test negative/ Oil-Red-0 Test negative
						18.5	5	MACRO CORE	2.6 4.0	262	UV test negative/ Oil-Red-0 Test negative
20		19.0 - 23.0 Wet, orange, fine to medium SAND.	SW		19.0	0.4				632	UV test negative/ Oil-Red-0 Test negative
						1.5 0.0 0.6	6	MACRO CORE	2.2 4.0	10.1	
25		23.0 - 28.0 Orange and gray, fine to medium SAND.	SW		23.0	1.5				6.3	
						3.3 0.5 0.0 0.0	7	MACRO CORE	1.7 4.0	2.0	
30		28.0 - 32.0 Wet, light brown and orange, fine to medium SAND.	SW		28.0	0.0 0.1 0.0 0.0	8	MACRO CORE	2.2 4.0	1.3	
		Boring completed at 32.0 ft				0.0					
35											
40											

AA BOREHOLE RECORD NO WELL LIGHTMAN DRUM.GPJ GOLDR NJ-PA 05-24-06.GDT 8/17/06

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Ameridrill
DRILLER: Dan

GA INSPECTOR: HL
CHECKED BY: K.M.
DATE: 8/17/06



APPENDIX C

SUMMARY OF SATURATED SOIL SAMPLING DETECTS (FROM REMEDIAL INVESTIGATION REPORT, GOLDER, AUGUST 2006)

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	PTB1-16	PTB2-14	PTB2-16	PTB4-16	SZ1-14	SZ1-16
		Labsamp	964508	964518	964519	964509	964507	964505
		Datesamp	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06
Dichlorodifluoromethane	NA			4900 J				
Acetone	100000							
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000							9 J
2-Butanone	50000					270 J		
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000							3 J
Toluene	500000							
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000			20000	8700 J			
Chlorobenzene	1000							
Ethylbenzene	100000		100 J	29000	18000	170 J		
Xylene (total)	67000		1800	640000	380000	2500		
Isopropylbenzene	NA			1400 J				
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000			1800 J				2 J
1,2-Dichlorobenzene	50000			1100 J				
1,2,4-Trichlorobenzene	100000		180 J	7100	1400 J			6 J

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ1-32	SZ2-10	SZ2-18	SZ2-28	SZ3-16	SZ3-18
		Labsamp	964506	964503	964502	964501	963319	963321
		Datesamp	26-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06
Dichlorodifluoromethane	NA							
Acetone	100000				16	12		18 J
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000						21	260 J
2-Butanone	50000							780 J
1,1,1-Trichloroethane	50000							3 J
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000							
Toluene	500000						180	930 J
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000						2 J	
Chlorobenzene	1000						31	93
Ethylbenzene	100000						7 J	48
Xylene (total)	67000						53	180
Isopropylbenzene	NA							
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000						12	14
1,2-Dichlorobenzene	50000						2 J	3 J
1,2,4-Trichlorobenzene	100000						10 J	

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ3-32	SZ4-32	SZ4-40	SZ4-40DUP	SZ4-44	SZ5-25
		Labsamp	963320	963304	963306	963302	963308	963305
		Datesamp	25-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06
Dichlorodifluoromethane	NA							
Acetone	100000						4 J	
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000			4 J		9 J		120 J
2-Butanone	50000							360 J
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000			5 J				140 J
Trichloroethene	1000			7 J		3 J		330 J
Toluene	500000			6 J				
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000					2 J		
Chlorobenzene	1000							
Ethylbenzene	100000			5 J				130 J
Xylene (total)	67000		22	79		32 J		1100
Isopropylbenzene	NA							
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000							
1,2-Dichlorobenzene	50000							
1,2,4-Trichlorobenzene	100000							

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ5-26	SZ5-36	SZ6-16	SZ6-18	SZ6-32	SZ7-16
		Labsamp	963309	963310	963313	963314	963312	963315
		Datesamp	24-Apr-06	24-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06
Dichlorodifluoromethane	NA							
Acetone	100000		26 J		8 J	17 J		5 J
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000		48			59		11
2-Butanone	50000							
1,1,1-Trichloroethane	50000							2 J
Cyclohexane	NA							
Benzene	1000		40					
Trichloroethene	1000		65		14	3 J		84
Toluene	500000		59		2 J			94
1,1,2-Trichloroethane	1000		2 J					
Tetrachloroethene	1000		30		38	28		17000 J
Chlorobenzene	1000		5 J					25
Ethylbenzene	100000		67		54	9 J		63000 J
Xylene (total)	67000		620		1200	500 J		720000 J
Isopropylbenzene	NA					3 J		42
1,3-Dichlorobenzene	100000				2 J	7 J		5 J
1,4-Dichlorobenzene	100000				6 J	24		20
1,2-Dichlorobenzene	50000				5 J	14		12
1,2,4-Trichlorobenzene	100000				120 J	190		2900 J

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ7-16DUP	SZ7-20	SZ7-36	SZ8-16	SZ8-18	SZ8-36
		Labsamp	963316	963318	963317	963301	963303	963307
		Datesamp	25-Apr-06	25-Apr-06	25-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06
Dichlorodifluoromethane	NA							
Acetone	100000							
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000					62		
2-Butanone	50000						180 J	
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000					190		
Toluene	500000			6600 J		250 J		
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000		870 J	39000		130 J		
Chlorobenzene	1000							
Ethylbenzene	100000		3100 J	150000		140 J	84 J	
Xylene (total)	67000		35000 J	1700000		1900	990	
Isopropylbenzene	NA					8 J		
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000					5 J		
1,2-Dichlorobenzene	50000					3 J		
1,2,4-Trichlorobenzene	100000					21		

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ9-16	SZ9-18	SZ9-36	SZ9-36DUPE	SZ10-16	SZ10-20
		Labsamp	992901	992703	992705	992706	992702	992903
		Datesamp	24-May-06	24-May-06	24-May-06	24-May-06	24-May-06	24-May-06
Dichlorodifluoromethane	NA							
Acetone	100000			6 J				
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000			12				13
2-Butanone	50000							
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000	220 J	12					6 J
Toluene	500000							6 J
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000	930 J	54					11
Chlorobenzene	1000							
Ethylbenzene	100000	1000 J	5 J					47
Xylene (total)	67000	34000 J	390				2400	670 J
Isopropylbenzene	NA							
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000			4 J				
1,2-Dichlorobenzene	50000			2 J				
1,2,4-Trichlorobenzene	100000			23				

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ10-36	SZ11-16	SZ11-22	SZ11-36	SZ12-14	SZ12-16
		Labsamp	992704	992708	992905	992716	992907	992713
		Datesamp	24-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
Dichlorodifluoromethane	NA							
Acetone	100000							
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000							
2-Butanone	50000							
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000			3 J	2 J			320 J
Toluene	500000							
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000			7 J	4 J		850 J	
Chlorobenzene	1000							
Ethylbenzene	100000						1100	390 J
Xylene (total)	67000						26000	7600
Isopropylbenzene	NA							
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000							
1,2-Dichlorobenzene	50000							
1,2,4-Trichlorobenzene	100000							

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ12-32	SZ13-16	SZ13-16DUPE	SZ13-18	SZ13-32	SZ14-16
		Labsamp	992715	992711	992712	992902	992714	992710
		Datesamp	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
Dichlorodifluoromethane	NA							
Acetone	100000							
Carbon Disulfide	NA							
cis-1,2-Dichloroethene	1000							
2-Butanone	50000							
1,1,1-Trichloroethane	50000							
Cyclohexane	NA							
Benzene	1000							
Trichloroethene	1000				170 J			4 J
Toluene	500000				100 J			
1,1,2-Trichloroethane	1000							
Tetrachloroethene	1000			280 J	150 J			5 J
Chlorobenzene	1000							
Ethylbenzene	100000			900 J	610	320 J		
Xylene (total)	67000			10000	6200	3900		
Isopropylbenzene	NA							
1,3-Dichlorobenzene	100000							
1,4-Dichlorobenzene	100000							
1,2-Dichlorobenzene	50000							
1,2,4-Trichlorobenzene	100000							

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2a
Summary of Detected Validated Data
Volatile Organics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ14-26	SZ14-36	SZ15-16	SZ15-20	SZ15-32
		Labsamp	992904	992709	992906	992707	992701
		Datesamp	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
Dichlorodifluoromethane	NA						
Acetone	100000			4 J		7 J	
Carbon Disulfide	NA						
cis-1,2-Dichloroethene	1000				18 J		
2-Butanone	50000						
1,1,1-Trichloroethane	50000				31 J	9 J	
Cyclohexane	NA						
Benzene	1000				40 J	7 J	
Trichloroethene	1000				870 J	410 J	
Toluene	500000				530 J	110	
1,1,2-Trichloroethane	1000						
Tetrachloroethene	1000				240 J	310 J	
Chlorobenzene	1000					4 J	
Ethylbenzene	100000				670 J	170	
Xylene (total)	67000				2100 J	1100 J	
Isopropylbenzene	NA				5 J		
1,3-Dichlorobenzene	100000						
1,4-Dichlorobenzene	100000				3 J		
1,2-Dichlorobenzene	50000				2 J		
1,2,4-Trichlorobenzene	100000				12 J		

Notes: All units are in ug/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

NA= Not Available

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ1-14	SZ1-16	SZ1-32	SZ2-10	SZ2-18	SZ2-28	SZ3-16
		Labsamp	X2525-10	X2525-08	X2525-09	X2525-04	X2525-03	X2525-02	X2513-22
		Datesamp	26-Apr-06	26-Apr-06	26-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ3-18	SZ3-32	SZ4-32	SZ4-40	SZ4-40DUP	SZ4-44	SZ5-25
		Labsamp	X2513-24	X2513-23	X2513-04	X2513-06	X2513-02	X2513-08	X2513-05
		Datesamp	25-Apr-06	25-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ5-26	SZ5-36	SZ6-16	SZ6-18	SZ6-32	SZ7-16	SZ7-16DUP
		Labsamp	X2513-09	X2513-10	X2513-14	X2513-17	X2513-13	X2513-18	X2513-19
		Datesamp	24-Apr-06	24-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ7-20	SZ7-36	SZ8-16	SZ8-18	SZ8-36	SZ9-16	SZ9-18
		Labsamp	X2513-21	X2513-20	X2513-01	X2513-03	X2513-07	X2982-06	X2982-02
		Datesamp	25-Apr-06	25-Apr-06	24-Apr-06	24-Apr-06	24-Apr-06	24-May-06	24-May-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ9-36	SZ10-20	SZ10-36	SZ11-16	SZ11-22	SZ11-36	SZ-12-14
		Labsamp	X2982-03	X2982-04	X2982-01	X2982-12	X2982-11	X2982-14	X2982-10
		Datesamp	24-May-06	24-May-06	24-May-06	25-May-06	25-May-06	25-May-06	25-May-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ-12-14RE	SZ12-16	SZ12-32	SZ13-16	SZ13-16DUPE	SZ13-18
		Labsamp	X2982-10RE	X2982-09	X2982-13	X2991-04	X2991-08	X2991-07
		Datesamp	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
No Analytes Detected	NA							

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2b
Summary of Detected Validated Data
Semivolatile Organics
Saturated Soil
1,4-dioxane
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ13-32	SZ14-16	SZ14-26	SZ14-36	SZ15-16	SZ15-20	SZ15-32
		Labsamp	X2991-01	X2991-06	X2982-17	X2991-10	X2982-15	X2982-16	X2991-05
		Datesamp	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
No Analytes Detected	NA								

Soil selected screening criteria is the more stringent of NJ
DEP Non-residential and impact to groundwater soil
cleanup criteria.

Table 5-2c
Summary of Detected Validated Data
Inorganics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	PTB1-20	PTB1-22	PTB1-24	PTB2-20	PTB2-22	PTB2-24
		Labsamp	964512	964510	964511	964514	964513	964515
		Datesamp	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06	26-Apr-06
Aluminum	NA		2150	1840	1330	2420	1640	1320
Antimony	340					0.24 J		0.28 J
Arsenic	20		1.5 J	2.2 J	6	3.4	1.8 J	4.4
Barium	47000		2.9 J	2.5 J	2.6 J	8.5 J	2.6 J	4.2 J
Beryllium	2							
Cadmium	100			0.079 J				
Calcium	NA							
Chromium	NA		11.9	8	11.8	21.3	8.1	7.4
Cobalt	NA		0.14 J			0.22 J	0.14 J	
Copper	600		1.4 J	1.3 J	1.4 J	2 J	0.96 J	1 J
Iron	NA		4380	4970	7710	8600	3840	6370
Lead	600		2.9	1.7 J	1.4 J	4.8	2.1 J	2.8
Magnesium	NA		30.1 J		29.8 J			
Manganese	NA							
Nickel	2400		0.51 J	0.29 J	0.21 J	0.45 J	0.36 J	
Potassium	NA		47.7 J	60.5 J	121 J	75.3 J	47.3 J	82.9 J
Silver	4100							
Sodium	NA							
Thallium	2							
Vanadium	7100		10.5	7.9 J	9.4 J	17.6	6.1 J	7.7 J
Zinc	1500		3.1 J	3.9 J	2.2 J	3.1 J		
Cyanide	21000							

Notes: All units are in mg/kg.

Soil selected screening criteria is the more stringent of NJ DEP Non-residential and impact to groundwater soil cleanup criteria.

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2c
Summary of Detected Validated Data
Inorganics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	PTB4-18	PTB4-20	SZ1-16	SZ2-18	SZ3-16	SZ4-32
		Labsamp	964517	964516	964505	964502	963319	963304
		Datesamp	26-Apr-06	26-Apr-06	26-Apr-06	25-Apr-06	25-Apr-06	24-Apr-06
Aluminum	NA		3500	753	275	1690	253	908
Antimony	340							
Arsenic	20		2.5	2.2 J	2.6	5.3	2.9	6.9
Barium	47000		6.2 J	1.5 J	0.75 J	2.3 J	1.4 J	1.3 J
Beryllium	2							
Cadmium	100				3.6		1.5	
Calcium	NA							
Chromium	NA		16.3	9.9	3.9 J	6.1	4.8	8.7 J
Cobalt	NA		0.25 J		0.12 J	0.13 J	0.15 J	0.16 J
Copper	600		2.1 J	0.84 J	0.34 J	1.1 J	0.75 J	1.7 J
Iron	NA		8190	4550	4190	7870	3330	7880
Lead	600		5.2	1.8 J		1.2 J	0.66 J	0.93
Magnesium	NA		36.6 J			23 J		
Manganese	NA		4.8 J			1.1 J		
Nickel	2400		0.82 J			0.31 J	0.29 J	0.56 J
Potassium	NA		96.8 J			95.3 J		86.8 J
Silver	4100							
Sodium	NA							
Thallium	2						0.62 J	
Vanadium	7100		18.7	8.6 J	1.7 J	6.3 J	1.8 J	6.4 J
Zinc	1500		3.7 J	3.3 J	5	2.9 J	3.6 J	1.9 J
Cyanide	21000							

Notes: All units are in mg/kg.

Soil selected screening criteria is the more stringent of NJ DEP
Non-residential and impact to groundwater soil cleanup criteria.

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2c
Summary of Detected Validated Data
Inorganics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ5-26	SZ6-16	SZ7-16	SZ7-16DUP	SZ8-18	SZ9-16
		Labsamp	963309	963313	963315	963316	963303	992901
		Datesamp	24-Apr-06	25-Apr-06	25-Apr-06	25-Apr-06	24-Apr-06	24-May-06
Aluminum	NA		1230	1310	3080	3770	1740	3360
Antimony	340							
Arsenic	20		4.5	0.6 J	0.8 J	0.93 J	0.38 J	0.92 J
Barium	47000		1.5 J	2.4 J	4.2 J	4.9 J	2.9 J	
Beryllium	2							
Cadmium	100							
Calcium	NA							
Chromium	NA		6.4 J	4.3	4.2	4.9	3.4	5.4
Cobalt	NA		0.15 J	0.16 J	0.27 J	0.26 J	0.15 J	
Copper	600		1.4 J	1.1 J	2.3 J	2.5 J	1.3 J	2.5 J
Iron	NA		6650	1930	2610	3060	1500	3880
Lead	600		0.98	1.5	1.6	1.9	1.1	2.4
Magnesium	NA			20.7 J	42.6 J	49.9 J	29.4 J	41.9 J
Manganese	NA							2.8 J
Nickel	2400		0.3 J	0.49 J	0.89 J	1 J	0.64 J	
Potassium	NA		76.6 J	38.8 J	81.1 J	85.5 J	43.2 J	75.3 J
Silver	4100							0.12 J
Sodium	NA				38.9 J			
Thallium	2			0.76 J				
Vanadium	7100		6.7 J	5 J	5.8 J	6.8 J	4.2 J	7.2 J
Zinc	1500		0.92 J	1.6 J	2 J	2.3 J	2.4 J	
Cyanide	21000							

Notes: All units are in mg/kg.

Soil selected screening criteria is the more stringent of NJ DEP
Non-residential and impact to groundwater soil cleanup criteria.

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

Table 5-2c
Summary of Detected Validated Data
Inorganics
Saturated Soil
Remedial Investigation
Lightman Drum Company Site
Winslow Township, NJ

Parameter	Selected Screening Criteria	Sample ID	SZ10-20	SZ11-22	SZ12-14	SZ13-18	SZ14-26	SZ15-16
		Labsamp	992903	992905	992907	992902	992904	992906
		Datesamp	24-May-06	25-May-06	25-May-06	25-May-06	25-May-06	25-May-06
Aluminum	NA		1560	1900	1910	2980	1980	3100
Antimony	340							
Arsenic	20			2 J			7.6	
Barium	47000							
Beryllium	2							
Cadmium	100							
Calcium	NA							
Chromium	NA		4.6	10.6	4.8	10.8	16.1	5.4
Cobalt	NA							
Copper	600				1.8 J	1.9 J	3.3 J	2.5 J
Iron	NA		2030	5330	2890	4270	11000	3590
Lead	600		3	2.1	2.3	2.9	1.7	2.3
Magnesium	NA		16.5 J	22.1 J	27.5 J	25.7 J	40.1 J	38.7 J
Manganese	NA		2 J	1.8 J	1.7 J	2.6 J	1.9 J	1.7 J
Nickel	2400		0.54 J	0.83 J	0.7 J	1.2 J	0.7 J	1 J
Potassium	NA		37.9 J	76.5 J	68.1 J	57.6 J	168 J	76.1 J
Silver	4100							
Sodium	NA							
Thallium	2							
Vanadium	7100		5.6 J	9.3 J	7.4 J	9.8 J	9.4 J	8.3 J
Zinc	1500				5.5			
Cyanide	21000							

Notes: All units are in mg/kg.

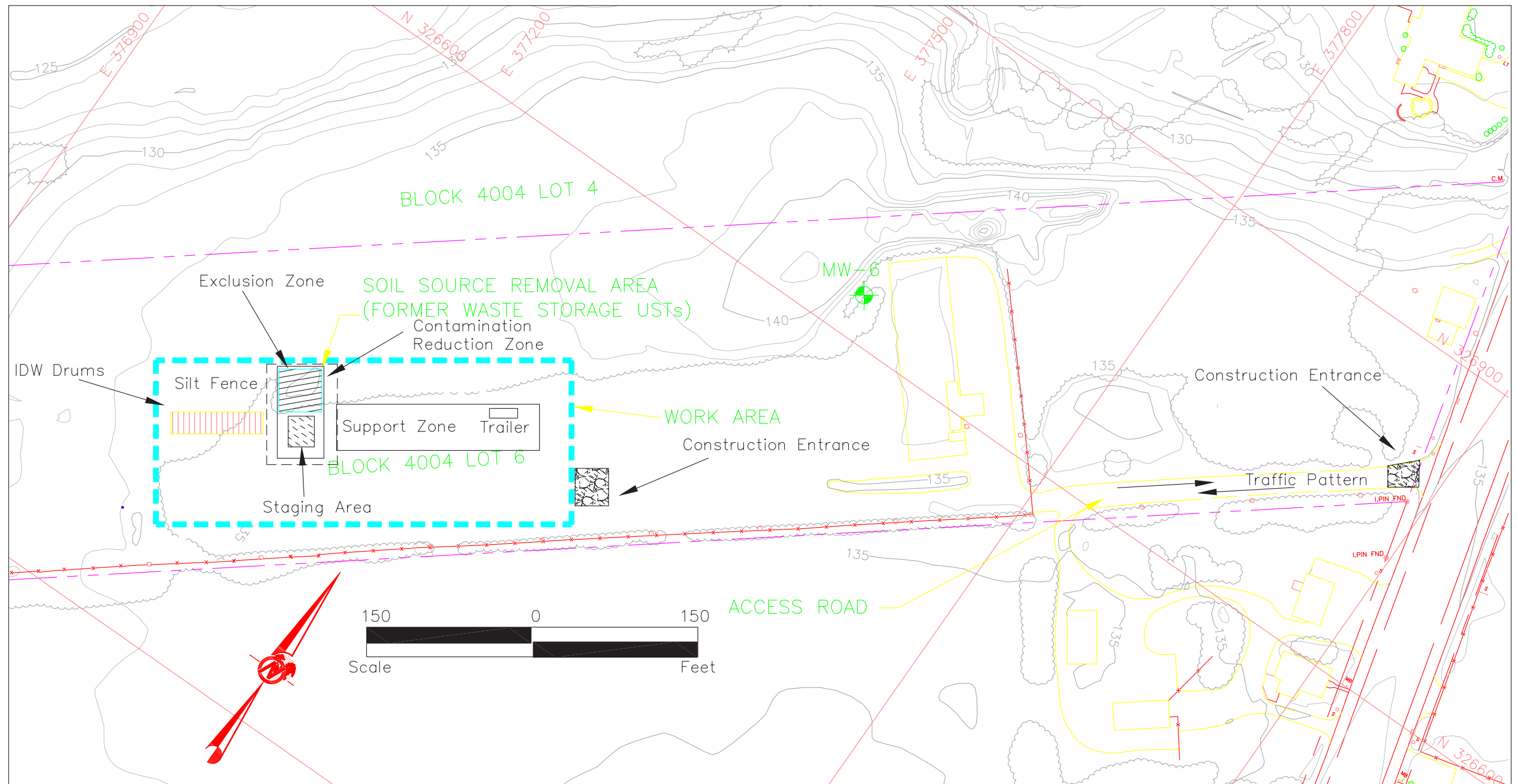
Soil selected screening criteria is the more stringent of NJ DEP
Non-residential and impact to groundwater soil cleanup criteria.

J = The analyte was detected and is considered estimated.

Values greater than screening criteria are indicated in **bold**

APPENDIX D

REMEDIAL CONTRUCTION WORK PLAN



Compass Environmental Services, Inc.
92 North Main Street
Windsor, NJ 08561

Date: 10-09-07

Soil Source Removal Lightman Drum Site Layout



Remedial Construction Plan

Soil Source Area Removal and Disposal Project

Lightman Drum Superfund Site

Winslow Township, New Jersey

Prepared for:

Golder Associates, Inc.
200 Century Parkway
Mount Laurel, New Jersey 08054

Prepared by:

Compass Environmental, Inc.
92 North Main Street
Unit 20B
PO Box 10
Windsor, New Jersey 08561

October 11, 2007



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1.0 Remedial Construction Plan

This Remedial Construction Plan has been prepared as required per the Settlement Agreement and Order of Consent for the Soil Source Area Removal and Disposal, Lightman Drum Superfund Site, Winslow Township, Camden County, New Jersey. In preparing this Plan, Compass utilized a cross-functional team of key staff with expertise in the various disciplines that comprise the work. Our team assessed the requirements of the project and developed an approach that provides the highest quality remedial construction services delivered in the safest manner possible at the most reasonable cost.

We understand that the purpose of the project is to remediate a single area of concern by stripping and staging uncontaminated soil, removing contaminated soil within a temporary excavation support system, transporting and disposing of the contaminated soil, and backfilling the area of concern with the uncontaminated stripped soil and imported clean fill, and seeding the restored area. In addition, existing investigation-derived waste (IDW) will be characterized, transported, and disposed.

This Plan serves as a discussion of our approach. Our understanding of the tasks comprising the project and our approach to implementing the required work are conveyed in the following sub-sections.

1.1 Pre-Work Activities

The primary pre-work activity is preparation of submittals. The primary submittals are this Remedial Construction Plan and the Site-Specific Health and Safety Plan. Concurrently, we will provide samples of materials and will perform any

necessary material testing. Compass will also attend a pre-construction meeting to discuss the details of our approach and schedule with Golder.

1.2 Mobilization and Site Preparation

Once the pre-work activities are completed, Compass will mobilize our personnel and equipment to the site and establish temporary facilities consisting of an office trailer. Compass will connect all necessary utility service. Considering the limited project duration, Compass will use a portable generator for power and cellular phones for communications. Portable toilets will be provided for sanitary facilities. With these facilities in place, Compass will proceed with the following site preparation tasks:

- A pre-work survey of the existing grades and limits of work will be performed. Compass will also take pre-construction photographs to document existing conditions in the work area. Subsequent photographs will be taken during and after the work and a photo log will be provided.
- Compass will locate existing aboveground and underground utilities as required.
- Erosion and sedimentation (E&S) controls will be installed as necessary. This will include installation of silt fence and the construction of two stabilized construction entrances. One will be constructed at the highway-site entrance interface and the second will be constructed at the work area/area of concern.
- Compass will abandon the 3 required existing monitoring wells (MW-2A, MW-2B, and MW-21) in the area of concern. The



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wells will be reinstalled at the completion of the work. All drilling will be performed by a New Jersey licensed driller.

- An approximate 30'x30' staging area will be established for contaminated soil. This will consist of 40-mil liner installed on existing site soil that is re-contoured with perimeter berms and sloped slightly to a collection sump. Since the soil will be excavated in the wet, this staging area will be used to collect water that gravity drains from the soil. Traffic on the liner will be limited to rubber tire equipment and minimized as much as possible to protect the integrity of the liner. Once contaminated soil has been loaded out, the liner will be removed, cut into manageable pieces and loaded out with the contaminated soil.
- The work areas will be cleared of vegetation as necessary. The material will be chipped and spread on site.
- Compass will install an approximate 10'x10' decontamination pad adjacent to the soil staging area, using 40-mil liner material. Similar to the soil staging area, existing site soil will be-contoured with perimeter berms and sloped slightly to a collection sump. Compass does not anticipate tracking equipment into the contaminated material, therefore decontamination efforts will be limited to heavy equipment buckets and boom extension.
- Stormwater management measures will be installed to minimize storm water runoff from entering active work area. This will be accomplished by placing a portion of the uncontaminated excavated soil in a windrow near the area of concern.

- Compass will set-up a 21,000-gallon water storage tank to store liquids prior to disposal.
- Compass will set-up the necessary odor control system. We will provide RUSMAR foam and a mobile foam application system.
- Compass does not propose to provide a full-time, dedicated, onsite Health and Safety Officer (HSO) for the work. Rather, our Site Manager will serve a dual role as the SM/HSO. He and or his designee will perform the necessary air monitoring, which will include monitoring the work area for volatile organic compounds (VOCs) and particulate emissions.

1.3 Excavation and Backfilling

The area of concern to be excavated has a surface area of 33 feet by 16 feet. Unsaturated soils are expected to exist to a maximum depth of 12 feet below grade, and once verified as uncontaminated, will be reused as backfill material. Contaminated soil will then be excavated to a maximum depth of 25 feet below grade.

To facilitate excavation to the required depth, Compass will design and install a temporary excavation support system. The system will be designed by a New Jersey Professional Engineer and will be installed by a local subcontractor with which Compass has prior similar work experience. Compass will install steel sheeting to a depth of 45 feet below grade at the perimeter of the work area. The sheeting will be installed with tie-backs to provide the necessary support to enable excavation to the required maximum depth of 25 feet.

Once the sheeting has been installed, Compass will proceed with excavation of the area of concern. The first task will be excavation of uncontaminated soil above the water table to a maximum depth of



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12 feet. Compass will excavate this soil while screening with a photo-ionization detector (PID). Any soil with a PID reading greater than 50 parts per million (ppm) will be segregated from soil with a PID reading <50 ppm. Compass will collect one sample of the uncontaminated soil (<50 ppm on the PID) and analyze this soil for TCL VOCs and SVOCs and TAL metals to verify that it is clean before reusing it as backfill material. Any soil with a PID reading >50 ppm will be commingled with the contaminated soil from greater depths for offsite disposal. The uncontaminated soil will be stockpiled on and covered with plastic sheeting pending confirmation that it is acceptable as backfill material.

With the uncontaminated soil removed and stockpiled, Compass will proceed with excavation of the contaminated soil to the required maximum depth of 25 feet. This soil will be stockpiled in the lined staged area discussed above and covered with plastic to prevent wind or water dispersal of material. Gravity drained water will be removed from the sump and pumped to a 21,000-gallon frac tank. By excavating in the wet and draining water from the soil in the staging area, Compass expects to minimize the quantity of water generated and requiring disposal to the greatest extent possible.

Four post-excavation soil samples will be collected from the base of the excavation to be analyzed for TCL VOCs and the area will be backfilled. As per the Settlement Agreement, before shipping any backfill material to the site, the name of the source of material will be provided to the USEPA along with analytical required by the SOW.

The area of concern will be backfilled with imported clean fill. Hydraulic fill will be installed to an elevation equal to the free-standing groundwater height. This fill will be placed in 12-inch lifts and compacted with the excavator bucket.

Select fill will be installed above freestanding groundwater height, placed in 12-inch loose lifts and compacted to 90% standard Proctor. Backfilling will be completed by reinstalling the previously excavated uncontaminated soil, once the results of analysis verify that it is uncontaminated. As backfilling proceeds, Compass will extract the steel sheeting from the ground. The sheets will be decontaminated and removed from the site.

Compass will perform the waste classification sampling and analysis in accordance with the Soil Source Removal Work Plan including Addendum No. 3-Sampling and Analysis Plan for the Source Removal Work Plan. The contaminated soil will be sampled and analyzed for RCRA waste characteristics and TCLP (VOCs, SVOCs, and metals); no analysis for pesticides or PCBs will be required, based on prior site data although additional analyses may be performed in accordance with any specific requirements of the proposed disposal facilities. Water generated during the project and stored in the frac tank will be sampled and analyzed for TCL VOCs and SVOCs and TAL metals.

Since waste classification analysis and disposal approvals will not be obtained prior to the performance of work, Compass will have to return to the site to load-out materials once disposal approvals have been received. We will submit the required information to USEPA as required in the Settlement Agreement at least 5 days before shipping waste for offsite disposal. Once all disposal approvals are received, Compass will return to the site and load the soil into dump trucks and water into a tanker trailer.



1.4 Existing Investigation-Derived Waste

There are approximately 100 drums of existing investigation-derived waste (IDW) in drums at the site. Compass will collect one composite characterization sample for each of three media stored in these drums - water, soil, and unknown/debris. These three samples will be analyzed for waste characterization purposes.

Once disposal approvals are received, Compass will load the drums into trucks for disposal at the approved facility or facilities. Alternately, the material may be commingled and disposed in bulk with the soil from the excavation work area.

1.5 Erosion Control, Site Restoration and Demobilization

Erosion control measures will be implemented to minimize the amount of run off from stockpiled material and eliminate the tracking of material onto public roadways. Requirements for soil disturbance in a Pinelands area will be followed.

Compass will submit an Erosion and Sediment Control Plan exemption request to the Camden County, New Jersey Soil Conservation District since the area to be disturbed is expected to be less than 5,000 square feet

Stockpiled soil, both clean and contaminated, will be surrounded with properly installed silt fence. A 12'x50' stabilized construction entrance (SCE) will be constructed consisting of 6" of clean washed gravel installed on a layer of 6-ounce non-woven geotextile. Both silt fence and SCE will be inspected daily and repairs will be made as necessary.

Site restoration activities will be minimal for this project. All equipment used will be decontaminated and removed from the site. Temporary facilities will be removed. All disturbed areas will be restored by installing 6 inches of topsoil and seeding. Considering the timing of the project, we expect that site restoration will likely proceed after the end of the planting season. Therefore, we propose to install temporary seed consisting of a winter rye mix. Permanent seeding will be performed by others in the spring of 2008, if necessary

1.6 Transportation and Disposal Plan

Transportation of soil, liquid, and drummed materials will be performed using licensed haulers and accordance with Paragraph 41 of the Settlement Agreement as follows:

- At least five days prior to shipment, the USEPA-OSC will be notified that certification has been obtained from USEPA for the proposed receiving facility.
- Compass will provide documentation of valid RCRA transporter and disposal facility identification numbers.
- Compass will provide the most recent 6 month State or EPA regulatory inspection results of the disposal facility.
- Compass will provide the most recent 6 month State or EPA regulatory inspection results of the disposal facility and any special provisions or conditions attached to the RCRA disposal permits as a result of the most recent inspection.
- Provide documentation that the respondent has provided written documentation to the



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receiving states environmental official of waste to be shipped.

- All wastes shall be properly manifested and shipped off-site by an appropriately permitted transporter.

All waste transportation will be performed using vehicles that are in good working condition and in accordance with all applicable rules and regulations.

Trucks will be permitted as required by the State of New Jersey and all drivers will possess the required commercial driver's licenses. If any hazardous waste is handled, the trucks will have the necessary and appropriate hazardous waste registration and the driver's will have the required hazardous waste endorsement on their licenses.

All trucks and containers will comply with state and federal regulations regarding markings and placarding. Each load will have the appropriate paperwork (manifests or bills of lading) signed by the Owner's representative, and emergency procedures and contact information will be provided in each vehicle.

Compass will ensure that all vehicles are properly loaded, that the loaded weights are within the permitted range and that trucks are covered and decontaminated prior to leaving the site when necessary.

Materials to be handled in the implementation of this project include solids (primarily excavated contaminated soil) as well as liquids. Compass will handle all materials of concern using personnel that are properly trained for each specific application. Most solid material handling will be performed using heavy equipment (primarily excavators and front-end loaders), with some assistance by laborers manually placing materials into the bucket of heavy equipment. Liquids will primarily be

handled using pumps to extract the liquid and pipes or hoses to convey the liquid to the appropriate storage container. All materials handling will be performed in accordance with the appropriate OSHA, USEPA, DOT, state and local rules and regulations and performed in a controlled manner to preclude any potential for spills. Appropriate measures will be taken to mitigate potential spills including maintaining the presence of a spill kit that includes absorbent pads, absorbent granular material (kitty litter) and hand tools. When possible, plastic sheeting will be used when pumping liquids as secondary containment should small spills occur. The spilled liquids will be collected and disposed of with the solid material along with the plastic sheeting.

Non-hazardous soil will be disposed at Soil Safe, Inc. located in Logan Township, NJ. Non-hazardous liquids will be disposed of at Eldredge, Inc. located in Westchester, PA. If materials are determined to be hazardous, soil will be disposed Waste Management located Model City, NY and liquid will be disposed at Dupont located in Deepwater, NJ.

1.7 Backfill Material Verification Plan

Prior to being shipped to the site, Compass will provide documentation to verify that the proposed soil to be used to backfill the excavated area is clean fill in accordance with N.J.A.C. 7:26E, free from chemical and radiological contamination. The soil will come from a natural soil source located within the Pinelands area, therefore background levels will be achieved. The soil will be screened with a Ludlum Model 19 low-level gamma meter to ensure that gamma radiation exposure is less than 30 microRoetgens per hour.



1.8 Site Security Plan

There are existing security measures at the site consisting of a main entrance gate and partial perimeter fencing giving limited access. In addition to these measures, Compass will install area specific high visibility fencing around all active areas including the excavation, contaminated soil stockpile area and drum storage area. During work hours, Compass will limit access to the work area to authorized personnel only.

1.9 Dewatering Plan

Since excavation is not required to be performed under dry conditions, water will be generated at the site from three primary sources – storm water from rain events, water drained from stockpiled soil, and wash water from decontamination efforts. Our approach to manage each source of water is discussed below.

Compass will isolate storm water from the area of concern by installing temporary diversion berms. This will be accomplished by placing a portion of the uncontaminated excavated soil in a windrow near the area of concern.

Water drained from the stockpiled soil will be contained within the bermed stockpile area. This water will be pumped to a 21,000-gallon frac tank pending offsite disposal. Water from decontamination activities will be handled similarly (i.e., pumped from the decontamination area to the frac tank).

1.10 List of Permits

Compass will secure the required permits as follows:

- Exemption from the Soil and Sediment Control Act.

- Appropriate Well Installation Permits prior to the construction of proposed wells.

1.11 Proposed Forms

Attached after this section is a sample of the daily form used by Compass to document work performed at the site.



Daily Construction Report

Compass Environmental
Lightman Drum Superfund Site
Winslow Township, New Jersey

Date:

Report #

Project #

Weather

Daily Low Daily High

Average Temp.

Precipitation

Dom. wind direction

Forecast:

Work Performed

Forecasted Work

Potential Issues

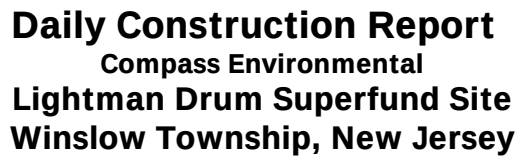
Meetings

Topic	Companies Represented	Description

Visitors

Name	Company	Purpose of Visit

* indicates addition tracking methods available upon request



*Material Shipped Offsite			
Material type	Vendor	Quantity	Purpose

* indicates addition tracking methods available upon request



Daily Construction Report
Compass Environmental
Lightman Drum Superfund Site
Winslow Township, New Jersey

*Material Deliveries			
Material type	Vendor	Quantity	Purpose

*Daily Water Treatment	Gallons (approximate)	Days online (Start date of x/x/xx)	Total gallons (approximate)	Daily Discharged (meter)

*Submittals	Transmittal	Section	Subsection	ID

*Analytical Data	Sample ID	Type	Number of Pages	Provider

*Erosion Control	Inspection #	Repairs Required?	Description and Location of Repairs

Additional attached items:

1. Air Monitoring Report
2. Material Weight Tickets
3. Other: _____
4. Other: _____

Site Superintendent Signature _____

* indicates addition tracking methods available upon request

APPENDIX E

HEALTH AND SAFETY PLAN



SITE SPECIFIC ENVIRONMENTAL, HEALTH & SAFETY PLAN

For

Soil Source Removal

Lightman Yard PRP Group

Located at

Lightman Drum Site
Winslow Township
Camden County, New Jersey

September 2007

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MANDATORY ATTACHMENTS

Attachment A – Forms Attached to SSHASP

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Attachment C – Site Safety & Health Plan Acknowledgement Form

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Other Documents Supporting This SSHASP:

Standards of Practice Associated with Site Activity: These are a part of and found in the Compass Environmental Health & Safety Plan 2007.

CE-01 General Practices	CE-48 Drilling
CE-02 Accident, Injury& Illness Reporting	CE-49 Environmental Health and Safety Audit
CE-03 Bloodborne Pathogens	CE-50 Hydrogen Sulfide
CE-04 Hazard Communications	CE-51 Process Safety Management
CE-05 Health & Safety Training	CE-52 Cadmium Monitoring Program
CE-06 Medical Surveillance	CE-53 Benzene Monitoring Program
CE-07 Personal Protective Equipment	CE-54 Sandblasting
CE-08 Unanticipated Contamination	CE-55 Naturally Occurring Radioactive Materials
CE-09 Hand and Power Tools	CE-56 Reserved
CE-10 Heat and Cold Stress	CE-57 Return to work
CE-11 Confined Space	CE-58 Reserved
CE-12 Hazard Material Handling	CE-59 Procedures for Identifying and Reporting Near Misses
CE-13 Emergency Response	CE-60 Subcontractor Safety Qualifications
CE-14 Fire Prevention and Control	CE-61 Operator Training
CE-15 Electrical Safety	CE-62 Safety Incentive Program
CE-16 Traffic Control	CE-63 Working Near Water
CE-17 Stairways, Ladders and Scaffolds	CE-64 Stop Work Authority
CE-18 Heavy Equipment	
CE-19 Lifting	
CE-20 Fall Protection	
CE-21 Excavations and Trenching	
CE-22 Lockout/Tag out	
CE-23 Compressed Gases	
CE-24 Cutting and Welding	
CE-25 Ropes Cables and Sling Safety	
CE-26 Respiratory Protection	
CE-27 Asbestos Awareness	
CE-28 Lead Exposure Program	
CE-29 Hearing Conservation Program	
CE-30 Housekeeping	
CE-31 Aerial Man Lift	
CE-32 Forklift Safety Procedures	
CE-33 Crane Safety	
CE-34 General First-Aid	
CE-35 Vehicle Safety	
CE-36 Vacuum Truck Safety	
CE-37 High Pressure Water Blasting	
CE-38 Refueling Safety	
CE-39 Fleet Management Program	
CE-40 OSHA Inspections	
CE-41 Substance Abuse Program	
CE-42 Safety Violation and Disciplinary Action Policy	
CE-43 Anti-Harassment Policy	
CE-44 Workplace Violence Program	
CE-45 Air Monitoring	
CE-46 Noise Monitoring	
CE-47 Unknown Drums or Containers	

Glossary of Acronyms

ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APR	AIR PURIFYING RESPIRATOR
ACGIH	AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
BTEX	BENZENE, TOLUENE, ETHYLBENZENE, XYLENE
CE	COMPASS ENVIRONMENTAL
CFR	CODE OF FEDERAL REGULATIONS
CPR	CARDIO-PULMONARY RESUSCITATION
CIH	CERTIFIED INDUSTRIAL HYGIENISTS
CGI	COMBUSTIBLE GAS INDICATOR
CLEAN ZONE	SUPPORT ZONE
COI	CHEMICALS/CONTAMINANTS OF INTEREST
CORPS	CORPS OF ENGINEERS
CRZ	CONTAMINATION REDUCTION ZONE
CSEP	CONFINED SPACE ENTRY PERMIT
DECON	DECONTAMINATION
ERCP	EMERGENCY RESPONSE CONTINGENCY PLAN
EZ	EXCLUSION ZONE
HAZWOPER	HAZARDOUS WASTE AND EMERGENCY RESPONSE
HOT ZONE	EXCLUSION ZONE
IAW	IN ACCORDANCE WITH
IDLH	IMMEDIATELY DANGEROUS TO LIFE & HEALTH
IH	INDUSTRIAL HYGIENISTS
JHA	JOB HAZARD ANALYSIS
LEL	LOWER EXPLOSIVE LIMIT
NIOSH	NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH
MSDS	MATERIAL SAFETY DATA SHEET
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION LIMIT
OVA	ORGANIC VAPOR ANALYZER
PAPR	POWERED AIR PURIFYING RESPIRATORS
PCE	TETRACHLOROETHENE
PEL	PERMISSIBLE EXPOSURE LIMIT
PID	PHOTOIONIZATION DETECTOR
PM	PROJECT MANAGER
PPE	PERSONAL PROTECTIVE EQUIPMENT
PPM	PARTS PER MILLION
PSHR	PROJECT SAFETY AND HEALTH REPRESENTATIVE
SCBA	SELF-CONTAINED BREATHING APPARATUS
SOP	STANDARD OPERATING PROCEDURE
SPCC	SPILL PREVENTION CONTROLS & COUNTERMEASURES
SPL	SPENT POT LINER
SSHASP	SITE SPECIFIC HEALTH AND SAFETY PLAN
SSHO	SITE SAFETY & HEALTH OFFICER
SZ	SUPPORT ZONE
TCE	TRICHLOROETHENE
TLV	THRESHOLD LIMIT VALUE
TWA	TIME WEIGHTED AVERAGE
US EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
VOC	VOLATILE ORGANIC COMPOUNDS



WARNING

- **Work activities conducted at this site will be in accordance with all applicable Environmental Protection Agency (EPA) standard operating guidelines and all applicable Occupational Safety and Health Administration (OSHA) regulations under 29 CFR 1910 and 29 CFR 1926.**
- **This Site Specific Health and Safety Plan (SSHASP) has been developed to provide site personnel and visitors with specific safety instructions for this site.**
- **Failure to read, understand, and follow these instructions may cause death or serious injury to yourself or others around you.**
- **Read and understand the instructions of this health and safety plan and the accompanying facility safety requirements prior to entering a work zone or performing any work on-site.**

SECTION 1 APPROVALS

By their signatures, the undersigned certify that this Site Specific Health and Safety Plan is approved and will be utilized for the Lightman Drum Project

Todd King
Regional Vice President

Date

Mark A. Fleri, CIH, P.E.
Vice President, Health and Safety

Date

Jim D'Angelo
Site Manager

Date

Josh Kelly
Manager of Health and Safety

Date

SECTION 2

GENERAL

2.1 OBJECTIVE

This Health and Safety Plan (HASP) has been prepared to provide details of the health and safety procedures, methods and requirements for the implementation of the remedial activities. Project site activities may include the following components:

- Mobilization;
- Well Decommissioning and Replacement;
- Install Excavation Support Systems;
- Excavation and Staging of Soil;
- Waste Characterization and Disposal;
- Backfill;
- Site Restoration; and
- Demobilization.

The objective of this plan is to provide a mechanism for establishing safe working conditions at the project site. The safety organization, procedures and protective equipment have been established based on an analysis of potential physical, chemical and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of accident or injury.

This HASP discusses general safety hazards associated with specific field activities outlined in the scope of work for this project. This plan also specifies minimum safety precautions for various field activities. Each subcontracted company of Compass Environmental must review this SSHASP with respect to their own standard safe operating procedures and make sure their operating procedures provide the minimum safety requirements set forth in this HASP as well as in EPA standard operating guidelines and OSHA regulations cited in 29 CFR 1910, specifically 1910.120, and 29 CFR 1926. Each contracted and subcontracted company is responsible for operating in a safe and healthful manner in order to protect their personnel and all site personnel.

2.2 PROJECT SITE INFORMATION

The Lightman Drum Company property is a narrow, wooded area covering approximately 15 acres in Winslow Township, Camden County, New Jersey. A portion of the eastern side of the property is being used by United Cooperage for drum brokerage.

A previous investigation conducted in two phases in 1989 and 1990 focused on delineating the extent of contamination in the soil and ground water. The investigations were conducted in known waste storage areas which included the former the areas where two 5,000 gallon underground storage tanks were located on the north-central end of the site. The tanks had been used to store paint pigments, ink sludge, and thinners.

The Remedial Investigation for the site was conducted between 2002 and 2007 and included a comprehensive soil and ground water investigation. The results indicated that the groundwater had been impacted with chlorinated VOCs, primarily TCE, PCE, and aromatic BTEX compounds. Two main plumes are present, one coming from the former Waste Storage Tank area, and a smaller plume from the former Unlined Waste Disposal Pit area.

Soil sampling was conducted on saturated and unsaturated zones. Results from the unsaturated zone showed no exceedance of any of the NJDEP Residential and Non-Residential Direct Contact Soil Cleanup Criteria. Results taken from the saturated soil areas indicated

localized zones close to the water table remain contaminated with VOCs and continue to provide a source for ground water contamination.

2.3 POTENTIAL CHEMICAL HAZARDS

The contaminants of interest (COIs) at the Lightman Drum Site are chlorinated volatile organic compounds (VOCs), primarily trichloroethene (TCE), tetrachloroethene (PCE), and aromatic BTEX compounds (benzene, ethyl benzene, toluene, and xylene). Table 2-1 lists the chemicals of interest (COI) known to be present in the soil, at the maximum concentrations. The chemicals present in the soil at concentrations high enough to demonstrate a risk of exposure (dermal or respiratory) are included for consideration.

TABLE 2.1
MAXIMUM SOIL CONCENTRATION OF THE CHEMICALS OF INTEREST

CONSTITUENTS	MAXIMUM CONCENTRATION
Volatile Organics	(ug/kg)
1,2-Dichlorobenzene	1100*
1,3-Dichlorobenzene	7*
1,4-Dichlorobenzene	1800*
1,2,4-Trichlorobenzene	7100
1,1,1-Trichloroethane	31*
1,1,2-Trichloroethane	2*
cis-1,2-Dichloroethene	260*
2-Butanone	780*
Acetone	26*
Benzene	140*
Chlorobenzene	93
Dichlorodifluoromethane	4900*
Ethylbenzene	150000
Isopropylbenzene	1400*
Tetrachloroethene	39000
Toluene	6600*
Trichloroethene	870*
Xylene (total)	720000*

TABLE 2.1 (continued)

MAXIMUM SOIL CONCENTRATION OF THE CHEMICALS OF INTEREST

CONSTITUENTS	MAXIMUM CONCENTRATION
Inorganics	(mg/kg)
Aluminum	3770
Antimony	0.28*
Arsenic	6.9
Barium	8.5*
Cadmium	3.6
Chromium	21.3
Cobalt	0.27*
Copper	3.3*
Iron	11000
Lead	5.2
Magnesium	49.9*
Manganese	4.8*
Nickel	0.89*
Potassium	168*
Silver	0.12*
Sodium	38.9*
Thalium	0.76*
Vanadium	18.7
Zinc	5.5

*= The analyte was detected and is considered estimated

Figure 2-1

Site Location Map

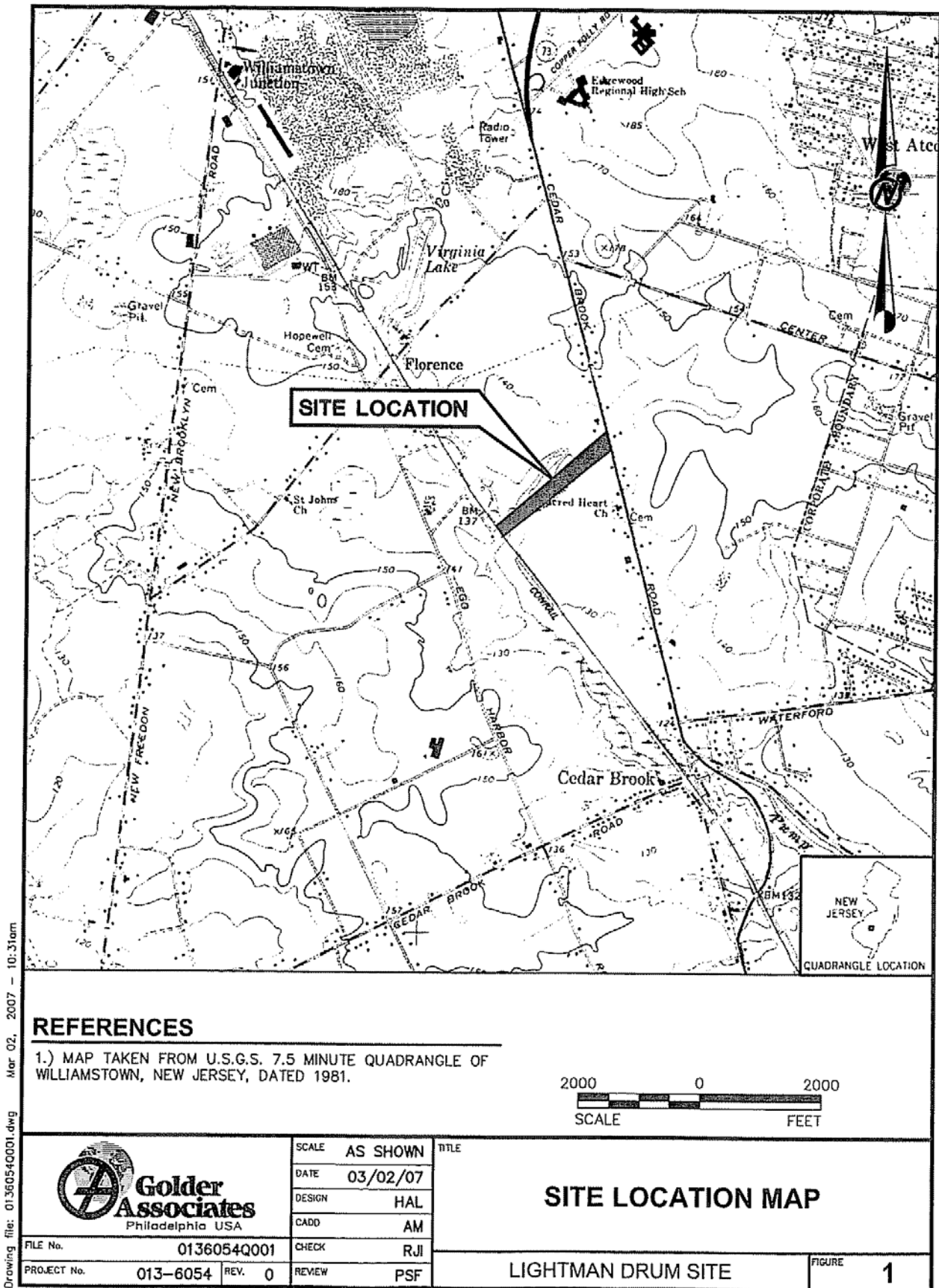
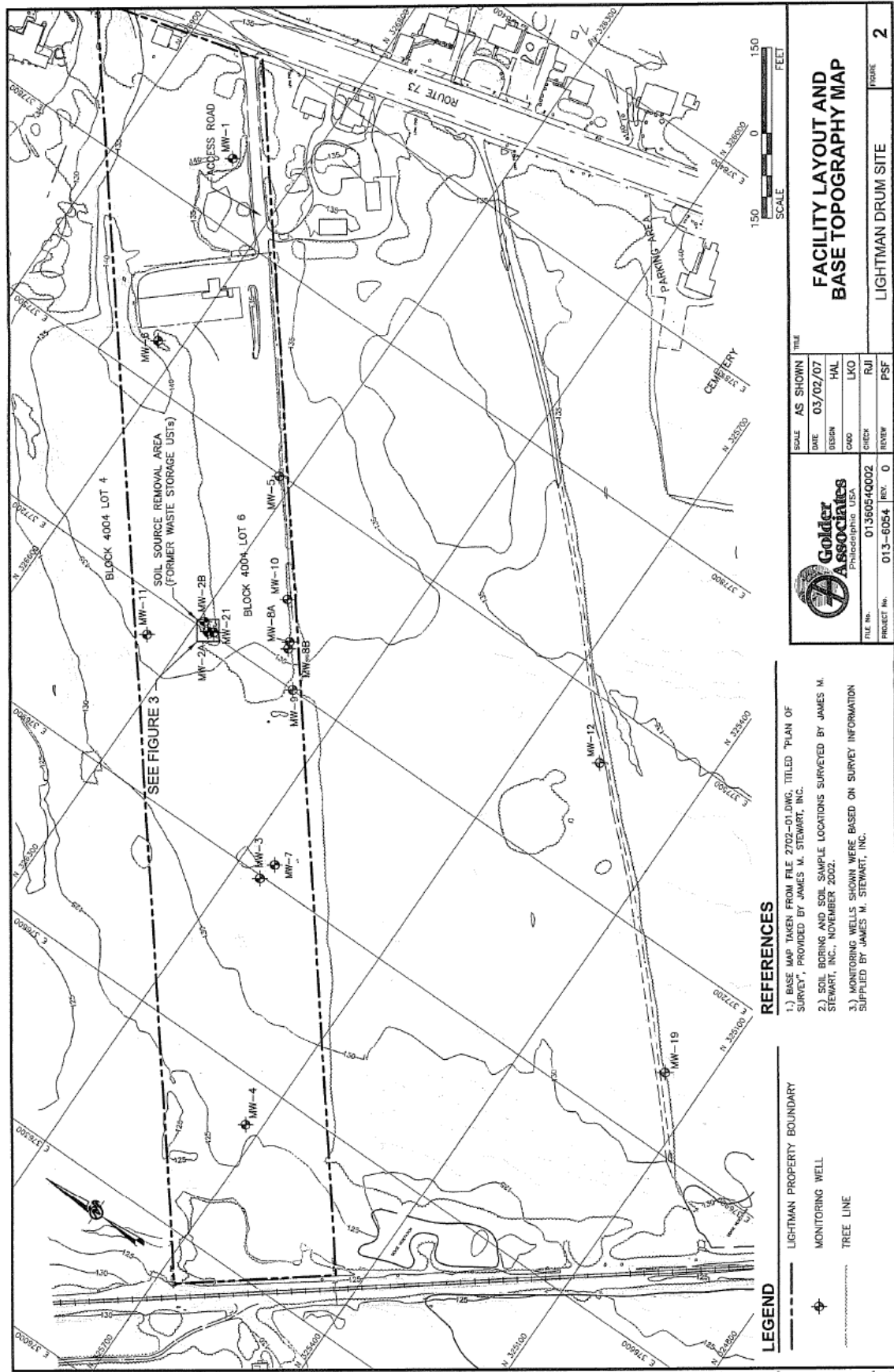


Figure 2-2

Facility Layout Map



2.4 Scope of work

Activities conducted as part of the Lightman Drum Project are divided into discrete tasks. A discussion of these activities can be found in Section 5. The tasks covered are as follows:

TASK NO.	DESCRIPTION
1	Mobilization
2	Well Decommissioning and Replacement
3	Install Excavation Support Systems
4	Excavation and Staging of Soil
5	Waste Characterization and Disposal
6	Backfill
7	Site Restoration
8	Demobilization

2.5 EMERGENCY TELEPHONE NUMBERS

ALL IMMEDIATE EMERGENCIES BE SURE TO CALL 911

AGENCY	TELEPHONE NUMBERS
EMERGENCY	911
POLICE – Winslow Township Police Department	609-561-3300
NEARBY HOSPITAL- Virtua Hospital	Main 856-322-3000 ER 856-322-3060
WINSLOW TOWNSHIP OFFICE OF EMERGENCY MANAGEMENT	609-567-0700
CAMDEN COUNTY OFFICE OF EMERGENCY MANAGEMENT	856-783-4808
NJDEP	877-927-6337
STATE HEALTH DEPARTMENT	800-367-6543
POISON CONTROL CENTER	800-336-6997
NATIONAL RESPONSE CENTER (NRC)	800-424-8802
SPILL HOTLINE	800-424-8802
CHEMTREC	800-424-9300
HEALTH BRIDGE	800-633-4350
COMPASS VICE PRESIDENT, HEALTH AND SAFETY (Mark Fleri)	678-462-3061
COMPASS MANAGER OF HEALTH AND SAFETY (Josh Kelly)	317-401-1815
COMPASS REGIONAL MANAGER (Todd King)	312-735-7739
COMPASS SITE MANAGER (Jim D'Angelo)	317-710-9390

SECTION 3

SITE ORGANIZATION AND RESPONSIBILITIES

3.1 OVERVIEW

All personnel will be responsible for continuous adherence to the procedures set forth by this plan and as administered by the Site Safety and Health Officer (SSHO) during the performance of on-site removal activities. In no case may work be performed which conflicts with the intent of or the inherent safety and environmental cautions expressed in these procedures. Compass Environmental employees and subcontractors will also follow all site specific requirements defined by Lightman Drum and its representatives. If Compass or subcontractor personnel are found violating safety and health procedures they will promptly be dismissed from the Site.

3.2 PROJECT SAFETY AND HEALTH REPRESENTATIVE

Compass will provide a Project Safety and Health Representative (PSHR) to administer the health and safety program outlined in this HASP. Minimum qualifications for the PSHR include formal training in Industrial Hygiene and Occupational Health, completion of a 40-hour HAZWOPER training course as mandated by OSHA in 29 CFR 1910.120, and familiarity with the requirements specifically set forth for this type of work in that regulation.

The PSHR will be responsible for:

- Work with the SSHO to ensure that medical examination and training requirements for all on-site Compass and subcontractor personnel are current and comply with 29 CFR 1910.120 and .134.
- Ensure a pre-job briefing is given to all Compass personnel, subcontractors, and vendors with regard to this HASP and other safety requirements including but not limited to (a) potential hazards; (b) personal hygiene principles; (c) personal protective equipment; (d) respiratory equipment usage; (e) emergency procedures for dealing with fire and medical emergency situations; and (f) Material Safety Data Sheets (MSDS);
- Ensure the site is complying with OSHA health and safety regulations as well as Compass health and safety policies and procedures
- Overseeing site audits of Compass Environmental jobsites on a regular basis.

The PSHR is given the authority to take the appropriate steps that are required to ensure adherence of operations to the adopted HASP. The PSHR will not be assigned to the site on a full time basis. The PSHR for this site is Mark Fleri, CIH

3.3 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) responsibilities will be delegated to the full time Site Manager for the duration of the project. Specifically, the Site Manager or his designee will inspect operations, equipment, and procedures for adherence to this plan. Where deviations are discovered, he will take immediate steps to correct the deviation, up to and including stopping the operation until the situation is adequately resolved. The Site Manager will have experience in the area of safety and health, a sound working knowledge of federal and state occupational safety and health regulations, training in occupational safety and health, and demonstrable experience in air monitoring techniques and the administration of respiratory protection programs. The Site Manager will also hold current certifications in CPR and basic first aid.

The Site Manager will have functional responsibility and authority for implementation and enforcement of the HASP. He will conduct daily employee exposure assessments for target contaminants for each functional task performed where exposure could reasonably be expected

to occur. The Site Manager will inspect protective equipment and protective clothing for proper maintenance and use by employees who are assigned personal protective equipment.

All confined space entry, hot electrical work, cutting and welding operations, lockout/tagout, and any other hazardous work will require advanced inspection (monitoring, testing, verification) by the Site Manager. Work permits will be issued to perform the requested task for a specific period only upon completion of a permit application and his concurrence (inspection) that the work can be performed safely.

The Site Manager shall immediately investigate all accidents/incidents that may have occurred. Each will be documented as to when it occurred, who was involved, and what corrective action needs to be implemented. The Site Manager will post the OSHA 300 log of injuries and illnesses, as well as ensure that the required log is made available to personnel.

The Site Manager will have the authority to suspend work during on-site emergencies and noncompliance with the HASP. The Site Manager will report to Compass Project Manager.

3.4 PROJECT MANAGER

The Compass Project Manager is ultimately responsible for field implementation of the safety and health program. This includes communicating specific health and safety requirements to site supervision and consulting with the SSHO regarding planned activities, unforeseen conditions, and resolution of any questions with identified safety procedures or levels of protection to be used. The duties of the Project Manager will be delegated to the Site Manager.

3.5 SITE MANAGER

The Site Manager is responsible for ensuring that all employees working on the site are complying with the requirements set forth in this HASP. As stated above, the Site Manager will serve dual roles to include SSHO responsibilities. The Site Manager will also ensure that employees and subcontractors are conducting themselves in compliance with the health and safety requirements of the plan. The site manager is responsible for completing the **Supervisor Weekly Inspection Checklist** every week. The site manager is responsible for immediately investigating injury circumstances and completing the **Compass Environmental Incident Report (Attachment A)** for any work-related incident that could have resulted in injury/illness. The Site Manager for this job will be Jim D'Angelo.

3.6 LABORERS/OPERATORS/TECHNICIANS

Employees who will be working on-site are responsible for understanding and complying with HASP requirements and for notifying either the SSHO or the site manager of any concerns they might have for their health and safety on the job. Site workers and all other support personnel are responsible for conducting themselves in a safe manner, mindful of the inherent hazards associated with working around contaminated materials, heavy equipment, and extreme environmental conditions. Disregard of the HASP or standard operating procedures will be grounds for immediate dismissal.

SECTION 4

CHEMICAL CONTAMINANTS/PHYSICAL HAZARDS

4.1 OVERVIEW

The purpose of this section is to identify the physical, chemical, and biological hazards associated with the scope of work at the Site. A detailed description of project activities to be performed is included in *Section 5, Hazard Assessment*. Subsections of this section will discuss each task or operation for the project in terms of the general hazards associated with it. Section 5 will also identify the protective measures to be implemented during the performance of each specific activity. If additional activities beyond those identified are conducted on-site by Compass or its subcontractors, a supplemental Job Hazard Analysis (JHA) will be performed specifically for those activities. The purpose of this information is to maintain an accident and injury free work site. This section will also outline the specific chemical contaminants of interest, as well as anticipated physical hazards that may be encountered at the Site.

4.2 CHEMICAL HAZARDS

Potential chemical exposure hazards exist from compounds known to be present because of previous operations and subsequent data generated from the remedial investigation activities. The major route of chemical exposure will be from inhalation, ingestion or dermal contact with contaminated material. These routes of chemical exposure will be significantly reduced through the use of proper personal protective equipment and good personal hygiene. Historical monitoring and sampling data indicates that the potential for exposure from contaminated soils may occur mainly during the small amount of excavation and transfer of soils from the excavation area during gas vent installation.

Each compound is listed with its associated exposure data, warning properties, and exposure symptoms. Reference material for this information and all chemicals brought on site by Compass will be included in the SSHASP. Each chemical will be listed and accounted for and the appropriate Material Safety Data Sheets (MSDS) will be filed in Site MSDS book upon the chemical's arrival. Reference material for this information includes:

- *A Comprehensive Guide to the Hazardous Properties of Chemical Substances*, Patnaik, Pradyot; Van Nostrand Reinhold, 1992.
- *Pocket Guide to Chemical Hazards*, NIOSH, 2005.
- *Threshold Limit Values for Chemical Substances and Physical Agents*, American Conference of Governmental Industrial Hygienists, 2003.

TABLE 4.1
MOST PREVALENT HAZARDOUS CHEMICALS ASSOCIATED
WITH REMEDIATION ACTIVITIES AT THE LIGHTMAN DRUM SITE

Substance [CAS]	IP (eV)	Odor Threshold (ppm)	Route	Symptoms of Exposure	Treatment	TWA	STEL	Source	IDLH (NIOSH)
Trichloroethene [79-01-6]	9.45		Inh Abs Ing Con	Irritation eyes, skin rash, headache, dizziness, tremors, drowsiness, nausea, vomiting, skin eryt; ; liver damage; [potential occupational carcinogen]	Irrigate eyes immediately Wash skin immediately Respiratory support Swallow: Immediate medical attention	100 ppm 25 ppm (10hr TWA)	200 ppm (C) 2 ppm (C)	PEL REL	1000 ppm
Tetrachlorethene [127-18-4]	9.32		Inh Abs Ing Con	Irritation eyes, skin, nose, throat, resp sys; headache; dizziness; tremors; drowsiness, nausea; vomiting; dermatitis; card arrhy; pares; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap flush promptly Breath: Respiratory support Swallow: Immediate medical attention	100 ppm	200 ppm (C)	PEL	150 ppm
Benzene [71-43-2]	9.24		Inh Abs Ing Con	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	1 ppm 0.5 ppm 0.1 ppm (Ca-29CFR 1910.1028)	3 ppm 2.5ppm 1 ppm	PEL TLV REL	500 ppm
Ethylbenzene [100-41-4]	8.76		Inh Abs Ing Con	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Soap wash immediately Breath: Respiratory support Swallow: Immediate medical attention	100 ppm 100 ppm 100 ppm	125 ppm 125 ppm	PEL TLV REL	800 ppm
Toluene [108-88-3]	8.82			Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	200 ppm 50 ppm 100 ppm	300 ppm C - 150 ppm	PEL TLV REL	500 ppm
Xylene [108-38-3] [106-42-3] [95-47-6] [1477-55-0]	8.56		Inh Abs Ing Con	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	100 ppm 100 ppm 100 ppm	- - 150	PEL TLV REL	900 ppm

* - For each analyte, the most conservative permissible exposure level value was chosen

NENotEstablished

4.3 PHYSICAL HAZARDS

The topics below identify the type of physical hazards which may be present on the Site during remedial activities:

- **Slip, Trip, Fall**—These type hazards result from unlevelled surfaces, slippery surfaces, and hard to see objects located across walking paths (i.e., rope, cords), and are responsible for a large majority of work-related injuries. A fall hazard may originate as a result of the void created by excavations and uneven surfaces on the Site.
- **Heavy Equipment**—Heavy equipment is necessary for both excavation and transport of materials. Associated hazards include poor operator visibility and inability to be fully aware of surroundings at all times (i.e., people, mobile and stationary objects). Severe slopes may be present which present potential rollover and fall hazards to operators and Site personnel.
- **Excavations**—Excavation of the Site has the potential to create hazards to Site personnel. For example, equipment may fall into open excavations. Workers may also fall into excavated areas. Excavations may cave in if not properly sloped or shored. Also, excavations may fill with water following extensive rainfall.
- **Oxygen-Deficient Atmosphere**—Oxygen-deficient atmospheres may occur in some areas on-site, including excavation areas. OSHA defines oxygen deficient atmospheres as environments with less than 19.5% oxygen content, by volume. For Site operations where oxygen deficiency is suspected or may exist, measurements will be performed to quantify oxygen levels prior to any entry. If oxygen deficiency is determined, appropriate ventilation must be performed prior to entry. Also the requirement for confined space entry (see *Compass Environmental SOP CE-11*) must be followed (testing, approvals, permit, etc.).
- **Drum Handling**—Should Site activities uncover buried drums, unknown containers, or other unknown contaminants, the procedure will be to cease operations, evacuate the immediate area, and notify the SSHO. Prior to resuming activities in the immediate area, all unknown situations must be evaluated and identified. This may require bringing in a specialized contractor trained in the safe methods for identifying and handling unknown contaminants.
- **Housekeeping and Sanitation**—In order to permit safe and efficient work conditions, all work areas shall be kept clean and free of debris. All office trailers will be mopped and cleaned on a weekly basis. All hand tools will be kept in storage until they will be needed for use. Trash containers will be leak proof, clean and maintained in a sanitary condition. If vermin are encountered, an approved extermination method will be initiated.
 - Potable water will be used for first aid, drinking, and personal hygiene purposes. All floors will be kept free of standing water. Disposable drinking cups will be provided along with the water coolers. Community drinking cups will not be permitted.
 - Portable toilets will be provided on site, a minimum of one toilet for each 15 employees, separate and designated by gender. The toilets will be maintained on a weekly basis.
- **Toxic atmospheres** —Toxic atmospheres may exist around the excavation areas, material staging areas, and material load-out areas. By nature of the work to be performed, varying concentrations of toxic airborne contaminants may be generated. In the disturbance of affected soils and dusts, the human sense of smell is not sufficient to provide adequate warning of unsafe levels of airborne substances. Where affected

materials may exist, frequent monitoring will be performed by a combination of personal monitoring with analysis of samples and by real time direct-reading instrumentation.

- **Falling Objects**—Operations of trucks and excavating equipment on-site can create hazards from falling objects. Hard hats, safety glasses, and steeled-toed footwear will be required for personnel in all operations and areas on-site, with the exception of the front gate security area and the office and support trailers.
- **Lighting Levels**—For work activities scheduled after dusk, poor lighting conditions may increase risk of injury. Low light levels may exist in confined spaces as well. If work is to be performed after dusk or before dawn, supplemental Site and vehicle lighting will be used. No operations will be performed after these periods of the day without both supplemented and vehicle lighting systems.
- **Heat Stress**—Heavy construction work in the summer months can create heat stress conditions for employees. The use of respiratory protective equipment and protective (non-breathable) clothing, boots, and gloves can greatly increase the potential for heat stress.
- **Cold Stress**—Cold-related problems are the result of low ambient temperatures and/or wind velocity. Wind chill is the term used to describe the effect of moving air on human flesh. Frostbite and hypothermia are the two cold-related problems of concern.
- **Electrical**—Electrical hazards may exist during maintenance, operation and mobilization activities. Employees will be trained in and shall use Lockout/Tagout procedures.
- **Traffic Safety**—During hauling operations, there will be a significant level of truck traffic coming to and from the work area. Pedestrian traffic on the Site may be at risk as traffic moves along the haul roads from which trucks enter and leave the work areas.
- **Unleveled Surfaces**—Unleveled surfaces result from excavation activities and the natural terrain in some areas. These areas will be flagged or roped off to eliminate traffic.
- **Flammable Atmosphere**—Flammable atmospheres may exist around buried lines and unidentified tanks, but are not expected on this project. The SSHO will be notified if any potentially hazardous atmospheres are discovered.
- **Noise**—High noise levels (in excess of 85 dBA for extended periods) can result in temporary and permanent loss of hearing. Areas where noise levels exceed 85 dBA will be posted and hearing protection will be provided and worn. Noise dosimetry will be performed as required by the OSHA specifications.
- **Compressed Gases**—Stored energy in cylinders, when released, can result in projectiles. Fire and explosion will result from the ignition of flammable gases. Toxic or oxygen-deficient atmospheres will result from the release of gases in confined spaces.
- **Fire**—Many ignition sources exist on Site which may cause a fire. Fuel sources may exist in the form of flammable liquids, combustible materials and flammable gases. Accumulation of debris can contribute fuel to fires. Improper storage and use of flammable materials may result in a fire.

4.4 BIOLOGICAL HAZARDS

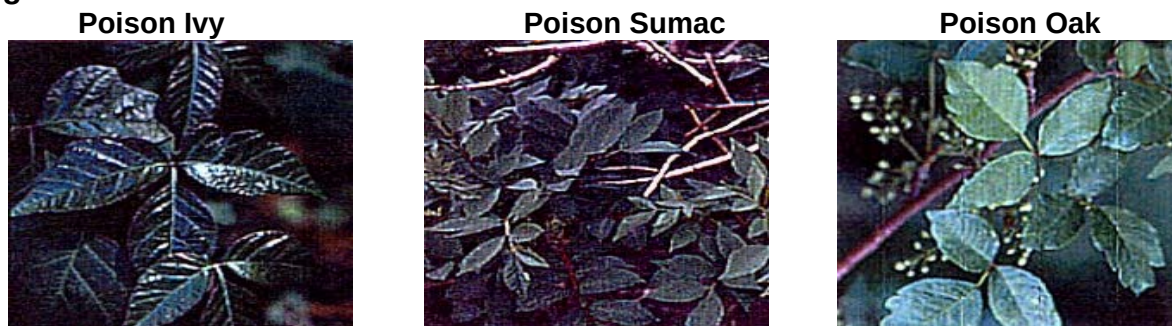
Potential biological hazards include plants, ticks, snakes, ants and various stinging insects. Some of the most common biological hazards can be prevented or the effects reduced by over the counter medications. These medications, as recommended by local pharmacists, will be kept in supply in the office first aid kit. Workers who know they are sensitized to any biological hazard should not perform any task that would increase their risk for anaphylactic shock.

4.4.1 POISONOUS PLANTS

Common poisonous plants on site may include plants from the poison ivy group, including poison oak and sumac. The most distinctive features of poison ivy and oak are that their leaves are composed of three leaflets (Figure 4-1). Both of these plants have greenish-white flowers and berries that grow in clusters. These plants can produce a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim may also develop a headache, high fever and feel very ill. The rash will usually begin to appear within a few hours but may be delayed for 24 to 48 hours.

If contact occurs with a poisonous plant, remove all contaminated clothing and wash any exposed skin thoroughly with soap and water, followed by rubbing alcohol. Apply calamine lotion if rash is mild. Seek medical advice if a severe reaction occurs or if there is a known history of previous sensitivity. If a poisonous plant is found in the work area, the SSHO should be notified so that it can be removed. All personnel working in an area with poison ivy should wear a Tyvek™ suit, at a minimum, to avoid skin contact.

Figure 4-1 Poisonous Plants



4.4.2 TICKS

Ticks are wingless, bloodsucking insects (Figure 4-2). Certain types of ticks can carry diseases such as Rocky Mountain Spotted Fever (RMSF) and Lyme's Disease.

Figure 4-2 Lone Star Ticks and Their Distributions

Lone Star Tick



Distribution of Lone Star Tick (Green)

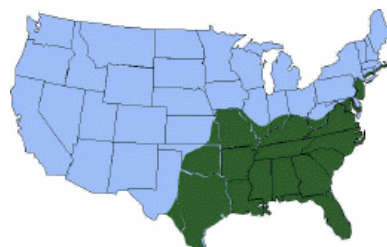
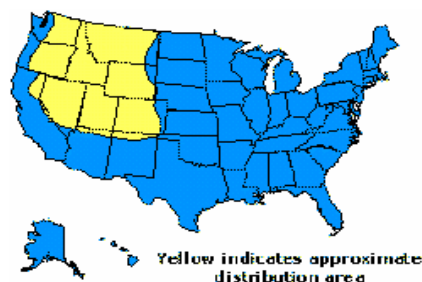


Figure 4-3 Rocky Mountain Wood Tick



Distribution of Rocky Mountain Wood Tick (Yellow)



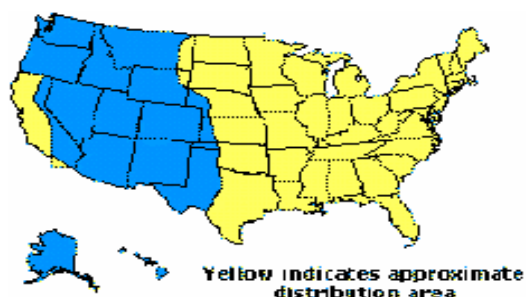
In New York, RMSF is most commonly spread by the American dog tick (*Dermacentor variabilis*). It can also be spread by dermal contact with tick blood or feces. Fewer than 50 cases of RMSF are reported annually in New York. Symptoms of RMSF include the sudden onset of moderate to high fever, severe headache, fatigue, deep muscle pain, chills and rash.

Figure 4-4 American Dog Tick and Their Distributions

American Dog Tick (*Dermacentor variabilis*)



Distribution of Dog Tick (Yellow)



Lyme disease is caused by a bacteria transmitted by the deer tick (*Ixodes scapularis*) (Figure 4.4, Figure 4.5). The New York State Department of Health is aware of over 40,000 cases of Lyme disease in New York since 1986. The chances of being bitten by a deer tick vary depending on the time of year. Deer ticks in the nymphal stage are active from mid-May to mid-August. Adult deer tick is most active in mid to late fall. In 60-80% of cases, a large, reddish rash about 2 inches in diameter appears around or near the site of the bite. This rash is sometimes referred to as the bull's eye rash (Figure 4.8).

Figure 4-5 Deer Ticks and Their Distributions

Deer Tick



Distribution of Deer Tick (Green)



Figure 4-6 Pacific Deer Ticks and Their Distributions

Pacific Deer Tick



Distribution of Pacific Deer Tick (Green)

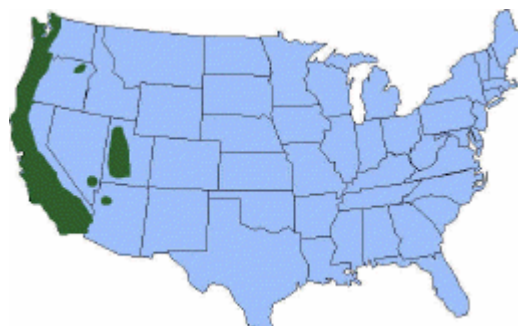
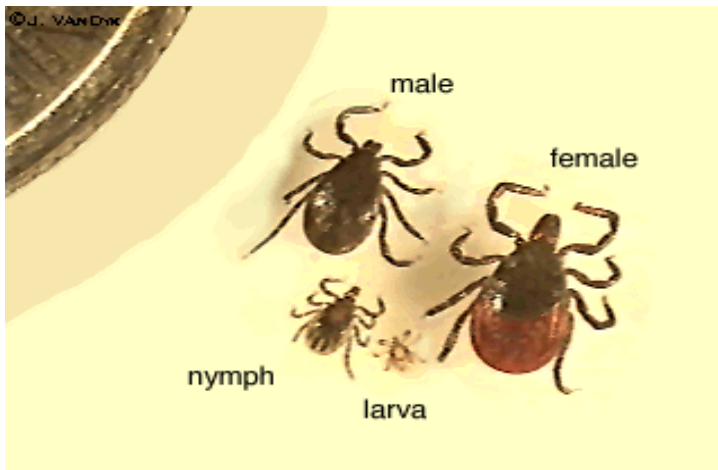


Figure 4-7 All Four Stages of the Deer Tick

Figure 4-8 Bull's Eye Rash



Multiple rashes may occur. Symptoms of Lyme disease include chills and fever, headache, fatigue, stiff neck, muscle and/or joint pain, and swollen lymph nodes. If left untreated, serious nerve and heart damage may develop. The rash may develop from three days to a month after the tick bite. Early treatment of Lyme disease symptoms with antibiotics can prevent the more serious medical problems of the later stages of the disease. If you suspect that you have been bitten by a tick or you have symptoms of Lyme disease, notify the SSHO.

When working in high grasses or brush, on-site personnel should wear Tyvek coveralls and boot covers with the joints taped. An insect repellent containing DEET is also recommended. It has been proven that the longer an infected tick remains on the body, the greater the chance that it will transmit disease. Because of this, workers should check themselves for ticks on a regular basis.

If an attached tick is found, remove it by grasping the tick with a pair of tweezers as close to the skin as possible. Be careful not to leave any part of the tick attached. The skin area of the victim should be marked or circled to indicate where the bite occurred. The tick should be placed in a container or zip-lock bag and marked as to the date, time and body area as from which it was removed. Universal precautions (Section 4.5) should be used during this procedure. The area should be washed with soap and water and then covered with an antibiotic ointment to prevent infection.

4.4.3 SNAKES

New Jersey is home to a variety of many different types of snakes, however only two poisonous snakes are known to be indigenous to this region of the United States. They are the Northern Copperhead and the Timber Rattlesnake.

To prevent snake bites, wear shoes and heavy pants where snakes are likely found (i.e. near water, thick brush). Do not reach into rocky cracks, under logs, or large rocks. Do not touch a snake even if it looks dead. Do not get near or tease a snake.

If someone is bitten by a snake, keep them warm and resting. Take them to the nearest hospital immediately (if possible, bring the snake). Do not give them anything to eat or drink. Do not use a tourniquet. Do not cut the bite or suck out the venom. Do not put ice on the site of the bite.

Figure 4-9 Poisonous Snakes



**Timber Rattlesnake
black phase**



**Timber Rattlesnake
yellow phase**



**Northern
Copperhead**

4.4.4 INSECT STINGS

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

If the victim has a history of allergic reaction, he should be taken to the nearest medical facility. If the victim has medication to reverse the effects of the sting, it should be taken immediately. The bitten area should be kept below the heart if possible. A physician should be contacted immediately for further instructions.

Figure 4-10

Honey Bee



Wasp



Mosquito



4.4.5 Mosquitoes

Mosquitoes are a vector that is common in the Southeastern United States. Due to the recent outbreaks of the West Nile virus, it is important to be educated on the prevention of mosquito bites. West Nile virus is spread by the bite of an infected mosquito, and can infect people, horses, many types of birds, and some other animals. Most people who become infected with West Nile virus will have either no symptoms or only mild ones. However, on rare occasions, West Nile virus infection can result in a severe and sometimes fatal illness known as West Nile encephalitis (an inflammation of the brain). The population with the highest risk are persons 50

years of age and older. There is no evidence to suggest that West Nile virus can be spread from person to person or from animal to person.

To avoid mosquito bites, apply insect repellent containing DEET (N,N-diethyl-meta-toluamide) when outdoors and wear long-sleeved clothes and long pants during peak mosquito feeding hours (dusk until dawn). Also, eliminating standing water sources around the jobsite will prevent mosquitoes from nesting.

4.5 BLOODBORNE PATHOGENS

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

In order to minimize any potential pathogen exposure, all employees should use the hand washing facilities on a regular basis. The decon area will provide an adequate supply of water, soap and single use towels for hand washing. Additionally, the following universal precautions should be followed to prevent further potential risk:

- Direct skin or mucous membrane contact with blood should be avoided.
- Open skin cuts or sores should be covered to prevent contamination from infectious agents.
- Body parts should be washed immediately after contact with blood or body fluids that might contain blood, even when gloves or other barriers have been used.
- Gloves and disposable materials used to clean spilled blood shall be properly disposed of in an approved hazardous waste container and labeled.
- First aid responders shall wear latex or thin mil nitrile gloves when performing any procedure risking contact with blood or body substances.
- Safety glasses will be worn to protect the eyes from splashing or aerosolization of body fluids.
- A CPR mask will be worn when performing CPR to avoid mouth-to-mouth contact.
- Work gloves will be worn to minimize the risk of injury to the hands and finger when working on all equipment with sharp or rough edges.
- Never pick up broken glass or possible contaminated material with your unprotected hands.

SECTION 5

HAZARD ASSESSMENT

Hazard Assessment

A job hazard assessment is necessary to identify potential safety, health and environmental hazards associated with each type of field activity. Because of the complex and changing nature of field projects, supervisors must continually inspect the project site to identify hazards that may harm site personnel, the community or the environment. Each Contractor's SSHO must be aware of these changing conditions and discuss them with their company's CHSO and PM whenever these changes impact employee health, safety, the environment or performance of the project. Each Contractor's SSHO will keep site representatives and other contractors informed of the changing conditions and each CHSO must review and accept addenda to this HASP, as necessary.

Field Activities, Hazards, Control Procedures

The following sections discuss general safety hazards associated with specific field activities outlined in the operations plan for this project. This section also specifies minimum safety precautions for various field activities. Subcontractors must review these activities and safety procedures with respect to their own standard safe operating procedures. Each subcontractor may utilize their own standard safe operating procedures provided the minimum requirements set forth in this HASP, 29 CFR 1910 and 29 CFR 1926 are met. Each subcontractor is responsible for operating in a safe and healthful manner in order to protect their personnel and all site personnel.

5.1 TASK-BY-TASK RISK ANALYSIS

Activities conducted as part of the Lightman Drum Project are divided into discrete tasks. This section is used to initially describe the hazards that may be present and the safety measures that will be used to avoid them. A more detailed analysis of the hazards will be performed upon mobilization to the site by the SSO. The SSO will set up a Job Safety Analysis (JSA) system that will cover all the tasks to be performed on the job. All workers performing the tasks will be required to attend the JSA meeting on the task and sign the JSA acknowledging they understand the hazards and will take the required safety measures to avoid them. The tasks covered in this HASP are as follows:

TASK NO.	DESCRIPTION
1	Mobilization
2	Well Decommissioning and Replacement
3	Install Excavation Support Systems
4	Excavation and Staging of Soil
5	Waste Characterization and Disposal
6	Backfill
7	Site Restoration
8	Demobilization

5.2 TASK 1 - MOBILIZATION

5.2.1 Description of Activity

Mobilization for the site will initially begin with the movement of a small crew to establish the field headquarters and initial temporary facilities. Mobilization will include personnel, equipment, tools, supplies, etc.

5.2.2 Hazard Assessment

- Vehicular accident
- Hitting overhead power lines and pipes
- Rolling equipment
- Vehicular/equipment movement can cause accidents /near misses due to lack of communication and coordination.

5.2.3 Health and Safety Mitigative Measures

- Traffic planning, Careful driving
- Good Communication
- Proper off loading
- Checking for overhead clearance, use spotters/barricaded/signage as appropriate
- All personnel must wear required PPE

5.3 TASK 2 – WELL DECOMMISSIONING AND REPLACEMENT

5.3.1 Description of Activity

Three monitoring wells located near the planned work area will be decommissioned prior to excavation activities. Following completion of excavation and site restoration, replacement wells will be installed at the approximate locations of the decommissioned wells.

5.3.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Possible contact with contaminated materials
- Weather Conditions/Temperature Stress
- Dust/particulate from cement grouting

5.3.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted
- All personnel must wear required PPE, use proper decon and contamination control techniques
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather.
- Cement grout will be handled in a manner that will minimize dust as best possible, dust suppression (water) and PPE (dust mask or respirator) will be used as needed.

5.4 TASK 3 – INSTALL EXCAVATION SUPPORT SYSTEM

5.4.1 Description of Activity

Temporary excavation support will be installed to facilitate soil removal in the designated work areas. The support system will be installed per design specifications. Upon completion of soil excavation, the support system will be removed in conjunction with backfilling operations.

The excavation support system will consist of steel sheet piling being driven into the specified areas and secured with tie-backs as specified in the work plan.

5.4.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Possible contact with contaminated materials
- Weather Conditions/Temperature Stress
- Excavation Hazards such as engulfment, accumulation of water, soil stability, hazardous atmospheres, limited routes or egress

5.4.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- All personnel must wear required PPE, use proper decon and contamination control techniques
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather
- Use safe work procedures for excavation, excavations shall be inspected by competent person, adequate excavation support will be used, Confined space entry procedures shall be used for any entry into an excavation, adequate routes of egress shall be established prior to entry into an excavation, accumulated water shall be removed or adequately managed prior to entry into an excavation and adequate PPE and support systems must be utilized, excavations shall be barricaded or monitored by a spotter at all times, personnel shall remain a minimum of 2ft from the edge of the excavation unless other safety precautions have been established or area is deemed safe by the competent person, Areas of observed or potential soil flow or slope failure shall be inspected by the competent person prior to any work beginning or continuing in those areas

5.5 TASK 4 – SOIL EXCAVATION AND STAGING

5.5.1 Description of Activity

Soil excavation will be conducted to a depth of approximately 20-25 feet using standard excavation equipment and without removal of accumulated ground water. If groundwater removal is required, the water will be containerized for characterization and disposal later.

Unsaturated soils deemed non-contaminated will be segregated from saturated soils and used for backfill. Contaminated soils will be staged in a controlled manner, including a cover

and erosion controls as needed. Any water collected from the soil will be characterized for disposal.

5.5.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Possible contact with contaminated materials
- Weather Conditions/Temperature Stress
- Excavation Hazards such as engulfment, accumulation of water, soil stability, hazardous atmospheres, limited routes or egress

5.5.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- All personnel must wear required PPE, use proper decon and contamination control techniques
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather
- Use safe work procedures for excavation, excavations shall be inspected by competent person, adequate excavation support will be used, Confined space entry procedures shall be used for any entry into an excavation, adequate routes of egress shall be established prior to entry into an excavation, accumulated water shall be removed or adequately managed prior to entry into an excavation and adequate PPE and support systems must be utilized, excavations shall be barricaded or monitored by a spotter at all times, personnel shall remain a minimum of 2ft from the edge of the excavation unless other safety precautions have been established or area is deemed safe by the competent person, Areas of observed or potential soil flow or slope failure shall be inspected by the competent person prior to any work beginning or continuing in those areas

5.6 TASK 5 – WASTE CHARACTERIZATION AND DISPOSAL

5.6.1 Description of Activity

Contaminated soil and groundwater will be sampled and characterized, then loaded for transport to the proper disposal facility.

5.6.2 Hazard Assessment

- Working with/around heavy equipment
- Lifting
- Possible contact with contaminated materials
- Weather Conditions/Temperature Stress

5.6.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use

- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- All personnel must wear required PPE, use proper decon and contamination control techniques
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather

5.7 TASK 6 – BACKFILL

5.7.1 Description of Activity

Imported backfill and approved site soils shall be used to backfill the excavated areas. This backfill will be installed in lifts as specified in the work plan.

5.7.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Possible contact with contaminated materials
- Weather Conditions/Temperature Stress
- Excavation Hazards such as engulfment, accumulation of water, soil stability, hazardous atmospheres, limited routes or egress

5.7.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use, Spotters will be used as needed to direct truck and equipment movements
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- All personnel must wear required PPE, use proper decon and contamination control techniques
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather
- Use safe work procedures for excavation, excavations shall be inspected by competent person, adequate excavation support will be used, Confined space entry procedures shall be used for any entry into an excavation, adequate routes of egress shall be established prior to entry into an excavation, accumulated water shall be removed or adequately managed prior to entry into an excavation and adequate PPE and support systems must be utilized, excavations shall be barricaded or monitored by a spotter at all times, personnel shall remain a minimum of 2ft from the edge of the excavation unless other safety precautions have been established or area is deemed safe by the competent person, Areas of observed or potential soil flow or slope failure shall be inspected by the competent person prior to any work beginning or continuing in those areas

5.8 TASK 7 – SITE RESTORATION

5.8.1 Description of Activity

Upon completion of operations, excavated areas will be restored as specified using topsoil and seeding or gravel installation.

5.8.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Weather Conditions/Temperature Stress

5.8.3 Health and Safety Mitigative Measures

- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- All personnel must wear required PPE
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather

5.9 TASK 8 - DEMOBILIZATION

5.9.1 Description of Activity

Upon completion of all site work, Compass shall demobilize all personnel, equipment, tools, supplies, etc. Demobilization may be conducted in as a piece of equipment or personnel are no longer needed at the site.

5.9.2 Hazard Assessment

- Working with/around heavy equipment
- Utility lines
- Lifting
- Weather Conditions/Temperature Stress

5.9.3 Health and Safety Mitigative Measures

- All personnel must wear required PPE
- Operate equipment in safe manner, use good communication, never approach equipment without operator's permission, inspect equipment prior to use
- Checking for line locations/clearance, use spotters/barricaded/signage as appropriate
- Use proper lifting techniques and equipment, no individual should lift over 50lbs unassisted, use mechanical lifting whenever possible
- Be aware of current/potential weather conditions, dress appropriately for the weather, utilize adequate rest periods and hydration methods, use safe work procedures in inclement weather

SECTION 6

PERSONNEL TRAINING AND MEDICAL REQUIREMENTS

6.1 TRAINING REQUIREMENTS

All Compass' personnel, subcontractor's personnel and visitors to the Site will have training relative to their job responsibilities. Such training will be provided prior to their being allowed to engage in Site activities that could expose personnel to health and safety hazards. The SSHO or designated alternate has the responsibility to ensure this training is provided—reflective of Site conditions—and is updated as needed.

6.1.1 Site Orientation

The following is a list of training topics required during Site orientation:

1. Acute and chronic health effects of the chemicals identified or suspected at the Site;
2. Physical agents, biological, and safety hazards identified at the Site;
3. Personal hygiene and personnel decontamination requirements and procedures;
4. The selection, use, and limitations of available safety equipment, and procedures required for personnel protection.
5. Proper selection, use, maintenance, and fitting of respirators;
6. Work zones established at the Site;
7. Prohibitions in contaminated areas;
8. Explanation of the “buddy” system;
9. Emergency preparedness procedures (emergency egress routes, emergency signals, evacuation procedures, phone numbers, personnel rescue methods, etc.);
10. First aid- and CPR-trained Site Safety and Health Representative on-site;
11. Site safety requirements and HASP review;
12. Use of fire extinguishers;
13. Decontamination procedures for equipment;
14. Review of standard operating procedures;
15. Review of Hazard Communication and Worker's Rights ;
16. Air monitoring program purpose and procedures;
17. Compass' Safety Inspection Audit Program; and
18. Emergency Evacuation Drill

All personnel who will work on the Site will be required to read this SSHASP. Prior to work on the Site, each individual must read and sign the **Site Safety & Health Plan Acknowledgement Form** (*Attachment C*) indicating they have read, understand and agree to abide by the requirements set forth in this SSHASP.

6.1.2 Pre-assigned Training

Compass' personnel and subcontractor personnel entering the Exclusion and/or Contamination Reduction Zones will have training in accordance with the provisions of 29 CFR 1910.120. These requirements are outlined below:

1. General workers, such as laborer and equipment operators, engaged in activities that expose or potentially expose them to hazardous substances and health hazards are required to complete and maintain documentation of:
 - Forty hours of instruction;
 - Three days of on-the-job training under the direct supervision of a trained experienced supervisor;
 - Eight hours of annual refresher training.
2. Workers on-site for a specific and limited task (for example, groundwater monitoring), and who are unlikely to experience exposure in excess of the applicable limits are required to complete:
 - Twenty-four hours of instruction;
 - One-day of on-the-job training under the direct supervision of a trained, experienced supervisor; and
 - Eight hours of annual refresher training.
3. Workers regularly on-site who work in areas which have been monitored and fully characterized, indicating that no PPE is required and that emergencies are unlikely to develop (i.e., the Site Support Zone) must have the same training requirements as listed in number two above.
4. On-site management and supervisors directly responsible for personnel engaged in on-site activities must complete:
 - The same or equivalent training as required for personnel they supervise;
 - Eight additional hours of specialized manager/supervisor training that complies with 29 CFR 1910.120 (e);
 - Eight hours of annual refresher training; and
 - Supervisor Drug and Alcohol Awareness Training
5. The employees who will be responsible for packaging, shipping, receiving or preparing shipping papers for hazardous materials transferred over a public access must have a certificate of successful completion of a hazardous materials training class in compliance with the requirements of 49 CFR 172.
6. On-site support staff, such as secretaries, guards and clerks, are not required to have any specialized training but they must receive a site orientation.

The SSHO is responsible for ensuring that personnel assigned to the Site are trained in accordance with the above requirements. The SSHO will ensure that all training certificates are current. A copy of the documents listed above will be on file in the SSHO office.

6.1.3 First Aid/CPR Training

The SSHO, and additional designees, will possess current certification in first aid and CPR. At least one person so certified will be present during each work shift while Compass and/or visitors or subcontractor personnel are on-site. A copy of the First Aid/CPR certification will be kept on file in the SSHO office.

6.1.4 Daily Health and Safety Meetings

The SSHO or designated members of management will conduct a daily tailgate safety meeting. The meeting will review existing protocols and serve as a mechanism to update personnel on new Site conditions and requirements. The meeting will serve as a means to communicate the latest incident and corrective measures to prevent the opportunity of reoccurrence. The meetings will also provide an opportunity for Site personnel to express any health and safety concerns. Topics for discussion may include, but are not limited to:

- Discussion of current work activities.
- Review of available analytical or relevant process data which relates to worker exposure;
- Review of the type and frequency of environmental and personal monitoring (if any) to be performed;
- Task-specific levels of protection and anticipated potential for upgrading;
- Review of emergency procedures;
- Review of existing and/or new health and safety issues.

The **Tailgate Safety Meeting Log** (*Attachment A*) will be signed by each attendee.

6.1.5 Subcontractor Training Requirements

Prior to arrival on-site, each subcontractor will be responsible for certifying that their employees meet the training, medical monitoring requirements contained in this section by providing a copy of their certificates. Each subcontractor employee will be required to provide a document certifying the dates of their training attendance and latest annual refresher. Subcontractor personnel will also be required to attend the daily tailgate safety meeting.

6.1.6 Documentation

Attachment C contains a **Site Safety & Health Plan Acknowledgement Form**. This form will be used to document personnel review of the SSHASP and acknowledgment of the training and certification requirements specified in this section. All on-site Compass' personnel, visitors, and subcontractors are required to sign this form. The form, together with the training certificates, will be retained on-site in a notebook in the SSHO office.

Daily tailgate safety meetings will also be documented on the appropriate form included in *Attachment A*. The form will include topics of discussion for the day and be signed by all those in attendance at the meeting. Completed forms will be maintained on-site in a notebook in the SSHO office.

6.2 GENERAL MEDICAL PROGRAM

6.2.1 General

Compass will use the services of Concentra Network Services. Concentra will be used to oversee the medical examinations and surveillance specified herein. The name of the Occupational Clinic for all on-site employees shall be The **Concentra Medical Center located at 817 E Gate Dr, Mount Laurel, NJ, 08054 Phone: 856-778-1090**. A map and directions are provided.

Compass will also use the services of HEALTH BRIDGE. Health Bridge is a consulting firm that helps support the process of ensuring employees get the best possible service in the unlikely event of an injury. They assist in maintaining the required paperwork and supporting compass management in liaising with the doctors and following through with the return to work procedures and reporting procedures.

All employees involved with the project will be provided with a medical examination prior to commencing work or sometime in the preceding 12 months. The examination will meet requirements of USEPA, OSHA 29 CFR 1910.120, 1910.134, and ANSI Z88.2. The medical protocol may include the following, at the discretion of the attending physician:

1. Medical and Work History;
2. General Physical Examination (including evaluation of all major organ systems);
3. Audiogram;
4. Electrocardiogram;
5. Biological Blood Profile (SMAC-20-25);
6. Complete Blood Count (CBC) with differential;
7. Chest X-ray (as clinically indicated);
8. Pulmonary Function Testing (FVC and FEV1.O);
9. Urinalysis with Microscopic Examination, Heavy Metals;
10. Ability to wear a respirator;
11. Visual acuity; and
12. Specific Bioassays (as required).

Additional clinical tests may be included at the discretion of the Occupational Physician.

Periodic (annual) surveillance examinations will be performed, as described above, for all on-site employees included in the medical surveillance program. In addition, nonscheduled medical examinations will be conducted under the following circumstances:

1. After acute exposure to any toxic or hazardous material;
2. At the discretion of the Owner, SSHO, and Occupational Physician, when an employee reports the potential exposure to dangerous levels of toxic or hazardous materials;
3. At the discretion of the Owner, SSHO, and Occupational Physician, and upon receipt of a request for a medical examination from an employee with demonstrated symptoms of exposure to hazardous substances;
4. In accordance with the corporate drug policy, after any accidents, severe injuries, and/or property damage caused by an error in judgment, and;
5. After lost workday accidents/illness as directed by Compass Environmental SOP CE-06 of the Compass' Corporate H&S manual.

Compass will maintain medical surveillance records for its employees and will require lower-tier subcontractors to do likewise. These records will be available to the Owner or regulatory agencies upon request by appropriate officials following all rules prescribed under 29 CFR 1910.120. A medical clearance form will be kept on site for each employee and subcontractor personnel. The employee's complete occupational medical history is on file at Concentra Network Services at the location at which the examination occurred. These records will be maintained for the duration of employment plus 30 years.

6.2.2 Respirator Certification

Prior to authorizing the use of any air purifying or supplied-air respirator, OSHA, under 29 CFR 1910.134 and 29 CFR 1925.58, requires that a determination be made regarding the prospective wearer's physical ability to safely use such equipment. Consequently, individuals scheduled to work in areas that require the use of respiratory protection must provide the SSHO with current documentation, signed by a qualified physician, regarding the individual's physical ability to wear a respirator. The medical clearance form will indicate the employee's ability to wear respiratory protection on the Site. The inability to provide current or complete documentation will be sufficient grounds to preclude any individual from areas or tasks requiring such protection. In addition to the medical clearance, an annual fit test will be issued to each employee. Documentation of a satisfactory fit test will be kept on file in the SSHO office.

6.2.3 Exposure/Injury Medical Emergency

As a follow-up to an injury or illness, or as a result of possible excessive exposure to either a chemical or physical hazard, all employees are entitled and required to seek appropriate medical attention. The SSHO or designated alternate must be apprised of the need for seeking such medical attention and assist in determining the immediacy of the situation.

During and immediately following the emergency situation, the SSHO or designated alternate has the following responsibilities:

- Ensure that the examining medical facility is fully apprised of the Site condition and/or hazard which caused the medical emergency;
- Health Bridge Services are called at 1-800-633-4350 before an employee is taken to a clinic
- Conduct an investigation of the Site condition which caused the medical situation prior to reassigning the task;
- Complete an **Compass Environmental Incident Report (Attachment A)**;
- Ensure that the injured or ill worker receives written medical clearance prior to returning to the Site;
- Ensure copies of the **Medical Clearance** and **Accident/Injury Investigation and Analysis Report** (Attachment A) are maintained on-site in the SSHO office for the duration of the project; and
- Provide a copy of the **Medical Clearance** and **Accident/Injury Investigation and Analysis Report** for the employee's medical records.
- Ensure that a copy of the report(s) is presented to the Health and Safety Manager and the Project Manager within 24 hours
- Implement corrective action to prevent future occurrence of the incident, and inform on-site personnel of such subsequent corrective incident and action.

Injury/illness and/or possible excessive exposure to either a chemical or physical hazard requiring emergency medical treatment and hospitalization must be reported within 24 hours to

the Project Manager, Compass' Manager of Health and Safety, and the Client. Fatalities must be reported immediately.

6.2.4 Exit Medical Examination

An exit medical examination will be provided for employees within two (2) working days upon the termination of the employee from Compass. This physical will include all items listed for the baseline medical exam. In addition, exit bioassays may be needed for employees who are exposed to the certain contaminants such as lead, at or above levels above the published permissible exposure levels for 30 or more days per year (12 consecutive months).

A complete examination report will be mailed to the employee, with a copy kept on file at Concentra Network Services. An abbreviated exit examination report or signed declination form will be kept on file in the Compass Environmental office in Stone Mountain, Georgia.

6.2.5 Location of Clinic

Figure 6-1 Route to Clinic

Start: 193 Rt 73, Berlin, New Jersey, United States

End: Concentra Medical Center
817 E Gate Dr, Mount Laurel, NJ, 08054

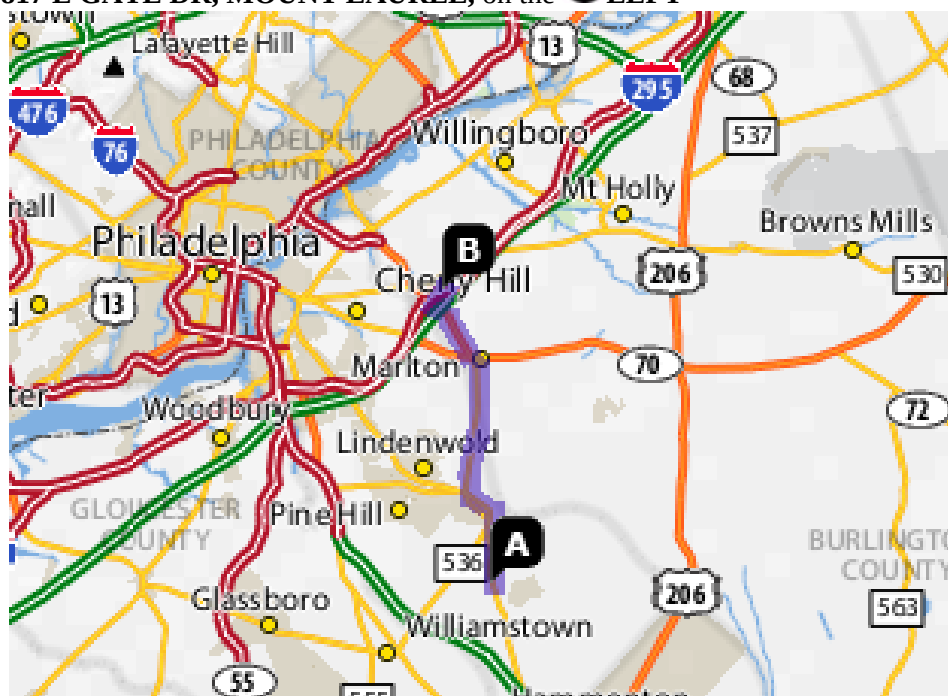
Phone: 856-778-1090

Fax: 856-778-9191

Total Distance: 16 miles

Estimated Time: 25 minutes

- | | | |
|--|-------------------|---------|
| 1. Start at 193 RT-73, BERLIN going toward TOM WELLS RD | go 14.1 mi | 14.1 mi |
| 2. Continue on RT-73 N | go 0.8 mi | 14.9 mi |
| 3. Turn (R) RIGHT on FELLOWSHIP RD | go 0.9 mi | 15.8 mi |
| 4. Turn (R) RIGHT on E GATE DR | go 0.1 mi | 15.9 mi |
| 5. Arrive at 817 E GATE DR, MOUNT LAUREL , on the (L) LEFT | | |



SECTION 7

SITE CONTROL

7.1 SITE CONTROL

Site control will minimize the potential contamination of workers and observers, protect the public from potential on-site hazards, and prevent vandalism of equipment and materials. Site control measures also enhance response in emergency situations. The Site field operations will be divided into three work zones. These zones are described below:

1. **Exclusion Zone (EZ)**—The area where the highest potential for exposure exists for workers. Personal protective equipment is required in this area. The EZ must be clearly demarcated by barricades or barrier tape that will be placed a minimum of 3 feet from the edge of an active operation. Some situations may necessitate a distance less than the recommended minimum. These instances should be reviewed by the SSHO.

Visitors are not permitted into controlled zones (EZ and CRZ) without the approval of site management. Additionally, visitors must have satisfactorily completed the required OSHA training, be properly fitted with respiratory protection, and have medical clearance, as required.

2. **Contamination Reduction Zone (CRZ)**—The area immediately adjacent to and surrounding the EZ. This area is used as a transition zone between the EZ and support zone. This area is used to minimize the potential for contact with contaminated soils by decontamination and other work practices. The CRZ will include facilities for personnel or equipment decontamination. Personal protective equipment worn in the EZ may not be worn outside the CRZ except during emergencies.
3. **Support Zone (SZ)**—All areas outside the CRZ and EZ. The exposure potential in these zones is minimal. SZs provide a changing area for personnel entering the CRZ and EZ, a lunch area, office space, and clean equipment and material storage. Protective clothing worn in an EZ may not be worn in a Support Zone except in an emergency.

The final locations of these zones will be determined and modified as necessary in the field. In addition, it may be necessary to make modifications as weather and Site conditions change. Movement of personnel between the three zones will be limited through specific access control points to prevent cross-contamination from contaminated to clean areas.

7.2 SITE ACCESS CONTROL

7.2.1 General

It is the responsibility of the Site Manager or designated alternate to control access to the Site and to ensure proper security. Any evidence of unauthorized entry should be noted, and the SSHO shall be immediately notified. Effective site security will prevent the following:

- Exposure of unauthorized, unprotected people to Site hazards;
- Increased hazards from vandals or persons seeking to abandon other wastes on the Site;
- Interference with safe working procedures.

Site visitors, as well as on-site workers, will be required to sign in at the office trailer upon arrival at the site.

7.2.2 Visitor Training

Prior to entry to the Site, all visitors must receive a Site-specific orientation briefing. The topics covered in this orientation will include those outlined in *Section 6.1.1*. Additional information will also be incorporated from the latest tailgate safety meeting.

Visitors who intend to enter the EZ must also provide evidence that they have successfully completed the 40 hours of general training and possess a physicians declaration reporting that the individual is medically fit to work as required in 29 CFR 1910.120.

7.3 BUDDY SYSTEM

Activities in contaminated or otherwise hazardous areas will be conducted with a “buddy” who is responsible for performing the following activities:

- Provide his/her partner with assistance;
- Observe his/her partner for signs of chemical or heat exposure;
- Periodically check the integrity of his/her partner's protective clothing; and
- Notify the shift supervisor or others if emergency help is needed.

The access area for personnel entering the Exclusion Zone is a convenient location for enforcing the buddy system because all personnel who enter the contaminated areas must pass through this entrance point.

7.4 SITE COMMUNICATIONS

Two sets of communication systems will be established prior to initiating Site activities: (1) internal communications among personnel on-site; and (2) external communication between on-site and off-site personnel. Internal communication alerts team members to emergencies; passes along safety information; time remaining until next rest period; changes in the work to be accomplished; and maintains Site control. An external communication system between on-site and off-site personnel is necessary to report to management, and maintain contact with essential off-site emergency response personnel.

On-site internal communications will be conducted through verbal communications and hand-held two-way radios. Nonverbal communications will be used when background noise or PPE impede verbal communications and will utilize standard hand and air-horn signals, as illustrated below:

On-site Communication Procedures—

- + Channel one has been designated as the radio frequency for personnel in the Exclusion Zone. All other on-site communications will use channel two.
- + Personnel in the Exclusion Zone should remain in constant radio communication or within sight of the working partner. Any failure of radio communication requires an evaluation of whether personnel should leave the Exclusion Zone.
- + The following standard hand signals will be used in case of radio failure:
 - Hand gripping throat Out of air, can't breathe.
 - Grip partner's wrist or both hands..... Leave area immediately.
around waist.
 - Hands on top of head Need assistance.
 - Thumbs up..... OK, I am all right, I understand.
 - Thumbs down No, negative.
- + **Three short blasts on the air horn** is the emergency signal to indicate all personnel should leave the Exclusion Zone.

External communications during Site activities will be accomplished by use of telephone at the Site office (External Emergency Services Numbers are found in Section 2).

7.5 DUST CONTROL

One of the best ways to reduce exposure to potentially contaminated soils is by reducing the generation of dust. Equipment operators will be responsible for using their equipment in a method that will create the least amount of unnecessary soil disturbance. This will include speed reduction during travel and correct loading/unloading of contaminated soil during work operations. If dust generation becomes a problem because of wind, low rainfall, etc., the employees on-site will be responsible for implementing fugitive dust control measures.

Dust will be minimized at all times, including non-working hours, weekends, and holidays. Water spray will be applied, as needed, to control dust during soil handling and stockpiling operations. Additionally, potentially hazardous material stockpiles will remain covered with polyethylene plastic sheeting when not directly involved in removal activities to prevent dusting due to wind and erosion due to rain. The goals of the dust control program are no visible dust as well as prevention of air levels that raise risk concerns for the chemicals of interest at the site.

SECTION 8

PERSONAL PROTECTIVE EQUIPMENT AND EQUIPMENT REASSESSMENT PROGRAM

8.1 OVERVIEW

This section of the HASP provides a discussion of the selection criteria, selected ensembles, and a comprehensive reassessment program providing action levels for both vapors and dust for either upgrading or downgrading the level of personal protective equipment (PPE). In addition, related information on the use of PPE is found in the following sections:

- **Section 6—Personnel Training and Medical Requirements** specifies that all individuals, who may be in potentially contaminated areas, will have Hazardous Waste Operations and Emergency Response (HAZWOPER) training. One of the purposes of that training is to cover the proper use, maintenance and limitations of PPE ensembles.
- **Section 7.3—Buddy System** specifically states one of the specific duties incorporated into the buddy system is an integrity check of others' PPE.
- **Section 10.4—Heat Stress** discusses the use of PPE in relationship to its propensity to cause concern about heat stress.
- **Section 12—Decontamination Protocols** is dedicated to the decontamination of equipment and personnel.

8.2 PPE SELECTION CRITERIA

PPE ensembles chosen for each individual task are specified in Section 8.6, Levels of Protection. Equipment selection is based on the mechanics of the task and the nature of the hazards which are anticipated. The following criteria were used in the selection of equipment ensembles:

- Chemical hazards known or suspected to be present;
- Routes of entry through which the chemicals could enter the body (i.e.-inhalation, ingestion, skin contact), and;
- Potential for contaminant-worker contact while performing the specific task or activity.

8.3 RESPIRATORY PROTECTION

All personnel who may come in contact with airborne contaminants must be provided respiratory protection sufficient to safeguard them from exposure to unacceptable levels. It is desirable to prevent airborne contaminants from being generated through engineering controls and proper work practices. Where these methods are insufficient to control exposures below the established limits, then respiratory protection shall be used to supplement these methods.

This section will serve as the written Respiratory Protection Program for the Site. Guidance contained in the Compass Environmental H&S manual will be followed. The following elements are required to be fully in place and operational prior to starting a task. These elements apply to all Compass's personnel and subcontractors who may require PPE:

- Written standard operating procedures governing the selection and use of respirators are established by this procedure.

- Respirators will be full-face, air-purifying respirators with combination pesticide, organic vapor and particulate cartridges.
- Compass' employees and subcontractors will be instructed and trained in the proper use of respirators and their limitations by the SSHO.
- When used, respirators will be assigned to individual workers for their exclusive use, with the exception of SCBAs.
- Respirators will be cleaned and disinfected at the conclusion of the shift. The SSHO will be responsible for enforcing these procedures.
- Respirators shall be stored in a convenient, clean, and sanitary location.
- Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use, such as self-contained breathing devices, shall be thoroughly inspected at least once a month and after each use. Emergency respirators shall be readily available for use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained by the SSHO.
- The SSHO will regularly inspect and evaluate the effectiveness of the program.
- A physician's "written opinion" will be obtained by the SSHO to document the ability of each employee to wear a respirator.
- NIOSH approved or accepted respirators only will be used.

Fit testing of respirators will be conducted for employees meeting the training and medical criteria.

8.4 PROTECTIVE CLOTHING

Protective clothing is used to minimize direct contact of the worker's skin with contaminated soil and water and to minimize contact with chemicals which will readily permeate "standard" work clothing. Clothing, gloves, and boots are not chemical proof and only provide increased resistance to skin contact with hazardous substances. Protective clothing deteriorates and degrades over time. Factors such as environmental stresses, type and concentration of contaminant present, duration of contact, and properties of the clothing are some of the factors affecting chemical protective clothing's ability to provide protection.

8.5 ESTABLISHED LEVELS OF PROTECTION

No entry into the EZ will be allowed without the proper level of protective equipment worn by the worker. Failure to wear the properly prescribed level of PPE for the specific task will be grounds for immediate dismissal.

Certain levels of protection are established for various functions on-site while in the EZ. These levels of protection shall be increased or decreased based on realtime monitoring data and historical exposure assessment data. The SSHO will provide monitoring to determine the proper levels of protection.

8.6 LEVELS OF PROTECTION

Minimum initial levels of protection for anticipated tasks to be considered are specified under the sections listed below:

1	Mobilization	Level D
2	Well Decommissioning and Replacement	Modified D/Level D
3	Install Excavation Support Systems	Modified D/Level D
4	Excavation and Staging of Soil	Modified D/Level D
5	Waste Characterization and Disposal	Modified D/Level D
6	Backfill	Modified D/Level D
7	Site Restoration	Level D
8	Demobilization	Level D

Compass will provide its personnel with appropriate personal safety equipment and protective clothing. Compass will ensure that all safety equipment and protective clothing is properly used, kept clean, and well maintained.

Personal safety equipment and protective clothing will include, but not be limited to, the following:

1. Clothing as dictated by weather;
2. Tyvek™ or poly-coated Tyvek™ provided to personnel entering the Exclusion Zone;
3. Chemical resistant gloves – Nitrile or Sol-Knit™
4. Hard-hats and liners;
5. Chemical-resistant, steel-toe boots that meet ANSI Z41;
6. Face shield and/or safety glasses that meet or exceed ANSI Z87.1; and
7. Air-purifying respirators with combination pesticide, organic vapor, and particulate cartridges; pressure-demand, self-contained breathing apparatus (SCBA), or other supplied-air system as necessary to conduct Site activities in a safe manner. A SCBA will be maintained in a ready state for emergency use.

Level D Protection Consists of the Following:

1. PVC, steel-toe boots or boot covers that meet or exceed ANSI Z41;
2. Outdoor work clothing appropriate for climate;
3. Hard hat;
4. Safety glasses (goggles) that meet or exceed ANSI Z87.1;
5. Leather Work Gloves; and
6. Hearing protection as required.

Modified Level D Protection Consists of the Following:

1. Cotton coveralls;
2. Tyvek™, poly-coated Tyvek™, or equivalent material for splash hazards;
3. PVC, steel-toe boots or boot covers that meet or exceed ANSI Z41;
4. Leather Work Gloves;
5. Nitrile or Sol-Knit™ (Ansell-Edmont) chemical protective gloves;
6. Hard-hat ;
7. Safety glasses (goggles) that meet or exceed ANSI Z87.1; and
8. Hearing protection as required.

Level C Protection Consists of the Following:

1. Tyvek™ or polycoated Tyvek™;
2. Full-face, air-purifying respirator with NIOSH certified combination cartridges for organic vapors, pesticides and particulates.
3. Outer boots;
4. All other equipment remains the same as for Level D.

Level B Protection Consists of the Following:

1. Full-face, supplied-air respirator with five-minute escape cylinder or SCBA replacing air-purifying respirator;
2. Outer boots;
3. All other equipment remains the same as for Level C.

Level A Protection Consist of the Following:

1. Pressure-demand, full face SCBA or pressure-demand supplied air respirator with escape SCBA.
2. Fully encapsulating suit.
3. All other equipment remains the same as for Level B.

8.7 PPE REASSESSMENT PROGRAM

The level of protection provided by selected PPE shall be upgraded or downgraded based upon monitoring results or a change in Site conditions. Typical indicators for reassessment would include:

- Commencement of a new work phase, such as the start of work that begins on a different portion of the Site.
- Change in job tasks during a work phase.
- Appearance of new contaminants other than those previously identified.
- Changes in ambient levels of contaminants.
- Change in work scope that affects the degree of contact with contaminants.

Upgrading or downgrading the level of protection based on changes in ambient levels of contaminants in the worker breathing zone will be determined by using portable direct-reading instruments for particulate concentrations and by personal dosimetry. Instrumentation will include a miniRam for measuring airborne particulates and an oxygen/combustible gas/carbon monoxide/toxic chemical meter for confined spaces (as required). Action levels for such area monitoring have been established for the project and are listed in Tables 8.1. Action levels are real time and the particulate action level should be considered when deciding on whether to upgrade respiratory protection from Level D to Level C. Therefore, the particulate action level will be used as the action level for the contaminants of interest. Additional air sampling and monitoring information can be found in Section 9. Sampling may be performed by either Compass or the owner's representative and if either company records levels above the action level, the airborne contaminant issue will be addressed.

TABLE 8.1A¹
ACTION LEVELS FOR PPE UPGRADE
FROM LEVEL D TO LEVEL C

CONTAMINANT	ACTION LEVEL*
-------------	---------------

Organic Vapors	5.0 ppm
Particulates	1 mg/m ³

TABLE 8.1B¹
ACTION LEVELS FOR PPE UPGRADE
FROM LEVEL C TO LEVEL B

CONTAMINANT	ACTION LEVEL *
Organic Vapors	10.0 ppm
Particulates	15 mg/m ³

*Sustained Readings for 15 minutes.

¹ A more detailed discussion concerning the development of the action levels can be found in Section 9.

Background levels of particulates will be established daily at each work area. If during the perimeter or work area monitoring the action level is exceeded, all workers in the work area will be required to don or upgrade respiratory protection if engineering controls such as dust suppression with a water truck cannot reduce levels immediately (Section 9, Paragraph 9.3). When the action level is exceeded, the SSHO or designee will implement continuous monitoring between the active work area and the perimeter to provide input for determining the source strength and potential downwind impacts.

Prior to entry into any confined space or excavation, the atmosphere will be checked using an oxygen/combustible gas meter. If an oxygen-deficient atmosphere is noted (less than 19.5% oxygen), the space will be ventilated and rechecked until the deficiency is corrected. Once the oxygen deficiency no longer exists, the atmosphere will be checked for the presence of combustible gases. Any reading above ten percent of the LEL will require corrective measures (i.e. PPE, continuous ventilation, etc.) prior to entry into the area. No confined space work is expected in this work plan

If at any time during air monitoring activities it is determined that an action level is reached, a higher grade of personal protection (C) will be used. *Table 8.2, Levels of Protection: Typical PPE Ensembles*, lists typical ensembles for Level A, B, C, and D protection and the reasons for use of each.

8.7.1 Recordkeeping

A **Daily Air Monitoring Report** (*Attachment A*) documenting all direct reading measurements will be maintained by the SSHO. This daily report form will document the task, time, meter reading, and level of protection being worn by workers involved in the activity. Actions taken in response to releases and/or recordings above pre-established action levels will also be recorded in the Daily Air Monitoring Report.

TABLE 8.2
LEVELS OF PROTECTION: TYPICAL PPE ENSEMBLES

LEVEL OF PROTECTION	RECOMMENDED	PROTECTION PROVIDED	SHOULD BE USED WHEN	LIMITING CRITERIA
A	Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA	The highest available level of respiratory, skin, and eye protection.	The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either: • Measured (or potential for) high concentration of atmospheric vapors, gases, or particulates. OR • Site operations and work functions involving a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the intact skin. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible. Operations must be conducted in confined, poorly ventilated areas until the absence of conditions requiring Level A protection is determined.	Fully encapsulating suit material must be compatible with the substances involved.

TABLE 8.2, (CON'T)
LEVELS OF PROTECTION: TYPICAL PPE ENSEMBLES

LEVEL OF PROTECTION	RECOMMENDED	PROTECTION PROVIDED	SHOULD BE USED WHEN	LIMITING CRITERIA
B	Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA. Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical-resistant one-piece suit). Inner and outer chemical-resistant gloves. Chemical-resistant safety boots/shoes. Hard-hat. Two-way radio communications. Disposable boot covers. Face shield.	The same level of respiratory protection but less skin protection than Level A.	The type and atmosphere concentration of substances have been identified and require a high level of respiratory protection, but less skin protection. This involves atmospheres: • with IDLH concentrations of specific substances that do not represent a severe skin hazard; OR • that do not meet the criteria for use of air-purifying respirators. Atmosphere contains less than 19.5% oxygen. Presence of incompletely identified vapors or gases indicated by direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemical harmful to skin or capable of being absorbed through skin contact.	Outer coverall suit material must be compatible with the substances involved.

TABLE 8.2, (CON'T)
LEVELS OF PROTECTION: TYPICAL PPE ENSEMBLES

LEVEL OF PROTECTION	RECOMMENDED	PROTECTION PROVIDED	SHOULD BE USED WHEN	LIMITING CRITERIA
C	Full-facepiece or half face air-purifying, cartridge-equipped respirator. Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). Chemical-resistant safety boots/shoes. Hard-hat. Hearing protection. Optional: Coveralls. Disposable boot covers. Face shield. Escape mask.	The same level of skin protection as Level B, but a lower level of respiratory protection.	The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin. The types of air contaminants have been identified, concentrations measured, and a canister is available that can remove the contaminant. All criteria for the use of air-purifying respirators are met.	Atmospheric concentration of chemicals must not exceed IDLH levels. The atmosphere must contain at least 19.5% oxygen.

TABLE 8.2, (CON'T)
LEVELS OF PROTECTION: TYPICAL PPE ENSEMBLES

LEVEL OF PROTECTION	RECOMMENDED	PROTECTION PROVIDED	SHOULD BE USED WHEN	LIMITING CRITERIA
Modified D	Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit).	The same level of skin protection as level C without respiratory protection	The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin.	May not be worn when atmospheric concentration of chemicals exceeds PEL.
	Chemical-resistant safety boots/shoes Hardhat Hearing protection Optional— • Gloves • Escape mask • Face shield			The atmosphere must contain at least 19.5% oxygen.
D	Coveralls	No respiratory protection.	The atmosphere contains no known hazard, or hazard is controlled to levels below the PEL.	This level should not be worn in the Exclusion Zone.
	Safety boots/shoes Safety glasses or chemical splash goggles Hardhat Hearing protection Optional— • Gloves • Escape mask • Face shield	Minimal skin protection.	Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.	The atmosphere must contain at least 19.5% oxygen.

SECTION 9

ENVIRONMENTAL AND PERSONAL

ON-SITE AIR MONITORING PLAN

9.1 OVERVIEW

This section describes the air monitoring program for the Lightman Drum project, including the equipment to be used, monitoring protocol for typical work activities, perimeter sampling and project personnel sampling protocol. The air monitoring plan establishes the data used to determine the action levels (Table 8.1) for initiation of dust suppression, and for changes in personal protective equipment (PPE). Therefore, the purposes of air monitoring include:

- Assessment of worker exposure;
- Detection of any off-site migration of contaminants
- Ensuring proper selection of protective equipment to minimize exposure; and
- Delineation of areas where protection is required.

While work is in progress, Compass will conduct real time monitoring in and around each active work location. Real-time monitoring will be conducted during excavation and as required by special work conditions. Adjustments in air sampling/monitoring will be at the discretion of the SSHO and PSHR. All monitoring data will be recorded on the **Daily Air Monitoring Report (Attachment A)** and transmitted to the Site Manager on a daily basis. As mentioned in Section 8, PPE will be upgraded or downgraded based upon real-time monitoring results. Prior to the beginning of Site activities, background levels of airborne particulates will be determined with real-time monitoring instruments and active sampling systems.

9.2 ON-SITE SAFETY AND HEALTH AIR MONITORING EQUIPMENT

Compass's health and safety staff will maintain air monitoring equipment on-site sufficient to meet the monitoring requirements for each active work area. Both real-time monitoring and perimeter air sampling will be used for the Lightman Drum project as needed to ensure both the employees and community are not exposed. The equipment Compass will keep on the Site will include:

1. Aerosol Monitor—Thermo pDR-1000 particulate monitor or equivalent
2. VOC monitor – Rae Systems MiniRAE PID or ppbRAE PID

If Confined Space work, including entry into an excavation, is required, a 4 gas meter will be brought onsite to monitor the atmosphere during those work activities. Air monitoring equipment will be calibrated daily or as recommended by the manufacturer. Maintenance on all monitoring and sampling equipment will be performed in accordance with the manufacturers recommended maintenance schedule.

9.3 MONITORING ACTIVITIES

9.3.1 Monitoring Typical Work Activities

Compass will conduct real-time monitoring for particulates during all Site work involving excavation, backfill, hazardous material handling, decontamination of equipment, confined space entry and general work in the EZ. Measurements will be taken in each working area, with monitoring efforts concentrated on the areas with the highest potential for contamination. All air

monitoring results will be recorded in the **Daily Air Monitoring Report** (*Attachment A*), discussed at the tailgate safety meetings, and posted in the Health and Safety office.

9.3.2 Monitoring Flame Cutting Operations

When flame cutting or burning is anticipated, the atmosphere will be checked for the presence of organic vapors, explosive and oxygen-deficient/rich atmospheres prior to that activity. The SSHO will record the results of this monitoring on the **Daily Air Monitoring Report** (*Attachment A*). In addition, the data will be used to complete a **Hot Work Permit** (*Compass Environmental SOP CE-14*), which must be signed by the SSHO. Burning or cutting operations will not be allowed if readings indicate there is more than ten percent of the Lower Explosive Limit (LEL), or the concentration of oxygen is below 19.5 percent or above 23 percent. Should the LEL or O₂ levels fall or rise above acceptable levels, the operation will be halted until the atmosphere returns to acceptable levels by natural means or by forced ventilation. No Flame cutting is expected.

9.4 PERSONAL SAMPLING

Samples will be collected in the employee's approximate breathing zone using personal sampling pumps and the appropriate collection media. The SSHR will select the employee with the highest potential exposure as a monitoring subject. For each major task, a representative number of employees (~10%) will be sampled. After the initial sampling, additional air sampling will be conducted when work activities change and when real time air monitoring indicates the need for additional sampling.

BTEX will be collected using NIOSH Methods 1500/1501 using a pre-calibrated personal sampling pump attached to a charcoal tube. A gas chromatograph/flame ionization detector will be used to quantify the analytes.

Tetrachloroethene will be collected using NIOSH Method 1003 using a pre-calibrated personal sampling pump attached to a charcoal tube. A gas chromatograph/flame ionization detector will be used to quantify the analytes.

Trichloroethene will be collected using NIOSH Method 1022 using a pre-calibrated personal sampling pump attached to a charcoal tube. A gas chromatograph/flame ionization detector will be used to quantify the analytes.

Each sample is to be shipped to the laboratory for analysis within its allowable hold time. A field blank will also be submitted for analysis for each sampling media on a frequency of one blank per twenty samples. The above mentioned sampling methods have been summarized in the table below:

Table 9.1
Personal Sampling Summary

Compound	Method	Media	Min/Max Air Volume (L)	Flow Rate L/min.
BTEX	N1500/1501	Charcoal tube	5-30	0.01- 0.2
Tetrachloroethene	N1501	Charcoal tube	5-30	0.01- 0.2
Trichloroethene	N0500	Charcoal tube	5-30	0.01- 0.2
TSP	N7300	MCE or PVC	200 - 1500	1 – 4

All personal samples will be collected as full-shift samples and results will be reported as work-shift Time-Weighted Averages (TWAs).

9.4.1 Occupational Exposure Limits/Action Levels

A major consideration given to air monitoring is the soil concentration of the contaminants of concern. The degree to which an individual is potential exposed is directly related to the source and extent of the contamination. Therefore to be protective of health and the environment and to include an additional safety factor to minimize the potential for exposure, the maximum concentration of each compound is used to determine the amount present when particulate are released in the air. To that end, the maximum concentrations for compounds found on site are listed in Table 9.2.

The generic term, 'time weighted average' (TWA) is the occupational exposure limit of airborne concentrations used to represent the conditions at which most workers can be repeatedly exposed without adverse health effects. The data has been compiled using the OSHA term 'Permissible Exposure Limits' (PEL); NIOSH uses another term 'Recommended Exposure Limits' (REL).

The generic term, 'time weighted average' (TWA), is the occupational exposure limit of airborne concentrations used to represent the conditions at which most workers can be repeatedly exposed without adverse health effects. This data has been compiled by OSHA using the term 'Permissible Exposure Limits' (PEL); NIOSH uses a common term 'Recommended Exposure Limits' (REL). The TWA is based upon an eight-hour day during a forty-hour workweek. Some workers who are regular smokers, hypersensitive, on medications, or those who have had previous exposures may not be adequately protected from the effects of chemicals at concentrations at or below these exposure limits.

Compass plans to operate with one 10-hour shift per day for 5 days during the removal activities thus the 10 hr TWA for the contaminants of concern will be used.

TABLE 9.2 CHEMICALS OF INTEREST

CONSTITUENTS	MAXIMUM CONCENTRATION	CONSTITUENTS	MAXIMUM CONCENTRATION
Volatile Organics	(ug/kg)	Inorganics	(mg/kg)
1,2-Dichlorobenzene	1100*	Aluminum	3770
1,3-Dichlorobenzene	7*	Antimony	0.28*
1,4-Dichlorobenzene	1800*	Arsenic	6.9
1,2,4-Trichlorobenzene	7100	Barium	8.5*
1,1,1-Trichloroethane	31*	Cadmium	3.6
1,1,2-Trichloroethane	2*	Chromium	21.3
cis-1,2-Dichloroethene	260*	Cobalt	0.27*
2-Butanone	780*	Copper	3.3*
Acetone	26*	Iron	11000
Benzene	140*	Lead	5.2
Chlorobenzene	93	Magnesium	49.9*
Dichlorodifluoromethane	4900*	Manganese	4.8*
Ethylbenzene	150000	Nickel	0.89*
Isopropylbenzene	1400*	Potassium	168*
Tetrachloroethene	39000	Silver	0.12*
Toluene	6600*	Sodium	38.9*
Trichloroethene	870*	Thalium	0.76*
Xylene (total)	720000*	Vanadium	18.7
		Zinc	5.5

*= The analyte was detected and is considered estimated

9.4.2 TSP Action Level for Constituents of Interest

Particulate levels will be controlled using safe work methods and dust suppression and monitored via real-time air monitoring. Personal sampling will be conducted for Total Suspended Particulate (TSP) and Lead during initial excavation activities. If conditions warrant, additional TSP monitoring will be conducted.

The TWA for lead will be used to calculate the maximum TSP action level allowed in the work areas. Because the collected TSP is ideally in the same percentages in the suspended particulate as in the soils, the maximum TSP level is determined by dividing each contaminant's 10-hour exposure limit by the maximum concentration found in the soils. Of each constituent of concern, vanadium and lead have the lowest allowable TSP levels, and will be used as the limiting component for determining the action level.

Example:

Vanadium	Allowable = 0.04 mg/m ³	Lead	Allowable = 0.04 mg/m ³
	Maximum in material = 0.00187%		Maximum in material = 0.00052%
	$0.04\text{mg/m}^3 \div 0.0000187 = > 1\text{mg/m}^3$		$0.04\text{mg/m}^3 \div 0.0000052 = > 1\text{mg/m}^3$

The TSP values calculated are greater 1 mg/m³, the maximum TSP levels have been set 1 mg/m³. Compass will use a value of 1 mg/m³ above background, sustained for 15-minutes, during real-time particulate monitoring as an action level to upgrade respiratory protection from Level D to Level C. This action level is considered sufficient indication of occupational exposure to the additional constituents of concern. In addition, personnel and ambient air sampling will be used to evaluate the effectiveness of the prescribed real time action levels. These levels have been established for real time TSP monitoring only.

9.4.3 VOC Action Level Calculation for Constituents of Concern

A PID will be used to evaluate real-time employee exposure to the volatile organic compounds. An action level of 5 ppm, sustained for 15 minutes, will be used to upgrade respiratory protection from Level D to Level C (Table 8.1A). An action level of 25 ppm, sustained for 15 minutes, will be used to upgrade respiratory protection from Level C to Level B (Table 8.1B). The action level is based on the short-term exposure limit for benzene because of its relative abundance and low permissible exposure limit. Although tetrachloroethylene is more abundant its permissible exposure limit is much greater than benzene's and therefore the action level set for benzene would also be protective when encountering tetrachloroethylene.

The calculation for the benzene action level was determined as follows:

$$\text{Occupational Exposure Limit (OEL)} = \frac{C_a T_a + C_b T_b + C_n T_n}{480 \text{ min}}$$

Where C is in ppm and T is in minutes, therefore three short term events were considered for duration of 15 minutes each.

$$\text{OEL} = \frac{(5\text{ppm})(15 \text{ min}) + (5 \text{ ppm})(15 \text{ min}) + (5 \text{ ppm})(15 \text{ min})}{480 \text{ min}}$$

In this example, OEL was determined to be 0.47 or more than two times lower than the NIOSH's 1 ppm STEL and approximately 10 times lower than that stipulated in 29 CFR 1910.1028

9.5 PERIMETER AIR MONITORING AND REAL TIME MONITORING

Compass will conduct real-time air monitoring for particulate and volatile organics around the designated work areas as needed. The results of this monitoring will be used to determine if the work procedures and personal protective equipment being used at the site are providing adequate protection for site personnel and the community.

Monitoring locations will be established daily based upon type and location of work and wind direction. The monitors will log periodic readings and the data will be downloaded at the end of the day and reviewed to ensure no action levels were exceeded. If action levels are exceeded, additional safety precautions will be put in place. These precautions may include, but are not limited to, additional PPE, changes in work procedures, or implementation of additional dust suppression.

Perimeter monitoring will not be performed by Compass for this portion of work.

SECTION 10

SAFE WORK PRACTICES

10.1 GENERAL

To maintain a strong safety awareness and enforce safe procedures at the Site, a list of standing orders has been developed stating the practices that must always be followed and those that must never occur in the EZ and CRZ on-site. The list of standing orders is as follows:

1. No smoking, eating, or gum chewing will be permitted in the EZ or in the CRZ;
2. Fieldwork will only be conducted during daylight hours unless adequate artificial lighting is provided;
3. Soil sampling activities in the excavation areas will be performed as a “Buddy System”;
4. All personnel are required to attend a daily safety meeting, read the SSHASP, and sign all appropriate forms prior to initiating work;
5. Personnel will be advised of the precautions to be taken against heat/cold stress;
6. Walkways will be kept clear of equipment, sampling materials, and other obstructions; and

To ensure that everyone who enters the Site is aware of these orders and familiar with their content, the list will be made available in the following ways:

- Available for review in the SSHO office;
- Posted conspicuously at the Site entrance and at the entrance to the CRZ and/or the Exclusion Zone; and
- Reviewed by the SSHO or designated alternate with the field crew at the beginning of each work day, thereby informing personnel of any new standing orders resulting from a change in Site conditions or work activities.

Additionally, appropriate warning signs, devices, and fences will be erected and posted.

In addition to the standing orders, the site's Hazard Communication Program will include MSDSs which list the names and properties of chemicals present on the Site. All chemicals that are used on-site will be properly stored and labeled. Employees will be briefed on this information at the beginning of the project or whenever they first join the work team. Tailgate safety meetings will be held for all employees prior to initiating work for the day.

10.2 HEAVY EQUIPMENT OPERATION

Working with tools and heavy equipment (e.g., excavation equipment) is a major hazard at the Site. Injuries can result from equipment hitting or running over personnel, impacts from flying objects, burns from hot objects, and damage to PPE. The following general precautions will be followed to help prevent injuries from such hazards:

- Before any heavy equipment, machinery or mechanized equipment is placed in use, it will be in safe operating condition. Records of the inspections (performed each shift and weekly) will be maintained at the Site and will be available on request to the designated authority.
- The Site Manager will designate a competent person to be responsible for the daily inspection of all machinery/equipment and during use to make sure it is in safe operating condition. Checks will be made at the beginning of each shift. The

equipment to be used will be tested to determine that the brakes and operating systems are in proper working condition.

- Preventative maintenance procedures recommended by the manufacturer will be followed.
- Any machinery or equipment found to be unsafe will be sidelined, tagged as unsafe, and its use prohibited until safe conditions have been restored.
- Machinery and mechanized equipment will be operated only by designated, experienced and qualified personnel. Equipment deficiencies observed at any time that affect their safe operation will be corrected before continuing operation.
- Getting off or on any equipment while in motion is prohibited.
- Machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. (**Exemption:** *Equipment designed to be serviced while running*).
- Bulldozer and scraper blades, front-end loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.
- All points requiring lubrication during operation will have fittings located and guarded as to be accessible to employees without potential for injury.
- When necessary, all mobile equipment and the area in which it is operated will be adequately illuminated while work is in progress.
- Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shutoff that will prevent spillage if connections are broken, may be used to fuel diesel-powered equipment left running.
- All towing devices used on any combinations of equipment will be structurally adequate for the weight drawn and securely mounted.
- Personnel will not be permitted to get between a towed object and towing piece of equipment until the towing equipment has been stopped and secured by setting the brakes, placing in neutral, and choking.
- All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.
- The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.
- All self-propelled construction equipment (except light service trucks, panels, pickups, station wagons), crawler cranes, power shovels, and draglines, whether moving alone or in combination, will be equipped with a reverse signal alarm. The alarm will be audible and sufficiently distinct to be heard above prevailing conditions and will operate automatically upon commencement of backward motion. The alarm may be continuous or intermittent (not to exceed three-second intervals) and will operate during the entire backward movement.
- All bulldozers, tractors, or similar equipment used in clearing operations will be provided with substantial guards, shields, canopies, and grills to protect the operator from falling and flying objects as appropriate to the nature of the clearing operations.
- Trucks will not trail debris or track mud outside the CRZ. Visible loose dirt will be removed. Pressure washing may be used where required to remove dirt.

10.3 ELECTRICAL SAFETY

Working with electrical systems to install necessary services to buildings and equipment presents safety hazards. Lack of basic electrical safety and sound wiring practices can result in fatalities due to electric shock.

- High-voltage overhead lines will be identified to all equipment operators and safe clear distances will be maintained at all times.
- No equipment will be positioned in a manner that any part of it may come within 20 feet of a power line unless a competent person has inspected the area and adequate precautions have been approved and implemented by the Site Manager, Site Superintendent and SSHO, as stated in the Compass Corporate policy.
- The OSHA standards for minimum clearance for operating near power lines are as follows as per CFR 1910.333:

While Working		In Transit	
Nominal System Voltage	Minimum Required Clearance	Nominal System Voltage	Minimum Required Clearance
0-50 kV	10 feet	0-50 kV	4 feet
51-100 kV	12 feet	51-345 kV	10 feet
101-200 kV	15 feet	346-750 kV	16 feet
201-300 kV	20 feet		

- Before work begins, the SSHO should show the employees the electrical hazards of the area. Workers should in turn tell the SSHO of any changing conditions, such as a drag in the line
- Three-wire (grounded) systems with ground fault circuit interrupters (GFCI) will be used on all temporary 110-volt electrical systems (extension cords, etc.).
- Wiring and grounding of all new facilities will be in accordance with the latest edition of the NEC.
- Wiring will be performed by a qualified electrician.
- No work will be performed on energized electrical systems capable of delivering current greater than 0.005 amps.
- Any wiring required will be protected from the elements while in use.

Any electrical work performed on-site will be in accordance will federal, state, and local requirements and also follow the guidelines set forth in Compass SOP CE-15 Electrical.

10.4 HEAT STRESS

To minimize the likelihood of employee heat stress, all workers must observe the following at temperatures above 70°F:

- Avoid prolonged periods of high heat stress;
- Take regular breaks;
- Consume increased amounts of fresh water (or Gatorade) to replenish body fluids;
- Observe coworkers (buddy system) for signs of fatigue; and
- Report any symptoms to the Site Manager or SSHO.

The Site Manager must regularly monitor the condition of the work force for signs of heat stress. Work in high ambient temperatures, coupled with protective clothing, can quickly result in worker heat stress. Heat stress monitoring and modified work-rest schedules will be instituted in accordance with ACGIH guidelines as required.

Alcohol consumption dehydrates the body and will increase the likelihood of incurring heat stress. Workers should curb their alcohol consumption after work and arrive at the Site each morning physically fit for work. Any worker deemed unfit for work because of alcohol consumption or for any reason will be restricted from Site activities. If a worker has been placed on restrictive duty by a physician, he will be restricted from activities which may cause injury/accidents to himself or to coworkers. Compass' Site management will be responsible for ensuring that unfit workers are restricted from site activities as required.

10.5 COLD STRESS

It is not likely that cold stress will be an issue of concern; however, if it does become an issue workers will be educated upon how to evaluate symptoms of cold stress related problems and the requirements of Compass Environmental SOP CE-10 Heat and Cold Stress will be followed.

10.6 CONFINED SPACE ENTRY

Workplaces that are not intended for human occupancy are defined as confined spaces. Limited openings hinder proper ventilation, escape, and rescue; therefore, creating a potentially life threatening situation for a worker.

Confined space entry will not be undertaken without prior approval from the Site Supervisor and the SSHO. Any confined space entry will be governed by the proposed OSHA regulation, 29 CFR 2910.146, and will be conducted in accordance with Compass Environmental SOP CE-11 Confined Space located in the Corporate Health and Safety Manual 2006.

10.7 SLIPS, TRIPS, FALLS

Slips, trips, and falls can easily occur at construction sites. Pedestrian traffic will be excluded from excavation areas. (Exceptions will be reviewed on a case-by-case basis, with SSHO authorization.) Walkways to and from equipment storage in the CRZ will be established and maintained as level and free of obstructions as possible. Walking surfaces will be constructed where required and maintained free of obstacles.

Work activity on elevated surfaces must be conducted in accordance with fall protection criteria 29 CFR 1910.23. Proper guardrails or a fall arrest system must be in place for work on surfaces six (6) feet or higher. See Compass Environmental SOP CE-20 for more information.

10.8 FIRE HAZARDS

Smoking will not be allowed inside the EZ or CRZ. Cigarettes, lighters, chewing tobacco (or any other personal effects) will not be allowed in the Exclusion Zone.

Debris (paper, brush, scrap, wood, etc.) shall be removed from work areas on a daily basis or as needed to preclude accumulation of sources of fuel. Flammable and combustible liquids will be maintained in the smallest quantities possible. No flammable/combustible liquids will be stored inside the office trailer, decon trailers, or Compass' temporary buildings. Fuel cans will have a designated storage area.

Portable fire extinguishers shall be provided for each of Compass' trailers and/or office buildings and for each mobile vehicle and piece of heavy equipment. Each employee will have received instruction on the proper operation of a portable fire extinguisher.

Cutting and welding will require an inspection of the area and review of the operation by the SSHO prior to cutting or welding activities being performed. A request to perform cutting or welding activities will be submitted and will require the inspection and testing of the work area. The site manager or SSHO will prepare the cutting and welding permit request form and sign it. The permit will be issued by the SSHO only for the specific operation for a specified period of time. See Compass Environmental SOP CE-14 Fire Prevention and Control

10.9 VISITORS

Visitors will be permitted in the immediate area of active operations only with approval from Site management. Approval for entry into the EZ and CRZ will require physical examination and compliance with training requirements (29 CFR 1910.120). All Site visitors must be briefed on appropriate sections of the HASP; a **Visitor's Log** (*Attachment A*) will be kept on-site. Visitor vehicles will be restricted to the SZ. Subcontractor and vendor equipment will not be permitted in the EZ without prior authorization and will be subject to Site decontamination procedures.

SECTION 11

DECONTAMINATION PROTOCOLS

11.1 GENERAL

Decontamination is the process of removing or neutralizing contaminants that have accumulated on personnel, personal protective equipment, and equipment. Decontamination activities are critical to health and safety at hazardous waste sites. Decontamination protects workers from hazardous substances that may contaminate and eventually permeate the protective clothing, respiratory equipment, tools, vehicles, and other equipment used on-site; it protects all Site personnel by minimizing the transfer of harmful materials into clean areas, and it protects the community by preventing uncontrolled transportation of contaminants from the Site.

11.2 PREVENTION OF CONTAMINATION

The first step in decontamination is to establish decontamination procedures that minimize contact with waste and thus the potential for spreading contaminants. Compass will:

PERSONNEL—

- Stress work practices that minimize contact with hazardous substances (e.g., do **not** walk through areas of obvious contamination, do **not** directly touch potentially hazardous substances).
- Use remote sampling, handling, and container-opening techniques.
- Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact Site materials.
- Wear disposable outer garments and use disposable equipment where appropriate.

HEAVY EQUIPMENT—

- Limit the surface area of contact, i.e., on backhoes, limit contact to the arm and bucket.
- If contaminated tools are to be placed on non-contaminated equipment for transport to the decon pad, plastic will be used on top of the non-contaminated equipment to keep it clean.
- Material from excavations will be placed in soil piles away from personnel and equipment traffic.

In addition, the following procedures will be used in sequential order, to maximize worker protection. The proper procedures for dressing prior to entering the EZ will minimize the potential for contaminants to bypass the protective clothing and escape decontamination. In general, all fasteners should be used (i.e., zippers fully closed, all buttons used, all snaps closed, etc.). Gloves and boots should be tucked under the sleeves and legs of outer clothing, and hoods (if not attached) should be worn outside the collar. Another pair of tough outer gloves will be worn over the sleeves. All junctures will be taped to prevent contaminants from running inside the gloves, boots, and jackets (or suits, if one-piece construction).

Prior to each use, the PPE will be inspected to ensure that it contains no cuts or punctures that could expose workers to contaminants. Similarly, any injuries to the skin surface, such as cuts and scratches, may enhance the potential for chemicals or infectious agents that directly contact the worker's skin to penetrate into the body. Particular care will be taken to protect these areas. Workers with large areas of damaged skin will not be allowed to work on-site until the skin heals.

11.3 TYPES OF CONTAMINATION

Contaminants can be located either on the surface of personal protective equipment or permeated into the PPE material. Surface contaminants may be easy to detect and remove; however, contaminants that have permeated a material are difficult or impossible to detect and subsequently remove. If contaminants that have permeated a material are not removed by decontamination, they may continue to permeate to the inner surface of the material where they can cause an unexpected exposure.

Five major factors which may affect the extent of permeation are listed below:

- **Contact Time.** The longer a contaminant is in contact with an object, the greater the probability and extent of permeation. For this reason, minimizing contact time is one of the most important objectives of a decontamination program.

When working with VOCs, respiratory contact time can be reduced by avoiding the vapors from the contaminated soils. Employees can reduce dermal contact time by using the correct PPE to avoid direct contact with hazardous materials. Employees can reduce their overall contact time by washing their exposed body parts, with soap and water, on a regular basis.

- **Concentration.** Molecules flow from areas of high concentration to areas of low concentration. As concentrations of waste increases, the potential for permeation of personal protective clothing increases. Because of this, workers will be instructed to change their outer layer of work clothing if it becomes heavily soiled.
- **Temperature.** An increase in temperature generally increases the permeation rate of contaminants. For example, VOCs have the ability to produce vapors, which can become an inhalation hazard. As the ambient temperature increases, the concentration of hazardous vapors may become sufficient enough to implement or increase the level of respiratory protection. The decision to increase respiratory protection will be based upon the results of the real-time air monitoring performed in the workers breathing zones.
- **Size of Contaminant Molecules and Pore Space.** Permeation increases as the contaminant molecule becomes smaller and as the pore space of the material to be permeated increases. Tyvek™ coveralls should keep the majority of contaminated soils from contacting the employees skin. However, workers will be required to tape all PPE junction points to further decrease the opportunity of contact with contaminated soils. Coveralls and other PPE should be checked regularly to ensure there are no tears, rips and holes which might allow the invasion of contaminated soils to the skin surface.
- **Physical State of Wastes.** As a rule, gases, vapors, and low-viscosity liquids tend to permeate more readily than high-viscosity liquids or solids. The contaminated material on the Site is primarily capable of producing hazardous vapors which may create an inhalation hazard. Because of this, the handling of soils will be minimized to reduce vapor generation. Also, stockpiles of contaminated material will be covered to reduce vapors in the work area.

11.4 PERSONNEL AND PERSONAL EQUIPMENT DECONTAMINATION FACILITIES

Compass will provide and maintain a designated decontamination station in the CRZ of each EZ. A map of the Site work areas can be used to locate these decontamination zones. They will be equipped with soap, water, and any other solutions which may be required for effective decontamination of personnel.

A temporary storage area for disposable protective clothing will be set aside in the EZ adjacent to the CRZ. Except for attire worn only in the SZ, no work clothes or boots will be worn or carried beyond the project boundary.

11.5 PERSONAL HYGIENE AND DECONTAMINATION PROCEDURES

11.5.1 Decontamination Procedures

Workers should check for gross contamination on boots and clothing before leaving the EZ. Protective clothing, if worn, should be removed in an inside-out fashion and disposed properly in waste receptacles provided. Employees will be required to wash face, hands, and any exposed areas with soap and water. Boots will be cleaned using a series of tubs containing soap, water, and a brush to remove contamination.

These decontamination procedures must be followed each time the employee leaves the contaminated area (EZ), with the exception of emergency escape situations, such as a fire. If employees come into contact with contaminated materials, portable eyewash bottles and portable showers will be located on-site for employees to wash affected skin or to flush the eyes (at least 15 minutes). If irritation, redness or swelling arises in the contact area, a physician will be contacted immediately.

11.5.2 Equipment Decontamination

A decontamination area for tools and equipment is to be established in an area near the personal decontamination area. Water used for decontamination will be collected and properly treated prior to re-use or disposal. All tools and equipment will be decontaminated before leaving the CRZ.

11.5.3 Vehicle Decontamination

Trucks, excavation equipment, cranes, and loaders will become contaminated during the normal course of operation. Any contaminated soil picked up in tire treads, undercarriages, splash guards and/or other areas of vehicles or equipment will be removed at the decon station prior to the unit leaving the Site. Soil collected at the decon station will be considered "affected" and removed from the decon facility and returned to either the treatment area or work area. Means to remove dry (loose) material will be provided, as well as a means to remove adhered material.

At the conclusion of the work associated with affected materials, trucks, loaders, etc., will be thoroughly decontaminated and inspected by the SSHO prior to release from the Site.

Equipment requiring service or repair being used in the EZ will be removed to allow access by repair personnel. The section of the equipment requiring service or repair will be decontaminated to prevent repair personnel from coming into contact with contaminated material.

SECTION 12

EMERGENCY RESPONSE/CONTINGENCY PLAN

12.1 GENERAL

This Emergency Response/Contingency Plan (ERCP) has been developed to include instruction and procedures for personnel evacuation and procedures for medical emergencies that may occur during the project. All personnel emergency conditions require precise and timely actions conducted in a manner that minimizes the health and safety risks. All on-Site personnel must be familiar with the ERCP described herein. Additions to the ERCP will be incorporated into this HASP by addendum. Additionally, all aspects of the plan will be addressed as part of the Site-Specific Health and Safety Training required for all on-site personnel.

12.2 RESPONSIBILITIES

12.2.1 Project Safety and Health Representative

The PSHR, or his designee, will oversee the development of, approve the ERCP and perform audits to ensure that the plan is in effect and that all pre-emergency requirements are met. The PSHR will act as a liaison to applicable regulatory agencies and notify OSHA of reportable accidents and fatalities.

12.2.2 Site Manager

The site manager will be responsible for ensuring that all Site work is performed in accordance with contract requirements and in a safe manner. In an emergency situation, the site manager may serve as a focal point for the dissemination of information or as a community relations manager. On the Lightman Drum site, the site manager will act as the emergency coordinator. The site manager will ensure that Emergency Response exercise is conducted to test the effectiveness of the ERCP.

12.2.3 Project Manager

The project manager is ultimately responsible for field implementation of the ERCP. This includes communicating specific health and safety requirements to Site supervision and consulting with the SSHO regarding planned activities, unforeseen conditions, and for resolving any questions with identified safety procedures.

12.2.4 Site Safety and Health Officer

The SSHO is responsible for assisting the CSHR in development of the SSHASP and ensuring its provisions are abided by on-site. The SSHO is responsible for seeing that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop-work order or evacuation. The SSHO will complete an **Compass Environmental Incident Report** (*Attachment A*) which includes the following:

1. A description of the emergency (including date, time, and duration);
2. Date, time, and name of all persons/agencies notified and their response; and
3. A description of corrective actions implemented or other resolution of the incident

On the Lightman Drum site, the SSHO will also serve as an alternate emergency coordinator.

12.2.5 Emergency Coordinator

The emergency coordinator is responsible for implementing the ERCP whenever conditions warrant. The emergency coordinator is responsible for ensuring the emergency treatment, transport and evacuation (if necessary) of Site personnel, and notification of the appropriate management staff when the emergency plan has been implemented. The emergency coordinator is also responsible for prior notification of emergency services (fire department, police department, hospital, ambulance, etc.) about the nature and duration of work expected on the Site, types of contaminants, possible health and safety effects, and the anticipated emergency conditions.

12.2.6 On-Site Personnel

All on-site personnel are responsible for knowing the ERCP and the procedures contained herein. Personnel will be expected to notify the emergency coordinator of occurring or impending emergencies and to cooperate fully once the plan has been enacted. All information should be communicated to the emergency coordinator; personnel are to direct the media or public's inquiries to the emergency coordinator.

12.3 POTENTIAL EMERGENCIES

The activities, layout, and hazards of the Site have been evaluated to determine the potential emergencies to be anticipated. As a result, five categories of emergencies have been established. This list may be revised if on-site conditions or operations warrant. In the event of a revision or addition to the list, the ERCP will be appropriately updated. The categories of anticipated emergencies are listed below.

- Injury, Illness
- Fire
- Explosion
- Spill/Environmental Release
- Natural Hazards

Due to the nature of this Site, personnel accidents requiring first aid, exposure to soils and groundwater with chemical constituents, potential fires near mechanical equipment, and water-related incidents (e.g., on-site flooding) are the most anticipated emergencies that may arise.

12.4 PUBLIC RESPONSE AGENCIES

Contact between Site personnel and local emergency services will assist in developing a good working relationship and provide an opportunity for the development of effective, overlapping emergency plans. The emergency coordinator will contact local fire, police, ambulance, and other emergency services before beginning work on the Site. The emergency coordinator will inform the emergency services about the nature and duration of work expected on the Site, types of contaminants and possible health or safety effects, and the anticipated emergency conditions. If possible, the emergency coordinator will have the emergency services' representatives visit the Site location and assess it in terms of their needs with respect to access, utilities, etc. Such contacts will be documented as part of the Site records.

12.5 COMMUNICATIONS

12.5.1 Communications Systems

Two sets of communication systems will be established prior to initiating Site activities: (1) internal communications among personnel on-site; and (2) external communication between on-site and off-site personnel.

12.5.2 Internal Communication

Internal communication alerts team members to maintain Site control; passes along safety information, such as the amount of air remaining (if level B is required); time remaining until next rest period; changes in the work to be accomplished; and emergencies. On-site internal communications will be conducted through verbal communications and hand-held two-way radios. Nonverbal communications will be used when background noise or PPE impede verbal communications; standard hand and air-horn signals will be utilized, as follows:

- Channel one has been designated as the radio frequency for personnel in the EZ. All other on-site communications will use channel two.
- Personnel in the EZ should remain in constant radio communication or within sight of the site Manager. Any failure of radio communication requires an evaluation of whether personnel should leave the EZ.
- Three short blasts on the **air horn** is the emergency signal to indicate all personnel should leave the EZ. A continuous 10-second blasts indicates to evacuate the Site.
- The following standard **hand signals** will be used in case of failure of radio communications:

Hand gripping throat Out of air, can't breathe.

Grip partner's wrist or both hands..... Leave area immediately.
around waist.

Hands on top of head Need assistance.

Thumbs up..... OK, I am alright, I understand.

Thumbs down No, negative.

12.5.3 External Communication

An external communication system between on-site and off-site personnel is necessary to coordinate emergency response, report to management, and maintain contact with essential off-site personnel. External communications during Site activities will be accomplished by use of telephone utilities established in the Site office. As a backup, at least one portable cellular telephone will also be maintained on-site.

12.5.4 Postings

The following information from the ERCP will be outlined and posted at all site telephones and entrances to the EZ.

- A list of public response agencies to be contacted is provided in Section 2.5, on page 6. It includes local hospitals, the local health department, ambulance service, fire and police departments, and others.
- Name and telephone number of the PSHR.
- Location on diagrams of fire extinguishers and emergency equipment including response procedures.
- Location of emergency eyewash/deluge systems.

- Procedures for potential overexposures.

12.6 EMERGENCY EQUIPMENT

12.6.1 General

On-site emergency equipment consists of equipment and supplies which are maintained on-site and specifically earmarked **for emergency use only** and other equipment which may be used as a part of regular Site operations (*Table 12.1*). The latter includes items such as telephones, two-way radios, PPE, and earth moving equipment. The following subsections describe the emergency equipment which will be on the Site.

**TABLE 12.1
EMERGENCY AND FIRST AID EQUIPMENT**

EQUIPMENT TYPE	QUANTITY REQUIRED
Fire Extinguishers • Multipurpose Dry Chemical	1 per building 1 per construction vehicle 1 per hot work location
Radios • Fixed (Motorola) • Portable (Motorola) • Portable (Motorola) • Portable (Motorola)	1 at base (field office) 1 per work group 1 at base 1 per SSHO
First Aid Equipment • Industrial First Aid Kit • Stretcher • Burn Kit • Fire Blanket	1 adjacent to CRZ 1 1 1
Eye Wash Stations and Shower	With first aid kit

12.6.2 First Aid Equipment

First aid equipment will be located adjacent to the CRZ where it will be most accessible to both the EZ and support area. Equipment will include a construction site-size first aid kit, water bottle, stretcher and wool blanket. Additional first aid kits may be strategically located at other points on the Site such as in the SSHO office.

12.6.3 Fire Equipment

Fire equipment will include strategically located fire extinguishers of the size and type indicated in *Table 12.1*. Each fire extinguisher will be marked using readily visible signs with the words "FIRE EXTINGUISHER". Locations will include each trailer, the CRZ, and on construction vehicles/equipment.

12.6.4 Spill Response Equipment

The hazardous waste spill response equipment stored at the Site consists primarily of earth moving and heavy construction-type equipment and assorted hand tools. The earth moving equipment is very effective for spills resulting from surface impoundment failures or breeches,

while hand tools are primarily used for small spills. In the event of a spill, the equipment can be accessed for work areas as necessary. Additional equipment may include sorbent vermiculite and drums.

12.7 PLAN IMPLEMENTATION

12.7.1 General

All on-site personnel will be instructed to notify the support area (Base Station) immediately upon encountering an emergency or near emergency. The Emergency coordinator will then institute the response measures to be taken and direct other personnel in their duties. Documentation of the incident will be accomplished as soon as possible to ensure accuracy of the reporting. The Emergency coordinator will complete an **Compass Environmental Incident Report** (*Attachment A*) which includes the following information:

1. A description of the emergency (including date, time, and duration);
2. Date, time, and names of all persons/agencies notified and their response; and
3. A description of corrective actions implemented or other resolution of the incident.

12.7.2 Site Evacuation

In the event of an emergency situation during operations that requires evacuation (such as fire, explosion, significant release of toxic gases, etc.), an air horn will be sounded for approximately 10 seconds indicating the initiation of evacuation procedures. All field personnel in both the restricted and unrestricted areas will evacuate and assemble near the CRZ trailer or other safe area identified by the Emergency coordinator. The location will be upwind of the incident if possible. As the safety of all field personnel is being established, appropriate emergency services will be contacted by security via telephone to respond to the emergency. When making the report to the Base Station, describe the complete situation including, if possible, the following:

- Type and location of the emergency.
- Is an explosion or fire involved?
- Type of material involved. Contamination released?
- Are there injuries?
- Estimated wind speed and direction?

Personnel will not reenter an evacuated area until instructed to do so by the Emergency Coordinator. In addition, if operations at the Site are stopped in response to an emergency, the Emergency Coordinator will ensure that valves, pipes, and other equipment are monitored for leaks, pressure buildup, gas generation, or ruptures.

12.8 RESTORATION AND SALVAGE

After an emergency, prompt restoration of utilities, fire protection, equipment, security equipment, medical supplies, and other equipment will reduce the possibility of further loss. Temporary systems/supplies may have to be purchased until the permanent systems are back on line. Items which may need addressing include but are not limited to:

- Refilling fire extinguishers or water supplies;
- Refilling medical supplies;
- Repairing vandalism promptly so as not to invite further damage;

- Obtaining copies of backup or hard copy data;
- Drying water sensitive equipment or records; and
- Obtaining temporary buildings.

12.9 PLAN EVALUATION/UPDATE

Following each practice, exercise, evacuation drill, or actual emergency, a critique shall be conducted by the Emergency coordinator. This critique shall include a review of the Emergency Plan to identify any deficiencies and any areas where improvement is necessary, and a review of each participant's performance. At a minimum, the documentation will include:

- A chronological history of the incident or exercise;
- Titles and names of personnel participating; and
- Description of actions taken; Decisions made by whom; Orders given—to who, by whom, and when; Actions taken—who did what, when, where.

12.10 EMERGENCY RESPONSE PROCEDURES

12.10.1 General

Although not all of the following emergencies will be applicable to each activity, the procedures that follow will serve as the basis for decision-making and the actions to be taken during an actual emergency.

Response to an emergency—fire/explosion or spill/environmental release—starts with the identification of trouble and continues after the emergency through the preparation of equipment and personnel for the next potential emergency. The stages of emergency response consist of notification, emergency evaluation, response, follow-up review, and documentation. The stages of emergency response are presented and discussed below in logical order.

NOTIFICATION—

Upon discovering the emergency, the emergency coordinator will be responsible for notifying other on-site personnel to the emergency. A predetermined internal audio communications device (siren, air horn, whistle) will be activated to notify personnel to stop work activities, to lower background noise (if possible), and to initiate emergency procedures.

The on-site emergency response personnel will be notified and informed by the emergency coordinator of the following information:

- What happened and how;
- Where and when did it happen and to whom;
- What is the extent of the damage; and
- What form of aid or response is required?

EMERGENCY EVALUATION—

Upon review of the emergency information above, emergency response capabilities and needs will be determined. A determination will be made as to what could potentially happen as a result of the emergency. Items to consider include the types of contaminants; the potential for fire, explosion, or release of hazardous materials; the location of on-site personnel relative to the hazardous area(s); and the potential for impact on the surrounding population and environment. Next, a determination will be made as to what should be done. The emergency coordinator must consider the appropriate emergency response;

- Equipment and personnel resources required for hazard mitigation;
- Number of persons available for response;
- Resources available on-site and off-site; and
- Hazards involved in rescue and response.

RESPONSE—

At this stage of emergency response, the emergency coordinator will decide the type of action required based on the available information. The response action(s) is then implemented. The Site Supervisor will also designate on-site personnel responsibilities in order to accomplish the response actions. Response actions may include the following:

Enforced Buddy System

No one will enter the EZ or hazardous area without a partner. Line-of-sight contact between rescue/response personnel and support will be maintained.

Allocate Resources

Along with the designation of on-site personnel to aid in the rescue/response operations, the Emergency Coordinator will also allocate on-site equipment to be used in the rescue/response operation.

Request Aid

The Emergency Coordinator will contact off-site personnel and/or agencies as required to aid in the rescue-response operation.

CONTROL—

The spill response team will bring the hazardous situation under complete or temporary control. The intent of control is to prevent the spread and impact of the emergency. In the event of a fire, the emergency coordinator will immediately call the fire department and decide if attempts should be made by on-site personnel to control the fire depending upon the degree of the fire. In the event of a spill or chemical release, the spill response team will contain the spill and prevent further migration via the use of booms, absorbent pads, or earthen berms. In the event of cave-in of excavations, the emergency coordinator will immediately direct the relocation of excavating equipment and personnel away from the unstable area and evaluate methods to stabilize the excavation.

STABILIZE—

The SSHO or designated alternate(s) will administer medical procedures to injured personnel as required and attend to the cause of the emergency, if possible (e.g., turn off leaking valve, shut down treatment system).

EVACUATE—

On-site personnel will be moved a safe distance upwind of the hazardous area. The emergency incident will be monitored for significant changes. The designated public safety personnel will be contacted when there is a potential or actual need to evacuate the off-site population. Evacuation of off-site personnel is the responsibility of government authorities. Rally points will be predetermined, posted and communicated to site personnel

FOLLOW-UP REVIEW—

Prior to resuming normal Site activities, on-site personnel must review the cause of the emergency and aid in the revision of this ERCP according to new Site conditions and events that took place during emergency response. Emergencies or accidents that result in any fatalities or five or more hospitalizations per incident must be reported to OSHA immediately.

DOCUMENTATION—

The emergency coordinator will be responsible for documenting the events of the emergency. Documentation of the emergency may be used to prevent reoccurrence of the emergency and

as evidence for potential legal actions. Documentation may be accomplished by the use of a bound field notebook and written transcripts of tape recordings made during the emergency.

Documentation of an emergency should include the following:

- Chronological history of the emergency;
- Facts pertaining to the incident when they become available;
- Names and titles of personnel involved;
- Photos;
- Actions taken, orders and instructions given and received, and decisions made by the Site Supervisor and other on-site and off-site personnel;
- Potential exposures of on-site personnel; and
- Signature, date, and time of individual entering data.

In response to an emergency, specialized equipment may be necessary to rescue victims, protect response personnel, and to mitigate hazardous conditions (e.g., contain spills). A list of basic on-site equipment and supplies for emergency response will be developed prior to Site entry. This list will be updated as necessary to include special equipment that should be obtained depending upon special conditions or emergencies that may arise during implementation of the Site remedies. After an emergency, Site equipment and supplies must be restocked, repaired, or replaced as necessary.

EVACUATION ROUTES—

In the event of a severe emergency (e.g., fire, explosion), normal Site exit routes may become blocked. Therefore, alternate routes for evacuating on-site personnel will be established prior to initiation of the remedial activities. Consideration will be given to the following factors when developing alternate evacuation routes:

- Upwind locations;
- Accessibility of potential routes;
- The development of two or more routes;
- Equipment necessary to mark out routes; and
- The mobility of Site personnel wearing protective equipment.

The alternate evacuation routes will be established prior to Site activity and will be shown on detailed Site maps. These maps will be appended to this SSHASP at that time.

12.10.2 On-Site Personnel Injury/Illness

12.10.2.1 General

Emergency first aid will be administered on-site as deemed necessary. Emergency medical services will be contacted to respond, or the person will be transported to the designated medical facility. The medical data sheet will accompany the injured person in each case. *Figure 12.1* shows the primary hospital route and instructions from the Site. These diagrams will be posted near the command trailer exit in a manner so they can be taken with the driver of the victim. The hospital will be called and notified of the impending arrival while the victim is being transported, and provided with pertinent information regarding the victim, injuries, etc.

If a person working on-site is physically injured, basic first aid procedures must be followed. Depending on the severity of the injury, emergency medical response may be sought. If the person can be moved, he/she will be taken to the edge of the work area where PPE will be

removed and emergency first aid administered. If necessary, transportation to a local emergency medical facility will be provided.

If the person can only be moved by emergency medical personnel, the SSHO will decide what protective equipment (if any) is required to be worn by emergency personnel. Each work area will have extra equipment available for emergencies.

If the injury to on-site personnel involves chemical exposure, the following first aid procedures must be initiated as soon as possible:

1. **Eye Exposure**—If solid or liquid gets into the eyes, wash eyes immediately at the emergency eyewash station, for at least 15 minutes, using water and lifting the lower and upper lids occasionally. Obtain medical attention immediately.
1. **Skin Exposure**—If solid or liquid gets on the skin, wash skin immediately at the emergency eyewash station using water. Obtain medical attention immediately.
2. **Inhalation**—If a person inhales large amounts of organic vapor, dust, etc., move him/her to fresh air at once. Obtain medical attention immediately. If breathing has stopped, appropriately trained on-site personnel and/or medical personnel should perform cardiopulmonary resuscitation. Keep affected person warm and at rest.
3. **Ingestion**—If solid or liquid is swallowed, medical attention must be obtained immediately and the State Poison Control Center consulted. The SSHO must inform the project manager of the injury/accident, and a written report detailing the incident, its causes, and consequences must be submitted to the project principal within 48 hours of the incident.

12.10.2.2 Temperature-Related Problems

Temperature-related problems are discussed in Section 10, Environmental and Personal On-Site Air Monitoring Plan, with respect to monitoring and mitigation.

First aid for all forms of heat stress includes cooling the body by removing PPE, moving to an area outside the EZ and CRZ, and allowing the person to rest in a cooler environment.

12.10.2.3 Emergency Decontamination

In the case of medical emergency, gross decontamination procedures will be implemented and the person transported to the nearest medical facility immediately. If a life threatening injury occurs and the injured person cannot undergo decontamination procedures without causing additional injuries, he/she will be transported in a body bag, plastic wrap, or wrapped in a blanket. The medical facility will be informed that an injured person is on the way and has not been decontaminated. The medical facility will be notified of the potential chemicals present and the exposure prevention measures that can be employed during treatment.

Decontamination measures for other emergencies will be based upon the toxicity of the contaminants on-site and the immediacy of the emergency.

12.10.3 Fire

Compass' personnel will not respond to fires that are larger than those which can be handled by the fire extinguishers maintained on-site. Any fire too large to be extinguished by portable fire extinguishers will be reported at once to Base which will in turn notify the local fire department.

12.10.4 Explosion

12.10.4.1 General

An explosion can be the most difficult emergency situation to deal with for multiple reasons: severe trauma, death, fire, unstable structures, secondary explosions, toxic clouds, and destruction of emergency response and communication equipment may all be associated with and explosion. Therefore, multiple response measures and backup systems may be required:

- Initiate evacuation procedures.
- Notify appropriate response agencies (fire, police, and ambulance).
- Assess situation: will secondary emergencies be immediately occurring?
- Turn off/remove sources of explosive gases or flammable liquids.
- Attend to the injured.
- Check for exposed live utilities.
- Initiate spill response measures, if necessary.

12.10.4.2 Explosive Atmospheres

- Initiate evacuation procedures if action levels dictate.
- Notify the fire department of a potentially explosive condition.
- Remove sources of ignition.
- Ventilate the area.
- Continue monitoring.

12.10.5 Spills/Environmental Release

12.10.5.1 General

All hazardous substance spills will be contained as close to the source as possible. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents will be placed directly on the waste to prevent further spreading and aid in recovery. Berms of earthen or sorbent material will be used to contain large spills and will be constructed downstream of the leading edge of the spill. These berms are especially effective in containing continuous spills such as impoundment or pipeline leaks. Drains or drainage in the spill area will also be blocked or surrounded by berms to prevent the spilled waste and any other materials from entry. Any contaminated sorbents or earthen materials will be cleaned up and placed in drums for proper storage or disposal as hazardous waste.

If any spill is large and/or continuing, an initial isolation area of at least 50 feet in all directions will be used. When any small spills or leaks from a drum, tank, or pipe spill occurs, only those personnel involved in overseeing or performing emergency operations will be allowed within the designated hazard areas. The MSDS should be used to determine the appropriate procedure and PPE for cleaning a spill. If necessary, the area will be roped off or otherwise blocked.

12.10.5.2 Spill Guidelines

In general, cleanup personnel will:

- Make sure all necessary personnel are removed from the hazard area;
- Wear proper protective clothing;
- If a flammable waste is involved, remove all ignition sources and use spark-proof and explosion-proof equipment and clothing in containment and cleanup;
- If possible, try to stop the leak; and

- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.

12.10.6 Natural Hazards

Because of the amount of planning that goes into preventing the other types of emergencies, slope failure, natural hazards (tornadoes, etc.) conceivably have the highest probability of occurrence on the Site. If a natural hazard occurs, the Site will be closed to all workers until it can be evaluated by the SSHO and site manager. In the event of a tornado warning, personnel will evacuate to a low-lying area or the interior of the facility

Restoration after the event will include a recheck of all operating systems by the site manager and SSHO. If additional personnel are needed for containment and cleanup of spills, they will be mobilized for that purpose. Following the full return of site personnel, the project manager will conduct a debriefing with site personnel, and resumption of Site operations will occur.

12.10.7 Bomb Threats/Civil Commotion

Activists, labor disputes, angry residents, racial tensions, disgruntled employees and pranksters may result in bomb threats, vandalism, arson, riots, and even assault. It is difficult to anticipate these occurrences but security measures can be taken to prevent or reduce their impact and the proper responses can control further loss.

12.10.8 Hospital Route

The SSHO will provide a map, including written directions, to all on-site personnel showing the route from the job-site to the selected medical facility (Figure 12.1).

Figure 12.1

ROUTE TO HOSPITAL

START **A** 193 Rt-73, BERLIN, NJ

FINISH **B** Virtua Hospital Berlin (856) 322-3000
100 Townsend Ave, BERLIN, NJ

Total Distance: 3.9 miles, Total Time: 7 mins (approx.)

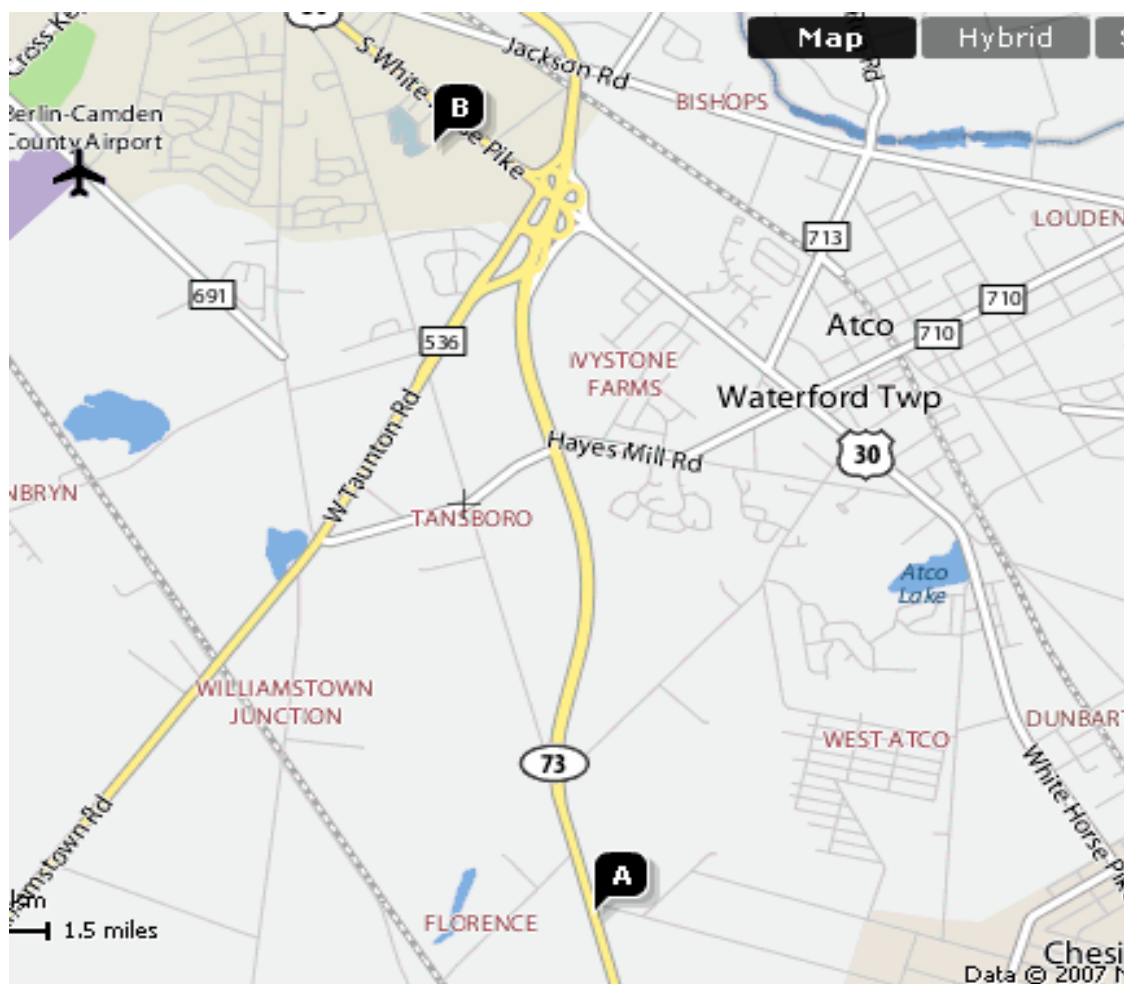
A

193 RT-73, BERLIN, NJ

1. Start at **193 RT-73, BERLIN** going toward **TOM WELLS RD** go **3.1 mi** 3.1 mi
2. Take ramp toward **CAMDEN** go **0.2 mi** 3.3 mi
3. Continue on **WHITE HORSE PIKE(US-30)** go **0.5 mi** 3.8 mi
4. Turn **L LEFT** on **TOWNSEND AVE** go **0.1 mi** 3.9 mi
5. Arrive at **100 TOWNSEND AVE, BERLIN**, on the **L LEFT**

B

100 TOWNSEND AVE, BERLIN, NJ



12.10.9 Emergency Contact Numbers

ALL IMMEDIATE EMERGENCIES BE SURE TO CALL 911

AGENCY	TELEPHONE NUMBERS
EMERGENCY	911
POLICE – Winslow Township Police Department	609-561-3300
NEARBY HOSPITAL- Virtua Hospital	Main 856-322-3000 ER 856-322-3060
WINSLOW TOWNSHIP OFFICE OF EMERGENCY MANAGEMENT	609-567-0700
CAMDEN COUNTY OFFICE OF EMERGENCY MANAGEMENT	856-783-4808
NJDEP	877-927-6337
STATE HEALTH DEPARTMENT	800-367-6543
POISON CONTROL CENTER	800-336-6997
NATIONAL RESPONSE CENTER (NRC)	800-424-8802
SPILL HOTLINE	800-424-8802
CHEMTREC	800-424-9300
HEALTH BRIDGE	800-633-4350
COMPASS VICE PRESIDENT, HEALTH AND SAFETY (Mark Fleri)	678-462-3061
COMPASS MANAGER OF HEALTH AND SAFETY (Josh Kelly)	317-401-1815
COMPASS REGIONAL MANAGER (Todd King)	312-735-7739
COMPASS SITE MANAGER (Jim D'Angelo)	317-710-9390

ATTACHMENT (A)

FORMS REQUIRED BY THIS SSHASP

ATTACHMENT (B)

AMMENDMENTS TO THIS SSHASP

ATTACHMENT (C)

SSHASP ACKNOWLEDGEMENT

SITE SAFETY PLAN ACKNOWLEDGEMENT FORM

I hereby acknowledge that I have been informed and understand and will abide by the programs and procedures set forth in this Site Specific Compass Environmental Site Health & Safety Plan for the Lightman Drum site.

PRINTED NAME	SIGNATURE	REPRESENTING/CO.	DATE

ATTACHMENT (D)

MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEETS

Lightman Drum Site
Camden County, NJ

- Acetone
- Aluminum
- Antimony
- Arsenic
- Barium
- Benzene
- Butanone
- Cadmium
- Chlorobenzene
- Chromium
- Cobalt
- Copper
- Dichlorobenzene
- Dichlorodifluoromethane
- Dichloroethene
- Ethylbenzene
- Iron
- Isopropylbenzene
- Lead
- Magnesium
- Manganese
- Nickel
- Potassium
- Silver
- Sodium
- Tetrachloroethene
- Thalium
- Toluene
- Trichloroethane
- Trichloroethene
- Vanadium
- Xylene (total)
- Zinc