



**Worldwide Facilities Group
ENVIRONMENTAL SERVICES
REMEDIATION TEAM**

1 December 2008
File No. 70613-125

Jacqueline Bobko
Case Manager
New Jersey Department of Environmental Protection
401 East State Street
P.O. Box 028
Trenton, New Jersey 08625

Subject: Revised Remedial Action Workplan
Former Delphi Interior and Lighting Systems Division
1445 Parkway Avenue, Ewing Township, Mercer County, New Jersey 08628
ISRA Case #E97070

Dear Ms. Bobko:

General Motors Corporation (General Motors) is pleased to submit to the New Jersey Department of Environmental Protection (NJDEP) this revised Remedial Action Workplan (RRAW) for the former Delphi Interior and Lighting Systems Site (Site). The Site is located at 1445 Parkway Avenue, Lot 1.01, Section 343, of the tax map of Ewing Township, Mercer County, New Jersey. This submittal includes narrative of the revised Remedial Action, including a discussion of the Remediation Standards to be used for this Site, revised Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP) associated with the proposed remedial activities, a revised Schedule of Implementation, a revised Cost Estimate, a draft Deed Notice, and supporting information including figures, tables and appendices.

General Motors is still evaluating the applicability of Impact to Groundwater (IGW) Soil Remediation Standards (SRSs) for metals to the Site. We are using SESOIL and AT123D as specified in the *Guidance Document Using The SESOIL Transport Model to Assess the Impact to Groundwater Pathway (2008)* and *Guidance for Using the SESOIL and AT123D Models to Develop Site Specific Impact to GroundWater Soil Remediation Standards (2008)*. We are establishing Site-specific input parameters and running the programs to establish values to be proposed to NJDEP. If any of the proposed values accepted by the NJDEP are more stringent than the Remediation Standards set in Appendix B of the attached RRAW, General Motors will revise the proposed remediation and implement the appropriate additional effort. Because IGW-Soil Cleanup Criteria (SCC) do not exist for metals and IGW-SRS values are not established, General Motors must develop Site-specific values. Because these values will be SRS, General Motors believes a possible revision to this RRAW due to calculation and NJDEP-approval of IGW-SRS should not affect the use of the SCC for organics as noted in the RRAW.

Thank you for your consideration of the attached. We look forward to your approval of the RRAW and our continuing interaction during its implementation. If you have any questions concerning the attached or otherwise related to the project, please do not hesitate to contact the undersigned.

Sincerely yours,

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Warren Tech Center - 30200 Mound Rd - MC: 480-111111 Warren, MI 48090

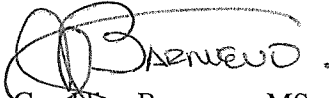
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GENERAL MOTORS CORPORATION
WORLDWIDE FACILITIES GROUP



Geraldine Barnuevo, MSc.
Remediation Project Manager

Enclosures:

Revised Remedial Action Workplan

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Ewing Township; Attn: Administrator - David W. Thompson (Cover Letter Only)
Ewing Township; Attn: Municipal Clerk - Stephen Elliott (Electronic Copy Only)
Ewing Township; Attn: Health Officer - W. Allen Lee (Electronic Copy Only)

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**REPORT ON
REVISED REMEDIAL ACTION WORKPLAN
FORMER DELPHI INTERIOR LIGHTING SYSTEMS DIVISION
GENERAL MOTORS CORPORATION
1445 PARKWAY AVENUE
TRENTON, NEW JERSEY**

ISRA CASE No. E97070

by

**Haley & Aldrich, Inc.
Parsippany, New Jersey**

for

**General Motors Corporation
Warren, Michigan**

**File No. 70613-125
December 2008**

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INTRODUCTION

On behalf of General Motors Corporation (General Motors or GM), this document is a revised Remedial Action Workplan (RRAW) for the former Delphi Interior and Lighting Systems Site (Site). The Site is located at 1445 Parkway Avenue, Trenton, New Jersey (Figure 1).

This document includes the following:

- A narrative of the revised Remedial Action, including a discussion of the Remediation Standards to be used for this site,
- A summary of the status of the Groundwater Investigation,
- A revised Health and Safety Plan (HASP) associated with the proposed remedial activities,
- A revised Schedule of Implementation (Schedule),
- A revised Cost Estimate, and
- Supporting Information including Figures, Tables and Appendices.

This submittal addresses only those Areas of Interest (AOIs) noted by the New Jersey Department of Environmental Protection (NJDEP) in the 11 June 2007 Notice of Deficiency (NOD) as either conditionally or not acceptable. Remedial Actions associated with AOIs that were acceptable to the NJDEP at the time of its review of the June 2006 Remedial Action Workplan (RAW) and the November 2006 RAW Addendum (RAWA) for the site are not repeated in this document.

The RAW, RAWA and discussion herein pertain to the remediation of soil and sediment AOIs only. If a groundwater remediation program is necessary, it will be presented under a separate cover. Ongoing groundwater investigation results will be presented to NJDEP in a meeting format with a follow up report. Depending on the outcome of the meeting, General Motors will determine what effort remains in the groundwater investigation and, as necessary, the remediation.

We include a Certification of this submission, as required by the regulations, in Appendix A.

Following completion of the development of the Impact to Groundwater Soil Remediation Standards, discussed below (§IG), General Motors will update the previously submitted databoxes comparing the data to the currently proposed Site Remediation Standards. Historical data has been presented in previous reports. New data for January 2008 soil sampling is presented in a Site Investigation Update Report, under separate cover, and a databox with this new data is discussed below.

1. SOIL REMEDIATION

As discussed with the NJDEP during a recent meeting in the NJDEP offices (9 September 2008) and agreed to by NJDEP, General Motors will not perform or document a

Remedial Action Selection. General Motors has re-evaluated the proposal concerning excavation of contaminated soil and the ultimate disposal of excavated soil. In general, General Motors has decided to excavate contaminated soil as described in the 2006 RAW and RAWA, and herein. Excavated soil will be transported off-site and recycled at a licensed Class B recycle facility, or disposed of at a landfill or hazardous waste facility depending on the quality of the soil.

The RRAW includes the proposed design associated with the remedy. Additional discussion concerning the operations and maintenance of any on-site facilities is not necessary. This RRAW includes figures indicating the boundaries of the implemented remedy. Information on probable sample locations to be included within the area to be remediated is discussed.

NJDEP found in their 2007 response letter that the proposal to excavate site soils to either 2.0 feet or to residential direct contact criteria/bedrock generally acceptable. The proposal to cap any remaining contamination following the excavation and include the remaining contamination in a deed notice was also considered acceptable. Any capping proposed in the following subsections will be implemented by the purchaser of the property as a condition of the Contract of Sale and the Site Deed Notice. Requirements for operations and maintenance of these caps will also be conveyed to the purchaser.

Delineation of areas not fully delineated by the existing dataset will be accomplished during the post-excavation sampling. Complete delineation (horizontal and vertical) will be accomplished to support a draft Deed Notice.

This RRAW includes a proposal for post-remediation sampling to: accomplish any outstanding delineation requirements, demonstrate completion of the remediation, and show that the proposed remedy is protective of human health and the environment. General Motors intends to use the post-excavation sampling in an iterative manner. The proposed limits to excavation presented in this document are intended to be the first iteration. Between using field screening and laboratory analysis, General Motors will determine if the Remediation Standards for the Site are met. If receipt of the data from the sampling described in this RRAW shows the Remediation Standards were not met, one or more additional iterations of excavation and post-excavation sampling may be performed, if necessary. Soil that contains one or more regulated substance above its respective Remediation Goal following the last excavation will be delineated and included in a Deed Notice.

A copy of this RRAW will be submitted to Ewing Township for review. We will request the Township review it for compliance with the Township's Master Plan. Following NJDEP acceptance of the proposal herein, we will request an interpretation by the Township for consistency with the Master Plan and approval by the Township's governing body. We anticipate the need for local permits or approvals to mine the quantity of soil anticipated in this document (soil mining, soil erosion control, traffic, etc.).

As discussed below, General Motors continues to perform groundwater monitoring and it is unlikely that an on-site source of groundwater trichloroethene (TCE)-contamination will be identified. However, if such a source is identified after the design of the soil remedy, General Motors will re-visit the selected remedy and revise it accordingly.

Discussion of hexavalent chromium (Cr^{+6}) and polychlorinated biphenyls (PCBs) as possible site-wide AOIs is presented below in the discussion of these two analytes.

General Motors has not included a groundwater RAW in this document. A groundwater investigation is ongoing and must be completed to determine if General Motors is responsible for the groundwater cleanup, and, if so, what the magnitude of the problem is before evaluating remedial alternatives.

1 A. Hexavalent Chromium

General Motors, as discussed below in specific AOI remediation proposals, has recently collected additional soil samples for Cr^{+6} . This additional effort was described in the Response to the Notice of Deficiency (September 2007). This text is a revision to the previously submitted evaluation of the Cr^{+6} and Total Chromium data set.

Based on the expanded data set, the data does not support Cr^{+6} as a site-wide risk in soils; therefore, we do not believe it is necessary to include analysis for Cr^{+6} at *all* future soil sample locations. We have reviewed the data set (up through January 2008) to determine the frequency of Cr^{+6} occurrence, the frequency which Cr^{+6} exceeds a NJDEP-cleanup criterion, and the concentration of Total Chromium at the locations where Cr^{+6} has been detected.

The following table summarizes the results of our updated evaluation. The table summarizes the analytical data for analysis of Cr^{+6} only.

TABLE I FREQUENCY OF HEXAVALENT CHROMIUM OCCURRENCE

Depth (feet)	Total Number of Samples Analyzed for Cr^{+6}	Number Detected (% Detected)	Number of Occurrences Above Stated Concentration (mg/Kg) ¹ Cr^{+6} Range (mg/Kg) ²				Location of Maximum
				20	240	400	
0 to 2	129	36 (28%)	ND ³ to 582	10	1	1	Northern Bank Southern Swale AOI 21
>2 to 10	135	28 (21%)	ND to 12,200	8	4	3	Plater Pit 6 AOI 1-25
>10	58	8 (14%)	ND to 57.1	3	0	0	Former Haz Waste Drum Pad AOI 11

Notes:

1. *For each row, the lower concentration includes the occurrence of the higher concentration. For example, for the 2-10 foot interval, a total of eight samples exceed 20 milligrams per kilogram (mg/Kg) and, of those eight, four are greater than 240 mg/Kg and, of these four, three are greater than 400 mg/Kg.*
2. *Represents the analytical data-range for Cr⁺⁶ in the depth- range regardless if Total Chromium was analyzed for or not.*
3. *ND is non-detect, or less than the Reporting Limit. The Reporting Limit varies by sample.*

As can be seen in the above table, only 21 out of a total of 322 samples (approximately 6.5%) were above the current interim guideline for exposure to Cr⁺⁶ for dust inhalation, while only 4 analyses (approximately 1% of the samples) were above the guideline of 400 mg/Kg for protection against allergic dermatitis for nonresidential soils (most of these elevated values were found near the Plater Pits). Should the future use of the Site include residential property, only 5 of the 322 (less than 2%) samples would be above the recommended criterion for inadvertent ingestion of surface soil by a child. It should be noted that the four highest values (12,200 mg/Kg, PL06-03; 4,920 mg/Kg, PL06-02; 993 mg/Kg, PL07-02; and 582 mg/Kg, ISO3) were, relative to the whole dataset, categorized as statistically significant "outliers" (ProUCL Software, Version 4.0). These results are most likely due to either the intentionally biased sample locations (near the Plater Pits) or, possibly, the inclusion of oxidized metal debris in the sample.

Of the 322 samples tested for Cr⁺⁶, 278 soil samples across the site were tested for both Total Chromium and Cr⁺⁶: 97 samples in the upper soil horizon (0 to 2 feet below ground surface), 126 samples in the 2 to 10 foot depth interval, and 55 samples at a depth greater than 10 feet below the ground surface.

Figures 2 and 3 qualitatively depict the Total Chromium and Cr⁺⁶ concentrations on the Site. Figure 2 includes locations with Total Chromium analyses, including those that do not have a paired Cr⁺⁶ datum. Figure 3 includes locations that have Cr⁺⁶ analytical results, including those that were not analyzed for Total Chromium.

For the future Site use scenarios, as are currently envisioned, 20 mg/Kg as the cleanup criterion for Cr⁺⁶ is overly conservative for the General Motors property. We are of the understanding, per the NJDEP website (NJDEP, 1998¹), that this criterion is applicable for exposure via inhalation subsequent to the release of fugitive dust in a non-residential scenario, particularly due to vehicular traffic. We are also aware of the statement made in the derivation of this criterion that we need to "...be advised that the larger the site, the less stringent the SCC [Soil Cleanup Criteria]" (ibid). We would therefore anticipate that the

¹ NJDEP, 1998. Summary of the Basis and Background of the Soil Cleanup Criteria for Trivalent and Hexavalent Chromium. New Jersey Department of Environmental Protection, Site Remediation Program. September 18, 1998. http://www.nj.gov/dep/srp/siteinfo/chrome/b_b_sum.pdf

actual risk-based cleanup criteria would be higher than the currently cited criteria and/or interim values.

The NJDEP background document for the cleanup of chromium sites (NJDEP, 1998) also states: "Once a site-specific number is generated, compliance is determined by comparing the calculated value to the 95% Upper Confidence Limit (95% UCL) of the mean of the observations. With respect to the inhalation pathway, the Department is considering moving away from a 'bright line' approach. This is in recognition that a single exceedance at a single location should not necessarily require a remedial action for the entire site, particularly when the phenomenon being evaluated is likely derived from an area source and not a point source." As mentioned above, using the ProUCL software provided by the United States Environmental Protection Agency (USEPA), the four highest Cr^{+6} values were identified as statistical outliers. When the software is run on the remaining 318 values (using the non-parametric function and the Reporting Detection Limit (RDL) for "nondetected" values), the Site-wide 95% UCL is 9.5 mg/Kg. This value falls well below the NJDEP Soil Cleanup Criterion of 20 mg/Kg for a non-residential scenario.

Given that: 1) the statistical interpretation of the soil data set is strongly biased by only a few elevated samples, 2) the General Motors Site is much larger (80 acres) than the 2 acre risk-based air model used to derive the 20 mg/Kg non-residential criterion, 3) the majority of the soil sample data were largely below the RDL even through the use of a sampling strategy that was intentionally biased toward on-site chromate sources, and 4) the 95% UCL of the mean, barring four statistical outliers, was less than the NJDEP soil cleanup criterion for a non-residential scenario, it is apparent that the results of Cr^{+6} sample concentrations at the Site would pose a negligible site-wide risk to human health following remediation of the four highest values.

For the 278 data pairs (Cr^{+6} and Total Chromium analyzed for on the same sample) collected to date on the General Motors property, there was a relationship between the Total Chromium versus Cr^{+6} values (using non-censored values, which were log-transformed due to the nature of the distribution). The preponderance of the data, however, is non-detect and has been included in the graph at a value equal to one-half the reported detection level for the sample. Because we do not know the true value of the actual Cr^{+6} concentration for values observed below the RDL, the data set would be categorized as "censored." These data are plotted in the following graph to demonstrate the large number of occurrences in which Cr^{+6} has been tested for and not found above the RDL. The following regression analysis (Figure 4) on the full dataset indicates one should be able to use approximately 2,000 mg/Kg Total Chromium as a screening criterion to select locations for Cr^{+6} analysis.

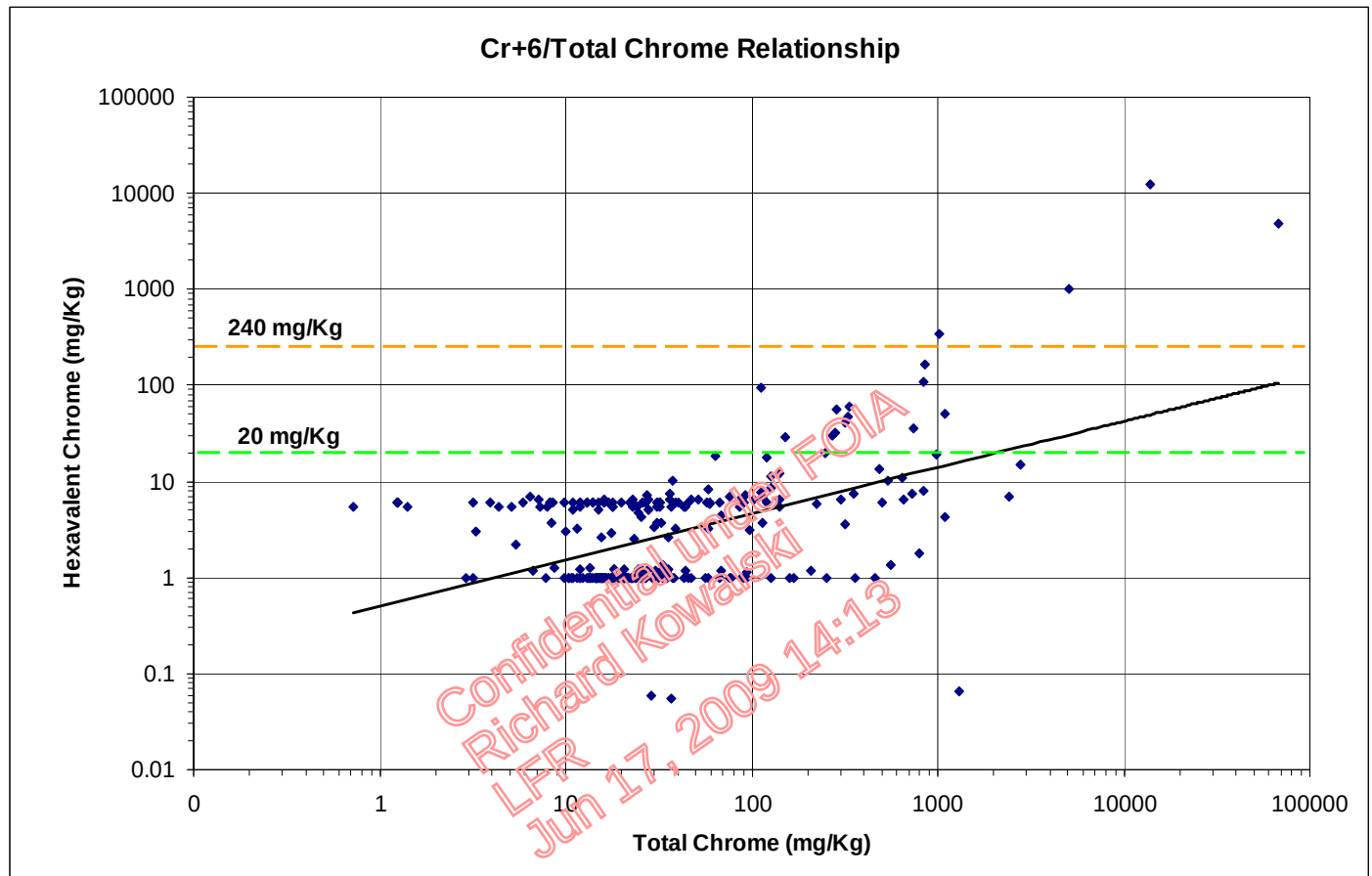


Figure 4 Relationship Between Cr^{+6} and Total Chromium $R^2 = 0.2585$; Line Equation:
 $y = 0.5103x^{0.4799}$

We note that R^2 in the regression analysis is low. However, this is the case because of the censored data set. The large range of Total Chromium that yields non-detect (using one-half of the detection level) for the Cr^{+6} results in a low R^2 value.

Future land use, as presented in the RAW and this RRAW indicates that the four areas with the four highest concentrations of Cr^{+6} will be remediated by removal, the placement of clean fill and then covered with impermeable material (e.g., building or parking lot). This remediation would prohibit vehicular contact with any contaminated material.

Given the anticipated redevelopment scheme (commercial and/or residential property), the residential-inhalation criterion² (240 mg/Kg) appears to be a more reasonable cleanup target. Although covered, as stated above, possible future excavation for maintenance or other purposes would result in a very limited exposure. The presence of the Total Chromium and Cr^{+6} will be documented in a site-wide deed notice recorded with NJDEP, Mercer County, and the municipality. The deed notice will require all future work done on the site that disturbs an engineering control shall be done only in accordance with a NJDEP-approved workplan (including a Health and Safety Plan, HASP), limiting potential short-term exposure.

The ingestion scenario does not seem to be probable, except for inadvertent ingestion associated with an acute exposure duration event for a future maintenance scenario (e.g. utility worker). As noted above, any disturbance of the engineering controls would require NJDEP approval of the workplan and HASP. Therefore, the duration of the potential ingestion pathway would be very short and should not be a probable health risk, especially with proper health and safety precautions.

General Motors, as specifically noted in related AOI discussions below, proposes the following alternative concerning Cr^{+6} :

- For the future samples in and around Plater Pits 6, 7 and 12, the Hazardous Waste Drum Storage Pad, former Sludge Bed No. 5, and along Gold Run, we will analyze all post-remediation samples for Cr^{+6} .
- The soil represented by the samples containing 240 mg/Kg or higher Cr^{+6} will be removed from the Site or otherwise treated to lower the Cr^{+6} concentration below 240 mg/Kg. This includes Plater Pits 6, 7 and 12, and former Sludge Bed No. 5.
- Unless otherwise noted, future analysis of post-excavation samples will include analyses for Cr^{+6} at a frequency of 5% (approximately the frequency of Cr^{+6} positive samples greater than 20 mg/Kg of those tested). The locations of these future samples will be biased, based on the current data set, towards locations with the highest (above 2,000 mg/Kg) Total Chromium concentrations.

1 B. PCBs

General Motors considered the USEPA Toxic Substances Control Act (TSCA) regulations (40 CFR §761.125, *Requirements For PCB Spill Cleanup*) pertaining to the remediation of PCB-

² Chromium Soil Cleanup Criteria, NJDEP, September 2008

contaminated soil and the New Jersey Cleanup Criterion (0.49 mg/Kg) when determining the extent of the proposed remediation in this RRAW. The release that caused the contamination on-site is either from handling of transformers and capacitors during the decommissioning of the Site or from unknown activities. Each release event was independent from the others and would have occurred at different times. The releases were, individually, less than 270 gallons. Therefore, the TSCA regulations would require the contaminated soil (visible), plus a one-foot buffer around it to be removed. Borings on-site have not produced visible indicators of PCBs in the soil. Therefore, General Motors believes the TSCA regulations will be met by implementing the proposed remediation of soil contaminated with and were met by the remediation historically completed at AOI 2.

A review of the current data set for PCBs that remains on the Site (not previously excavated), Figure 5, suggests a wide-spread, low level (maximum concentration of 27 mg/Kg) occurrence of PCBs. Because of the wide-spread occurrence at low concentrations, General Motors will include PCB analysis in all post-remediation sampling for areas being remediated for PCBs and will include PCB analysis in samples in AOIs specifically mentioned below (Section IH).

1 C. Concrete

General Motors, prior to removal of the concrete slab, will implement a Concrete Assessment Plan (CAP; August 2008) approved by NJDEP following the September 2008 presentation of the plan. The CAP was prepared using the February 2007 guidance for the sampling and analysis of concrete: (http://www.nj.gov/dep/dshw/resource/guidance/concrete_sampling_022007.pdf).

Based on this guidance, the concrete-demolition material generated from the removal of Site concrete slabs would not be considered clean unless sampling data indicates the absence of any contaminant above Direct Contact Soil Remediation Goal. Disposal or recycling of the concrete debris will be in accordance with pertinent regulations, depending on the quality of the concrete (clean, contaminated, or hazardous).

General Motors will remediate AOI 1 last in the sequence of the Site remediation. The concrete slab remaining over AOI 1 will serve two purposes during the remediation: 1) it will serve as a temporary storage area for contaminated soil excavated from other areas of the Site and prevent contaminants from the excavated soil from entering the soil beneath, and 2) it will continue the existing condition with respect to runoff and infiltration in this AOI until the soil beneath is ready to be excavated.

1 D. Vapor Intrusion

General Motors has considered possible vapor intrusion through subsurface utilities, and basements or other structures that will remain after implementation of the site remediation. If subsurface structures remain, we will investigate the occurrence of volatile organic compounds (VOCs) in them. At least one compound (TCE) exceeds the groundwater screening criterion for requiring further action. Although General Motors does not, at this time, believe the TCE is its responsibility, the TCE is in the groundwater under this Site. Therefore, General Motors will establish an institutional control within the limits of the groundwater exceedance to address future use of the overlying land.

Buildings do not exist on the Site at this time. Therefore, testing of indoor air quality has not and cannot be performed.

The Institutional Control to be established for the Site will require future building construction to incorporate appropriate remedial designs to address the vapor intrusion pathway. Future development of the Site will not be performed by General Motors. If future evaluation of Site conditions by or for the Developer (e.g. soil gas screening) indicate remedial designs are necessary, the selection and implementation of these controls will be the responsibility of the Developer. While General Motors will not have control over what remedial measures, if any, will be undertaken, engineering controls may be appropriate based on the results of the remedial investigation, future land use and site conditions. Controls such as one or a combination of the following incorporated into future development of the Site may be used to remediate this pathway:

- Installing a sealed vapor barrier (e.g. plastic sheeting, liquid membrane) over earthen, gravel, etc. floors or crawlspaces,
- Utilizing natural ventilation,
- Installing a subsurface depressurization system,
- Installing a pressurized air curtain,
- Utilizing building pressurization,
- Utilizing heat recovery ventilation, or
- Installing a soil vapor extraction system

At this time, implementation of these controls is not included in the RRAW. If the developer chooses to use one or more of these controls, a revision to the Deed Notice will be necessary to include biennial inspection and certification, and inclusion of the implemented control(s) into the Site engineering controls. The developer will be responsible for the revision to the Deed Notice.

1 E. Post Remediation Sampling and Analysis

At all AOIs, post-excavation samples will be collected and analyzed from the bottom of the excavation (unless the excavation extends to bedrock) and sidewalls of the excavation. Analyses of samples are AOI-specific and discussed in each AOI below (See Section 11 H). We propose using field screening (hand-held instrumentation³, field observations) to determine location of appropriate post-excavation samples.

If elevated PID readings (100 ppm or more above background) are observed for a post-excavation sample location and VOCs are not otherwise included in the analyses for that AOI, we will add VOC analysis to that sample. If XRF readings suggest the level of one or more metals are in excess of the Site Remediation Standard at more than one location, General Motors will either continue the excavation or collect a sample for analysis. If multiple XRF readings are above 5 times the Remediation Goal after excavation is considered complete, samples from all of these locations will be submitted for analysis in the laboratory.

General Motors considers the investigation performed to date of Site soil to be adequate to identify AOIs. While some areas may not be micro-delineated with the existing data set,

³ Photo-ionization Detector (PID), X-ray fluorescence (XRF)

General Motors will use data from field screening to assist us in determining the extent of the excavation. Post-excavation sampling described in this Section will confirm the excavation is sufficient to remediate the contamination associated with each AOI. By verifying the issues in an AOI have been removed or otherwise addressed, we will satisfy the requirements to delineate an AOI.

All excavations are expected to be greater than 20 feet in perimeter and few are expected to be less than 300 feet in perimeter. Many of the proposed excavations will be significantly larger than 300 feet in perimeter.

The following table (Table II) summarizes the general approach to collecting post-excavation samples. If specific sample locations (sidewalls, floor, depth) are specified for a particular AOI (Section 1H), those samples will be collected rather than using the general approach presented in the table below. If the number of samples to be taken per the approach in the table is greater than the number specified in Section 1H, the total number of samples will be as determined in the table and the location of the samples to be collected in addition to those specified in Section 1H will be collected as per the approach in the Table biasing the remaining samples to avoid the samples specified in Section 1H.

TABLE II POST-EXCAVATION SOIL SAMPLE APPROACH

Depth	Excavation Perimeter		
	<20 feet	20 to 300 feet	>300 feet
0 to 3 feet	None Expected	1 sample from top 6 inches ^a for every 30 linear feet of perimeter. 1 sample from every 900 sq ft of excavation bottom	Field screen ^b 8 sidewall locations ^c per 100 cubic yards excavated. Sample for laboratory analysis 1 sidewall ^c sample per 1,000 cubic yards excavated. Field screen 2 bottom ^d locations per 100 cubic yards excavated. Sample for laboratory analysis 1 bottom ^d sample per 1,000 cubic yards excavated.
>3 feet	None Expected	Field screen ^b every 30 linear feet of perimeter in each 3-foot interval ^e . 1 sample every 30 linear feet of perimeter based on field screening. A minimum of 1 sample for each 3-foot	Field screen ^b 8 sidewall locations ^c per 100 cubic yards excavated. Sample for laboratory analysis 1 sidewall ^c sample per 1,000 cubic yards excavated based on field screening results. The field screening will be distributed evenly throughout the depth

			interval ^e . If field screening is not conclusive concerning reason for biased samples, even distribution of samples between each 3-foot interval ^e . 1 sample from every 900 sq ft of excavation bottom.	of the excavation with similar number of field screening and laboratory samples from each 3-foot interval ^e . Field screen 2 bottom ^d locations per 100 cubic yards excavated. Sample for laboratory analysis 1 bottom ^d sample per 1,000 cubic yards excavated.
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Notes:

- a) *Shallow excavations assumed to be from surface releases. Therefore, sampling will be biased to surface (VOCs will be collected from at least 1 foot below top of excavation). If field conditions suggest deeper samples needed, shallow samples will be replaced with the deeper.*
- b) *Photo-ionization detector (PID) and X-ray fluorescence (XRF)*
- c) *Sidewalls that are intended to be removed as part of the proposed excavation will NOT be screened or sampled. Only sidewalls that we expect to remain following the proposed excavation will be screened and sampled. Field screening or analytical results may result in additional excavation. If the removed soil is inside the excavation and all exposed soil will be removed in accordance with the proposed remediation, screening and sampling will not occur for that removed volume.*
- d) *Bottoms that are intended to be removed as part of the proposed excavation will NOT be screened or sampled. Only bottoms that we expect to remain following the proposed excavation will be screened and sampled. Field screening or analytical results may result in additional excavation.*
- e) *Or portion thereof for intervals greater than a depth evenly divided by 3.*

For example, a 270-foot-perimeter sidewall of an excavation that is 9 feet deep will have a total of nine sidewall samples collected, on average, three from each of three vertical horizons, all nine could be from one of the horizons if field screening indicates the preponderance of the contamination is from that depth, or some combination yielding one or more samples from one or more horizons.

All sampling will be performed as quickly as possible following exposure of the excavation surface (i.e. sidewall and bottom). Post-excavation samples taken within 24 hours of excavation that will be analyzed for VOCs will be collected from the 0 to 6-inch interval from the excavation surface. Samples taken after 24 hours will be collected from 6 to 12-inches from the excavation surface. Post-excavation samples for all other parameters will be collected from the 0 to 6-inch interval from the excavation surface.

Excavations will remain open until the analytical data for that excavation are received and indicate the remedial Standards for that ACD have been achieved. If the analytical results

indicate the remediation of an AOI has not been achieved, General Motors will evaluate the proper response for that AOI. If additional excavation is determined to be the next step, this action will be taken without further consulting NJDEP. If it is determined to leave the contaminated soil in place, General Motors will delineate the remaining contamination and request NJDEP review of the proposed leaving in place. With NJDEP approval of leaving the contamination in place, the AOI will be included in the Site Deed Notice.

All sampling, sample handling and sample preservation will be performed in accordance with the NJDEP's Field Sampling Procedures Manual (FSPM; August 2005).

Analytical methods will be selected in accordance with NJAC 7:26E-2.1 *Quality Assurance Requirements*. See Appendix B for the analytical methods selected for the post-remediation sample analysis. Holding times will be in accordance with the FSPM and the analytical methods. Appendix C contains a Quality Assurance Project Plan (QAPP) for the post-remediation sampling.

Field duplicates, matrix spike and matrix spike duplicates, and field blanks will be performed on a 1 in 20 basis.

1 F. Dust and Odor Measurement and Control

During all intrusive activity (e.g. excavation), wind direction will be monitored and recorded. Dust and odor will be monitored in accordance with the Community Air Monitoring Plan (Appendix D).

As per the workplan for January 2008's soil sampling, dust collection occurred during the test pit activity in the vicinity of MW-8. We used a stationary sampler consisting of two pumps drawing ambient air over filter cassettes. The filter media were analyzed for Total Chromium and Cr⁺⁶. Results for both were non-detect.

During the January 2008 sampling event, a weather station was on-site to collect data during the year-long transducer study and was used to determine the downwind direction during the test pit activities. A wind rose diagram (Figure 6) was created from the wind speed and direction data from this unit. As can be seen, the wind tends to blow towards the east most of the time. This information will be used to set-up monitoring points at each of the cardinal directions.

1 G. Site- Specific Remediation Standards

Appendix B includes the Remediation Standards for this Site. In accordance with NJAC 7:26D and suggested by NJDEP during Departmental training provided to the regulated community about the new Soil Remediation Standards, General Motors proposes a mixture of the May 1999 Soil Cleanup Criteria (SCC) for organics (PCBs, VOCs and base/neutral extractable organic compounds (B/Ns)), and the June 2008 Soil Remediation Standards (SRS; NJAC 7:26D) for metals. We use the SCC value for total petroleum/total organic compounds. As discussed above, we use 240 mg/Kg for Cr⁺⁶ (both residential and non-residential). We use the SRS values for cyanide (CN). As noted above (Section IB), TSCA will also be considered for remediation of soil containing PCBs.

Figure 7 presents an updated depiction of the areas of the Site proposed to be redeveloped with future residential and non-residential development. Although General Motors does not plan on developing the Site, it is willing to restrict development on the Site through a Deed Notice (Appendix E) and its Contract of Sale. The proposed non-residential redevelopment area would include use for one or more of the following: slab on grade structures for commercial, transportation, warehousing, offices and possibly condominium purposes; roadway; parking; and other possible uses that would restrict access to the subsurface. The proposed residential redevelopment area would be for single-family residential, driveways, roadways and community access areas.

For areas of the Site to be developed as non-residential, the non-residential, direct contact/inhalation values are used for the SCC and SRS. For areas of the Site to be developed as residential, or not scheduled to be developed, the most stringent of the residential direct contact or inhalation, or Impact to Groundwater SCC for the organics are used; and the Residential Direct Contact or Inhalation value for metals are used, except for Cr^{+6} , as noted above.

General Motors is evaluating the applicability of Impact to Groundwater SRSs for metals to the Site. We are using SESOIL and AT123D as specified in the *Guidance Document Using The SESOIL Transport Model to Assess the Impact to Groundwater Pathway (2008)* and *Guidance for Using the SESOIL and AT123D Models to Develop Site Specific Impact to Groundwater Soil Remediation Standards (2008)*. We are establishing Site-specific input parameters and running the programs to establish values to be proposed to NJDEP. If any of the proposed values accepted by the NJDEP are more stringent than the Remediation Standards set in Appendix B, General Motors will revise the proposed remediation and implement the appropriate additional effort. Because IGW-SCC do not exist for metals and IGW SRS values are not established, General Motors must develop Site-specific values. Because these values will be SRS, General Motors believes a possible revision to this RRAW due to calculation and NJDEP-approval of IGW-SRS should not affect the use of the SCC for organics as noted above.

1 H. Areas of Interest (AOIs)

As noted in the Introduction, this RRAW does not repeat the proposed remedial action for AOIs that NJDEP has accepted the removal action proposed in the RAW. If the only change to the proposal is the means of managing the excavated material (off-site recycling or disposal instead of on-site management), the AOI is not discussed in this document. In general, unless otherwise specified below, remediation of each AOI will be accomplished by excavating to the specified depth(s), and possibly capping and inclusion in a Deed Notice if contamination above the Remediation Standards remains after the AOI's remediation.

NOTE: Proposed excavation depth and post-excavation sample analysis in this RRAW may vary from the original RAW due to different Site Remediation Standards. Most notably, the metals SRS used in this proposal may be less stringent than the SCC values for the same metals. Therefore, it is possible that a metal is no longer of interest in this discussion where it may have been in the original RAW. Also, it is possible an AOI will no longer be purposely remediated because of the new Site Remediation Standard.

A summary of the AOIs numbers and names is provided in Table III. Figure 8 depicts the location and depth of proposed excavations to be performed as described in more detail in the following sections. Upon finalization of the Remediation Standards (see §1G above), General Motors will submit an updated set of databoxes for the AOIs discussed in this section to indicate the exceedances with the new standards. The following table (Table IV) summarizes the volumes of soil to be excavated using the proposed Remediation Standards (Appendix B), by depth and proposed redevelopment scenario. The estimated total soil to be excavated and transported off-site is 23,290 cubic yards.

TABLE IV SUMMARY OF EXCAVATION VOLUMES BY DEPTH AND REDEVELOPMENT SCENARIO

DEPTH OF EXCAVATION (FT)	PROPOSED RESIDENTIAL DEVELOPMENT AREA	PROPOSED NON-RESIDENTIAL DEVELOPMENT AREA
0 TO 2	3140	5230
2 TO 5	2980	4450
5 TO 8	1930	2280
8 TO 11	1180	940
11 TO 14	620	260
14 TO 17	230	25
17 TO 20	25	
TOTALS	10105	13185

Following completion of the excavation (including any additional required to meet the Remediation Standards following interpretation of the post-excavation samples), General Motors will restore each excavated area by backfilling the excavation with Certified clean fill from an off-site source. If the remediation proposed for an AOI (discussed below in the following sub sections) calls for capping, General Motors does not plan on implementing the proposed cap; however, a cap in that area will be required to be installed by the future developer of the Site, or additional remediation, approved by NJDEP, by the developer will be required to remove the requirement for a cap in that AOI.

1H1. Area 1 - Manufacturing Bldg. and East Parking Lot

1H1a. Production Pits

Remedial alternatives that would leave Cr^{+6} on-site appear to be allowed in accordance with the Chromium Moratorium Memorandum (Jackson, 8 February 2007) that would allow a conditional No Further Action (NFA) for soil that will be commercial, industrial or open space as long as the remediation is consistent with the Technical Regulations (NJAC 7:26E) and the Oversight Regulations (NJAC 7:26C). General Motors will agree to remove or treat Cr^{+6} above 240 mg/Kg, as stated above in Section IA in the locations noted below that contain Cr^{+6} .

1H1a(i). AOI 1-24 - Former Plater Pit #5

The original proposal for this AOI included removal of the top two feet below the slab. The excavation of the hot-spot in this area (PL05-03) will be extended to a minimum depth of 8.0 feet. Post-excavation samples will be analyzed for VOCs, base/neutral-extractable organic compounds (B/NEs), CN, and site metals⁴. Sidewall post excavation samples may be required from multiple depths (e.g. 3.75-4.25 and 6.5-7 ft). Because of the elevated Cr⁺⁶ in nearby Plater Pits, General Motors will include a post-excavation sample in this area (PL05-03 area (3.75-4.25 ft)) for Cr⁺⁶ analysis.

1H1a(ii). AOI 1-25 - Former Plater Pit #6

The original proposal for this AOI included removal of the top two feet below the slab. The excavation of the hot-spots in this area (PL06-02/03) will be extended to a minimum depth of 8.0 feet. Post-excavation samples will be analyzed for total petroleum hydrocarbons (TPH), Cr⁺⁶, and site metals. Sidewall post excavation samples may be required from multiple depths (e.g. 3 to 4 ft interval as well as 6.5-7 ft).

1H1a(iii). AOI 1-37 - Former Plater Pit #7

The original proposal for this AOI included removal of the top two feet below the slab. The excavation of the hot-spot in this area (PL07-02) will be extended to a minimum depth of 5.0 feet. Post-excavation samples will be analyzed for Cr⁺⁶ and site metals. Because of the elevated Cr⁺⁶ result at the location PL07-02; 3 to 3.5 feet, General Motors will include Cr⁺⁶ analysis at this interval in the post-remediation sampling to be performed.

1H1a(iv). AOI 1-15 - Former Plater Pit #9

The original proposal for this AOI included removal of the top two feet below the slab. The excavation in this area will be extended to a minimum depth of 5.0 feet. Post-excavation samples will be analyzed for site metals, and Cr⁺⁶.

1H1a(v). AOI 1-14 - Former Plater Pit #10

The original proposal for this AOI included removal of the top two feet below the slab. The excavation in this area will be extended to a minimum depth of 4.0 feet, or deeper, if required to address the presence of black staining, trace cinders, etc. Post-excavation samples will be analyzed for TPH, VOCs, B/NEs, and site metals.

1H1a(vi). AOI 1-16 - Former Plater Pit #11

The original proposal for this AOI included removal of the top two feet below the slab. Because contamination was not detected beneath the invert of the plater pit, excavation will not be performed in this AOI. General Motors requests a No Further Action for this AOI.

⁴ Site Metals are the Target Analyte List (TAL) metals minus the Earth Metals: Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, Zn.

1H1a(vii). AOI 1-32 - Former Plater Pit #12

The original proposal for this AOI included removal of the top two feet below the slab. The excavation of the hot-spots in this area will be limited to the area around PL12-06 and 08 and will be extended to a minimum depth of 9 feet or bedrock (PL12-06) and 5 feet (PL12-08). Post-excavation samples will be analyzed for Cr⁺⁶ and site metals.

1H1a(viii). AOI 1-36 – Existing Die Cast Area

The original proposal for this AOI included removal of the top two feet below the slab. After review of the data and comparison to the Remediation Standards, General Motors proposed no remediation of this area and requests No Further Action.

Note: NJDEP comments in the NOD concerning elevated concentrations zinc (sample S6; 129,000 mg/Kg) detected in material removed from pits in this area was incorrectly reference to the Existing Die Cast Area located at the south end of the slab and should be in reference to the Former Die Cast Area located near the middle of the slab.

1H1a(ix). AOI 1-13 - Former Zinc Barrel Pit

The original proposal for this AOI included removal of the top two feet below the slab. Most of this area does not need remediation. The TPH found at ZB-1 will be remediated as part of Platter Pit No. 10 (See 1H1a(v)). The excavation in this area will be extended to a minimum depth of 3.0 feet. Post-excavation samples will be analyzed for TPH.

1H1b. Sewer Pits: 103, 106, 107, 108, 109, 110, 111, 113, and 118

Soil around these pits, except 108, is not contaminated and remediation specifically around these pits (other than removal of the concrete) is not proposed. General Motors requests No Further Action for these areas.

1H1b(i). Pit 108

General Motors will excavate soil to approximately 6.5 feet below the surface of the current slab to remove metals-contaminated soil. Post-excavation samples will be analyzed for site metals.

1H1c. Miscellaneous Sumps and Pits

1H1c(i). Pits #203, 206, 208, 221, 229, 239, 247, 249, 250, 255, 261, 262, 263, 264, 271, 275, and 279

These pits are outside areas that are proposed to be excavated. Soil associated with any of these pits is not intended to be excavated, but may be in the course of removal from other areas intended to be excavated. General Motors requests No Further Action for these pits.

1H1c(ii). AOI 1-38 - Scrap Metal Pits

The data from the soil around the scrap metal pit indicate this area does not need remediation. General Motors requests No Further Action for this area.

1H1c(iii). AOI 1-2 - Pit #213

The original proposal for this AOI included removal of the top two feet below the slab. The excavation in this area will be extended to a minimum depth of 4.0 feet. Post-excavation samples will be analyzed for site metals.

1H1c(iv). AOI 1-51 - Pit #268

The original proposal for this AOI included removal of the top two feet below the slab plus approximately 32 square feet (268-1 and -2) to 7.5 feet (or bedrock, whichever occurs first). The proposed area of excavation in this area has been reduced. The depth of the excavation at 268-1 will only be 2 feet. At NJDEP's request, General Motors will collect sidewall post-excavation samples from the 3.25 to 3.75 and 6.5 to 7 ft below ground surface interval at 268-2. Post-excavation samples will be analyzed for site metals.

1H1d. Process Sewer Lines

1H1d(i). AOI 1-6 - Main Creek

The original proposal for this AOI included removal of the top two feet below the slab. General Motors proposes to remove this sewer line, in the vicinity of MC3-1. This will result in excavation to approximately 8.5 feet. Because the remainder of this area did not exhibit elevated concentrations compared to cleanup levels, the remainder of the former sewer line will be grouted with concrete and will remain in place. Post-excavation samples from around the vicinity of MC3-1 will be analyzed for TPH, PCBs, and site metals, including Cr⁺⁶.

1H1d(ii). Lateral Production Sewer Lines (LP)

General Motors will excavate the contamination associated with the lateral sewer lines identified during the sub slab investigation. Soil around laterals that data indicated did not have an exceedance above the Remediation Standards will not be excavated (Laterals 1, 6 and 7). Soil in the vicinity of L4-1 (AOI 1-18) will be excavated to a depth of approximately 8 feet (or to bedrock, whichever occurs first). Soil in the vicinity of L5-1 (AOI 1-21) will be extended to approximately 5 feet (or to bedrock, whichever occurs first). Soil in the vicinity of L8-1 (AOI-48) will be excavated to approximately 5 feet (or to bedrock, whichever occurs first). Post excavation sampling in these extended depth areas will occur as described in Section 1E. Analysis of these samples will be for: L4 will be for PCBs, L5 will be for TPH, and L8 will be for site metals.

1H1d(iii). AOI 1-47 - Connection Pipes (CP)

General Motors requests No Further Action for this AOI.

1H1d(iv). AOI 18 - Manhole #5

General Motors requests No Further Action for this aspect of this AOI.

1H1d(v). AOI 23 - Crock Entrance Points (CE)

The original proposal for this AOI included removal of the top two feet of soil. We will extend the excavation in the vicinity of CE-1 to 3 feet. Post-excavation samples will be analyzed for site metals.

1H1e. Supplemental Areas

1H1e(i). AOI 1-49 - Chemical Storage Area

General Motors requests No Further Action for this AOI.

1H1e(ii). AOI 1-10 - Former Hydraulic UST Vault

The original proposal for this AOI included removal of the top two feet below the slab. Review of this area indicates the soil quality in this area is satisfactory and General Motors proposes remediation of this area is not necessary. General Motors requests No Further Action for this area.

1H1e(iii). AOI 1-45 - Former De-Ionization Room

The original proposal for this AOI included removal of the top two feet below the slab. The proposed excavation will be limited to the area around DI-3. Post-excavation samples will be analyzed for site metals.

1H1e(iv). AOI 1-50 - Former 10,000 Gallon Gasoline UST Locations Beneath Solution Storage Room and AOI 1-53 - Former 1,000 Gallon Gasoline UST at Northeastern Manufacturing Building Corner

Two suspected underground storage tanks (USTs) were previously noted in submitted documents: one below the former Solution Storage Room and the other east of the northeast corner of the former manufacturing building. General Motors removed these two tanks in April 2008 (TMS No. NO8-6150; UST Closure Report, 31 July 2008). All post-excavation samples from these two excavations indicate the soil in these two areas is acceptable. General Motors has requested No Further Action for these two AOIs.

1H1f. Miscellaneous Off-Slab Areas

1H1f(i). AOIs 6 & 7 - Below Ground Piping Between Fuel Oil Tank and Power House

See Section 1H3h(v) below.

1H2. Area 2 - Above Ground Storage Tank Area and Primary Switch House

1H2a. AOI 4 - Former 5,000 Gal. Paint Thinner AGST and Former 4,000 Gal. Solvent AGST

Due to the elevated concentration of VOCs (above the Impact to Groundwater Soil Remediation Goal for the Site) in soil in this area and the observed effect on groundwater (exceedance of the New Jersey Groundwater Quality Standard (GWQS)), General Motors agrees to excavate this material to the bottom of the contaminated zone or to water table, whichever occurs first. Post-excavation samples will be analyzed for VOCs and B/NEs in the northeast portion of the excavation.

1H2b. Liquid Propane Tank (LPG)

The investigation/remediation of this area of concern has been completed as specified in the December 17, 1993 letter. A No Further Action/Covenant Not To Sue will be issued for the industrial establishment at the completion of the ISRA case and after the filing of all applicable institutional controls.

1H2c. 400,000 Gal. Water Tank

The investigation/remediation of this area of concern has been completed as specified in the December 17, 1993 letter. A No Further Action/Covenant Not To Sue will be issued for the industrial establishment at the completion of the ISRA case and after the filing of all applicable institutional controls.

1H2c(i). AOI 3 - Storm Drain Area Near Water AGST

General Motors proposes to excavate this structure as part of the remediation of this AOI. Visibly-contaminated soil will be excavated and samples below the invert of the sewer line will be collected. Post-excavation analysis will include VOCs, B/NEs, PCBs, and site metals. NJDEP required Cr^{+6} in these post-excavation samples. General Motors disagrees that this analyte is necessary at this location. A sample of the "slag" in this general area (the only contaminated material around this AGST) contains Total Chromium (50 mg/Kg) well below a level associated with elevated Cr^{+6} . Therefore, unless the post-excavation samples contain Total Chromium at concentrations above 2,000 mg/Kg, the post-excavation samples will not be analyzed for Cr^{+6} .

1H2d. Primary Switch House

1H2d(i). AOI -2 - Transformer M-1

General Motors previously excavated PCB-contaminated soil from this AOI and has applied compliance averaging to this AOI to demonstrate compliance with the cleanup criterion. The soil represented by the sample containing 0.74 mg/Kg total PCB is the only PCB-contamination remaining in this AOI. All other PCB-contaminated soil in this AOI has been excavated and transported off-site for disposal. The remediation in this area was previously documented (RAW; June 2006).

General Motors considered the USEPA Toxic Substances Control Act (TSCA) regulations (40 CFR §761.125, *Requirements For PCB Spill Cleanup*) pertaining to the remediation of PCB-contaminated soil when determining the extent of the proposed remediation in this RRAW. The release that caused the contamination in this area is from handling of transformers and capacitors during the decommissioning of the Site. The release was less than 270 gallons. Therefore, the TSCA regulations would require the contaminated soil (visible), plus a one-foot buffer around it to be removed. Borings on-site have not produced visible indicators of PCB in the soil. Therefore, General Motors believes the TSCA regulations have been met by implementing the remediation completed at AOI 2.

General Motors requests No Further Action for this AOI.

1H2d(ii). AOI 3 - Area of Cinders and Slag

Visible cinders and slag down to soil will be excavated and disposed of off-site. Because a grab sample of the cinders (GRB2-1) contains arsenic and lead in excess of soil Remediation Standards, the soil beneath the material, after removal, will be analyzed for site metals.

1H3. *Area 3 - Power Station and Fuel Storage*

Note: The first three of these areas discussed in this Section exist in a pit that was used as secondary containment for the AGSTs. This pit is approximately 10 feet deeper than the surrounding land surface.

1H3a. AOI 7 - 500,000 Gal No. 6 Oil AGST

The original proposal for this AOI included removal of the top two feet in this area. We will limit the excavation in this AOI to approximately 1 foot beyond the bottom of the current pit. Post-excavation samples will be analyzed for B/NEs and TPH.

1H3b. AOI 7 - Two 30,000 Gal No. 6 Oil AGSTs

The original proposal for this AOI included removal of soil to the bottom of the contamination or the top of bedrock, whichever occurred first. We will limit the excavation in this AOI to approximately 1 foot beyond the bottom of the current pit. Post-excavation samples will be analyzed for B/NEs and TPH.

1H3c. AOI 7 - Two Steam Condensate Blowdown Sumps

The original proposal for this AOI included removal of the top two feet of the soil in the secondary containment pit, or to Residential Remediation Goal or the top of bedrock, whichever occurred first. We will limit the excavation in this AOI to approximately 1 foot beyond the bottom of the current sumps. Post-excavation samples will be analyzed for B/NEs and TPH.

1H3d. AOI 5 - Cooling Tower East of Power House

The original proposal for this AOI included removal of soil to the bottom of the contamination or the top of bedrock, whichever occurred first. The data for this AOI indicate this excavation will

extend to approximately 0.5 to 1 foot. Post-excavation samples will be analyzed for site metals, including Cr^{+6} .

General Motors takes issue with NJDEP's position concerning the removal (or treatment) of all soil containing more than 20 mg/Kg Cr^{+6} .

- First, in accordance with the Chromium Moratorium Memorandum (Jackson, 8 February 2007), a conditional NFA for soil can be issued for a Site that will have residential, commercial, or open space use. Based on that memo, the conditional NFA appears to be suitable to a Site with greater than 20 mg/Kg. With the exclusion of four outliers that will be excavated, the 95% UCL for the General Motors Site is below 10 mg/Kg.
- Second, 20 mg/Kg is the cleanup goal based on inhalation by a worker at an industrial site. This exposure scenario will not occur after removal of surface contaminated soil and replacement of the excavated soil with clean material.
- Third, the groundwater in the vicinity of this AOI (MW-28, 32 and 50, and UST-13) has Total Chromium concentrations (maximum of 22 $\mu\text{g/L}$ at MW-50), which is well below the New Jersey GWQS (70 $\mu\text{g/L}$) for Total Chromium (a GWQS does not exist for Cr^{+6}).

Therefore, the Cr^{+6} concentration in soil at FSO3 (24.6 mg/Kg) is not contributing to degradation of groundwater quality.

General Motors will commit to treating to reduce the concentration or remove elevated Cr^{+6} concentrations in soil, but proposes to use the value of 240 mg/Kg, as stated above, for this action level. The Cr^{+6} that exists at FSO3 (0 to 0.5 ft) will be removed as part of the proposed remediation of this area. General Motors will compare the post-excavation results to 240 mg/Kg.

1H3e. AOI 10 - Former Gasoline USTs (MOA Area D)

The original proposal for this AOI included removal of the soil to meet the Impact to Groundwater Criteria. General Motors has reconsidered this and proposes natural attenuation of the gasoline-related VOCs in this area. Previous remedial measures in this area included removal of the USTs and contaminated soil. What remains is at depth and is minimal in extent. In order to remove the affected soil would require removal of approximately 14 feet of clean material that overlays the contaminated soil. This is not practical. Because the contaminated soil is 14 feet below ground surface, direct contact with this material is unlikely. This soil will be included in a Deed Notice to be prepared for the Site.

The compounds found in the soil that have concentrations in excess of the most stringent soil Remediation Goal in this AOI are limited to four VOCs. Each of these occurs in an isolated sample. These sample locations (B6, B3-2, B3-3, B3-4 & B3-5) are in close proximity to one another. The sample depths containing these compounds range from 9.5 to 17 feet below ground surface. The only compound detected above the Remediation Goal that is detected above a GWQS in nearby monitoring wells is benzene (UST-3 & -5). Depth to water in this area varies over time and is periodically in the zone containing these substances.

General Motors will continue to monitor UST-3 and UST-5 for benzene concentration to verify that the concentration is decreasing with time. General Motors will evaluate the applicability of a Classification Exception Area (CEA) or other groundwater remediation when it completes the site groundwater investigation (Section II of this document).

1H3f. 2,000 Gal. Unleaded Gasoline UST

General Motors requests No Further Action for this AOI.

1H3g. Former 2,500 Gal. Paint UST

General Motors requests No Further Action for this AOI.

1H3h. Staining Surrounding Power House

1H3h(i). AOI 6 - Below No. 6 Fuel Oil Unloading Port – (Former No. 6 Oil Transfer Piping)

The original proposal for this AOI included removal of soil to the bottom of the contamination or the top of bedrock, whichever occurred first. The data for this AOI indicate this excavation will extend to approximately 2.5 to 3 feet. Post-excavation samples will be analyzed for B/NEs.

1H3h(ii). Stained gravel/concrete Between Two Air Receivers on West Side of PowerHouse

No Further Action for soils within this area was previously approved. The stained gravel was removed and disposed of offsite in December 1993 with other oil waste and General Motors has not retained a bill of lading for this shipment.

1H3h(iii). Stained Area Beneath Air Receiver on East Side of PowerHouse

No Further Action for soils within this area was previously approved. All black stained soil and gravel was removed and disposed of offsite in December 1993 with other oil waste and General Motors has not retained a bill of lading for this shipment.

1H3h(iv). Stained Gravel Adjacent to Truck Parking Area

General Motors requests No Further Action for this AOI.

1H3h(v). AOIs 6 & 7 - Below Grade Piping

The original proposal for the trench that previously contained the below grade piping included removal of soil to the bottom of the contamination or the top of bedrock (for the portion in AOI 6), whichever occurred first and the top two feet (for the portion in AOI 7). Following removal of the trench, the data for this area indicate this excavation will extend to approximately 2.5 to 3 feet in the vicinity of 306-3. Post-excavation samples will be analyzed for B/NEs and site metals.

1H3h(vi). AOI 8 - Roll-Off Box Staging Area

The original proposal for this AOI included removal of soil to the bottom of the contamination or the top of bedrock, whichever occurred first. The data for this area indicate this area does not require remediation. The samples referenced by NJDEP (B3-28, and FSO27, FSO28 and FSO29) are more applicable to AOI 9 (§1H3h(vii)) and AOI 7, and are not part of AOI 8.

General Motors requests No Further Action for this AOI.

1H3h(vii). AOI 9 - Railroad Spur Staining/Stained Concrete West of Railroad Tracks

The original proposal for railroad siding included removal of the top two feet of soil, except for at FSO33, which removal to the bottom of the contamination or bedrock, whichever occurred first. We will remove the track from the front of the former oil tanks to the northern terminus. Following removal of the track, the data for this area indicate this excavation will extend to approximately 1 foot or less. After review of the data, we have determined that excavation to bedrock at FSO33 will not be necessary. Therefore, this area will be managed in a similar manner as the remainder of this AOI. Post-excavation samples will be analyzed for B/NEs and site metals.

1H4. Area 4 - Process Waste and Hazardous Waste Staging Area

1H4d. AOI 11 - Hazardous Drum Storage Area (MOA Area C)

The original proposal for this AOI included removal of the top two feet in this area. We will extend the excavation of contaminated material in this AOI to approximately 6 feet. Post-excavation samples will be analyzed for B/NEs, site metals, and TPH. Because the Total Chromium at MOA-C-B7 is greater than 2,000 mg/Kg, we will include analysis for Cr⁺⁶, biased towards this location, in the post-excavation samples.

The southeast portion of this AOI contains metals, including Cr⁺⁶ (57 mg/Kg), above action levels at depths greater than 6 feet (up to 12 feet). General Motors proposes to leave this soil in place and identify it in the Deed Notice. The metals will be greater than 6 feet below the ground surface after removal of the top 6 feet and replacement with clean fill. Direct contact is not a pathway that needs to be considered after cleanup of the upper 6 feet. Groundwater (MW-9/9A, MW-11/11A, and MW-40/40A) does not exhibit contamination by these metals, including Total Chromium or Cr⁺⁶. Therefore, the presence of these metals in the deep subsurface is not contributing to groundwater contamination, and this pathway should not be considered a concern. The soil associated with MOA-C-B13, -14, and -15 also contain B/NEs above Remediation Standards below 6 feet. The B/NEs in the soil were not identified in groundwater in the downgradient wells noted above. Therefore, similar to the rationale for leaving the metals below 6 feet, we propose leaving the B/NEs in place and identifying them in the Deed Notice.

General Motors does not believe the removal (or treatment) of all soil containing more than 20 mg/Kg Cr⁺⁶ is necessary.

- In accordance with the Chromium Moratorium Memorandum (Jackson, 8 February 2007), a conditional NFA for soil can be issued for a Site that will have commercial, industrial or open space use. Based on the preceding portion of that memo, the conditional NFA appears to be suitable to a Site with greater than 20 mg/Kg. With the exclusion of four outliers, the 95%UCL for the General Motors Site is less than 10 mg/Kg.
- 20 mg/Kg is the cleanup goal based on inhalation by a worker at an industrial site. This exposure scenario, after remediation and development (to be selected) will not occur.
- The groundwater downgradient of this AOI (MW-9/9A, MW-11/11A, and MW-40/40A) has Total Chromium concentrations below 2 µg/L, which is well below the New Jersey GWQS (70 µg/L). The Cr⁺⁶ concentration in MW-9A, 40 and 40A is non-detect.

Therefore, the Cr⁺⁶ concentration in soil at this location that NJDEP notes (57.1 mg/Kg) is not currently contributing to the degradation of groundwater quality.

General Motors will commit to treating to reduce the concentration or remove elevated Cr⁺⁶ concentrations in soil, but proposes to use the value of 240 mg/Kg as stated above for this action level.

1H4e. Six Waste Roll-Offs

No Further Action was previously accepted for these units.

1H5. Area 5 - Raw Materials Storage And Maintenance Area

1H5a. AOI 12 - Shipping and Receiving Area

The original proposal for this area did not include any excavation. The data for this area indicate this area is clean (305-1, 2, 3 and 4) and will not require any remedial measures.

General Motors requests No Further Action for this AOI.

1H5b. Power Substation #10

General Motors requests No Further Action for this AOI.

1H5c. AOI 13 - Vehicle Wash Area

General Motors requests No Further Action for this AOI.

1H5d. AOI 14 - Raw Materials Drum Storage Pad

The original proposal for this area included removal of the top two feet of soil. The data for this area indicate this excavation will only extend to approximately 1 foot. The excavation will remove ESO8. The excavation will stop at the concrete knee wall, east of ESO8 unless field indicators suggest the PCB contamination in this AOI end before the wall. Post-excavation samples will be analyzed for PCBs.

General Motors considered the USEPA Toxic Substances Control Act (TSCA) regulations (40 CFR §761.125, *Requirements For PCB Spill Cleanup*) pertaining to the remediation of PCB-contaminated soil when determining the extent of the remediation in this AOI. The release that caused the contamination in this area is from handling of transformers and capacitors during the decommissioning of the Site. The handling of these transformers and capacitors did not result in the release of anywhere near 270 gallons. Therefore, the TSCA regulations would require the contaminated soil (visible), plus a one-foot buffer around to be removed. Borings in this area have not produced visible indicators of PCB in the soil. Therefore, General Motors believes the TSCA regulations will be met by implementing the proposed remediation.

1H5e. AOI 8 - Metal Scrap Bins

General Motors requests No Further Action for this AOI.

1H5f. AOI 15 - Truck Unloading Area

The original RAW did not include a remedial measure in this AOI. This area is located outside the southeast corner of the former manufacturing building. This area was used for temporary truck parking during transfer of liquids from the truck to storage tanks located inside the Solution Storage Room. Surface runoff in this area entered a stormwater-trench that discharged to the process sewer. This trench is filled with sediment. General Motors will clean the trench and dispose of the removed material with the other soil from the Site. Following cleaning, we will inspect the integrity of the trench. We will remove the trench as part of the remediation of the Solution Storage Room trench (See §1H1c(iv)). Post-remediation samples will be analyzed for VOCs, B/NEs, PCBs, site metals and Cr⁺⁶. If observation of the trench prior to removal indicates the trench is not intact, we will bias the sample from this area to the area of lack of integrity; otherwise, we will collect random sidewall and bottom samples from this AOI based on field conditions.

1H6. *Area 6 - South Parking Lot; Paint Storage Bldg.; and Maintenance Garage*

1H6a. No Further Action Areas

1. AOI 8 - Metal Storage Bins (See Above) - No Further Action was previously approved for this area.
2. Paint Storage Building - No Further Action was previously approved for this area.
3. Maintenance Garage Drain - No Further Action was previously approved for this area.

4. 550 Gal. Diesel AGST – No Further Action was previously approved for this area.
5. 200,000 Gal. Elevated Water Tank - No Further Action was previously approved for this area.
6. Fire Fighting Practice Area – No Further Action was previously approved for this area.

1H6b. AOI 16 - Soil Staining South End of Parking Lot

NJDEP approved the combining of this area with the following one.

1H6c. AOI 16 - Drainage Swale South of Parking Lot

The original proposal for this area included: removal of vegetation from the swale banks, removal of the top two feet of soil on the banks and 4 feet in the swale itself, replacement of the excavated soil with clean fill or top soil, and re-vegetation of the banks to stabilize the slope.

This is still the proposal.

This proposal also applies to the stained soil south of the parking lot (B6-9, B6-10, B6-11 and B6-12).

Analysis of post-remediation samples from the swale will include VOCs, B/NEs, and site metals including Cr⁺⁶.

Analytical results from post-remediation samples from the swale will be included in a future version of the Baseline Ecological Evaluation that will re-evaluate the potential for ecological concern after implementing the proposed removal.

1H6d. AOI 17 - Stained Pavement on Parking Lot/Delineation of B6-3

The original proposal for this area included removal of the top two feet of soil. Based on the data, the excavation in this area need only extend to 1 foot. General Motors proposes to remove the asphalt in this area, ship it off-site for reuse, and excavate the contaminated soil. Post-excavation samples will be analyzed for site metals.

1H6e. AOI 16 - Offsite Metals (South of Drainage Swale/Adjacent to CSX Property)

This area is being addressed as part of the Drainage Swale (AOI 16).

1H7. Area 7 - Drainage Swale, Die Storage Area; Former Raw Materials Storage Area; Former Sludge Drying Bed #5

1H7a. AOI 18 - Die Storage Area – (Stained Soil South of Die Storage Area Berm and Perimeter Sampling)

The original proposal for this AOI included removal of the top two feet in this area. Based on the analytical data for this area, after the concrete is removed, excavation of soil in the vicinity of

the contaminated samples will be excavated to 2 feet. Post-excavation samples will be analyzed for TPH, B/NEs, VOCs, and site metals.

During implementation of the GWIW Addendum (January 2008), General Motors collected eight horizontal and one vertical-delineation sample(s) around and below the former ISO23 (7 to 7.5-foot) location. During original collection of this sample, the boring was advanced to approximately 12 feet below ground surface. We encountered clay from 7 to 11 feet and weathered bedrock from 11 to 12 feet. We noticed "wet" conditions at about 7.5 feet and collected a sample 6-inches above this depth. The remainder of the clay and weathered bedrock was noted as dry. During implementation of the GWIW Addendum, we sampled beneath the original location (ISO23R) and at the same interval as the original sample and the deeper sample at four locations around the original location (ISO23-1, -2, -3, and -4).

Analytical data for these delineation samples indicate the low concentration of TCE at ISO23 (1.6 mg/Kg) is isolated. Chlorinated VOCs were found in the delineation samples (including TCE at an estimated concentration), but none were found above their respective Remediation Goal. Therefore, the isolated soil associated with ISO23 at 7 to 7.5 feet will not be subject to remediation. Using compliance averaging, the TCE concentration in this area is below the Remediation Goal (54 mg/Kg) and General Motors requests No Further Action for this contaminant in soil at this AOI.

The two sample locations noted by NJDEP as containing zinc and arsenic (ISO30 and ASO11) are actually in AOI 16 (See 81H6c) and will be addressed as discussed above.

1H7b. AOI 20 - Former Raw Materials Drum Storage Area

The original proposal for this AOI included removal of the top two feet in this area. Based on the analytical data for this area, General Motors proposes remediation in this area is not necessary. The soil in this area will be included in the Deed Notice for the Site.

1H7c. 550 Gal. Gasoline AGST

No Further Action was previously granted for this AOC.

1H7d. AOI 19 - Former Sludge Drying Bed #5

The original proposal for this AOI included removal of the top two feet in this area. Based on the analytical data for this area, excavation of soil in this AOI will be excavated to 2 feet with the area around the storm pipe to be excavated to approximately 5 feet to remove the discolored soil around the storm sewer in the bedding in test pits TP7-3, -5, -6, -7 and -8 observed during the implementation of the GWIW Addendum in January 2008. Post-excavation samples will be analyzed for VOCs, B/NEs, site metals, and Cr⁺⁶.

The proposed excavation will remove the identified contamination except at SB-7-SO-3 below 6 feet. This contamination includes B/NEs (6 – 10 ft), copper (8 – 10 ft) and TCE (8 – 10 ft). None of these are identified above Site Remediation Standards in any of the other samples in or near this AOI (including B7-4 [AOI 18] and B7-5 [AOI 22]). Except for TCE, these compounds are not detected above the GWQS in monitoring wells near this AOI (MW-12,

MW-22 and MW-22A). TCE is part of a site-wide issue and does not seem to be the result of an isolated 1.5 mg/Kg at this location. Therefore, General Motors proposes to leave the contamination below 6 feet and include it in a Deed Notice.

During implementation of the GWIW Addendum (January 2008), General Motors conducted ten test pits (TP7-1 through TP7-10) in the vicinity of MW-8 to better understand the cause for what appears to be a localized groundwater mound (Figure 9). General Motors collected samples from the sidewalls and of the excavated material from TP7-1 through TP7-5. We dug TP7-6 through TP7-10 to trace a sewer pipe discovered in the vicinity of MW-8 and did not collect samples from these latter five test pits. Samples from the first five test pits were analyzed for VOCs, B/NEs, site metals, Cr⁺⁶, and waste characterization parameters. The analytical data indicate the VOCs and B/NEs are below action levels. Metals exceed Remediation Standards in test pits TP7-2 (As) and TP7-5 (Pb) at the ground surface and Cr⁺⁶ did not exceed Remediation Standards in any of the test pits.

General Motors installed a new monitoring well at the former ISO27 location (MW-49). We sampled this well for VOCs and site metals. The analytical result for Total Chromium is 11.1 µg/L in May 2008 and the well was dry in August 2008. The Total Chromium concentration is well below the GWQS (70 µg/L).

Although General Motors will collect post-excavation samples from this area for Cr⁺⁶, General Motors believes the removal (or treatment) of all soil containing more than 20 mg/Kg Cr⁺⁶ is not necessary.

- In accordance with the Chromium Moratorium Memorandum (Jackson, 8 February 2007), a conditional NFA for soil can be issued for a Site that will have commercial, industrial or open space use. Based on the preceding portion of that memo, the conditional NFA appears to be suitable to a Site with greater than 20 mg/Kg. With the exclusion of four outliers, the 95% UCL for the General Motors Site is less than 10 mg/Kg.
- 20 mg/Kg is the cleanup goal based on inhalation by a worker at an industrial site. This exposure scenario, after remediation and development (to be selected) will not occur.

General Motors will commit to treating to reduce the concentration or remove elevated Cr⁺⁶ concentrations in soil, but proposes to use the value of 240 mg/Kg as stated above for this action level.

1H7e. AOI 20 - Former Raw Materials Drum Storage Area - Oil-Stained Concrete

See §1H7b above. Refer to §IC Concrete for methodology regarding concrete handling.

1H7f. AOI 21 - Drainage Swale South of Die Storage Area / Offsite Delineation

See §1H6c above.

1H7g. AOI 22 - Area of Concrete Staining in Motor Storage Area

The area around ISO11 will be excavated to a depth of 2 feet and B7-5 to 4 feet. Post-excavation samples will be collected for PCBs and site metals.

1H8. Area 8 - Waste Water Treatment Plant

1H8a. AOI 23 - New Oil-Water Separator

The original proposal for this AOI included removal of the top two feet in this area. After further review of the data for this area, General Motors proposes to not remediate this area.

All results from these locations are lower than the Remediation Standards for the Site except below 6 feet at BH-2. B/NEs exist below 6 feet at this location. Nearby samples, including JSO35, indicate this contamination is limited horizontally and deeper samples at BH-2 indicate vertical delineation is complete. Groundwater results in this vicinity (MW-10, -11/11A, and -12) indicate B/NEs are not a contaminant in the groundwater downgradient of BH-2. Therefore, General Motors proposes to leave this contamination in place and record it in the Deed Notice.

Otherwise, General Motors requests No Further Action for this aspect of this AOI.

1H8b. Sanitation Washdown Area

General Motors requests No Further Action for this AOI.

1H8c. AOIs 24 & 25 - Former 500,000 Gal. Sludge Settling Tanks and Offsite Sampling

The original proposal for this AOI included burial under the on-site management unit, in the area around the former settling tanks, and removal of vegetation and soil on the banks of the swale. We now propose to remove the top two feet of soil in the vicinity of the former settling tanks (the northern portion of AOI 24 and the southern portion of AOI 25) around B8-5. Post-excavation samples will be analyzed for VOCs, B/NEs, and site metals.

Samples from 6 feet and greater in the vicinity of the Sludge Settling Tanks contain metals and B/NEs above respective Remediation Standards. Removal of the soil represented by these samples would require removal of at least 6 feet of clean material. Monitoring wells have not been installed in this AOI or immediately downgradient of it. However, where tested, B/NEs have not been above GWQS in but a small number of wells. Therefore, B/NEs are not considered a groundwater issue at the Site. General Motors proposes to leave the soil associated with this deeper contamination in place and include it in the Site's Deed Notice.

Concrete masonry debris was used to fill the sludge settling tanks. Prior to closing these tanks, General Motors cleaned and inspected these tanks. NJDEP was invited to inspect the tanks. Following that inspection, it was determined that the concrete walls could be pushed into the tanks as fill. General Motors punched holes in the bottom to prevent the vessels from retaining water and pushed the walls into the tanks. The remainder of the void was filled with imported soil. Because NJDEP approved this action at the time, General Motors does not believe it is

necessary to access this concrete for sampling. Nor is it necessary to remove this concrete from the Site.

A summary of demolition debris, disposal destinations, and available transportation documentation is presented in the Remedial Investigation Progress Report (RIPR), under separate cover.

1H8d. AOI 24 - Former Process Sewer Structures (Sump, Parshall Flume, and Retention Box)

The original proposal for these structures was to remove them during soil excavation activity in this AOI and evaluate conditions outside these structures once they are removed. This remains the proposal. Post-excavation soil sampling will be for VOCs, TPH, B/NEs, site metals, CN, one Cr⁺⁶ and one PCB analysis per structure. The Cr⁺⁶ and the PCB analysis will be biased towards any indication that the structure was not intact, discoloration of soil, or other field indicator.

1H8e. AOI 23 - Waste Oil Tank

This former tank was the 30,000-gallon waste oil tank identified as part of MOA Area B. See §IH8o, below.

1H8f. AOI 23 - 11,000 Gal. Waste Oil AGST

The original proposal for this AOI included removal of the top two feet in this area. This is still the proposal with the exception of the area around JSO19 and JSO29. These two locations are approximately 10 feet apart. JSO19 is horizontally delineated with JSO31, 32 and 33, and vertically delineated with JSO30 (7-7.5 feet). Delineation to the north is incomplete (a decreasing trend from JSO19 to JSO29 suggests delineation is approximately another 10 feet to the northwest. During field work associated with implementation of the GWIW Addendum (January 2008), General Motors conducted a boring in the former JSO29 location. One sample was collected from JSO29R at the water table (7 to 7.5 feet). TCE (0.02 mg/Kg) does not exceed the Site Remediation Goal and TCE is vertically delineated in this location. Therefore, the area around JSO19 and JSO29 will be excavated to approximately 6 feet below ground surface. Post-excavation samples will be analyzed for VOCs.

1H8g. AOI 25 - Eight Neutralization Tanks

After decontamination, these tanks were decommissioned. Holes were punched in the bottom and the sidewalls pushed in to prevent these tanks becoming bathtubs. Masonry debris from the building decommissioning was used to aide in the filling of this void. A summary of demolition debris, disposal destinations, and available transportation documentation is presented in the RIPR, under separate cover.

The original proposal for this AOI included burial under the on-site management unit, in the area around the former settling tanks. We now propose to remove the top two feet of soil in the vicinity of the former neutralization tank (the northern portion of AOI 25). Post-excavation samples will be analyzed for VOCs, B/NEs, and site metals.

Samples from 6 feet and greater in the vicinity of the neutralization tank contain metals and B/NEs above respective Remediation Standards. Removal of the soil represented by these samples would require removal of at least 6 feet of clean material. Monitoring wells have not been installed in this AOI or immediately downgradient of it. However, where tested, B/NEs have not been above GWQS in but a small number of wells. Therefore, B/NEs are not considered a groundwater issue at the Site. General Motors proposes to leave the soil associated with this deeper contamination in place and include it in the Site's Deed Notice.

1H8h. AOIs 24 & 25 Waste Treatment Building

No Further Action was required for this area.

1H8i. Former Incinerators

1H8i(i). AOI 26 - Former Trash Incinerator

The original proposal for this AOI included removal of the top two feet in this area. We will excavate soil to 6 feet in the vicinity of SB-8-SO-15 & SB-8-SO-16. Post-excavation samples will be analyzed for site metals.

1H8i(ii). AOI 23 - Former Waste Oil Incinerator

The original proposal for this AOI included removal of the top two feet in this area. We will excavate soil in the vicinity of JSO20 to explore the refusal encountered in this area. We will expand the excavation in this area beyond the refusal (unless it is natural) and extend the excavation one additional foot, if we can get past the refusal. Post-excavation samples will be analyzed for site metals.

Because of the possible occurrence of Cr^{+6} in this area due to a Total Chromium concentration over 800 mg/Kg in MOA-B-BS2, General Motors performed limited soil sampling during implementation of the GWIW Addendum (January 2008) in the vicinity southeast corner of the former separator (MOA-B-BS2, MOA-B-BS3, JSO14 and JSO20) at depths similar to previous sample collection. The samples were analyzed for Total Chromium and Cr^{+6} and Cr^{+6} was not detected in the four samples. Therefore post-excavation samples will not be analyzed in this area for Cr^{+6} .

1H8j. AOI 27 - Spent Nitric Acid Spill/Past Leak in Process Wastewater Sewer

The original proposal for this AOI included removal of the top two feet in this area. Upon further review of the data for this area, General Motors proposes not to excavate this area unless nearby excavation extends into this AOI. All data for this AOI are below the Site Remediation Standards.

General Motors requests No Further Action for this AOI.

1H8k. AOI 25 - Sulfuric Acid Leak

The original proposal for this AOI included burial under the on-site management unit. We now propose to remove the top two feet of soil in the vicinity of samples JSO11 and JSO12. Post-excavation samples will be analyzed for B/NEs.

1H8l. AOI 24 - Drainage Swale Downstream of Outfall DSN003a

See §1H6c above.

1H8m. AOI 28 - Transformer Substation No.14

The original proposal for this AOI included removal of the top two feet in this area. This is still our proposal. We will collect post-excavation samples for PCBs. We will bias the bottom sample in this excavation to the former location for JSO4.

1H8n. Past Leak in Process Waste Water Sewer

General Motors requests No Further Action for this AOI.

1H8o. AOI 23 - Former Oil/Water Separator and Waste Oil UST (MOA Area B)

The original proposal for this AOI included removal of the top two feet in this area. General Motors proposes to excavate 4 to 6 feet below ground surface in the vicinity of the old oil/water separator. The one sample previously collected from beneath the separator that contains tetrachloroethene (PCE; 1.3 mg/Kg; MOA-B-S6) will remain and be included in the Site's Deed Notice. Sampling in this AOI indicates chlorinated VOCs is not a general issue (only occurring above a remedial goal at two locations: MOA-B-S6 [PCE] and JSO19 [TCE], and after remediation of AOI 23, only the soil represented by MOA-B-S6 will remain). Groundwater monitoring in this area (MW-10, MW-11, and MW-12R) indicates PCE has not been found above its GWQS (1 µg/L). We will collect post-excavation samples for VOCs, B/NEs, site metals and PCBs.

Because of the possible occurrence of Cr⁺⁶ in this area due to a Total Chromium concentration over 800 mg/Kg in MOA-B-BS2, General Motors performed limited soil sampling during implementation of the GWIW Addendum (January 2008) in the vicinity southeast corner of the former separator (MOA-B-BS2, MOA-B-BS3, JSO14 and JSO20) at depths similar to previous sample collection. The samples were analyzed for Total Chromium and Cr⁺⁶ and Cr⁺⁶ was not detected in the four samples. Therefore post-excavation samples will not be analyzed in this area for Cr⁺⁶.

1H9. *Area 9 - Power house Parking Lot and Equipment Storage Area*

1H9a. AOI 29 - Power House Parking Lot

The original proposal for the portion of this area that contained B9-1 through B9-4 was to remove the contamination to Residential Remediation Standards or bedrock, whichever occurred first. This is still the proposal. This excavation will also include soil represented by B9-5, HSO16 and

HSO17, and SB-9-SO-7 and SB-9-SO-8. Based on borings in this area, vertical delineation indicates the bottom of the excavation will occur before bedrock and General Motors proposes to remove the top two feet in this area and collecting post-excavation samples to confirm we have achieved residential Remediation Standards in this area.

The original proposal for the remainder of this AOI was burial under the on-site management unit. General Motors now proposes removal of the top one foot of material along the eastern edge of the parking lot, along with necessary asphalt to achieve Residential Remediation Standards on the western edge of this excavation. Post-excavation sampling of the sidewalls and base of this excavation will be used to demonstrate removal of the contamination. Existing soil sampling indicates, in general (except as noted below), vertical delineation is complete in this area. Post-excavation samples will be analyzed for B/NEs and site metals. We will collect one post-excavation samples for PCBs biased toward B9-12.

Following the proposed excavation in this AOI, the following will remain: B10-1 (Chrysene) at 4.5 to 5 feet, SB-10-SO-3 (B/NEs and metals) at 1 to 2 feet, and B9-14 (metals) at 1.5 to 2 feet. The groundwater in this AOI (MW-1/1A, MW-26 and MW-27/27A, "A" wells are in the shallow bedrock) contains TCE and degradation products (part of the site wide groundwater contamination, no TCE source in this area identified) and manganese (also widely distributed in the Site groundwater, a naturally occurring element in soil). Isolated (time and locations) observations of nicker (MW-14, June 2006) and arsenic (MW-27, June 2005 and August 2008) above respective GWQS have occurred. Based on our observations over time, we conclude that there is no potential impact on groundwater surrounding this area in the future.

1H9b. AOI 29 - Equipment Storage Areas

This area includes B9-3 and B9-4. See response above (§1H9a).

1H9c. AOI 29 - NE Corner of Parking Lot

This area is also within the Eastern Edge of Parking Lot (HSO20 to HSO23). Based on analytical data from these samples, this area is clean and does not require remediation. General Motors request No Further Action for this area.

1H9d. AOI 30 - Areas of Past Fill Placement and Areas of Settlement

The original proposal for this AOI was (western portion) removal to Residential Remediation Standards and (eastern) burial under the on-site management unit. General Motors now proposes removal of the soil above Residential Remediation Standards (or bedrock, whichever occurs first) in the area of test pits TP9-2 and TP9-3. This excavation would also include SB-9-SO-9. Numerous anomalies under this parking lot were identified during two electromagnetic (EM) surveys. Both test pits and borings were performed in the areas of these anomalies. Miscellaneous debris, such as tires, wood, brick, was found distributed throughout this area. The proposed areas for excavation were identified with contaminated soil. The proposal is to remediate this contamination and not remove the debris. Therefore, post-excavation samples will be used to determine the limits of this remediation, not the appearance or lack thereof of debris. Post-excavation samples will be analyzed for B/NEs, site metals, and PCBs.

1H10. Area 10 – Undeveloped Area Between Parking Lot and Gold Run

1H10a. AOI 31 - Former Sludge Drying Beds #1-4

The original proposal for the remainder of this AOI was burial under the on-site management unit. General Motors now proposes removal of the top four feet of material from the top of the four areas that previously contained these sludge beds. We will extend the excavation to six feet at SB-10-SO-2 and SB-10-SO-7 to remove the lead at these locations, and at SB-10-SO-10 to remove the lead and VOCs at this location. According to interviews with previous employees of the facility, the sludge was removed from these beds during decommissioning before being filled in. This proposed excavation will revisit these areas and remove any remaining sludge or contaminated soil that remains to four feet below the current surface of these beds. If this excavation indicates sludge exists below 4 feet, General Motors will evaluate the extent and quality of the remaining sludge. If the extent is nominal, the additional material will be removed. If it is extensive and the quality exceeds the Site Remediation Standards, this material will either be excavated or included in the Site Deed Notice. Post-excavation sampling of the sidewalls and base of this excavation will be used to demonstrate removal of the contamination. Post-excavation samples will be analyzed for VOCs, B/NEs, site metals, and PCBs.

The proposed excavation will leave metals and SVOC-contamination at depths greater than the proposed excavation depths at the following locations: SB-10-SO-2 (4 ft), SB-10-SO-5 (4 ft), SB-10-SO-7 (8 ft), and SB-10-SO 11 (4 ft). General Motors has not been monitoring B/NEs in groundwater during recent sampling events because historical sampling for this class of compounds indicated they were not a contaminant of concern in the groundwater (although minor exceedances of standards have been found in seven wells, all but 5 results [one each in 5 wells] are estimated concentrations that exceed the GWQS). In addition, all locations with elevated B/NEs, except MW-14A (the upgradient well), have VOC contamination that will need to be addressed in a future groundwater remedial recommendation. Metals are found in both groundwater and the soils in this AOI, predominantly lead. After the proposed excavation, the soil contaminated with this metal will be removed.

Even though there are occurrences on-site of Cr^{+6} greater than 20 mg/Kg when the concentration of Total Chromium is less than 200 mg/Kg, of the 278 samples around the site analyzed for both Total-Chromium and Cr^{+6} , only 2 (0.7%) have Cr^{+6} greater than 20 mg/Kg when the concentration of Total Chromium is less than 200 mg/Kg (WSO4, 0 to 2 feet; and PL12-08, 2 to 10 ft). This is not a significant occurrence. Therefore, General Motors does not agree with NJDEP that it is necessary to include Cr^{+6} in all of the post-excavation samples in this area. We will collect a sample for Cr^{+6} in Sludge Beds 1 through 4, biased toward the sample locations exhibiting the elevated (greater than 2,000 mg/Kg) Total Chromium (in the current data set): SB-10-SO-7, SB-10-SO-5A, and SB-10-SO-2. If the Total Chromium-analysis in any of the post-excavation samples in the Sludge Beds exceed 2,000 mg/Kg, General Motors will either continue the excavation to remove the soil represented by the sample data or collect and analyze a sample from the same area for Cr^{+6} .

General Motors does not believe the removal (or treatment) of all soil containing more than 20 mg/Kg Cr^{+6} is necessary.

- In accordance with the Chromium Moratorium Memorandum (Jackson, 8 February 2007), a conditional NFA for soil can be issued for a Site that will have commercial, industrial or open space use. Based on the preceding portion of that memo, the conditional NFA appears to be suitable to a Site with greater than 20 mg/Kg. With the exclusion of four outliers, the 95% UCL for the General Motors Site is below 10 mg/Kg.
- 20 mg/Kg is the cleanup goal based on inhalation by a worker at an industrial site. This exposure scenario, after remediation and development (to be selected) will not occur.
- The groundwater in the vicinity of this AOI (MW-2/2A, MW-3/3A, MW-4/4A, MW-5/5A, MW-6/6A, MW-7/7A, and MW-13) has Total Chromium concentrations below 20 µg/L, which is well below the New Jersey GWQS (70 µg/L).

Therefore, the Total Chromium concentration in soil at this location is not currently contributing to the degradation of groundwater quality.

General Motors will commit to treating to reduce the concentration or remove elevated Cr^{+6} concentrations in soil, but proposes to use the value of 240 mg/Kg as stated above for this action level.

1H10b. AOI 31 - Wooded Area Surrounding Sludge Beds/ Debris Piles

General Motors will remove the debris located to the east of the Sludge Beds and west of Gold Run. General Motors will excavate approximately one foot of soil in the area represented by WSO6 and collect post-excavation samples for B/NEs after removal of debris from this area.

1H10c. Rust Colored Stain

NJDEP accepted a No Further Action proposal with regard to the rust-colored soils.

1H10d. AOI 31 - Gold Run Downstream of Area 9 Parking Lot Drain Outfall

The original proposal for this area included:

- for WSE6 and WSE7: removal of vegetation from the swale banks, removal of the top two feet of soil on the banks and 4 feet in the swale itself, replacement of the excavated soil with clean fill or top soil, and re-vegetation of the banks to stabilize the slope.
- for WSE2 through WSE5, and WSE8 and WSE9: no remediation

General Motors still proposes the same for the area around WSE6 and WSE7. We will add WSE2 through WSE5, WSE8 and WSE9 to the area of the proposed remediation.

Also, regarding WSO3 and WSO5, these samples were collected, as soil, in an area mapped as wetlands. During sampling, these locations were not under water. Samples of sediment from Gold Run and the Southern Swale, including WSE4 and WSE5 (north and south of WSO3), and WSE6 and WSE7 (south and east of WSO5) are the closest to these two sample locations.

General Motors proposes to excavate the top foot of soil from the vicinity of WSO3, provided it is accessible (due to wet ground conditions). Post-excavation samples will be analyzed for B/NEs, PCBs, and Cr⁺⁶.

Regarding WSO5, see §1H6c above.

1H10e. AOI 31 - Offsite Borings – CSX Property

The Southern Swale is a narrow, stormwater drainage feature created, historically, by the elevation of the railroad siding to the south, and the filling of the Site, to the north; therefore, lateral delineation (cross swale) is not practical. Delineation along the run of the swale has been completed. Delineation efforts have included sampling of soil on the face of the historical fill and railroad ballast. Vertical delineation has been attempted; however, in some locations we encountered bedrock (e.g. ASE8 and ASE10). At other locations (e.g. ISE6 and ISE8) we encountered clay, collected a sample in the top six inches of the clay and did not proceed further so that we did not inadvertently penetrate the clay. Comparing the results in the sediment and in the clay, we believe the concentration gradient can be used to imply the contamination stops in the near surface of the clay beneath the sediment.

Samples ASO15 and ASO35; ISO17 through ISO29, ISO38, ISO40, and ISO42; JSO24, JSO25 and JSO28; and WSO19 and WSO11 were collected south of the Southern Swale, generally on the lower portion of the bank of the CSX elevated track. The tracks are elevated on a bank of soil covered with rip-rap. Therefore, these sample results were compared to the Soil Cleanup Criteria, not Sediment Screening Guidelines. As noted before, General Motors proposes to remove the contaminated soil and sediment from the sidewalls and bottom of this swale.

1H11. Area 11 - Undeveloped Parkland Area/Northern Property Boundary

The portion of Area 11 known as the Ballfield Parcel received a No Further Action determination October 9, 2002. This parcel has since been sold and developed.

1H11a. AOI 32 - Gold Run Pond (Sediment)

As part of the delineation effort for TCE in the Gold Run Pond sediment, General Motors collected and analyzed additional sediment samples. The TCE found at PS-11 was historically vertically delineated (September 2006) and was horizontally delineated in May 2007. The TCE found at PS-18 extends to bedrock, vertically, and has been horizontally delineated in May 2007 as well as it can – the westerly delineation sample shows decreasing concentration, but it is still above the Sediment Screening Guideline. However, this sample was collected adjacent to the shore and additional sediment to the west is limited. Delineation to the north is accomplished with historical sample PS-19; sampleable sediment does not exist between PS-18 and PS-19 where this part of Gold Run has exposed rock in the stream bed.

General Motors proposes to remove the contaminated sediment in Gold Run Pond. Based on the current Conceptual Site Model, the contaminated sediment in the pond is serving as a source to groundwater contamination. Based on surface water sample results (See §3 below), the sediment has likely been contaminated by surface water entering the pond from the storm

sewer under Parkway Avenue. Although this source is not General Motors', General Motors will remove and dispose of this sediment as part of the Site remediation.

Remediation of the sediment will require lowering the water level in the pond. Once the pond is dry, we will excavate the contaminated sediment. Based on the current dataset, the sediment will be removed to a depth of 3 feet, or bedrock, whichever occurs first. Data concerning the waste-characteristics of this material were collected, and we determined this material would not be considered a hazardous waste. This material will be disposed of off-site. Post-removal samples will be collected on the sidewall, and, if available, from the floor of the pond (sediment remains above bedrock). Post-removal samples will be analyzed for VOCs, B/NEs, site metals, PCBs, and Cr⁺⁶.

1H11b. AOI 32 - Eastern Gold Run Pond Shore

This area was not previously included in the RAW or its previous revisions. General Motors proposes to remove up to one foot of soil along the eastern bank of Gold Run Pond and the creek from Parkway Avenue to approximately 100 feet south of the dam. This excavation will extend approximately 25 to 30 feet away from the water. Post-excavation samples will be analyzed for B/NEs and PCBs. A post-removal sample will be analyzed for Total Chromium and Cr⁺⁶ between BF-S1 and BF-S5.

Regarding BF-S12, BF-S20 to the east and BF-S21 and BF-S22 to the south delineate the PCB found in BF-S12. Although BF-S12 was not analyzed for Total Chromium or Cr⁺⁶, BF-S4, and BF-S20 through BF-S22 were. Cr⁺⁶ was below 20 mg/Kg at all four locations; therefore, we do not expect Cr⁺⁶ to be present at BF-S12.

1H11c. AOI 33 - Property Boundary/Offsite Soil Sampling

Additional samples were collected in September 2006 along the northern property line to delineate arsenic and polycyclic aromatic hydrocarbons (PAHs) in former samples XSO1 through XSO4 and GSO26BD. We collected 18 samples from 11 locations and analyzed these samples for PAHs or arsenic, depending on what we were delineating. Locations to the north of Parkway Avenue were included in this effort. PAHs appear to be limited to the area immediately adjacent to both sides of Parkway Avenue and are thought to be the result of road runoff. Arsenic levels above 19 mg/Kg are limited to the south side of Parkway Avenue. Based on the available data, the southerly and westerly extent of the arsenic in soil has not yet been established. The data indicate, except at the most-westerly investigation location, the occurrence of arsenic is limited to the top 6 or so inches.

Because the PAHs are immediately adjacent to Parkway Avenue and do not seem to be present in excess of Remediation Standards further away from this roadway, we believe the observed contamination along the roadway is from road runoff. Therefore, General Motors proposes not to remediate this area for this class of compounds.

For arsenic, General Motors proposes to excavate six inches of soil between the sidewalk south of the southern side of Parkway Avenue and the Municipal Building Setback line for the IP-1 zone (approximately 120 feet south of the southern edge of the sidewalk) where arsenic exceeds the Remediation Goal. Limited excavation to 2 feet will occur in the general vicinity

of former samples PKWY-01 and GSO26BD. This area will be backfilled with topsoil and seeded with grass, returning this area to current conditions. Post-excavation samples will be analyzed for arsenic.

2. PERMITS

The following permits are considered necessary for the implementation of the proposed remedial action.

- Soil Erosion and Sediment Control Plan Certification for Land Disturbance Control
- Wetlands Permit (General Permit No. 4) for remediation of the Southern Swale and eastern bank of Gold Run Pond
- Stream Encroachment Permit for remediation of the Southern Swale and Gold Run Pond
- Soil Mining Permit for excavation of soil and transport off-site, if required by local ordinances
- Approvals under authority of ISRA

If any additional permits are identified during the preparation of the remediation contract or prior to implementation of the remediation, General Motors commits to obtain the necessary permit(s) prior to implementation.

3. GROUNDWATER

An update concerning the groundwater investigation will be presented to NJDEP in a meeting scheduled for December 2008 and will be documented in a separate Groundwater Investigation Status Report to be prepared following the meeting. Depending on the outcome of the meeting, this Status Report may present the current data and interpretation only, recommendation for additional investigation (if necessary), and a recommendation for No Further Action (if applicable). A Groundwater Remedial Action Workplan, if necessary, will be prepared, under separate cover, upon completion of the groundwater investigation.

General Motors has been performing additional investigation to better understand the Conceptual Site Model (CSM) including: interpreting the Navy pumping data as it affects water levels on the Site, evaluation of surface and groundwater chemistry, and further evaluation of the interaction between groundwater and surface water.

3A. Refinement of the CSM

General Motors' on-going groundwater investigation has been geared towards defense of our hypothesis that other explanations exist for the TCE found in groundwater on the Site other than from a Site source. The purpose of the investigation currently being performed is to understand how water table and water in the bedrock interact, how water and contaminants

are being transported in both overburden and bedrock, and what source(s) of TCE may be causing the TCE found in the Site groundwater. Additional potential transport mechanisms, in addition to direct advection of TCE-impacted groundwater from the Navy, are currently being investigated as part of the CSM update.

General Motors is investigating conditions on the Site and entering the Site from off-site locations in order to identify the source(s) of groundwater contamination. We are analyzing the collected data to refine our CSM. Information being used to develop and refine the CSM includes: groundwater and surface water flow and chemistry, stratigraphy, strike and dip of bedrock bedding planes and fracture sets, interaction between surface water and groundwater, influence of external disturbances to the aquifer(s), soil chemistry and Site history.

General Motors' current CSM includes the transport of TCE via the storm sewer into Gold Run pond (historical and current) is contributing to the site-wide presence of TCE in the groundwater. This hypothesis provides a plausible explanation for how TCE has migrated from the NAWC, across the fault identified by the USGS and onto the General Motors Site.

General Motors is not accepting responsibility, at this time, for vertical and horizontal delineation of the site-wide TCE and daughter product contamination because, according to the CSM, a significant on-site source has not been identified. Only at such time that this CSM, which concludes impacts to the General Motors Site from TCE from the Navy Site, is proven to not be valid and the TCE contamination is shown to be from some yet unidentified source on-site, will General Motors embark on a vertical and horizontal delineation of the TCE in groundwater.

General Motors will delineate what groundwater contamination it is responsible for, if any. To that end, we have installed and sampled additional monitoring wells to evaluate suspect source locations to evaluate distribution of contaminants that might have a Site source. Data interpretation continues and the results will be presented to NJDEP in a December 2008 meeting. If further delineation of a specific plume is necessary, additional investigation will be proposed.

4. HEALTH AND SAFETY PLAN, REVISED

A revision to the HASP is included as Appendix F. This HASP is for the implementation of the remediation presented in this RAWA.

5. SCHEDULE, REVISED

A revised Schedule is in Appendix G.

6. REMEDIATION COST ESTIMATE, REVISED

A revised Cost Estimate for the remedial action presented herein is in Appendix H. For cost estimating purposes, General Motors has included a safety factor of 1.5 to the volume to be excavated to allow for unexpected contaminated soil to be encountered during implementation of the proposed excavations. In addition, General Motors has include approximately 25% of the total volume being excavated (including the safety factor) for off-site disposal as a contaminated material (ID-27) that will require management through the Mercer County waste-flow system.

The estimate cost for the proposed remediation is in the following table:

Remediation Task	Estimate
General Excavation and Restoration	\$9,903,050
Southern Swale	\$1,224,200
Gold Run Pond	\$1,309,700
Xylene Area	\$380,700
TOTAL	\$12,817,650

We estimate approximately \$150,000 will be necessary to maintain the wetlands restoration for up to five years before natural events will take affect.

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TABLES

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TABLE III
SUMMARY OF AREAS OF INTEREST
 General Motors Corporation
 Former Delphi Interior and Lighting Systems
 Trenton, New Jersey
 ISRA Case No. E97070

Jun 17, 2009 14:13

AOI Number	Description
<i>Investigation Area 1 – Manufacturing Building and East Parking Lot</i>	
1	Manufacturing Building and East Parking Lot
AOI 1-01	Pit 203 - Injection Molder
AOI 1-02	Pit 213 - Process Sump
AOI 1-03	Pit 206 - Injection Molder
AOI 1-04	Lateral Pipe 1
AOI 1-05	Pit 103 - Process Sewer Pit
AOI 1-06	Main Crock Line
AOI 1-07	Pit 208 - Injection Molder
AOI 1-08	Pit 279
AOI 1-09	Pit 221 - Process Sump
AOI 1-10	Hydraulic Oil UST
AOI 1-11	Pit 107 - Sewer Sump
AOI 1-12	Pit 106 - Sewer Sump
AOI 1-13	Former Zinc Barrel Plater Pit
AOI 1-14	Plater Pit 10
AOI 1-15	Plater Pit 9
AOI 1-16	Plater Pit 11
AOI 1-17	Pit 118 - Sewer Pit
AOI 1-18	Lateral Pipe 4
AOI 1-19	Pit 301 - Eastern Track Well
AOI 1-20	Pit 229 - Sump
AOI 1-21	Lateral Pipe 5
AOI 1-22	Pit 108 - Sewer Sump
AOI 1-23	Pit 109 - Sewer Sump
AOI 1-24	Plater Pit 5
AOI 1-25	Plater Pit 6
AOI 1-26	Pit 302 - Western Track Well
AOI 1-27	Pit 111 - Sewer Sump
AOI 1-28	Pit 110 - Sewer Sump
AOI 1-29	Pit 239 - Sump
AOI 1-30	Lateral Pipe 6
AOI 1-31	Plater Pit 12
AOI 1-32	Lateral Pipe 7
AOI 1-33	Pit 255 - Sump
AOI 1-34	Pit 113 - Sewer Pit
AOI 1-35	Pit 275 - Condensate Return Sump
AOI 1-36	Existing Die Cast Area
AOI 1-37	Plater Pit 7
AOI 1-38	Scrap Metal Pits
AOI 1-39	Pit 250 - Sump
AOI 1-40	Pit 249 - Plasticol Paint and Primer Pit
AOI 1-41	Pit 264 - Imbiber Bead Box
AOI 1-42	Former Press Storage Area
AOI 1-43	Pit 261 - Sump
AOI 1-44	Pit 262 - Sump
AOI 1-45	De-Ion Room
AOI 1-46	Pit 263 - DI Pit
AOI 1-47	Connection Pipe 1A
AOI 1-48	Lateral Pipe 8
AOI 1-49	Chemical Storage Area in Solution Storage Room
AOI 1-50	Former 10,000 Gallon Gasoline UST beneath the Solution Storage Room
AOI 1-51	Pit 268 - Solution Storage Room Trench
AOI 1-52	Pit 271 - Hydraulic Compactor Trench
AOI 1-53	Former 1,000 Gallon Gasoline UST at Northeastern Manufacturing Building Corner
<i>Investigation Area 2 – Above Ground Storage Tank Area/Primary Switch House</i>	
2	Primary Switch House/Transformer M-1
3	Area of slag and cinders
4	Former solvent ASTs

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TABLE III
SUMMARY OF AREAS OF INTEREST
 General Motors Corporation
 Former Delphi Interior and Lighting Systems
 Trenton, New Jersey
 ISRA Case No. E97070

Jun 17, 2009 14:13

AOI Number	Description
<i>Investigation Area 3 – Powerhouse and Fuel Storage</i>	
5	Cooling Tower East of Powerhouse
6	Former No. 6 Fuel-Oil Transfer Area
7	Below Grade Piping No. 6 Heating Oil ASTs Steam Condensate Blowdown Sumps Former 2500 Gallon Paint UST
8	Roll-Off Box Staging Area
9	Stained Concrete West of Railroad Tracks
10	Former Gasoline USTs (MOA Area D)
<i>Investigation Area 4 – Process Waste and Hazardous Waste Staging Area (MOA Area C)</i>	
11	Process Waste and Hazardous Waste Staging Area (MOA Area C)
<i>Investigation Area 5 – Raw Materials Storage and Maintenance Area</i>	
12	Shipping and Receiving Area
13	Vehicle Wash Area
14	Raw Materials Drum Storage Pad
15	Truck Unloading Area (No Samples have been collected in this area.)
<i>Investigation Area 6 – Drainage Swale, Offsite Metals Delineation and South Parking Lot</i>	
16	Soil Staining South End of Parking Lot Drainage Swale South of Parking Lot Offsite Metals (South of Drainage Swale/Adjacent to CSX Property)
17	Stained Pavement on Parking Lot/Delineation of B6-3
<i>Investigation Area 7 – Drainage Swale, Die Storage Area, Former Raw Materials Storage Area, and Former Sludge Drying Bed No.</i>	
18	Die Storage Area (Stained Soil South of Die Storage Area Berm and Perimeter Sampling)
19	Former Sludge Drying Bed #5
20	Former RAW Materials Drum Storage Area
21	Former RAW Materials Drum Storage Area – Oil Stained Concrete
22	Drainage Swale South of Die Storage Area / Offsite Delineation
22	Motor Storage Area
<i>Investigation Area 8 – Wastewater Treatment Plant Area: Former Sludge Settling Tanks, Former Transformer Substation #14, 11,000-Gallon Waste Oil AST, Former Incinerators, Nitric Acid Spill Area, Sulfuric Acid Leak Area and Southern Drainage Swale</i>	
	Former Process Sewer Structures – Sump, Parshall Flume, and Retention Box
23	New Oil-Water Separator Former Oil/Water Separator and Waste Oil UST (MOA Area B) Waste Oil Tank (Part of MOA Area B) 11,000 Gallon Waste Oil AST Former Waste Oil Incinerator
24	Former 500,000 gallon Sludge Settling Tanks and Offsite Sampling Drainage Swale Downstream of Outfall DSN003a
25	Eight Neutralization Tanks Sulfuric Acid Leak
26	Former Trash Incinerator
27	Spent Nitric Acid Spill/Past Leak in Process Wastewater Sewer
28	Transformer Substation No. 14
<i>Investigation Area 9 – Powerhouse Parking Lot and Equipment Storage Area</i>	
29	Eastern Edge of Former Parking Lot Area Equipment Storage Areas
30	Areas of Past Fill Placement and Areas of Settlement
<i>Investigation Area 10 – Former Sludge Drying Beds Nos. 1 through 4, Debris Piles, Gold Run Sediment and Swale</i>	
31	Wooded Area Surrounding Sludge Beds/Debris Piles Gold Run Downstream of Area 9 Parking Lot Drain Outfall Offsite Borings – CSX Property
<i>Investigation Area 11 – Undeveloped Area and Southern Property Boundary</i>	
32	Gold Run Pond
33	Northern Property Boundary

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FIGURES

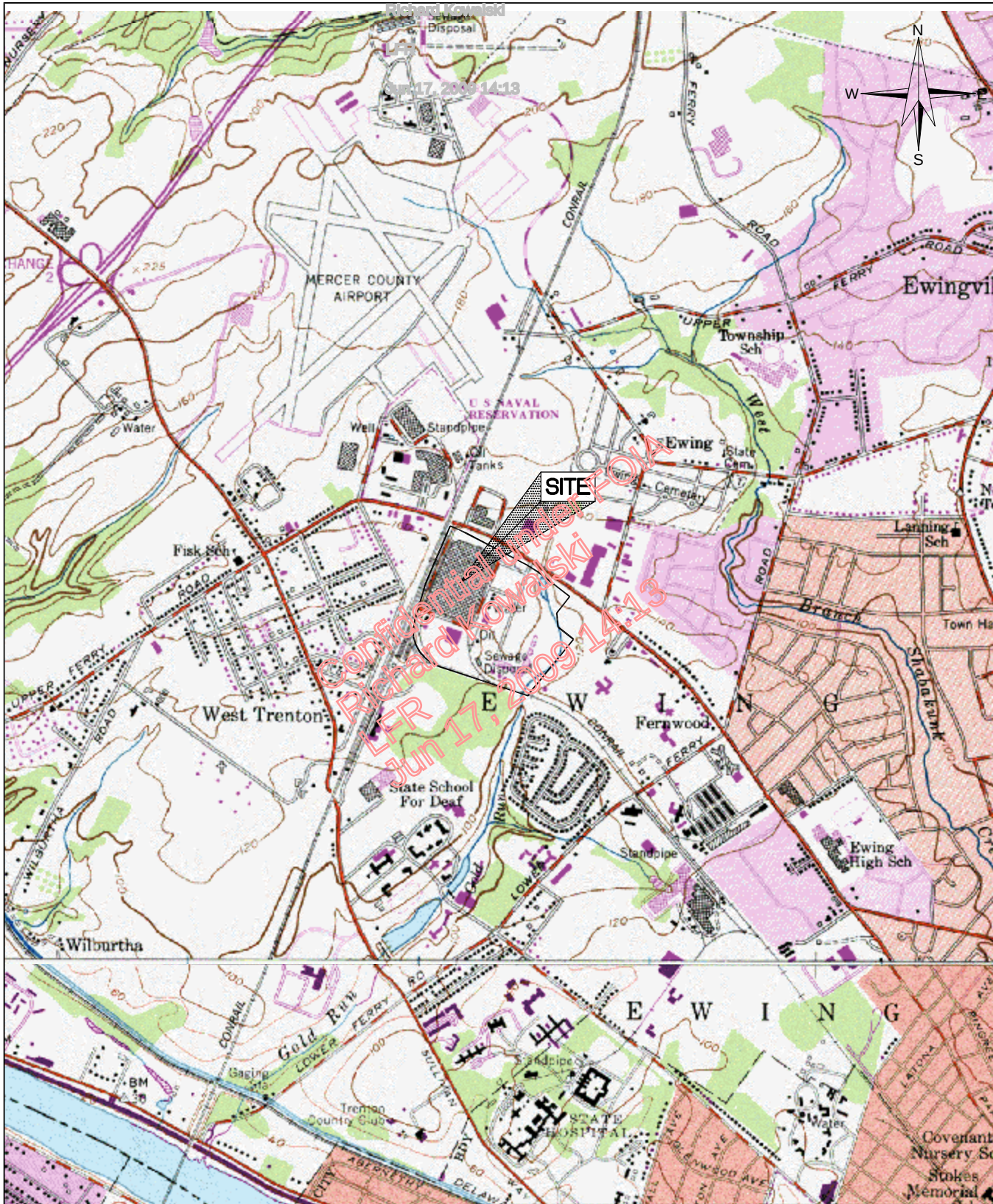
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SOURCE:
PENNINGTON QUADRANGLE, NEW JERSEY - PENNSYLVANIA,
USGS 7.5 MINUTE SERIES (TOPOGRAPHIC), DATED 1954,
PHOTOREVISED 1981 AND TRENTON WEST QUADRANGLE,
NEW JERSEY - PENNSYLVANIA, USGS 7.5 MINUTE SERIES
(TOPOGRAPHIC), DATED 1955, PHOTOREVISED 1981.

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REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

SITE LOCUS

0 1000 2000
APPROXIMATE SCALE IN FEET

SCALE: AS SHOWN
DECEMBER 2008

FIGURE 1

LEGEND:

- CHROMIUM IN SOIL 0-2 feet
- CHROMIUM IN SOIL 2-10 feet
- CHROMIUM IN SOIL > 10 feet
- CHROMIUM CONCENTRATION IN mg/Kg
 - NOT DETECTED
 - <= 20
 - > 20 AND <= 100
 - > 100 AND <= 1,000
 - > 1,000 AND <= 10,000
 - > 10,000

NOTES:

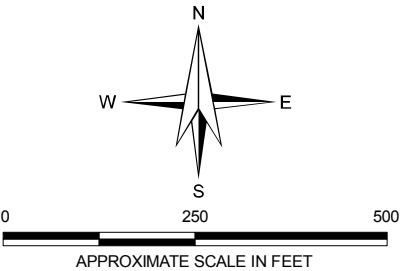
- mg/Kg - MILLIGRAMS PER KILOGRAM
- THERE IS NO NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION SOIL CLEANUP CRITERIA OR SOIL REMEDIATION STANDARD FOR TOTAL CHROMIUM.
- BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & c..
MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED.
MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870
N.J. LAND SURVEYOR LIC. NO. 26791
NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1
ELEVATION 131.49' (NAVD 1988)
HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)



HALEY & ALDRICH
REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

TOTAL CHROMIUM DISTRIBUTION
IN SOIL

SCALE: AS SHOWN
DECEMBER 2008

FIGURE 2

LEGEND:

- HEXAVALENT CHROMIUM IN SOIL 0-2 feet
- HEXAVALENT CHROMIUM IN SOIL 2-10 feet
- HEXAVALENT CHROMIUM IN SOIL > 10 feet

HEXAVALENT CHROMIUM CONCENTRATION IN mg/Kg AS COMPARED TO THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION MOST STRINGENT SOIL CLEANUP CRITERIA FOR CHROMIUM VI (HEXAVALENT CHROMIUM) OF 20 mg/Kg

- NOT DETECTED
- <= 20
- > 20 AND <= 100
- > 100 AND <= 1,000
- > 1,000 AND <= 10,000
- > 10,000

NOTES:

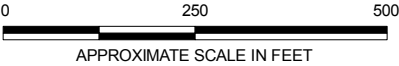
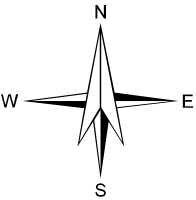
- mg/Kg - MILLIGRAMS PER KILOGRAM
- BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

HEXAVALENT CHROMIUM DISTRIBUTION
IN SOIL

SCALE: AS SHOWN
DECEMBER 2008

FIGURE 3

G:\Data\7070613\GIS\125-2008-RevisedRAW\MapProjects\70613-125-RAW2008-PCB-SOIL-SEDIM.mxd

LEGEND:

PCB CONCENTRATION IN SOIL

● NOT DETECTED

● < 0.49 mg/Kg

BF-S3 ● > 0.49 mg/Kg AND =< 10 mg/Kg

BF-S6 ● > 10 mg/Kg

PCB CONCENTRATION IN SEDIMENT

▲ NOT DETECTED

▲ < 0.07 mg/Kg

S11-3 ▲ > 0.07 AND =< 20 mg/Kg

PS-20 ▲ => 20 mg/Kg

NOTES:

1. PCBs - POLYCHLORINATED BIPHENYLS

2. mg/Kg - MILLIGRAMS PER KILOGRAM

3. SOIL RESULTS COMPARED TO NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION (NJDEP) MOST STRINGENT SOIL CLEANUP CRITERIA (0.49 mg/Kg)

4. SEDIMENT RESULTS COMPARED TO NJDEP FRESHWATER SEDIMENT SCREENING GUIDELINES (0.07 mg/Kg)

5. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

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N.J. LAND SURVEYOR LIC. NO. 26791

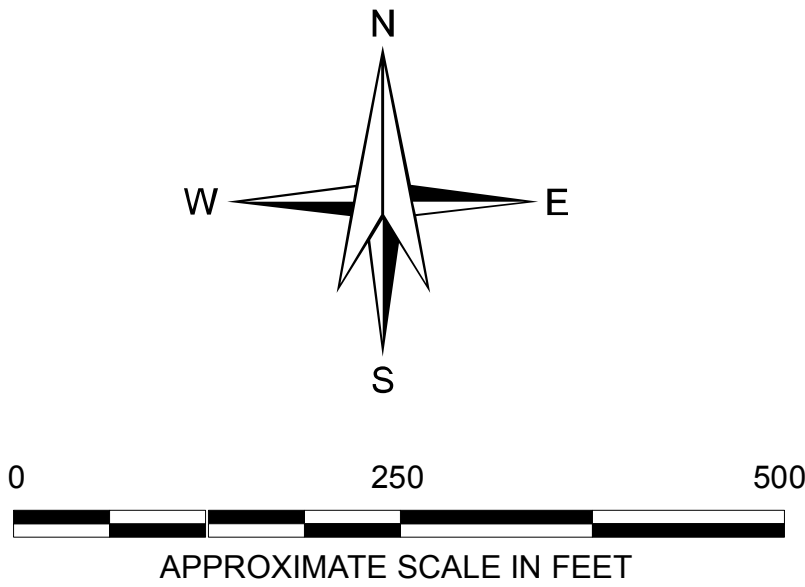
NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1

ELEVATION 131.49' (NAVD 1988)

HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)



HALEY & ALDRICH REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

**PCB REMAINING AFTER EXCAVATION -
SOIL AND SEDIMENT**

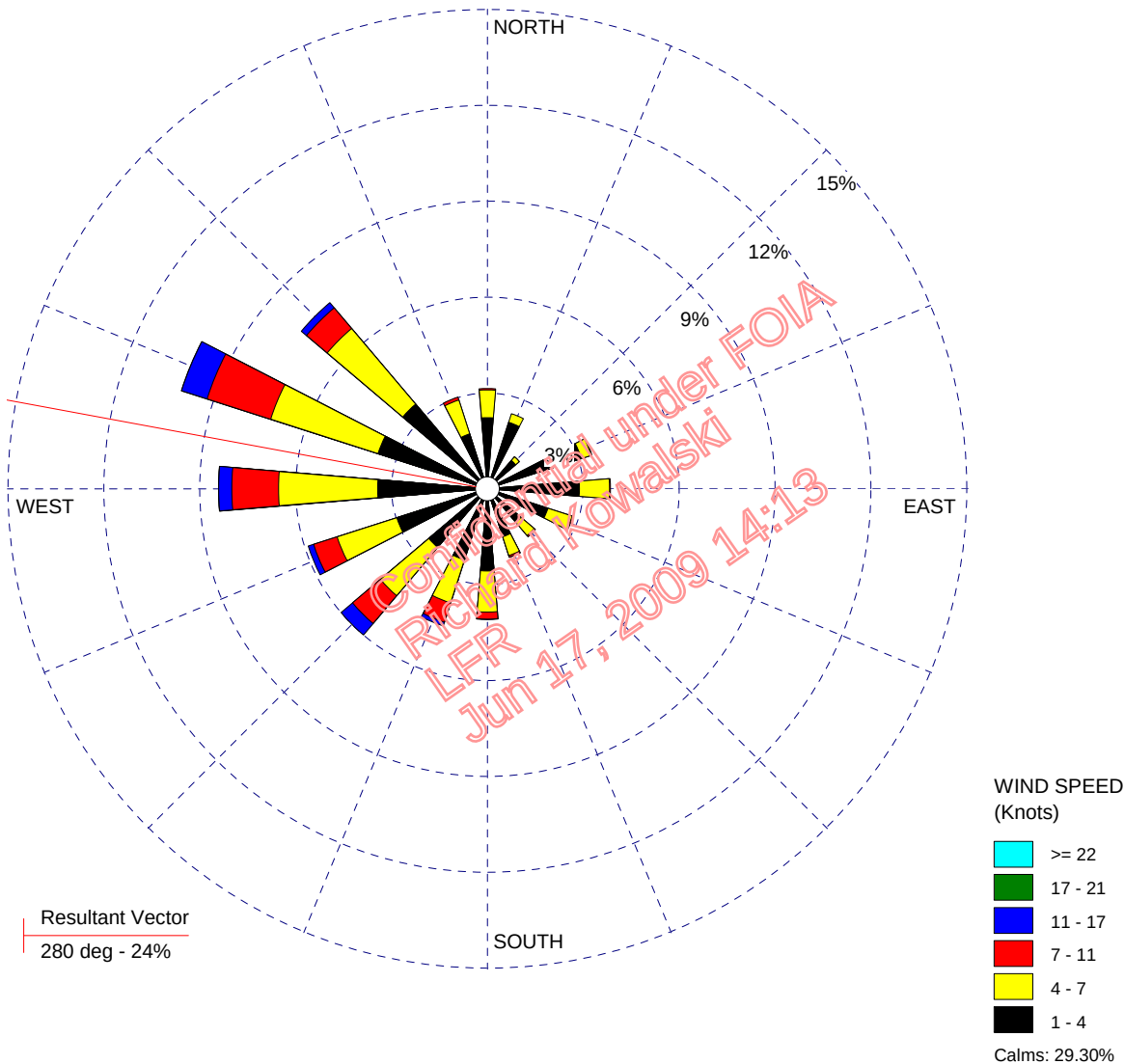
SCALE: AS SHOWN
DECEMBER 2008

FIGURE 5

FIGURE 6
2007-2008 Site Specific Wind Rose Diagram

Jun 17, 2009 14:13

Wind Speed
Direction (blowing from)



Wind speed and wind direction data averaged over 0.25 minute intervals. High wind speed and wind direction may vary from average.

DATA PERIOD:
17 JULY 2007
31 JULY 2008

MODELER
DSM/ARF

CALM WINDS:
29.30%

AVG. WIND SPEED:
3.09 Knots

DATE:
11/25/2008

**HALEY &
ALDRICH**

PROJECT NO.:
70613-125

U:\LAND PROJECTS\7070613-125-2008_RAW\70613-125-0D02-PROP-REDEVELOP-AREA.DWG



LEGEND:

— — — — — PROPERTY LINE

— — — — — NON RESIDENTIAL REMEDIATION GOALS ARE COMPRISED OF A MIXTURE OF THE MAY 1999 NON RESIDENTIAL DIRECT CONTACT SOIL CLEANUP CRITERIA (SCC) FOR ORGANICS (VOLATILE ORGANIC COMPOUNDS (VOCs), SEMI VOLATILE ORGANIC COMPOUNDS (SVOCs), AND POLYCHLORINATED BIPHENYLS (PCBs) AND TOTAL PETROLEUM HYDROCARBONS (TPH)/TOTAL ORGANIC COMPOUNDS; AND THE JUNE 2008 NON RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARDS (SRS; NJAC 7:26D) FOR METALS AND CYANIDE. THE SCC VALUE OF 240 mg/Kg IS USED FOR HEXAVALENT CHROMIUM (CR+6).

— — — — — RESIDENTIAL REMEDIATION GOALS ARE COMPRISED OF A MIXTURE OF THE MAY 1999 MOST STRINGENT SCC FOR ORGANICS (VOCs, SVOCs, AND PCBs) AND TPH/TOTAL ORGANIC COMPOUNDS; AND THE JUNE 2008 RESIDENTIAL DIRECT CONTACT SRS FOR METALS AND CYANIDE. THE SCC VALUE OF 240 mg/Kg IS USED FOR CR+6.

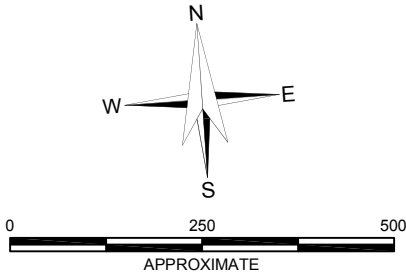
— — — — — POSSIBLE REDEVELOPMENT RESTRICTIONS.

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J."DATED 8/02/93, LAST REVISED 10/19/93,
PREPARED BY ROBERT W. ENT, INC. DEED REFERENCE : DEED BOOK 4512, PAGE 252 & c.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM
CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A..

HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED.
MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870
N.J. LAND SURVEYOR LIC. NO. 26791 NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008
BENCH MARK - N.J.G.S. MON. 11 B 1
ELEVATION 131.49' (NAVD 1988)
HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)



HALEY & ALDRICH REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE No. E97070

PROPOSED AREA OF REDEVELOPMENT

SCALE: AS SHOWN
DECEMBER 2008

FIGURE 7

LEGEND:

- 17' - 20' EXCAVATION
- 14' - 17' EXCAVATION
- 11' - 14' EXCAVATION
- 8' - 11' EXCAVATION
- 5' - 8' EXCAVATION
- 2' - 5' EXCAVATION
- 0' - 2' EXCAVATION
- NOT EXCEED

SITE BOUNDARY

AREAS OF INTEREST (AOI)

- | | | |
|--------|--------|--------|
| AOI_1 | AOI_12 | AOI_24 |
| AOI_2 | AOI_13 | AOI_25 |
| AOI_3 | AOI_14 | AOI_26 |
| AOI_4 | AOI_16 | AOI_27 |
| AOI_5 | AOI_17 | AOI_28 |
| AOI_6 | AOI_18 | AOI_29 |
| AOI_7 | AOI_19 | AOI_30 |
| AOI_8 | AOI_20 | AOI_31 |
| AOI_9 | AOI_21 | AOI_32 |
| AOI_10 | AOI_22 | AOI_33 |
| AOI_11 | AOI_23 | |

- NON RESIDENTIAL REMEDIATION GOALS
- RESIDENTIAL REMEDIATION GOALS
- POSSIBLE REDEVELOPMENT RESTRICTIONS.

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC.

DEED REFERENCE : DEED BOOK 4512, PAGE 252 & c..
MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.

HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED.
MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S.
SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870
N.J. LAND SURVEYOR LIC. NO. 26791
NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008

BENCH MARK - N.J.G.S. MON. 11 B 1
ELEVATION 131.49' (NAVD 1988)
HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)

HALEY & ALDRICH
REVISED REMEDIAL ACTION WORKPLAN
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

PROPOSED EXCAVATION SUMMARY

SCALE: AS SHOWN
DECEMBER 2008

FIGURE 8



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APPENDIX A

GM Certification

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CERTIFICATION

As required by N.J.A.C. 7:26B-1.6(c)

Any person making a submission to the Department required by this chapter and pursuant to N.J.A.C. 7:26E, shall include the following signatures and notarized certification, for each technical submittal. Additionally, the certification shall indicate the case name and address, case number, type of documents submitted, e.g. Remedial Action Report, for each technical submittal.

Type of Document: Revised Remedial Action Workplan**Case Name:** Former Delphi Interior & Lighting System Division, General Motors Corporation**Case Address:** 1445 Parkway Avenue, Trenton, New Jersey 08628**Case Number:** ISRA Case No. E97070

An individual who is familiar with the Industrial Establishment through on-site observation must sign the certification. The individual must be in a position of authority that can attest to the accuracy of the response to each question. When the situations arise, the certification shall be executed as follows:

1. For a corporation or limited liability company, by a principal executive officer of at least the level of Vice President;
2. For a partnership or sole proprietorship, by a general partner of the proprietor, respectively;
3. For a municipality, state, Federal or other public agency, by either a principal executive officer or ranking elected official; or
4. By a duly authorized representative of a corporation, partnership, sole proprietorship, municipality, state or Federal or other public agency, as applicable. A person is deemed to be a duly authorized representative if the person is authorized in writing by an individual described in 1, 2, or 3 above and the authorization meets the following criteria:
 - The authorization specifies either an individual or a position having responsibility for the overall operation of the industrial establishment or activity, such as the position of plant manager, or superintendent or person of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position);
 - The written authorization is submitted to the Department; and
 - If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the industrial establishment or activity, a new authorization satisfying the requirements listed above shall be submitted to the Department prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of N.J.S.A. 13:1K-6 et seq., I am personally liable for the penalties set forth at N.J.S.A. 13:1K-13.

Typed/Printed

Name William J McFarland Title Director, Remediation ServicesSignature William J. McFarland Date 12-1-08

Sworn to and Subscribed Before Me

On this First day of December 20 08Notary Rebecca Lynn Najor

REBECCA LYNN NAJOR
Notary Public - Michigan
Macomb County
My Commission Expires
December 09, 2010

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APPENDIX B

Remediation Standards and Analytical Methods

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VOC – Method 8260B

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	Non-Residential mg/Kg	Residential mg/Kg
1,1,1-Trichloroethane	1,000	50
1,1,1,2-Tetrachloroethane	310	1
1,1,2,2-Tetrachloroethane	70	1
1,1,2-Trichloroethane	420	1
1,1-Dichloroethane	1,000	10
1,1-Dichloroethene	150	8
1,2,4-Trichlorobenzene	1,200	68
1,2-Dichloroethane	24	1
1,2-Dichloropropane	43	10
2-Butanone (Methyl Ethyl Ketone)	1,000	50
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	1,000	50
Acetone	1,000	100
Acrylonitrile	5	1
Benzene	13	1
Bromodichloromethane	46	1
Bromoform	370	1
Bromomethane (Methyl Bromide)	1,000	1
Carbon tetrachloride	4	1
Chlorobenzene	680	1
Chloroform (Trichloromethane)	28	1
Chloromethane (Methyl Chloride)	1,000	10
cis-1,2-Dichloroethene	1,000	1
cis-1,3-Dichloropropene	5	1
Dibromochloromethane	1,000	1
Ethylbenzene	1,000	100
Methylene chloride	210	1
Styrene	97	23
Tetrachloroethene	6	1
Toluene	1,000	500
trans-1,2-Dichloroethene	1,000	50
trans-1,3-Dichloropropene	5	1
Trichloroethene	54	1
Vinyl chloride	7	2
Xylene (total)	1,000	67

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SVOC – Method 8270

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	Non-Residential mg/Kg	Residential mg/Kg
1,2,4-Trichlorobenzene	1,200	68
1,2-Dichlorobenzene	10,000	50
1,3-Dichlorobenzene	10,000	100
1,4-Dichlorobenzene	10,000	100
2,2-oxybis(1-Chloropropane)	10,000	10
2,4,5-Trichlorophenol	10,000	50
2,4,6-Trichlorophenol	270	10
2,4-Dichlorophenol	3,100	10
2,4-Dimethylphenol	10,000	10
2,4-Dinitrophenol	2,100	10
2,4-Dinitrotoluene	4	1
2,6-Dinitrotoluene	4	1
2-Chlorophenol	5,200	10
2-Methylphenol	10,000	2,800
3,3-Dichlorobenzidine	6	2
4-Chloro-3-methylphenol	10,000	100
4-Chloroaniline	4,200	230
4-Methylphenol	10,000	2,800
Acenaphthene	10,000	100
Benzo(a)anthracene	4	0.9
Benzo(a)pyrene	0.66	0.66
Benzo(b)fluoranthene	4	0.9
Benzo(k)fluoranthene	4	0.9
Benzyl Alcohol	10,000	50
bis(2-Chloroethyl)ether	3	0.66
Bis(2-chloroisopropyl)ether	10,000	10
bis(2-Ethylhexyl)phthalate	210	49
Butyl benzylphthalate	10,000	100
Chrysene	40	9
Dibenz(a,h)anthracene	0.66	0.66
Diethyl phthalate	10,000	50
Dimethyl phthalate	10,000	50
Di-n-butylphthalate	10,000	100
Di-n-octyl phthalate	10,000	100
Fluoranthene	10,000	100
Fluorene	10,000	100
Hexachlorobenzene	2	0.66
Hexachlorobutadiene	21	1
Hexachlorocyclopentadiene	7,300	100
Hexachloroethane	100	6
Indeno(1,2,3-cd)pyrene	4	0.9
Isophorone	10,000	50
Naphthalene	4,200	100
Nitrobenzene	520	10
N-Nitrosodi-n-propylamine	0.66	0.66
N-Nitrosodiphenylamine	600	100
Pentachlorophenol	24	6
Phenol	10,000	50
Pyrene	10,000	100

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PCBs – Method 8082

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	Non-Residential mg/Kg	Residential mg/Kg
Aroclor-1016 (PCB-1016)	2	0.49
Aroclor-1221 (PCB-1221)	2	0.49
Aroclor-1232 (PCB-1232)	2	0.49
Aroclor-1242 (PCB-1242)	2	0.49
Aroclor-1248 (PCB-1248)	2	0.49
Aroclor-1254 (PCB-1254)	2	0.49
Aroclor-1260 (PCB-1260)	2	0.49
Aroclor-1262 (PCB-1262)	2	0.49
Aroclor-1268 (PCB-1268)	2	0.49

METALS – Method 6010C (7471A for Mercury)

Aluminum	NC	78,000
Antimony	450	31
Arsenic	19	19
Barium	59,000	16,000
Beryllium	140	16
Cadmium	73	78
Chromium (Total) ¹	120,000	120,000
Cobalt	590	1,600
Copper	45,000	3,100
Lead	800	400
Manganese	5,900	11,000
Mercury	65	23
Nickel	23,000	1,600
Selenium	5,700	390
Silver	5,700	390
Thallium	79	5
Vanadium	1,100	78
Zinc	110,000	23,000

OTHER

Cr Hex – Method 7196 Chromium VI (Hexavalent)	240	240
TPH – Method OGA-QAM-025 Petroleum hydrocarbons	10,000	10,000
INORGANICS – Method 9013A & 9010C Cyanide (total)	2,3000	1,600

¹ General Motors will use 2.000 mg/Kg Total Chromium as a screening criterion to determine which samples will be analyzed for Cr⁺⁶. Cr⁺⁶ analysis will occur at: 1) post-excavation samples biased toward locations exhibiting this concentration (or higher) Total Chromium in the existing dataset, and 2) post-excavation samples where post-excavation sample results exceed 2,000 mg/Kg (if the soil will not be removed in subsequent excavations).

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APPENDIX C

Quality Assurance Project Plan (QAPP)

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QUALITY ASSURANCE PROJECT PLAN

**FORMER DELPHI INTERIOR LIGHTING SYSTEMS DIVISION
GENERAL MOTORS CORPORATION
1445 PARKWAY AVENUE
TRENTON, NEW JERSEY**

ISRA CASE No. E97070

by

**Haley & Aldrich, Inc.
Parsippany, New Jersey**

for

**General Motors Corporation
Warren, Michigan**

**December 2008
File No.: 70613-125**

TABLES

Table 1

**Sample Container, Preservation, Analytical Method,
Shipping and Packaging Requirements**

Table 2

**Summary of Generalized Post-Excavation Sampling
Approach**

APPENDICES

Appendix A

Laboratory Detection Limits

Appendix B

Field Equipment Calibration Procedures

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1. PROJECT SCOPE

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This QAPP has been prepared on behalf of General Motors Corporation (General Motors or GM). The QAPP is a component of the Revised Remedial Action Workplan (RRAW), which also includes a Health and Safety Plan (HASP), and a summary of the site and the project scope and how it relates to the overall remedial strategy. In general, General Motors has decided to excavate contaminated soil/sediment. Excavated soil will be transported off-site and recycled at a licensed Class B recycle facility, or disposed of at a landfill or hazardous waste facility depending on the quality of the soil/sediment.

1.1 Data Quality Objectives

The Data Quality Objectives (DQOs) for post-remediation sampling will: accomplish any outstanding delineation requirements, demonstrate completion of the remediation, and show that the proposed remedy is protective of human health and the environment.

1.2 Project Schedule

The schedule of projected milestones is presented in the RRAW.

2. PROJECT ORGANIZATION AND RESPONSIBILITIES

The GM Project Manager will have the primary responsibility for the implementation of the RRAW. This section defines the roles and responsibilities of the individuals who will perform remedial activities.

2.1 Management Responsibilities

Management responsibilities are as follows:

Jacqueline Bobko – New Jersey Department of Environmental Protection (NJDEP) Project Coordinator

The NJDEP Project Coordinator has the responsibility for regulatory-compliance oversight of all phases of the remedial action.

Geraldine Barnuevo – GM Project Manager

The GM Project Manager is responsible for implementing the remedial action, and has the authority to commit the resources necessary to meet project objectives and requirements. The GM Project Manager's primary function is to ensure that technical, financial, and scheduling objectives are achieved successfully. The GM Project Manager will provide the major point of contact and control matters concerning the project and represent the project team at regulatory agency meetings and public hearings. The GM Project Manager will define project objectives and develop a detailed project schedule. The GM Project Manager will establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task.

David Hagen, P.G. – Haley & Aldrich Project Director

The Project Director will provide final review of significant work products and may participate in technical meetings with the NJDEP. The Project Director will ensure that overall technical

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quality is maintained. He will be actively involved in the direction of the project. The Project Director has overall responsibility for ensuring that the project meets RRAW objectives. The Project Director will:

- Acquire and apply technical and other resources as needed to ensure performance within budget and schedule restraints;
- Review work performed on each task to ensure quality, responsiveness, and timeliness;
- Be responsible for the preparation and quality of interim and final reports;
- Communicate with GM about the progress of the project.

Jeffrey Duncan, P.E. – Haley & Aldrich Project Manager

The Project Manager is responsible for managing the implementation of the RRAW and coordinating the collection of data pertaining to the Remedial Activities. The Project Manager is responsible for technical quality control and project oversight. The Project Manager also provides approval of the QAPP.

Amy K. Murphy – Haley & Aldrich Field Quality Assurance (QA) Officer

The Field QA Officer will assist the Project Director and the Project Manager in day-to-day project management. The Field QA Officer is responsible for coordinating all field activities and the procurement of project subcontractors.

Additional duties will include:

- Assisting in monitoring the progress and quality;
- Conducting internal QA/QC audits of the remedial activities;
- Providing input to the Project Director and the Project Manager on corrective actions required;
- Preparing and reviewing reports; and
- Providing technical support of project activities.

2.2 Quality Assurance Responsibilities

The QA team will consist of a QA Officer and the Project Manager. Quality Assurance responsibilities are described as follows:

Paul McMahon – Conestoga-Rovers & Associates (CRA) Laboratory Data QA Officer

The QA Officer reports directly to the Haley & Aldrich Project Manager and will be responsible for ensuring that quality assurance/quality control (QA/QC) procedures are performed in accordance with this plan. The QA Officer will be responsible for overseeing the review of laboratory data.

Additional responsibilities include:

- Assuring the application of the QAPP by the analytical laboratory and the project staff;
- Review of data validation and audit reports;
- Monitor the performance of the laboratory to ensure that the DQOs for the project are met.

The QA Officer will be assisted by data validation staff in the evaluation and validation of field and laboratory generated data.

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Regulatory Agency QA Officer

The Regulatory Agency's QA Officer may review this QAPP. Additional responsibilities for the project may include:

- Conducting external performance and system audits of laboratories; and
- Reviewing and evaluating field and analytical laboratory procedures.

2.3 Laboratory Responsibilities

TestAmerica-Edison Laboratory (NJDEP Certification # 12028), 777 New Durham Road, Edison, New Jersey will provide laboratory services in support of the remedial activities.

Joy Kelly - Laboratory Project Manager

The Laboratory Project Manager will report directly to CRA QA Officer and/or Haley & Aldrich Project Manager and will be responsible for ensuring all resources of the laboratory are available on an as-required basis. The Laboratory Project Manager will also be responsible for the approval of the final analytical reports and approval of the laboratory's ability to adhere to the QAPP. In addition, the Laboratory Project Manager will be responsible for coordinating laboratory analysis, supervising in-house chain-of-custody reports, scheduling sample analyses, overseeing data review, and overseeing preparation of analytical reports.

Carl Armbruster - Laboratory QA Officer

The Laboratory QA Officer will have sole responsibility for review and validation of the analytical laboratory data generated as part of the RRAW. The Laboratory QA Officer, or his designee, will sign all final laboratory data reports provided from the analysis of the project samples and will provide Case Narrative descriptions of any data quality issues encountered during the analyses conducted by the laboratory. The QA Officer will also define appropriate QA procedures and provide overview of QA/QC documentation.

Laboratory Sample Custodian

The Laboratory Sample Custodian will report to the Laboratory Project Manager and will be responsible for the following:

- Receiving and inspecting the incoming sample containers;
- Recording the condition of the incoming sample containers;
- Signing appropriate documents;
- Verifying chain-of-custody and its correctness;
- Notifying the Project Manager and Operations Manager of sample receipt and inspection;
- Assigning a unique identification number and customer number, and entering each into the sample receiving log;
- Initiating transfer of samples to laboratory analytical sections; and
- Controlling and monitoring access/storage of samples and extracts.

Laboratory Technical Personnel

The laboratory technical staff will have the primary responsibility in the performance of sample analysis and the execution of the QA procedures developed to determine the data quality. These activities will include the proper preparation and analysis of the project samples in accordance with the laboratory Quality Assurance program and associated method specific Standard Operating Procedures (SOPs).

Data Validation Staff

The data validation staff will be independent of the laboratory and familiar with the analytical procedures performed. The validation will include a review of each validation criterion as prescribed by the guidelines presented in Section 7.2.2 of this document.

2.4 Field Responsibilities

Amy K. Murphy - Field QA Officer

The Field QA Officer is responsible for the overall operation of the field team and reports directly to the Project Director and Project Manager. The Field QA Officer works with the project Health & Safety Officer to conduct operations in compliance with the project HASP. The Field QA Officer will facilitate communication and coordinate efforts between the Project Director and the field team members. Other responsibilities include:

- Developing and implementing field-related work plans, ensuring schedule compliance, and adhering to management-developed project requirements;
- Coordinating and managing field staff, including sampling;
- Performing field system audits;
- Overseeing quality control for technical data provided by the field staff;
- Preparing, and approving of text and graphics required for field team efforts;
- Coordinating and overseeing technical efforts of subcontractors assisting the field team;
- Identifying problems in the field, resolving difficulties in consultation with the Project Director, Project QA Officer and Project Manager, implementing and documenting corrective action procedures; and
- Participating in preparation of the final reports.

Field Team Personnel

Field Team Personnel involved in the RRAW field activities will be responsible for:

- Performance of field activities as detailed in the RRAW and in compliance with the DQO outlined in this QAPP; and
- Immediately reporting any accidents or unsafe conditions to the project Health & Safety Officer and taking all reasonable precautions to prevent injury.

2.5 Contact Information

Contact information for the project team is included below.

Contact	Role	Phone Number
Geraldine Barnuevo	GM Project Manager	248-255-2790
Jeffrey Duncan	Haley & Aldrich Project Manager	603-391-3312
<u>Paul McMahon</u>	<u>CRA Laboratory Data QA Officer</u>	716-297-6150
Joy Kelly	Laboratory Project Manager	732-549-3900

3. ANALYTICAL METHODS/QUALITY ASSURANCE

Please refer to Table 1 for a summary of analytical methods, number of samples and quality assurance measures to be used for the remedial action. Appendix A lists the laboratory detection limits by parameter.

4. FIELD SAMPLING METHODS AND SAMPLE PRESERVATION/HANDLING

Samples of soil and sediment will be obtained during implementation of the RRAW remedial action. The sampling procedures will be consistent for the objectives of this QAPP. Table 1 provides the analytical methodology. Table 2 provides a summary or post-excavation sampling approach and frequency of blank and duplicate samples.

4.1 Soil and Sediment

All soil and sediment post-excavation sampling will be conducted in accordance with the NJDEP Field Sampling Procedures Manual (FSPM, August 2005). Soil and sediment post-excavation samples will be collected using decontaminated sampling equipment, including some or all the following: stainless steel split spoons, stainless steel hand augers, and stainless steel scoopulas. Samples will be field screened using either a photo-ionization detector (PID) or X-ray Florescence (XRF).

Sampling equipment will be decontaminated between post-excavation samples, or will be dedicated and disposed of after each use. Decontamination of field equipment will be completed using one of three methods: steam cleaning, laboratory decontamination, and field decontamination. Larger equipment, such as backhoe buckets, will be decontaminated using steam cleaning. Smaller equipment, such as stainless steel hand auger buckets, will be decontaminated in the laboratory or in the field using the procedures outlined in the FSPM.

4.2 Field and Trip Blank Collection

As required, field blanks and trip blanks will be collected for quality assurance. Field blanks will be prepared by running laboratory-demonstrated analyte-free water over sampling equipment, prior to use. Field blanks will be analyzed for the same parameters being tested for at the time of Field Blank generation. Trip blanks will be water or methanol aliquots generated by the laboratory that will accompany the sample bottles at all times, including shipment to the site and back to the laboratory. Trip blanks will be tested for Target Compound List Volatile Organic Compounds plus ten tentatively identified compounds (TCL VOC+10). Trip blanks

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will be associated with every shipment of VOC samples and field blanks will be performed on a 1 in 20 basis.

4.3 Duplicate Sampling Methods

Duplicate samples will be collected using methods outlined in the FSPM. Duplicate soil samples (including Matrix Spike/Matrix Spike Duplicates (MS/MSD)) will be collected at a rate of one duplicate per parameter per twenty samples.

4.4 Sample Storage/ Handling

All samples collected as part of the RRAW will be labeled with information documenting sample location, time, and analytical parameters. All samples will be stored in coolers and maintained at a maximum of 4°C until delivery to the laboratory. All samples will be shipped under strict chain-of-custody documentation to insure the integrity of the samples.

4.5 Sample Handling Time

All samples will be analyzed within holding times as prescribed in the FSPM. A summary of holding times is presented in Table 1.

5.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes procedures for maintaining the accuracy for all the instruments and measurement equipment, which will be used for conducting field tests and laboratory analyses. These instruments and equipment will be calibrated prior to each use or according to a periodic schedule.

5.1 Field Instrument Calibration Procedures

Instruments and equipment (PIDs and XRFs) used to gather, generate, or measure environmental data will be calibrated as specified in the field SOPs in Appendix B. This calibration will also serve as preventative maintenance to ensure proper and reliable operation of equipment while in the field.

Specific information concerning calibration frequency, acceptance criteria, and the conditions that require more frequent calibration is contained in the field SOPs.

Satisfactory completion of the pre-operation inspection will be noted on the Field Sampling Record, along with the results of each field measurement.

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6.0 CUSTODY PROCEDURES

Custody is one of several factors necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis and final project files. Final project files, including all originals of laboratory reports, are maintained under document control in a secure area.

Custody of a sample begins when the sample is collected by or transferred to an individual and ends when that individual relinquishes or disposes of the sample. A sample or project file is under custody if:

- the item is in actual possession of a person;
- the item is in the view of the person after being in actual possession of the person;
- the item was in actual possession and subsequently stored to prevent tampering; or
- the item is in a designated and identified secure area.

6.1 Field Custody Procedures

Field personnel will keep written records of field activities on applicable preprinted field forms or in a bound field notebook. The written records provide the means of recording data collecting activities. These records will be written legibly in ink and will contain pertinent field data and observations. Entry errors or changes will be crossed out with a single line, dated and initialed by the person making the correction. Field forms and notebooks will be periodically reviewed by the Field QA Officer. Each member of the field team will be assigned a logbook. Each logbook title page should include the field member's name, project name, project start date, project end date, and unique logbook number.

The beginning of each entry in the logbook or preprinted field form will contain the following information:

- Date,
- Start time,
- Weather,
- Names of field personnel (including subcontractors),
- Level of personal protective equipment used at the Site, and
- Names of all visitors and the purpose of their visit.

For each measurement and sample collected, the following will be recorded:

- Detailed description of sample location,
- Equipment used to collect sample or make measurement,
- Date equipment was calibrated,
- Time sample was collected,
- Sample description,
- Depth sample was collected (if applicable),
- Volume and number of containers filled with the sample; and,
- Sampler's name.

6.1.1 Field Procedures

Data quality can be affected by sample collection activities. If the integrity of collected samples is questionable, the data, regardless of its analytical quality, will also be questionable.

The following procedure describes the process to maintain the integrity of the samples:

- Upon collection, samples are placed in the proper containers. In general, soil and sediment samples collected for analysis will be placed in pre-cleaned glass containers.
- Samples will be assigned a unique sample number and will be affixed to a sample label. The information to be placed on the sample label will include the sample ID number, the sample type, the sampler's name, date collected, preservation technique, and analytical parameter and method to be performed. Information on the labels will be completed with a ballpoint pen or indelible marker.
- Samples will be appropriately preserved by field personnel in order to minimize loss of the constituent(s) of interest due to physical, chemical or biological mechanisms.
- Appropriate volumes will be collected to ensure that the appropriate method detection limits (MDLs) can be achieved and the required quality control (QC) sample analyses can be performed.

6.1.2 Transfer of Custody and Shipment Procedures

- A chain-of-custody (COC) record will be completed at the time of sample collection and will accompany each shipment of project samples to the laboratory. The field personnel collecting the samples will be responsible for the custody of the samples until the samples are relinquished to the laboratory. Sample transfer will require the individuals relinquishing and receiving the samples to sign, date and note the time of sample transfer on the COC record. As few people as possible should handle the samples.
- Samples will be shipped or delivered in a timely fashion to the laboratory so that holding-times and/or analysis times as prescribed by the methodology can be met.
- Samples will also be transported in containers (coolers) packed with ice or "blue ice" to maintain the temperatures prescribed in Table 1. Samples will be packaged for shipment and shipped to the appropriate laboratory for analysis with a separate signed chain-of-custody record enclosed in each sample cooler. Soil VOC samples will be placed in sealed sample pouches or bubble wrap. The remaining samples in glass containers will be wrapped in bubble wrap and placed in the sample cooler. All samples will be placed in an upright position and limited to one layer of samples per each cooler. Additional bubble wrap or packaging material will be added to fill the cooler. Shipping containers will be secured with strapping tape and custody tape for shipment to the laboratory.

- If samples are split with NJDEP representatives, a separate chain-of-custody will be prepared for the samples and marked to indicate to whom the samples are being split. The person relinquishing the samples will require the representative's signature acknowledging sample receipt.
- If samples are sent by a commercial carrier, a bill of lading will be used. A copy of the bill of lading will be retained as part of permanent documentation. Commercial carriers are not required to sign the custody record as long as the custody record is sealed inside the sample cooler and the custody tape remains intact.
- Samples will be picked up by a laboratory courier or transported overnight by a courier to the laboratory the same day they are collected unless collected on a weekend or holiday. In these cases, the samples will be stored in a secure location until delivery to the lab. Additional ice will be added to the cooler as needed to maintain proper preservation temperatures.

6.2 Laboratory Chain-of-Custody Procedures

A sample custodian will be assigned the responsibility of sample control. It will be the responsibility of the sample custodian to receive all incoming samples. Once received, the custodian will document that the custody tape on the coolers is unbroken, that each sample is received in good condition (i.e., unbroken, cooled, etc.) and that the associated paperwork, such as chain-of-custody forms, have been completed and will sign the chain-of-custody forms. In special cases, the custodian will document from appropriate sub-samples that chain-of-custody with proper preservation has been accomplished. The custodian will also document that sufficient sample volume has been received to complete the analytical program. The sample custodian will then place the samples into secure, limited access storage (refrigerated storage, if required). The sample custodian will assign a unique number to each incoming sample for use in the laboratory. The unique number will then be entered into the sample-receiving log. The laboratory date of receipt will also be noted.

Consistent with the analyses requested on the chain-of-custody form, analyses by the laboratory's analysts will begin in accordance with the appropriate methodologies. Samples will be removed from secure storage only after internal chain-of-custody sign-out procedures have been followed. While awaiting analysis, samples will be stored in coolers to maintain temperature of 4°C.

6.3 Storage of Samples

After completion of all laboratory analyses for each sample, containers with volume remaining will be returned to secure and limited access storage. The samples will be held at least thirty (30) days after reports have been submitted. Disposal of remaining samples will be completed by the sample custodian or their designee in compliance with all Federal, State and local requirements.

6.4 Final Project Files Custody Procedures

The final project files will be the central repository for all documents pertaining to sampling and analysis activities as described in this QAPP. The Project Manager will be the custodian of the project file. The project files for the RRAW, including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports and data reviews will be maintained in a secure area under custody of the Project Director or his designee.

The final project file will include the following:

- Project plans and drawings,
- Field data records,
- Sample identification documents,
- Chain-of-custody documentation,
- Correspondence,
- References, literature,
- Laboratory data deliverables (on CD or DVD),
- Data validation and assessment reports,
- Progress reports, QA reports, and
- Final report.

The laboratory will be responsible for maintaining analytical logbooks, laboratory data and sample chain of custody documents. Raw laboratory data files and copies of hard copy reports will be inventoried and maintained by the laboratory for a period of six (6) years at which time the laboratory will contact GM regarding the disposition of the project files.

7.0 DATA REDUCTION, VALIDATION AND REPORTING

All analytical results will be reported in accordance with NJDEP "reduced deliverables" format. Electronic deliverables will be prepared using data provided by the certified laboratory and will be checked with the NJDEP Electronic Data Submittal Application Software prior to submittal to the NJDEP.

7.1 Data Reduction

7.1.1 Field Data Reduction Procedures

Field data reduction procedures will be minimal in scope compared to those implemented in the laboratory setting. Only direct read instrumentation will be employed in the field. The PID and XRF readings collected in the field will be generated from direct read instruments following calibration per manufacturer's recommendations. Such data will be written into field logbooks immediately after measurements are taken. If errors are made, results will be legibly crossed out, initialed and dated by the field member, and corrected in a space adjacent to the original entry. Later, when the results forms required for this study are being filled out, the Project Coordinator will proof the forms to determine whether any transcription errors have been made by the field crew.

7.1.2 Laboratory Data Reduction Procedures

For this project, the equations that will be employed in reducing data are found in the appropriate chapter of SW-846, Third Edition. Such formulae make pertinent allowances for matrix type. All calculations are checked at the conclusion of each operating day. Errors are noted; corrections are made, but the original notations are crossed out legibly. Analytical results for soil samples shall be calculated and reported on a dry weight basis.

Quality control data (e.g., laboratory duplicates, surrogates, matrix spikes, and matrix spike duplicates) will be compared to the method acceptance criteria. Data considered to be acceptable will be entered into the laboratory computer system. Data summaries will be sent to the Laboratory QA Officer for review. If approved, data are logged into the project database format. Unacceptable data shall be appropriately qualified in the project report. Case narratives will be prepared which will include information concerning data that fell outside acceptance limits and any other anomalous conditions encountered during sample analysis.

7.2 Data Validation

Data validation procedures shall be performed for both field and laboratory operations as described below.

7.2.1 Procedures Used to Evaluate Field Data

Procedures to evaluate field data for this project will include review of field logbooks and checking for transcription errors to project specific documents. This task will be the responsibility of the Field QA Officer.

7.2.2 Procedures to Validate Laboratory Data

Validation of the analytical data will be performed by the data validation staff using the following documents as guidance for the review process:

"USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review", EPA-540/R-99/008, October 1999 and the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA-540/R-94-013, February 1994.

The specific data qualifiers used will be as presented and defined in the CLP National Functional Guidelines. Validation will be performed, by qualified personnel, and is subject to review by the Haley & Aldrich QA Officer. Data review and validation will consist of two tiers of assessment that incorporates an approach similar to "Innovative Approaches to Data Validation", USEPA Region III, June 1995.

Tier I data validation will be performed on 100% of the laboratory quality control summary data deliverables and will consist of the following components:

Organic Analysis

- technical holding times;
- GC/MS instrument performance check;
- initial and continuing calibration;
- internal standard performance
- method, trip and field blanks;
- system monitoring compounds (surrogate spikes);
- MS/MSD results;
- laboratory control samples; and
- field duplicate samples.

Inorganic Analysis

- technical holding times;
- initial calibration;
- initial and continuing calibration verification;
- blanks;
- ICP interference check samples;
- ICP serial dilutions;
- laboratory control samples;
- MS/MSD and matrix duplicate results; and
- field duplicate.

Tier II validation will be completed on 10 percent of the expanded deliverables during the initial investigation activities. The Tier II validation will include the evaluation of all raw data and mass spectra to validate the above components as well as verify sample results.

The completeness of each data package will be evaluated by the data validation staff. Completeness checks will be administered on all data to determine whether deliverables specified in the QAPP are present. At a minimum, deliverables will include sample

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chain-of-custody forms, analytical results, QC summaries and supporting raw data from instrument printouts. The review will determine whether all required items are present and request copies of missing deliverables.

7.3 Data Reporting

Data reporting procedures shall be carried out for field and laboratory operations as indicated below.

7.3.1 Field Data Reporting

Field data reporting shall be conducted principally through the transmission of report sheets containing tabulated results of all measurements made in the field and documentation of all field calibration activities.

7.3.2 Laboratory Data Reporting

The laboratory data reporting package will be sufficient to perform a data validation. The task of reporting laboratory data will be initiated after the completion of data validation.

Analytical reports will be consistent with New Jersey's Tier II Deliverables Package and will include an EQS-compatible electronic disk deliverable. In addition to the record of the chain-of-custody, the final laboratory data report format shall consist of the following.

Title Page

- project name and number;
- laboratory project or lot number;
- signature of the Laboratory QA Officer or his designee; and
- date issued.

Table of Contents - laboratory report contents

Case Narrative

- number of samples and respective matrices;;
- laboratory analysis performed;
- any deviations from intended analytical strategy;
- definition of data qualifiers used;
- QC procedures utilized and references to the acceptance criteria;
- condition of samples "as received";
- discussion of whether or not sample holding times were met;
- discussion of technical problems or other observations which may have created analytical difficulties; and
- discussion of laboratory QC checks which failed to meet project criteria.

Analytical Methods Summary - methods of sample preparation and analyses for samples.

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Analytical Sample Summary - cross-reference table of laboratory sample to project sample identification numbers.

Shipping and Receiving Documents

- sample container documentation; and
- sample reception information and original chain of custody record.

Chemistry Data Package by Analysis

- Sample Results
 - sample quantitation (report) limits (RL), reporting MDL and estimated values between the RL and MDL,
 - methods of sample preparation and analyses for samples,
 - raw data for sample results (dated chromatograms, parameter specific quantitation reports, mass spectra and instrument printouts;
- QC Summary Data with Current Control Limits
 - matrix spike and matrix spike duplicate recoveries, laboratory control samples, method blank results, surrogate recoveries, GC/MS tuning results, and internal standards (organics),
 - matrix spike recoveries and matrix duplicate relative percent differences, laboratory control sample, serial dilutions, method blank results, and reagent blank results and interference check standards (inorganics);
- Standard Data
 - initial calibration data, initial calibration checks, continuing calibration verification/check standards,
 - initial and continuing calibration blanks,
 - raw data for calibration data (dated chromatograms, parameter specific quantitation reports, mass spectra and instrument printouts;
- Raw QC Data - dated chromatograms, parameter specific quantitation reports, mass spectra and instrument printouts of QC samples;
- Miscellaneous Data
 - instrument run logs,
 - sample preparation records, and
 - instrument conditions.

The laboratory will provide one hard copy of the laboratory data report to the Laboratory Data QA Officer and one to the Project Manager. The Project Manager's copy will be forwarded to NJDEP as part of the reporting of this event. The Laboratory will also provide a copy of the report to both the QA Officer and the Project Manager in .pdf format for retention in the Project Files.

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8.0 PERFORMANCE AND SYSTEM AUDITS

A performance audit is an independent quantitative comparison with data routinely obtained in the field or the laboratory. Performance audits include two separate, parts: field and laboratory audits.

8.1 Field Performance and System Audits

Internal audits of field activities include the review of sampling and field measurements conducted by the Field QA Officer. The audits will verify that all procedures are being followed. Internal field audits will be conducted once during each phase of the sampling and at the conclusion of the project. The audits will include examination of the following:

- Field sampling records, screening results, instrument operating records,
- Sample collection,
- Handling and packaging in compliance with procedures,
- Maintenance of QA procedures, and
- Chain-of-custody reports.

Follow up audits will be conducted to correct deficiencies and to verify that procedures are maintained throughout the investigation.

8.2 Laboratory Performance and System Audits

The laboratory system audits will be conducted by the Project QA Officer or designee and performed on an annual basis. Laboratory performance audits will be conducted prior to field activities or on an annual basis, depending on the duration of the project.

The system audit will include an examination of laboratory documentation including: sample receiving logs, sample storage, chain-of-custody procedures, sample preparation and analysis, and instrument operating records.

The performance audits will include submittal of blind performance evaluation samples along with project samples. The Project QA Officer will evaluate the analytical results to ensure the lab is maintaining acceptable QC performance.

System audits, as opposed to performance audits, are qualitative and consist of an on-site review of a laboratory's quality assurance system and physical facilities for calibration and measurement.

At the conclusion of internal or external system audits, reports are provided to the laboratory's operating divisions for appropriate comment and remedial/corrective action where necessary. Written response to internal as well as external audits will be required. Records of audits and corrective actions are maintained by the Laboratory QA Officer.

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TABLE 1
SAMPLE CONTAINER, PRESERVATION, ANALYTICAL METHOD, SHIPPING AND PACKAGING REQUIREMENTS

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Matrix	Analyses ¹	Sample Containers ²	EPA Analytical Method	Preservation	Maximum Holding Time From Sample Collection ³	Volume of Sample	Shipping	Normal Packaging
Soil and Sediment	Volatile Organic Compounds	Three 5g EnCore® Sampler per analysis ⁴	8260B	Iced, <= 4 +/- 2 C	48 hours for extraction 14 days after extraction for analysis	Fill completely	Overnight or hand deliver	Foil Pouch
		-or- Four 40 mL Terra Core® vials ⁴	8260B/5035A	Iced, <= 4 +/- 2 C	48 hours or 14 days after sample has been frozen	5 grams +/-	Overnight or hand deliver	Bubble Pack or Foam Chips
	Semi Volatile Organic Compounds	One 8-ounce glass jar per analysis	8270	Iced, <= 4 +/- 2 C	14 days for extraction 40 days after extraction for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Semi Volatile Organic Compounds and Polychlorinated Biphenyls	One 8-ounce glass jar per analysis	8082	Iced, <= 4 +/- 2 C	14 days for extraction 40 days after extraction for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Target Analyte List Metals minus Earth Metals	One 4-ounce glass jar per analysis	6010B/7471A	Iced, <= 4 +/- 2 C	180 days (mercury 28 days) for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Chromium VI	One 4-ounce glass jar per analysis	7193A	Iced, <= 4 +/- 2 C	24 hours for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Total Petroleum Hydrocarbons	One 8-ounce glass jar per analysis	QA-3/M-025	Iced, <= 4 +/- 2 C	14 days for extraction 40 days after extraction for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Total Cyanide	One 4-ounce glass jar per analysis	9012A	Iced, <= 4 +/- 2 C	14 days for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	TCLP Volatile Organic Compounds	One 4-ounce glass jar per analysis	1311/3260B	Iced, <= 4 +/- 2 C	14 days to extraction 14 days after extraction for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	TCLP Metals	One 4-ounce glass jar per analysis	1311/6010B/7470A	Iced, <= 4 +/- 2 C	180 days (mercury 28 days) for analysis	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Ignitability and Corrosivity	One 4-ounce glass jar per analysis	1010A/9045D	Iced, <= 4 +/- 2 C	14 days for ignitability 28 days for corrosivity	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Cyanide, Reactive	One 4-ounce glass jar per analysis	SW-846 Chapter 7.3	Iced, <= 4 +/- 2 C	N/A	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips
	Sulfide, Reactive	One 4-ounce glass jar per analysis	SW-846 Chapter 7.3	Iced, <= 4 +/- 2 C	N/A	Fill to shoulder of jar	Overnight or hand deliver	Bubble Pack or Foam Chips

Notes:

¹ Analyses-sample containers, preservation, shipping and packaging requirement are applicable to TCL/TAL parameter groups.² Multiple analyses for a soil sample may not require additional containers for each parameter.³ The technical holding times are based on time elapsed from sample collection.⁴ If VOCs are the only parameter analyzed, one 4-ounce plastic container will be collected for dry weight determination.

N/A - Not Applicable

Richard Kowalski
TABLE 2

SUMMARY OF GENERALIZED POST-EXCAVATION SAMPLING APPROACH

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Depth	Excavation Perimeter		
	<20 feet	20 to 300 feet	>300 feet
0 to 3 feet	None Expected	1 sample from top 6 inches ^a for every 30 linear feet of perimeter 1 sample from every 900 sq ft of excavation bottom.	Field screen ^b 8 sidewall locations ^c per 100 cubic yards excavated. Sample for laboratory analysis 1 sidewall sample per 1,000 cubic yards excavated. Field screen 2 bottom ^d locations per 100 cubic yards excavated. Sample for laboratory analysis 1 bottom ^d sample per 1,000 cubic yards excavated.
>3 feet	None Expected	Field screen ^b every 30 linear feet of perimeter in each 3-foot interval ^e . 1 sample every 30 linear feet of perimeter based on field screening. A minimum of 1 sample for each 3-foot interval ^e . If field screening is not conclusive concerning reason for biased samples, even distribution of samples between each 3-foot interval ^e . 1 sample from every 900 sq ft of excavation bottom.	Field screen ^b 8 sidewall locations ^c per 100 cubic yards excavated. Sample for laboratory analysis 1 sidewall sample per 1,000 cubic yards excavated based on field screening results. The field screening will be distributed evenly throughout the depth of the excavation with similar number of field screening and laboratory samples from each 3-foot interval ^e . Field screen 2 bottom ^d locations per 100 cubic yards excavated. Sample for laboratory analysis 1 bottom ^d sample per 1,000 cubic yards excavated.

Notes:

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- a) Shallow excavations assumed to be from surface releases. Therefore, sampling will be biased to surface (VOCs will be collected from at least 1 foot below top of excavation). If field conditions suggest deeper samples needed, shallow samples will be replaced with the deeper.
 - b) Photo-ionization detector (PID) and X-ray fluorescence (XRF)
 - c) Sidewalls that are intended to be removed as part of the proposed excavation will NOT be screened or sampled. Only sidewalls that we expect to remain following the proposed excavation will be screened and sampled. Field screening or analytical results may result in additional excavation. If the removed soil is inside the excavation and all exposed soil will be removed in accordance with the proposed remediation, screening and sampling will not occur for that removed volume.
 - d) Bottoms that are intended to be removed as part of the proposed excavation will NOT be screened or sampled. Only bottoms that we expect to remain following the proposed excavation will be screened and sampled. Field screening or analytical results may result in additional excavation.
 - e) Or portion thereof for intervals greater than a depth evenly divided by 3.

Field duplicates, matrix spike and matrix spike duplicates, and field blanks will be performed on a 1 in 20 basis.

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**PQLs and MDLs for
SOILS by Method 8260B
LOW LEVEL**

Matrix: Soils VOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS limits (% Rec)
Acetone	5035/8260B	5.0	0.64	46-141
Acetonitrile	5035/8260B	100	5.66	-----
Acrolein	5035/8260B	100	14.61	-----
Acrylonitrile	5035/8260B	50	5.36	-----
Allyl alcohol	5035/8260B	1000	-----	-----
Allyl chloride	5035/8260B	5.0	-----	-----
Benzene	5035/8260B	1.0	0.31	67-143
Benzyl chloride	5035/8260B	5.0	0.51	-----
Bromobenzene	5035/8260B	5.0	0.27	-----
Bromochloromethane	5035/8260B	5.0	0.15	-----
Bromodichloromethane	5035/8260B	1.0	0.23	70-149
Bromoform	5035/8260B	4.0	0.24	70-145
Bromomethane	5035/8260B	5.0	0.41	59-137
2-Butanone	5035/8260B	5.0	1.59	64-136
Butyl Acetate	5035/8260B	10	0.74	-----
Carbon Disulfide	5035/8260B	5.0	0.39	44-129
Carbon Tetrachloride	5035/8260B	2.0	0.23	60-151
Chlorobenzene	5035/8260B	5.0	0.22	71-132
Chloroethane	5035/8260B	5.0	0.46	57-148
2-Chloroethyl Vinyl Ether	5035/8260B	5.0	0.67	70-130
Chloroform	5035/8260B	5.0	0.40	77-138
Chloromethane	5035/8260B	5.0	0.50	51-163
2-Chlorotoluene	5035/8260B	5.0	0.23	-----
4-Chlorotoluene	5035/8260B	5.0	0.31	-----
Cyclohexane	5035/8260B	5.0	0.54	-----
cis-1,2-Dichloroethene	5035/8260B	5.0	0.38	66-150
cis-1,3-Dichloropropene	5035/8260B	5.0	0.12	71-146
Dibromochloromethane	5035/8260B	5.0	0.32	72-142
Dibromomethane	5035/8260B	5.0	0.27	-----
1,2-Dibromo-3-chloropropane	5035/8260B	5.0	0.87	-----
1,2-Dibromoethane	5035/8260B	5.0	0.28	-----
1,2-Dichlorobenzene	5035/8260B	5.0	0.16	62-132
1,3-Dichlorobenzene	5035/8260B	5.0	0.20	56-126
1,4-Dichlorobenzene	5035/8260B	5.0	0.23	49-154
Dichlorodifluoromethane	5035/8260B	5.0	0.43	-----
1,1-Dichloroethane	5035/8260B	5.0	0.26	71-143
1,2-Dichloroethane	5035/8260B	2.0	0.22	62-157
1,1-Dichloroethene	5035/8260B	2.0	0.45	63-137
1,2-Dichloroethene (total)	5035/8260B	5.0	0.61	-----
1,2-Dichloropropane	5035/8260B	1.0	0.29	64-157
1,3-Dichloropropane	5035/8260B	5.0	0.21	-----
2,2-Dichloropropane	5035/8260B	5.0	0.45	-----
1,1-Dichloropropene	5035/8260B	5.0	0.28	-----
1,4-Dioxane	5035/8260B	1000	143.73	-----

**PQLs and MDLs for
SOILS by Method 8260B
LOW LEVEL**

Matrix: Soils VOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS limits (% Rec)
DIPE	5035/8260B	5.0	0.20	-----
Epichlorohydrin	5035/8260B	100	-----	-----
Ethyl Acetate	5035/8260B	10	1.37	-----
Ethylbenzene	5035/8260B	4.0	0.30	70-143
Ethyl Ether	5035/8260B	5.0	0.34	-----
Freon TF	5035/8260B	5.0	0.42	-----
Hexachlorobutadiene	5035/8260B	5.0	0.30	-----
2-Hexanone	5035/8260B	5.0	0.89	54-134
Isoprene	5035/8260B	5.0	0.42	-----
Isopropyl Acetate	5035/8260B	10	0.93	-----
Isopropylbenzene	5035/8260B	5.0	0.35	-----
Methyl acetate	5035/8260B	5.0	0.54	-----
Methyl Acrylate	5035/8260B	5.0	-----	-----
Methylcyclohexane	5035/8260B	5.0	0.39	-----
Methylene chloride	5035/8260B	3.0	0.34	70-146
Methyl methacrylate	5035/8260B	5.0	0.50	-----
4-Methyl-2-pentanone	5035/8260B	5.0	0.67	50-141
m+p -Xylene	5035/8260B	10.0	0.72	70-133
MTBE	5035/8260B	5.0	0.41	-----
Naphthalene	5035/8260B	5.0	0.26	-----
n-Butylbenzene	5035/8260B	5.0	0.42	-----
n-Pentane	5035/8260B	5.0	0.54	-----
n-Propylbenzene	5035/8260B	5.0	0.30	-----
o-Xylene	5035/8260B	5.0	0.21	70-137
p-Isopropyltoluene	5035/8260B	5.0	0.23	-----
Propyl Acetate	5035/8260B	10	0.98	-----
sec-Butylbenzene	5035/8260B	5.0	0.20	-----
Styrene	5035/8260B	5.0	0.20	57-142
TBA	5035/8260B	100	8.58	-----
tert-Butylbenzene	5035/8260B	5.0	0.34	-----
1,1,1,2-Tetrachloroethane	5035/8260B	5.0	0.30	-----
1,1,2,2-Tetrachloroethane	5035/8260B	1.0	0.34	62-149
Tetrachloroethene	5035/8260B	1.0	0.37	61-138
trans-1,2-Dichloroethene	5035/8260B	5.0	0.33	63-143
trans-1,3-Dichloropropene	5035/8260B	5.0	0.19	73-138
1,2,3-Trichlorobenzene	5035/8260B	5.0	0.24	-----
1,2,4-Trichlorobenzene	5035/8260B	5.0	0.28	-----
1,1,1-Trichloroethane	5035/8260B	5.0	0.36	66-156
1,1,2-Trichloroethane	5035/8260B	3.0	0.21	69-154
Trichloroethene	5035/8260B	1.0	0.37	62-140
Trichlorofluoromethane	5035/8260B	5.0	0.34	56-145
1,2,3-Trichloropropane	5035/8260B	5.0	0.51	-----
1,2,4-Trimethylbenzene	5035/8260B	5.0	0.28	-----
1,3,5-Trimethylbenzene	5035/8260B	5.0	0.22	-----

**PQLs and MDLs for
SOILS by Method 8260B
LOW LEVEL**

Matrix: Soils VOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS limits (% Rec)
Toluene	5035/8260B	5.0	0.35	70-132
Vinyl Acetate	5035/8260B	5.0	0.39	-----
Vinyl chloride	5035/8260B	5.0	0.37	50-153
Xylenes (Total)	5035/8260B	5.0	0.83	-----

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**PQLs and MDLs for
SOILS by Method 8260B
Medium Level**

Matrix: Soils		PQL (ug/kg) 5g/10ml	PQL (ug/kg) 10g/25ml	MDL (ug/kg)	Spike Limits (% Rec)
VOCs	Method				
Analytes					
Acetone	5030/8260B	500	620	130.63	-----
Acetonitrile	5030/8260B	10000	12000	664.31	-----
Acrolein	5030/8260B	10000	12000	1134.53	-----
Acrylonitrile	5030/8260B	5000	6200	577.15	-----
Allyl alcohol	5030/8260B	100000	120000	-----	-----
Allyl chloride	5030/8260B	500	620	-----	-----
Benzene	5030/8260B	100	120	23.57	62-136
Benzyl chloride	5030/8260B	500	620	18.37	-----
Bromobenzene	5030/8260B	500	620	39.07	-----
Bromochloromethane	5030/8260B	500	620	34.36	70-130
Bromodichloromethane	5030/8260B	100	120	20.43	-----
Bromoform	5030/8260B	400	500	14.65	-----
Bromomethane	5030/8260B	500	620	49.29	-----
2-Butanone	5030/8260B	500	620	101.57	-----
Butyl Acetate	5030/8260B	1000	1200	39.45	-----
cis-1,2-Dichloroethene	5030/8260B	500	620	12.71	-----
cis-1,3-Dichloropropene	5030/8260B	500	620	18.48	-----
Carbon Disulfide	5030/8260B	500	620	17.16	-----
Carbon Tetrachloride	5030/8260B	200	250	26.18	-----
Chlorobenzene	5030/8260B	500	620	26.59	65-138
Chloroethane	5030/8260B	500	620	18.24	-----
2-Chloroethyl Vinyl Ether	5030/8260B	500	620	25.62	-----
Chloroform	5030/8260B	500	620	16.57	62-141
Chloromethane	5030/8260B	500	620	26.05	-----
2-Chlorotoluene	5030/8260B	500	620	24.59	-----
4-Chlorotoluene	5030/8260B	500	620	23.82	-----
Cyclohexane	5030/8260B	500	620	38.12	-----
Dibromochloromethane	5030/8260B	500	620	16.23	-----
Dibromomethane	5030/8260B	500	620	34.48	-----
1,2-Dibromo-3-chloropropane	5030/8260B	500	620	18.43	-----
1,2-Dibromoethane	5030/8260B	500	620	16.99	-----
1,2-Dichlorobenzene	5030/8260B	500	620	16.58	-----
1,3-Dichlorobenzene	5030/8260B	500	620	24.72	63-139
1,4-Dichlorobenzene	5030/8260B	500	620	25.89	-----
Dichlorodifluoromethane	5030/8260B	500	620	25.09	-----
1,1-Dichloroethane	5030/8260B	500	620	16.52	65-138
1,2-Dichloroethane	5030/8260B	200	250	20.89	-----
1,1-Dichloroethene	5030/8260B	200	250	44.13	71-132
1,2-Dichloroethene (total)	5030/8260B	500	620	35.85	-----
1,2-Dichloropropane	5030/8260B	100	120	24.11	64-136
1,3-Dichloropropane	5030/8260B	500	620	16.97	-----
2,2-Dichloropropane	5030/8260B	500	620	31.58	-----
1,1-Dichloropropene	5030/8260B	500	620	30.34	-----
1,4-Dioxane	5030/8260B	100000	120000	18079.34	-----
DIPE	5030/8260B	500	620	11.78	-----
Epichlorohydrin	5030/8260B	10000	12000	569.69	-----
Ethyl Acetate	5030/8260B	1000	1200	87.89	-----
Ethylbenzene	5030/8260B	400	500	22.90	70-134
Ethyl Ether	5030/8260B	500	620	20.59	-----
Freon TF	5030/8260B	500	620	32.44	-----
Hexachlorobutadiene	5030/8260B	500	620	77.53	-----
2-Hexanone	5030/8260B	500	620	31.23	-----
Isoprene	5030/8260B	500	620	24.52	-----
Isopropyl Acetate	5030/8260B	1000	1200	55.02	-----
Isopropylbenzene	5030/8260B	500	620	23.28	70-130
Methyl Acetate	5030/8260B	500	620	46.07	-----
Methyl Acrylate	5030/8260B	500	620	-----	-----
Methyl Cyclohexane	5030/8260B	500	620	23.30	-----
Methyl methacrylate	5030/8260B	500	620	21.21	-----
Methylene chloride	5030/8260B	300	380	24.09	60-152
4-Methyl-2-pentanone	5030/8260B	500	620	56.49	-----
m+p-Xylene	5030/8260B	500	620	47.97	-----
MTBE	5030/8260B	500	620	16.60	70-130
Naphthalene	5030/8260B	500	620	19.85	-----
n-Butylbenzene	5030/8260B	500	620	22.68	-----
n-Pentane	5030/8260B	500	620	37.30	-----
n-Propylbenzene	5030/8260B	500	620	15.51	-----

**PQLs and MDLs for
SOILS by Method 8260B
Medium Level**

Matrix: Soils		PQL (ug/kg) 5g/10ml	PQL (ug/kg) 10g/25ml	MDL (ug/kg)	Spike Limits (% Rec)
VOCs	Method				
Analytes					
o-Xylene	5030/8260B	500	620	18.83	-----
p-Isopropyltoluene	5030/8260B	500	620	23.41	-----
Propyl Acetate	5030/8260B	1000	1200	46.20	-----
sec-Butylbenzene	5030/8260B	500	620	19.96	-----
Styrene	5030/8260B	500	620	15.83	-----
TBA	5030/8260B	10000	12000	712.59	-----
tert-Butylbenzene	5030/8260B	500	620	25.76	-----
1,1,1,2-Tetrachloroethane	5030/8260B	500	620	26.91	-----
1,1,2,2-Tetrachloroethane	5030/8260B	100	120	22.70	-----
Tetrachloroethene	5030/8260B	100	120	27.53	58-137
Toluene	5030/8260B	500	620	24.28	60-138
trans-1,2-Dichloroethene	5030/8260B	500	620	33.20	-----
trans-1,3-Dichloropropene	5030/8260B	500	620	12.16	-----
1,2,3-Trichlorobenzene	5030/8260B	500	620	36.43	-----
1,2,4-Trichlorobenzene	5030/8260B	500	620	38.67	-----
1,1,1-Trichloroethane	5030/8260B	500	620	21.36	-----
1,1,2-Trichloroethane	5030/8260B	300	380	26.74	-----
Trichloroethene	5030/8260B	100	120	26.75	62-134
Trichlorofluoromethane	5030/8260B	500	620	53.36	-----
1,2,4-Trimethylbenzene	5030/8260B	500	620	23.54	-----
1,3,5-Trimethylbenzene	5030/8260B	500	620	16.63	-----
1,2,3-Trichloropropane	5030/8260B	500	620	19.73	-----
Vinyl Acetate	5030/8260B	500	620	33.33	-----
Vinyl chloride	5030/8260B	500	620	26.38	60-151
Xylenes (Total)	5030/8260B	500	620	55.43	-----

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**PQLs and MDLs for
SOILS (Low Level) by Method 8270C**

Matrix: Soils (Low level)				
Soxtherm SVOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS Limits (% Rec)
Acenaphthene	8270C	330	21.22	51-116
Acenaphthylene	8270C	330	16.01	54-109
Acetophenone	8270C	330	14.48	39-97
Aniline	8270C	330	29.38	36-95
Anthracene	8270C	330	27.72	52-119
Atrazine	8270C	330	26.91	34-116
Benzaldehyde	8270C	330	22.87	0-122
Benzidine	8270C	1300	214.57	0-28
Benzo(a)anthracene	8270C	33	14.60	35-143
Benzo(a)pyrene	8270C	33	12.68	35-152
Benzo(b)fluoranthene	8270C	33	10.90	36-141
Benzo(g,h,i)perylene	8270C	330	12.98	25-134
Benzo(k)fluoranthene	8270C	33	15.47	39-160
Benzoic Acid	8270C	1650	260.64	0-130
Benzyl Alcohol	8270C	330	13.30	51-118
bis(2-chloroethoxy)methane	8270C	330	12.64	55-108
bis(2-chloroethyl)ether	8270C	33	13.18	46-105
bis(2-Chloroisopropyl)ether	8270C	330	9.51	49-107
bis(2-Ethylhexyl)phthalate	8270C	330	5.63	62-122
4-Bromophenyl-phenylether	8270C	330	24.92	50-116
Butylbenzylphthalate	8270C	330	17.56	59-116
Caprolactam	8270C	330	15.24	46-127
Carbamazepine	8270C	330	17.17	----
Carbazole	8270C	330	21.10	58-110
4-Chloroaniline	8270C	330	20.09	1-97
4-Chloro-3-methylphenol	8270C	330	179.58	53-115
2-Chloronaphthalene	8270C	330	13.84	51-111
2-Chlorophenol	8270C	330	150.46	49-118
4-Chlorophenyl-phenylether	8270C	330	19.84	52-112
Chrysene	8270C	330	16.76	38-149
Coumarin	8270C	330	21.32	----
Dibenz(a,h)anthracene	8270C	33	11.90	35-124
Dibenzofuran	8270C	330	19.87	54-109
Diethylphthalate	8270C	330	25.22	59-116
Di-n-butylphthalate	8270C	330	12.26	61-111
Di-n-octylphthalate	8270C	330	15.28	46-156
1,2-Dichlorobenzene	8270C	330	11.59	45-105
1,3-Dichlorobenzene	8270C	330	11.72	43-101
1,4-Dichlorobenzene	8270C	330	9.82	43-104
3,3-Dichlorobenzidene	8270C	670	76.22	4-105
2,4-Dichlorophenol	8270C	330	178.09	50-118
2,4-Dimethylphenol	8270C	330	168.95	44-113

**PQLs and MDLs for
SOILS (Low Level) by Method 8270C**

Matrix: Soils (Low level)				
Soxtherm SVOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS Limits (% Rec)
Dimethylphthalate	8270C	330	25.69	57-115
4,6-Dinitro-2-methylphenol	8270C	1300	117.85	0-130
2,4-Dinitrophenol	8270C	1300	70.22	0-117
2,4-Dinitrotoluene	8270C	67	21.13	58-121
2,6-Dinitrotoluene	8270C	67	22.43	59-125
1,4-Dioxane	8270C	330	8.46	----
1,2-Diphenylhydrazine	8270C	330	21.26	56-109
Diphenyl	8270C	330	9.42	52-108
Diphenyl Ether	8270C	330	12.51	----
Fluoranthene	8270C	330	17.11	23-164
Fluorene	8270C	330	20.46	53-115
Hexachlorobenzene	8270C	33	20.92	49-120
Hexachlorobutadiene	8270C	67	12.79	51-114
Hexachlorocyclopentadiene	8270C	330	10.38	0-135
Hexachloroethane	8270C	33	10.81	40-100
Hydroquinone	8270C	330	+++++	----
Indeno(1,2,3-cd)pyrene	8270C	33	12.36	36-129
Isophorone	8270C	330	14.23	51-109
1-Methylnaphthalene	8270C	330	8.41	----
2-Methylnaphthalene	8270C	330	9.44	44-114
2-Methylphenol	8270C	330	159.84	51-110
4-Methylphenol	8270C	330	179.47	49-112
2-Nitroaniline	8270C	670	17.92	61-109
3-Nitroaniline	8270C	670	16.01	39-104
4-Nitroaniline	8270C	670	16.99	43-116
2-Nitrophenol	8270C	330	146.07	50-107
4-Nitrophenol	8270C	1300	173.94	58-120
Naphthalene	8270C	330	10.43	50-112
Nitrobenzene	8270C	33	14.06	54-107
N,N-Dimethylaniline	8270C	33	8.60	----
N-Nitrosodimethylamine	8270C	330	9.27	29-110
N-Nitroso-di-n-propylamine	8270C	33	15.19	47-117
N-nitrosodiphenylamine	8270C	330	23.73	48-117
N-Decane	8270C	330	6.39	----
N- Octadecane	8270C	330	12.77	----
O-Tricresylphosphate	8270C	330	17.73	----
Pentachlorophenol	8270C	1300	150.43	28-127
Phenanthrene	8270C	330	25.45	38-143
Phenol	8270C	330	164.56	45-108
Pyrene	8270C	330	17.41	24-167
Pyridine	8270C	330	12.53	----
1,2,4-Trichlorobenzene	8270C	33	10.34	46-112

PQLs and MDLs for SOILS (Low Level) by Method 8270C				
<i>Matrix: Soils (Low level)</i>				
<i>Soxtherm SVOCs Analytes</i>	<i>METHOD</i>	<i>STL PQL (ug/kg)</i>	<i>STL MDL (ug/kg)</i>	<i>LCS Limits (% Rec)</i>
2,4,5-Trichlorophenol	8270C	330	178.98	45-118
2,4,6-Trichlorophenol	8270C	330	176.92	49-114
2,3,7,8-TCDD (SCREEN)	8270C	33	+++++	----

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**PQLs and MDLs for
SOILS (Medium Level) by Method 8270C**

Matrix: Soils (Medium level)			
SVOCs			
Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)
Acenaphthene	8270C	25000	272
Acenaphthylene	8270C	25000	242
Acetophenone	8270C	25000	3516
Aniline	8270C	25000	3567
Anthracene	8270C	25000	244
Atrazine	8270C	25000	3271
4-Bromophenyl-phenylether	8270C	25000	2975
Benzaldehyde	8270C	25000	543
Benzidine	8270C	100000	27132
Benzo(a)anthracene	8270C	2500	208
Benzo(a)pyrene	8270C	2500	309
Benzo(b)fluoranthene	8270C	2500	299
Benzo(g,h,i)perylene	8270C	25000	245
Benzo(k)fluoranthene	8270C	2500	318
Benzoic Acid	8270C	25000	7189
Benzyl Alcohol	8270C	25000	3047
bis(2-chloroethoxy)methane	8270C	25000	2762
bis(2-chloroethyl)ether	8270C	2500	1152
bis(2-Chloroisopropyl)ether	8270C	25000	2356
bis(2-Ethylhexyl)phthalate	8270C	25000	1285
Butylbenzylphthalate	8270C	25000	2700
Caprolactam	8270C	25000	1933
Carbazole	8270C	25000	283
4-Chloro-3-methylphenol	8270C	25000	5831
4-Chloroaniline	8270C	25000	1773
4-Chlorophenyl-phenylether	8270C	25000	3890
2-Chloronaphthalene	8270C	25000	2475
2-Chlorophenol	8270C	25000	7496
Chrysene	8270C	25000	394
Dibenz(a,h)anthracene	8270C	2500	358
Dibenzofuran	8270C	25000	1631
1,2-Dichlorobenzene	8270C	25000	3240
1,3-Dichlorobenzene	8270C	25000	3012
1,4-Dichlorobenzene	8270C	25000	2534
3,3-Dichlorobenzidene	8270C	50000	26587
2,4-Dichlorophenol	8270C	25000	6128
Diethylphthalate	8270C	25000	2618
2,4-Dimethylphenol	8270C	25000	5973
Dimethylphthalate	8270C	25000	2311
Di-n-butylphthalate	8270C	25000	2053
2,4-Dinitrophenol	8270C	100000	10659
2,4-Dinitrotoluene	8270C	5000	1664
2,6-Dinitrotoluene	8270C	5000	1409
4,6-Dinitro-2-methylphenol	8270C	100000	7845

**PQLs and MDLs for
SOILS (Medium Level) by Method 8270C**

Matrix: Soils (Medium level) SVOCs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)
Di-n-octylphthalate	8270C	25000	2505
1,4-Dioxane	8270C	25000	4139
Diphenyl	8270C	25000	1560
Diphenyl Ether	8270C	25000	1598
1,2-Diphenylhydrazine	8270C	25000	2010
Fluoranthene	8270C	25000	378
Fluorene	8270C	25000	359
Hexachlorobenzene	8270C	2500	1471
Hexachlorobutadiene	8270C	5000	3192
Hexachlorocyclopentadiene	8270C	25000	1678
Hexachloroethane	8270C	2500	2408
Indeno(1,2,3-cd)pyrene	8270C	2500	304
Isophorone	8270C	25000	2733
2-Methylnaphthalene	8270C	25000	1836
2-Methylphenol	8270C	25000	8635
4-Methylphenol	8270C	25000	9691
2-Nitroaniline	8270C	50000	1799
3-Nitroaniline	8270C	50000	2585
4-Nitroaniline	8270C	50000	2066
2-Nitrophenol	8270C	25000	5744
4-Nitrophenol	8270C	100000	4156
Naphthalene	8270C	25000	131
Nitrobenzene	8270C	2500	1072
N-Nitrosodimethylamine	8270C	25000	2705
N-Nitroso-di-n-propylamine	8270C	2500	926
N-nitrosodiphenylamine	8270C	25000	1624
N,N-Dimethylaniline	8270C	2500	763
Pentachlorophenol	8270C	100000	4823
Phenanthrene	8270C	25000	274
Phenol	8270C	25000	7482
Pyrene	8270C	25000	353
Pyridine	8270C	25000	3538
1,2,4-Trichlorobenzene	8270C	2500	2248
2,4,5-Trichlorophenol	8270C	25000	4556
2,4,6-Trichlorophenol	8270C	25000	4526
2,3,7,8-TCDD (SCREEN)	8270C	2500	+++++

**PQLs and MDLs for
SOILS (High Level) by Method 8270C**

Matrix: Soils (High level)			
SVOCs			
Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)
Acenaphthene	8270C	50000	675.11
Acenaphthylene	8270C	50000	546.09
Acetophenone	8270C	50000	6172.56
Aniline	8270C	50000	4969.40
Anthracene	8270C	50000	614.97
Atrazine	8270C	50000	5684.73
4-Bromophenyl-phenylether	8270C	50000	5964.91
Benzaldehyde	8270C	50000	1624.01
Benzidine	8270C	200000	50428.57
Benzo(a)anthracene	8270C	5000	581.90
Benzo(a)pyrene	8270C	5000	698.70
Benzo(b)fluoranthene	8270C	5000	769.56
Benzo(g,h,i)perylene	8270C	50000	676.32
Benzo(k)fluoranthene	8270C	5000	605.41
Benzoic Acid	8270C	50000	17101.87
Benzyl Alcohol	8270C	50000	4770.09
bis(2-chloroethoxy)methane	8270C	50000	6964.56
bis(2-chloroethyl)ether	8270C	5000	3878.14
bis(2-Chloroisopropyl)ether	8270C	50000	3558.37
bis(2-Ethylhexyl)phthalate	8270C	50000	2090.07
Butylbenzylphthalate	8270C	50000	4035.87
Caprolactam	8270C	50000	6991.72
Carbazole	8270C	50000	639.26
4-Chloroaniline	8270C	50000	5239.19
4-Chloro-3-methylphenol	8270C	50000	11760.98
2-Chloronaphthalene	8270C	50000	5208.85
4-Chlorophenyl-phenylether	8270C	50000	7420.66
2-Chlorophenol	8270C	50000	11275.38
Chrysene	8270C	50000	364.48
Dibenz(a,h)anthracene	8270C	5000	773.45
Dibenzofuran	8270C	50000	5730.26
1,2-Dichlorobenzene	8270C	50000	5033.76
1,3-Dichlorobenzene	8270C	50000	5444.44
1,4-Dichlorobenzene	8270C	50000	4816.02
3,3-Dichlorobenzidene	8270C	100000	32622.78
2,4-Dichlorophenol	8270C	50000	10509.94
Diethylphthalate	8270C	50000	5749.82
Dimethylphthalate	8270C	50000	5363.88
2,4-Dimethylphenol	8270C	50000	10352.23
Di-n-butylphthalate	8270C	50000	2925.56
2,4-Dinitrophenol	8270C	200000	5681.41
2,4-Dinitrotoluene	8270C	10000	4821.86
2,6-Dinitrotoluene	8270C	10000	5076.95
4,6-Dinitro-2-methylphenol	8270C	200000	14561.84

**PQLs and MDLs for
SOILS (High Level) by Method 8270C**

Matrix: Soils (High level)			
SVOCs			
Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)
1,4-Dioxane	8270C	50000	6367.12
Di-n-octylphthalate	8270C	50000	6202.43
Diphenyl	8270C	50000	3690.90
Diphenyl Ether	8270C	50000	5426.72
1,2-Diphenylhydrazine	8270C	50000	4585.71
Fluoranthene	8270C	50000	668.78
Fluorene	8270C	50000	606.94
Hexachlorobenzene	8270C	5000	4067.14
Hexachlorobutadiene	8270C	10000	6218.81
Hexachlorocyclopentadiene	8270C	50000	3355.98
Hexachloroethane	8270C	5000	4575.24
Indeno(1,2,3-cd)pyrene	8270C	5000	736.07
Isophorone	8270C	50000	5834.02
2-Methylnaphthalene	8270C	50000	3509.94
2-Methylphenol	8270C	50000	10967.61
4-Methylphenol	8270C	50000	11610.44
2-Nitroaniline	8270C	100000	5195.03
3-Nitroaniline	8270C	100000	5204.84
4-Nitroaniline	8270C	100000	4802.16
2-Nitrophenol	8270C	50000	7989.42
4-Nitrophenol	8270C	200000	12475.16
Naphthalene	8270C	50000	371.09
Nitrobenzene	8270C	5000	3158.22
N-Nitrosodimethylamine	8270C	50000	4765.44
N-Nitroso-di-n-propylamine	8270C	5000	2604.05
N-nitrosodiphenylamine	8270C	50000	4754.05
N,N-Dimethylaniline	8270C	5000	3734.97
Pentachlorophenol	8270C	200000	8746.86
Phenanthrene	8270C	50000	526.41
Phenol	8270C	50000	14141.66
Pyrene	8270C	50000	521.61
Pyridine	8270C	50000	3980.46
1,2,4-Trichlorobenzene	8270C	5000	2229.34
2,4,5-Trichlorophenol	8270C	50000	15168.60
2,4,6-Trichlorophenol	8270C	50000	11129.28
2,3,7,8-TCDD (SCREEN)	8270C	100000	+++++

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PQLs and MDLs for Soils by Method 8082

Matrix: Soils By Soxtherm PCBs Analytes	METHOD	STL PQL (ug/kg)	STL MDL (ug/kg)	LCS limits (% Rec)
PCB-1016 (AROCLOR)	8082	67	5.3	70-160
PCB-1221 (AROCLOR)	8082	67	9.9	-----
PCB-1232 (AROCLOR)	8082	67	8.1	-----
PCB-1242 (AROCLOR)	8082	67	5.4	-----
PCB-1248 (AROCLOR)	8082	67	9.2	-----
PCB-1254 (AROCLOR)	8082	67	8.7	-----
PCB-1260 (AROCLOR)	8082	67	5.7	42-186
PCB-1262 (AROCLOR)	8082	67	7.4	-----
PCB-1268 (AROCLOR)	8082	67	7.4	-----

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Reporting IDL in Form 1												
TRACE 1 ICP		TRACE 2 ICP		TRACE 3 ICP						GFAA		

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PQLs and MDLs for Soil by Method NJDEP OQA-QAM-025			
Matrix: Soil SVOCs Analytes	METHOD	STL PQL (mg/kg)	STL MDL (mg/kg)
TPHC	OQA-QAM-025	6.7	1.8

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TESTAMERICA EDISON WET CHEM CONTROL LIMITS										
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Parameter	ASTM or DEP LAB METHOD	Methods EPA	Std Mth. 18th	SW 846	RL	UNITS	RPD	MS % REC	HOLD TIME	MDL
Acidity		305.1			5	PPM	20.0	NA	14d	4.34
Alkalinity (water)- <i>Man-tech-Auto</i>		310.1	2320B		5.0	PPM as CaCO ₃	10	NA	14d	1.22
Alkalinity-soil		310.1	2320B		20.0	PPM as CaCO ₃	20.0	NA	14d	
Amenable Cyanide				9012B	0.01	PPM	NA	NA	14d	
Ammonia(water)		350.2 + 350.1	4500-NH3 H		0.10	PPM as N	14.0	63-119	28d	0.0886
Ammonia(soil)		350.2 + 350.1	4500-NH3 H		8.00	PPM as N	20.0	70-130	28d	3.285
Bicarbonate			2320B		5.0	PPM as CaCO ₃	10.0	NA	14d	
BOD (<i>Polyseed</i>)		405.1	5210B		5.0	PPM	10.0	21-157	48hr	1.84
BOD (<i>Natural Seed</i>)		405.1	5210B		5.0	PPM	10.0	21-157	48hr	0.832
BOD (<i>Man-tech</i>) Auto		405.1	5210B		5.0	PPM	10.0	21-157	48hr	2.90
Carbon Dioxide-Free			4500 CO ₂ D		5.0	PPM as CO ₂	25.0	NA	Analyze Imm.	
Carbonate			2320B		5.0	PPM as CaCO ₃	10.0	NA	14d	
Chloride(soil)	ASTM D3987-85		4500-Cl B		5.0	PPM	20.0	70-130	28d	
Chloride(water)			4500-Cl B	9253	5.0	PPM	10.0	70-130	28d	0.767
Chloride- <i>DA method</i>		325.2	4500-Cl E	9251	5.0	PPM	10.0	70-130	28d	1.3
Chlorine Demand			2350B/4500-Cl F		0.30	PPM	20.0	NA	48hr	
Chlorine Residual		330.4	4500-Cl F		0.4	PPM	10.0	NA	Analyze Imm.	0.117
COD(soil)	ASTM D3987-85	410.4	5220D		10.0	PPM	20.0	70-130	28d	
COD(water)		410.4	5220D		10.0	PPM	10.0	70-130	28d	3.82
Color		110.2	2120B		5.0	CU	10.0	NA	48hr	
Corrosivity				9040B	NA	SU	10.0	NA	7d	
Cr ⁺⁶ (3060A/7196A)				SW-846-3060A/7196A	2.0	PPM	20.0	75.0-125	30d	0.78
Cr ⁺⁶ (3060A/7199)				SW-846-3060A/7199A	2.0	PPM		75.0-125	30d	0.111
Cr ⁺⁶ (7196A)				7196A	10.0	PPB	20.0	85.0-115	24 hr	3.08
Cr ⁺⁶ (7199)				7199	1.0	PPB		85.0-115	24 hr	0.020
Cr ⁺⁶ (USGS)	USGS-METH I-1230-85:01032				10.0	PPB	20.0	85.0-115	24hr	4.55
Dissolved Oxygen		360.1	4500-O G		1.0	PPM	10.0	NA	Analyze Imm.	
Ferrous Iron - Manual			3500-FeD		0.1	PPM	10.0	81-115	-	
Ferrous Iron- <i>DA method</i>			3500-FeD		0.1	PPM	10.0	81-115	-	0.021
Fluoride (water)		340.2	4500-F C	9214	0.1	PPM	10.0	70-130	28d	0.0069
Hardness, Total		130.2	2340C		5.0	ppm	10.0	N/A	6 mos.	1.19
Hydroxide			2320 B		5.0	PPM as CaCO ₃	10.0	NA	14d	
Ignitability (soil)				1020A	NA	deg F	10.0	NA	14d	
Ignitability (water)				1020A	NA	deg F	10.0	NA	14d	
Langlier's Index			SM16th-203		NA	NA	NA	NA	NA	
Nitrate-Nitrite		353.2	4500-NO3 F		0.10	PPM as N	10.0	54-113	28d	0.0206
NO2-N (nitrite)- <i>Lachat</i>		353.2			0.10	PPM as N	10.0	41-142	48hr	0.015
NO2-N (nitrite)- <i>DA method (WW only)</i>		354.1	4500-NO2 B		0.10	PPM as N	10.0	41-142	48hr	0.0071
NO2-N (soil)	ASTM D3987-85	353.2	4500-NO3 F		0.10	PPM as N	20.0	70-130	48hr	
NO3-N (nitrate)		353.2	4500-NO3 F		0.10	PPM as N	10.0	54-113	48hr	0.055
NO3-N (soil)	ASTM D3987-85	353.2	4500-NO3 F		0.10	PPM as N	20.0	70-130	48hr	
Oil & Grease(grav) water		413.1	5520 B	9070	10.0	PPM	10.0	78-110	28d	2.25
Oil & Grease (solid)(IR)		413.2			25.0	PPM	20	70-130	28d	7.197
Oil & Grease(IR)		413.2			10	PPM	20.0	70-130	28d	0.818
Oil & Grease(sqar)	DEP LAB METH 036				33.0	PPM	10.0	N/A	28d	
Organic Nitrogen		351.2-350.2			0.2	PPM as N	NA	NA	28d	
Ortho Phosphorus (soil)	ASTM D3987-85	365.2	4500-P E		0.03	PPM as P	20.0	70-130	48hr	
Ortho Phosphorus(water)		365.2	4500-P E		0.03	PPM as P	10.0	85-112	48hr	0.0081

TESTAMERICA EDISON WET CHEM CONTROL LIMITS										
Parameter	ASTM or DEP LAB METHOD	Methods EPA	Std Mth. 18th	SW 846	RL	UNITS	RPD	MS % REC	HOLD TIME	MDL
Paint Filter				9095A	0.5	ml/100g	10.0	NA	14d	
pH/corrosivity (soil)				9045C	NA	SU	10.0	NA	7d	
pH(sqar)	DEP LAB METH 010				NA	SU	10.0	NA	28d	
pH(water)		150.1	4500-H ⁺ B	9040B	NA	SU	10.0	NA	Analyze Imm.	
PHC (soil)		418.1			25.0	PPM	10.0	79-107	28d	5.66
PHC (water)- FTIR		418.1			1.00	PPM	10.0	70-130	7d	0.828
Reactive Cyanide				Vol. 1c 7.3.3	25.0	PPM	10.0	NA	14d	
Reactive Sulfide				Vol. 1c 7.3.4	20.0	PPM	12.0	5-59	14d	12.9
Redox Potential(soil)			2580		NA	mV	10.0	NA	7d	
Redox Potential(water)			2580		NA	mV	10.0	NA	Analyze Imm.	
Resistivity		120.1	2510B	9050A	1.0	megohms/cm	10.0	NA	28d	
Settleable Solids		160.5	2540 F		0.5	ml/l	10.0	NA	48hr	
Specific Conductance		120.1	2510B	9050A	1.0	umhos/cm	10.0	NA	28d	0.173
Sulfate(soil) - DA method	ASTM D3987-85	375.4		9038	5.0	PPM	20.0	70-130	28d	
Sulfate(water)- DA method		375.4		9038	5.0	PPM	10.0	83-126	28d	0.83
Sulfate (Water) - Manual		375.4		9038	5.0	PPM	10.0	83-126	28d	
Sulfide (soil)				9030B	10.0	PPM	20.0	75-130	7d	3.65
Sulfide (water)		376.1	4500-S E		1.0	PPM	10.0	70-130	7d	0.577
Sulfite (soil)	ASTM D3987-85	377.1	4500-SO3 B		5.0	PPM	20.0	70-130	Analyze Imm.	
Sulfite (water)		377.1	4500-SO3 B		5.0	PPM	20.0	70-130	Analyze Imm.	0.460
TDS		160.1	2540C		10.0	PPM	5.0	NA	7d	5.98
TKN (soil) - Lachat					25.0	PPM	20.0	70-130	28d	4.473
TKN (water) - Lachat		351.2			0.50	PPM as N	10.0	76-132	28d	0.121
TOC (soil)- T-Finnigan		Lloyd Kahn's Method			100	PPM	15.0	NA	14d	72.6
TOC (water)		415.1			1.0	PPM	10.0	79-118	28d	0.689
TOC (water)				9060	1.0	PPM	10.0	79-118	28d	0.938
TOC (water-DW)			5310B		1.0	PPM	10.0	79-118	28d	0.699
Total Cyanide (DW)		335.4			0.01	PPM	10.0	90-110	14d	0.0046
Total Cyanide(soil) - Lachat				9012A	0.5	PPM	10.0	82-125	14d	0.040
Total Cyanide(water) - Lachat		335.3	4500-CN ⁻ E	9012B	0.01	PPM	10.0	90-120	14d	0.00276
Total Phenol(soil) - Lachat		420.1 + 420.2		9066	5.0	PPM	18.0	72-130	28d	
Total Phenol(soil) - DA method		420.1 + 420.2		9066	5.0	PPM	18.0	72-130	28d	3.03
Total Phenol(sqar)				9066	5.0	PPM	18.0	72-130	28d	
Total Phenol(water) - Lachat		420.1 + 420.2		9066	0.05	PPM	14.0	72-123	28d	
Total Phenol(water)- DA method		420.1 + 420.2		9066	0.05	PPM	14.0	72-123	28d	0.024
Total Phosphorus(soil)			4500-P B5+E		1.50	PPM as P	20.0	70-130	28d	0.49
Total Phosphorus(water)		365.2	4500-P B5+E		0.03	PPM as P	10.0	88-119	28d	0.0061
Total Volatile Suspended Solids		160.4			10.0	PPM	10.0	NA	7d	
TS		160.3	2540B		10.0	PPM	5.0	NA	7d	7.13
TSS		160.2	2540D		10.0	PPM	5.0	NA	7d	2.83
Turbidity		180.1	2130B		0.50	NTU	10.0	NA	48hr	0.181
Volatile Solids(soil)		160.4			0.1	%	14.0	NA	7d	
Volatile Solids(water)		160.4			10.0	PPM	10.0	NA	7d	
f:\wetchem\Limits.xls										

Jun 17, 2009 14:13 SOIL VOC SCREENING

Scope and Application: This method is applicable to screening VOCs in the headspace of soil samples.

Method: Photoionization

Sensitivity: Approximately 0.5 ppm depending on background

Optimum Range: background to 2,000 ppm

Reagents and Apparatus:

1. MiniRAE 2000 PID;
2. Calibration gas;
3. Calibration apparatus and tubing;
4. Battery rechargers.

Calibration:

Calibration of MiniRAE 2000 PID

1. Connect the supplied regulator to the span gas cylinder. Hand tighten the fittings. Observe proper handling techniques for all gases.
2. Open the valve on the gas bag by turning the valve stem fully counterclockwise.
3. Attach the nut to the regulator. Hand tighten the fittings.
4. Turn the regulator knob counterclockwise about half a turn to start the flow of gas.
5. Fill the gas bag about half full and then close the regulator fully clockwise to turn off the flow of gas.
6. Disconnect the bag from the adapter and empty it. Flush the bag a few times with the span gas and then fill it.
7. Close the gas bag by turning the valve clockwise.
8. Press [N/-] and Mode buttons simultaneously on the PID to enter the Programming Mode.
9. The first sub-menu in the Programming Mode will show the message: Calibrate/Select Gas? Press the [Y/+] button to select this menu.
10. The next sub-menu will show the message: Fresh Air Cal? Press the [Y/+] to zero the PID.

11. After about 15 seconds PID will show the message update data....zeroed....reading = X.X ppm. Press any key to return to the Fresh Air Cal? sub-menu.
12. Make sure the PID is connected to the Tedlar® bag filled with calibration gas.
13. Press the [Y/+] key at the Span Cal? sub-menu to start the calibration.
14. The display will show “Apply Gas Now”, open the valve on the tedlar bag.
15. Display will show “Wait....30” with a countdown timer showing the number of remaining seconds while the monitor performs calibration.
16. When the countdown timer reaches zero, the monitor will show the calibrated value. The value should be very close to the span gas value.
17. Close the valve on the Tedlar® bag and remove the bag from the monitor.
18. Press the Mode key to return to operation mode.

Procedure:

1. Calibrate meter using the correct calibration procedure for the meter used.
2. Screening for VOCs will be accomplished by cutting the core and running the probe of the meter along the entire length of the core.
3. Take the highest reading from the meter or readout of the instrument.
4. Record the reading in the field logbook.

Quality Control:

1. Calibration check results must be ± 10 percent of the true value. If the result is outside of the ± 10 percent, recalibrate the meter as specified above.
2. Duplicate samples are not analyzed since the headspace VOC readings will vary considerably as soil VOCs volatilize.

Interferences and Limitations:

Humid conditions will cause a negative bias to the reading. The photoionization detection principle used by the instruments will not detect all VOCs. The instrument is most sensitive to aromatic, alkene and alkyne VOCs.

SOIL METALS SCREENING

Scope and Application: This method is applicable to screening metals in soil samples.

Method: X-Ray Fluorescence

Accuracy: 99.7% confidence level for a 120 second test

Optimum Range: Dependant on element

Reagents and Apparatus:

1. Innov-X Alpha handheld XRF;
2. 316 Standardization mask.

Calibration:

Calibration of Innov-X Alpha handheld XRF:

1. Turn on the XRF.
2. Once the XRF is in operation mode, a screen will pop up stating that standardization is necessary.
3. Place the 316 Standardization mask clip over the end of the XRF.
4. Click okay on the screen.
5. The XRF will verify that the hardware is working properly. If an error message appears, the unit will need to be returned to the manufacturer for calibration.

Note from manufacturer:

Before performing tests, it is necessary to standardize the instrument. This automated procedure involves collecting a spectrum on a known material (stainless steel 316), which is mounted in the standardization mask which is shipped with each instrument. Various aspects of the 316 spectra are compared to values stored when the instrument was calibrated at the factory, and minor adjustments may be made to ensure the electronics are properly functioning. If there are any problems with the instrument, they will be indicated by an error message.

The standardization works not by checking the chemistry of the 316 mask, instead it verifies that the hardware is operating correctly. The 316 in the standardization mask is designed to check the energy calibration and the intensity of signal coming from the analyzer. The total count rate off the 316 is checked, and the energy scale is verified by ensuring that the iron (Fe) and Molybdenum (Mo) peaks in the spectra are found at the right energy.

The chemistry of the 316 mask is not certified. The mask may contain certain tramp elements which can naturally occur in certain grades of 316, for example, Niobium (Nb) and Copper (Cu). Therefore, the user may expect that an analyzer will properly ID the metal in the coin as 316, but may not display an "Exact Match."

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APPENDIX D

Community Air Monitoring Plan

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Appendix D**Community Air Monitoring Plan**

Former Delphi Interior and Lighting Systems Division
1445 Parkway Avenue, Ewing Township, New Jersey
ISRA Case #E97070

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1.0 Community Air Monitoring Plan (CAMP)

This Community Air Monitoring Plan (CAMP) describes air monitoring for particulate matter (fugitive dust) and volatile organic compounds (VOCs) during implementation of the Remedial Action Workplan (RAW) for impacted soil excavation activities at the Former GM Trenton Facility (Site) in Trenton, NJ. Air monitoring will be performed during excavation of soil containing volatile and non-volatile constituents of concern (COCs) present at concentrations greater than applicable remediation criteria.

The air monitoring activities will be performed to provide a basis for deciding when to implement measures to mitigate potential site worker and community exposures to COCs.

2.0 Constituents of Concern (COCs)

Areas of soils affected by COCs and proposed for excavation are described and depicted in the RAW. The COCs for which remediation criteria have been developed for the Site include zinc, copper, antimony, nickel, lead, arsenic, hexavalent chromium, a mixture of semi-volatile organic compounds (SVOCs), and the following VOCs: xylene, ethylbenzene, methylene chloride, 1,2-dichlorobenzene, chlorobenzene, 1,4-dichlorobenzene, trichloroethylene, and benzene.

3.0 Dust and Vapor Control Measures

Appropriate dust and vapor mitigation measures will be implemented during excavation and earth moving activities, based on the results of the air monitoring described herein. Control measures will include the following, at a minimum:

- Pre-apply water (mist) to depth of proposed cuts.
- Re-apply water mist as necessary to maintain soils in a damp condition to ensure that visible dust emissions do not extend beyond the site fence line.
- Vapor suppressant products may be applied to control the generation of vapors from VOC impacted soils.

If visible dust is observed, the excavation contractor will implement dust-control mitigation measures; which includes increasing dust control measures until no visible dust is observed. If additional watering is conducted and is ineffective or cannot be implemented satisfactorily (e.g., with no runoff or discharge from the Site), then these operations will be discontinued and alternative dust suppression measures may be implemented, including cessation of excavation and re-evaluation of mitigation measures.

4.0 SITE-SPECIFIC WORKER AND COMMUNITY HEALTH AIR QUALITY MONITORING

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During soil excavation and materials management activities, ambient air monitoring will be implemented to:

- Monitor potential on-site affects on ambient air from the excavation and materials management activities,
- Monitor potential off-site (community) affects,
- Assess whether mitigation measures are necessary to protect worker and community health.

4.1 Action Levels

COCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations will also be measured to establish background conditions. The air monitoring will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

Non-volatile COCs may be bound to dust particles emitted from the Site during excavation and materials management activities. Dust action levels have been derived to be protective of on-Site workers and the adjacent community. The derivation of these action levels is provided below. The associated calculations are presented in the attached Table 1.

Volatile COCs may be emitted during excavation and materials management activities. Permissible Exposure Limits for volatile COCs are presented in the attached Table 2.

Site Perimeter

A. Particulates

The perimeter action level for dust monitoring is 0.1 mg/m^3 (equivalent to $100 \text{ }\mu\text{g/m}^3$) of particulate matter less than 10 microns in size (PM-10) greater than the measured upwind background level for a 15-minute time weighted average, or if visible dust is observed extending beyond the site fence line.

To ensure that measured fugitive dust concentrations are considered protective for the community during on-Site soil excavation and materials-management activities, estimated maximum fugitive dust concentrations were compared to separate COC-specific perimeter action levels developed for Site-specific COCs being remediated. These COC-specific, perimeter action-levels are dust-equivalent concentrations derived using the maximum, measured COC concentrations in on-Site soil. These calculations are presented in the attached Table 1.

For example, the lowest of the calculated Dust Equivalent PELs presented in Table 1 is for hexavalent chromium (Cr^{+6}), which is 0.2 mg/m^3 ($200 \text{ }\mu\text{g/m}^3$). This level is greater than the above-identified dust action level of 0.1 mg/m^3 . Therefore, the action level is considered to provide adequate protection during Site remediation activities.

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B. Volatiles

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The perimeter action-level for volatile COCs, except for benzene, will be if the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average.

The perimeter action-level for benzene will be if the ambient air concentration of benzene at the downwind perimeter of the work area or exclusion zone exceeds 1 part per million (ppm) above background for the 15-minute average.

Areas Occupied by Workers**A. Particulates**

The Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for respirable dust is 5 mg/m^3 . PELs are time weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek.

To ensure that the respirable-dust PEL is protective enough for fugitive dust generated from COC-impacted soil and materials management activities at the Site, the estimated maximum fugitive dust concentrations were compared to a separate, COC-specific, worker action-level developed for Site-specific COCs being remediated. These COC-specific, worker action-levels are dust-equivalent concentrations derived using PELs and the maximum measured COC concentrations in on-Site soil. These calculations are presented in Table 1.

The lowest of the COC-specific action levels (0.2 ng/m^3 for Cr^{+6}) was compared to the PEL for respirable nuisance-dust of 5 mg/m^3 . Because this COC-specific action level for Cr^{+6} is lower than that for respirable nuisance-dust, 0.2 ng/m^3 was selected as the worker action level for the proposed excavation and materials-management activities at the Site.

B. Volatiles

The action level for volatile COCs, except for benzene, in on-Site areas occupied by workers is the lowest of the 8-hr TWAs (10 ppm) or 15-min. STELs (25 ppm) listed in the attached Table 2.

The action level for benzene in on-Site areas occupied by workers 0.5 ppm (8-hr TWA) and 2.5 ppm (15-min. STEL), as listed in the attached Table 2.

4.2 Equipment

A MIE Personal DataRAM (or equivalent) will be used for monitoring total dust to assess the Site perimeter and worker action levels. The DataRAM is a portable real time particulate monitor with a concentration measurement range of 0.001 milligrams per meter (mg/m^3) to 400 mg/m^3 at an accuracy of $\pm 5\%$. This instrument has a particulate-size range of maximum response of 0.1 to 10 microns. The calibration performed by the DataRAM manufacturer will be verified using a certified calibration bag at the beginning of each workday in accordance with the procedures specified by the manufacturer. Calibration logs will be maintained for each day.

Volatile COCs, except benzene, will be measured with a portable photoionization detector (PID) equipped with a minimum 10.2 eV lamp and datalogger, such as MiniRAE 2000 or equivalent. Benzene will be measured with a Draeger CMS Analyzer with benzene chips capable of detecting benzene in the range of 0.2 – 10.0 ppm.

A Noavalynx Model 110-WS-16 modular weather station (or equivalent) will be used to record wind speed, wind direction, temperature, relative humidity, and barometric pressure. The weather station can record wind speeds from 0 to 99.9 mph with an accuracy of $\pm 3\%$. The weather station will be set up in a location at the Site where interference from structures or trees will be minimal. The weather station will be left at this location throughout the remediation activities.

4.3 Measurement Frequency and Locations

Measurements will be taken throughout the workday as described in the following sections, when the subject remedial excavation and materials management activities are being conducted.

Site Perimeter

Particulate and volatile COC concentration measurement frequency for Site perimeters will be every 15 minutes during the subject work activities.

Measurement locations at Site perimeters will be based on prevailing wind direction with monitoring points established within 5 to 15 degrees of the measured upwind/downwind direction. Monitoring locations may be moved throughout the day based on wind direction. Perimeter monitoring locations include:

- One upwind location just inside the property boundary (fence line) at the further upwind direction, and
- One downwind location just inside the property boundary (fence line) at the further downwind direction.

Areas Occupied By Workers

Particulates will be measured at a frequency of every 15 minutes for areas occupied by workers. When an ambient dust concentration of 0.2 mg/m^3 is detected in the work area, readings will be monitored for a 5-minute period to determine if the measurement above the action level is sustained.

Miniram-dust-monitor action-levels in areas of the Site occupied by workers will be verified by periodic personal air sampling results. In scheduling personal monitoring, consideration will be given to collecting samples at times of maximum potential exposure. Samples will be collected in the staff members' breathing zone (9-inch radius hemisphere centered at the nose and forward of the shoulders). Personal sampling will be conducted periodically for at least the initial two weeks of excavation activities at the Site, but may be curtailed thereafter once representative results have been evaluated and found to have good correlation with MiniRam-dust-monitor results.

Each personal sample will be collected using a calibrated personal air-sampling pump (e.g., Gilian GilAir Sampling Pump or equivalent) equipped with clean tubing, a filter holder, and a laboratory-provided clean filter with a 0.8 micron cellulose ester membrane. The personal air-sampling pump shall be calibrated per analytical method guidance. Documentation certifying the pump calibration must be obtained and maintained as part of the project file. The sampling pump shall be clipped to the person being monitored and the filter holder shall remain in the breathing zone of the person during the 8-hour work day. The pump shall remain in the above-noted position, operating during the 8-hour sampling period. The pump shall not be turned off or the filter moved during break periods or other non-work activities. The filter will be removed, labeled, placed in a sealed plastic bag, and transported under chain-of-custody to an AIHA-accredited industrial hygiene laboratory for 24-hour turn around time for total particulates, lead, arsenic, total chrome, and Cr^{+6} analysis. The results of the initial exposure assessment will be compared to the Action Levels in Table 1. These results will also be compared to measured

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fugitive dust concentrations to further evaluate the protectiveness of the specific worker action level derived for fugitive dust.

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Volatile COC concentrations, except benzene, will be monitored in the work area continuously with the PID. Benzene concentrations will be monitored every 15 minutes during the subject work activities with the Draeger CMS Analyzer.

4.4 Mitigation Measures

If Site action levels are reached, the mitigation measures described below will be implemented.

Site Perimeter

If the difference in the TWA₁₅ total dust readings between the upwind and downwind fence line locations is greater than the action level, excavation activities will be stopped and dust suppression activities will be conducted until the fugitive dust readings are less than the action level.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds the action level, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background of the 15-minute average. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown until the source of the vapors is mitigated.

If the ambient air concentration of benzene at the downwind perimeter of the work area or exclusion zone exceeds the action level, work activities must be temporarily halted and the source of the vapors mitigated. Work may resume when benzene concentrations sustained over 15 minutes are below the action level.

Areas Occupied by Workers

If action levels applicable to Site workers are exceeded, then work activities must be halted and measures taken to mitigate the sources of the exposures. If mitigation measures do not successfully reduce COC concentrations in the work area to less than the worker action levels, the excavation activities will be stopped and workers will leave the work area (exclusion zone defined by the HASP). Alternatively, if COC concentrations are less than 50 times the applicable action levels, workers may resume work if they don full-face air-purifying respirators supplied with combination HEPA / VOC cartridges until COC concentrations are reduced to below applicable action levels.

4.5 Recordkeeping

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The instruments will be calibrated at the beginning of each workday and the time and name of field personnel will be recorded. In addition, weather conditions at the Site will be recorded each day. Measurements will be documented for each reading at each designated monitoring location.

The following information will be recorded for each instrument reading:

- Date and time of reading
- Reading location (e.g., upwind, downwind)
- Reading zone (e.g., upwind, downwind)
- Concentration reading

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Table 1. Calculated Dust Equivalent Permissible Exposure Limits for Non-Volatile Constituents of Concern

Constituent of Concern	Reference Exposure Limit (mg/m3)	Highest Soil Concentration	
		(mg/m3)	Dust Equivalent PEL (mg/m3)
Zinc	2	101,000	19.80
Copper	1	46,700	21.41
Antimony	0.5	487	1026.69
Nickel	0.1	30,700	3.26
Lead	0.03	10,600	2.83
Arsenic	0.005	310	16.13
Hexavalent Chromium (Cr ⁺⁶)	0.0025	12,200	0.20
PAHs (as benzo(a)pyrene)	0.2	180	1111.11

NOTES:

1. The Dust Equivalent PEL is calculated as (Ref. Exposure Limit / Highest Soil Concentration) * Conversion Factor of 1,000,000 mg/kg
2. The reference exposure limit is the lower of either the ACGIH Threshold Limit Value (TLV), or the OSHA Permissible Exposure Limit (PEL) or Action Level (if established).

Table 2. Permissible Exposure Limits for Volatile Constituents of Concern

Constituent of Concern	Reference Exposure Limit (ppm)	
	8-hr Time Weighted Average	15-min Short-Term Exposure Limit
Benzene	0.5	2.5
Trichloroethylene	10	25
1,4-Dichlorobenzene	10	na
Chlorobenzene	10	na
1,2-Dichlorobenzene	25	50
Methylene chloride	12.5	125
Ethylbenzene	100	125
Xylene	100	150

NOTES:

1. The reference exposure limit is the lower of either the ACGIH Threshold Limit Value (TLV), or the OSHA Permissible Exposure Limit (PEL) or Action Level (if established).

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APPENDIX E

Draft Deed Notice

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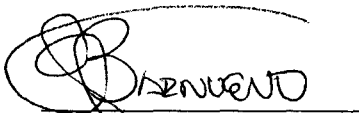
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Former Delphi Interior and Lighting Systems Division
1445 Parkway Avenue, Ewing Township, Mercer County, New Jersey 08628
ISRA Case #E97070

After review the existing data set and the Remedial Action Workplan and subsequent revisions, General Motors Corporation (General Motors) intends to use a deed notice as part of the remedial action for the above referenced site. As owner of record for the subject site, General Motors's hereby provides consent to record a deed notice as part of the December 2008 Revised Remedial Action Workplan pursuant to N.J.A.C. 7:26E-8.2(b).

GENERAL MOTORS CORPORATION
WORLDWIDE FACILITIES GROUP

Geraldine Barnuevo
Remediation Project Manager
Worldwide Facilities Group


[Signature]

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Prepared by: _____
[Signature] Jun 17, 2009 14:13

[Print name below signature]

Recorded by:

[Signature, Officer of County Recording Office]

[Print name below signature]

DEED NOTICE

This Deed Notice is made as of the _____ day of _____, by General Motors Corporation, Worldwide Real Estate, Attn: Director of Real Estate, 200 Renaissance Center, 38th Floor, M/C 482-B38-C96 , Detroit, MI 48265, (together with his/her/its/their successors and assigns, collectively "Owner").

1. THE PROPERTY. General Motors Corporation, Worldwide Real Estate, Attn: Director of Real Estate, 200 Renaissance Center, 38th Floor, M/C 482-B38-C96 , Detroit, MI 48265 is the owner in fee simple of certain real property designated as Block 343 Lot 1.01, on the tax map of the Township of Ewing, Mercer County; the New Jersey Department of Environmental Protection Program Interest Number (Preferred ID) for the contaminated site which includes this property is 011336; and the property is more particularly described in Exhibit A, which is attached hereto and made a part hereof (the "Property").

2. DEPARTMENT'S ASSIGNED BUREAU. The Bureau of Industrial Site Remediation was the New Jersey Department of Environmental Protection program that was responsible for the oversight of the remediation of the Property. The matter was Case No. E97070.

3. SOIL CONTAMINATION. General Motors Corporation, Worldwide Facilities Group has remediated contaminated soil at the Property, and the New Jersey Department of Environmental Protection approved a remedial action on [Insert date of Department's approval], such that soil contamination remains in certain areas of the Property which contains contaminants in concentrations that do not allow for the unrestricted use of the Property; this soil contamination is described, including the type, concentration and specific location of such contaminants, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Deed Notice and engineering controls in accordance with N.J.S.A. 58:10B-13.

4. CONSIDERATION. In accordance with the New Jersey Department of Environmental Protection's approval of the remedial action work plan for the remediation of the site which included the Property, and in consideration of the terms and conditions of that approval, and other good and valuable consideration, Owner has agreed to subject the Property to certain statutory and regulatory requirements which impose restrictions upon the use of the Property, to restrict certain uses of the Property, and to provide notice to subsequent owners, lessees and

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operators of the restrictions and the monitoring, maintenance, and biennial certification requirements outlined in this Deed Notice and required by law, as set forth herein.

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5A. RESTRICTED AREAS. Due to the presence of these contaminants, the Owner has agreed, as part of the remedial action for the Property, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions on site for inspection by governmental enforcement officials.

5B. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Purchaser of the property as a condition of the Contract of Sale will be required to agree, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C. Requirements for operations and maintenance of engineering controls will also be conveyed to the Purchaser.

6A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. Except as provided in Paragraph 6B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first obtaining the express written consent of the Department of Environmental Protection. Nothing herein shall constitute a waiver of the obligation of any person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health Administration. To request the consent of the Department of Environmental Protection, contact:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413

ii. Notwithstanding subparagraph 6A.i., above, the Department of Environmental Protection's express written consent is not required for any alteration, improvement, or disturbance provided that the owner, lessee or operator:

(A) Notifies the Department of Environmental Protection of the activity by calling the DEP Hotline, at 1-877-WARN-DEP or 1-877-927-6337, within twenty-four (24) hours after the beginning of each alteration, improvement, or disturbance;

(B) Restores any disturbance of an engineering control to pre-disturbance conditions within sixty (60) calendar days after the initiation of the alteration, improvement or disturbance;

(C) Ensures that all applicable worker health and safety laws and regulations are followed during the alteration, improvement, or disturbance, and during the restoration;

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(D) Ensures that exposure to contamination in excess of the applicable remediation standards does not occur;

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(E) Submits a written report, describing the alteration, improvement, or disturbance, to the Department of Environmental Protection within sixty (60) calendar days after the end of each alteration, improvement, or disturbance. The owner, lessee or operator shall include in the report the nature of the alteration, improvement, or disturbance, the dates and duration of the alteration, improvement, or disturbance, the name of key individuals and their affiliations conducting the alteration, improvement, or disturbance, a description of the notice the Owner gave to those persons prior to the disturbance, the amounts of soil generated for disposal, if any, the final disposition and any precautions taken to prevent exposure. The owner, lessee, or operator shall submit the report to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413

6B. EMERGENCIES. In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, any person may temporarily breach any engineering control provided that that person complies with each of the following:

i. Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

ii. Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

iii. Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;

iv. Notifies the Department of Environmental Protection when the emergency has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

v. Restores the engineering control to the pre-emergency conditions as soon as possible, and provides a written report to the Department of Environmental Protection of such emergency and restoration efforts within sixty (60) calendar days after completion of the restoration of the engineering control. The report must include all information pertinent to the emergency, potential discharges of contaminants, and restoration measures that were implemented, which, at a minimum, should specify: (a) the nature and likely cause of the emergency, (b) the potential discharges of or exposures to contaminants, if any, that may have occurred, (c) the measures that have been taken to mitigate the effects of the emergency on human health and the environment, (d) the measures completed or implemented to restore the engineering control, and (e) the changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future. The owner, lessee, or operator shall submit the report to:

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Department of Environmental Protection
Division of Remediation Management and Response

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Bureau of Operation, Maintenance, and Monitoring
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7A. MONITORING AND MAINTENANCE OF DEED NOTICE, AND PROTECTIVENESS CERTIFICATION. The persons in any way responsible, pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11a et seq., for the hazardous substances that remain at the Property, the persons responsible for conducting the remediation, the Owner, and the subsequent owners, lessees, and operators, shall monitor and maintain this Deed Notice, and certify to the Department on a biennial basis that the remedial action that includes this Deed Notice remains protective of the public health and safety and of the environment. The subsequent owners, lessees and operators have this obligation only during their ownership, tenancy, or operation. The specific obligations to monitor and maintain the deed notice shall include all of the following:

- i. Monitoring and maintaining this Deed Notice according to the requirements in Exhibit C, to ensure that the remedial action that includes the Deed Notice continues to be protective of the public health and safety and of the environment;
- ii. Conducting any additional remedial investigations and implement any additional remedial actions, that are necessary to correct, mitigate, or abate each problem related to the protectiveness of the remedial action for the site prior to the date that the certification is due to the Department pursuant to iii. below, in order to ensure that the remedial action that includes this Deed Notice remains protective of the public health and safety and of the environment.
- iii. Certify to the Department of Environmental Protection as to the continued protectiveness of the remedial action that includes this Deed Notice, on a form provided by the Department and consistent with N.J.A.C. 7:26C-1.2 (a)1, every two years on the anniversary of the date stamped on the deed notice that indicates when the deed notice was recorded;

7B. MONITORING AND MAINTENANCE OF ENGINEERING CONTROLS, AND PROTECTIVENESS CERTIFICATION. The persons in any way responsible, pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11a et seq., for the hazardous substances that remain at the Property, the person responsible for conducting the remediation, and, the Owner, and the subsequent owners, lessees, and operators, shall maintain all engineering controls at the Property and certify to the Department on a biennial basis that the remedial action of which each engineering control is a part remains protective of the public health and safety and of the environment. The subsequent owners, lessees and operators have this obligation only during their ownership, tenancy, or operation. The specific obligations to monitor and maintain the engineering controls shall include the following:

- i. Monitoring and maintaining each engineering control according to the requirements in Exhibit C, to ensure that the remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment;
- ii. Conducting any additional remedial investigations and implement any additional remedial actions, that are necessary to correct, mitigate, or abate each problem related to the protectiveness of the remedial action for the Property prior to the date that the certification is due to the Department pursuant to iii. below, in order to ensure that the remedial action

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that includes the engineering control remains protective of the public health and safety and of the environment.

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iii. Certify to the Department of Environmental Protection as to the continued protectiveness of the remedial action that includes the engineering control, on a form provided by the Department and consistent with N.J.A.C. 7:26C-1.2 (a)1, every two years on the anniversary of the date stamped on the deed notice that indicates when the deed notice was recorded.

8. ACCESS. The Owner and the subsequent owners, lessees and operators agree to allow the Department, its agents and representatives access to the Property to inspect and evaluate the continued protectiveness of the remedial action that includes this Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if persons responsible for monitoring the protectiveness of the remedial action, as described in Paragraph 7, above, fail to conduct such remediation pursuant to this Deed Notice as required by law. The Owner, and the subsequent owners and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

9. NOTICES.

i. The Owner and the subsequent owners and lessees, shall cause all leases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply with all, and not to violate any of the conditions of this Deed Notice. Nothing contained in this Paragraph shall be construed as limiting any obligation of any person to provide any notice required by any law, regulation, or order of any governmental authority.

ii. Owner and all subsequent owners and lessees shall notify any person intending to conduct invasive work or excavate within the Restricted Areas at the Property, including, without limitation, tenants, employees of tenants, and contractors of the nature and location of contamination in the Restricted Areas, and, of the precautions necessary to minimize potential human exposure to contaminants.

iii. The Owner and the subsequent owners shall provide written notice to the Department of Environmental Protection at least thirty (30) calendar days before the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the owner's interest in the Restricted Area.

iv. The Owner and the subsequent owners shall provide written notice to the Department within thirty (30) calendar days following the owner's petition for or filing of any document initiating a rezoning of the Property. The Owner and the subsequent owners shall submit the written notice to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413.

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10. ENFORCEMENT OF VIOLATIONS.

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i. This Deed Notice itself is not intended to create any interest in real estate in favor of the Department of Environmental Protection, nor to create a lien against the Property, but merely is intended to provide notice of certain conditions and restrictions on the Property and to reflect the regulatory and statutory obligations imposed as a conditional remedial action for this site.

ii. The restrictions provided herein may be enforceable solely by the Department against any person who violates this Deed Notice. To enforce violations of this Deed Notice, the Department may initiate one or more enforcement actions pursuant to N.J.S.A. 58:10-23.11u and require additional remediation and assess damages pursuant to N.J.S.A. 58:10-23.11g.

11. SEVERABILITY. If any court of competent jurisdiction determines that any provision of this Deed Notice requires modification, such provision shall be deemed to have been modified automatically to conform to such requirements. If a court of competent jurisdiction determines that any provision of this Deed Notice is invalid or unenforceable and the provision is of such a nature that it cannot be modified, the provision shall be deemed deleted from this instrument as though the provision had never been included herein. In either case, the remaining provisions of this Deed Notice shall remain in full force and effect.

12. SUCCESSORS AND ASSIGNS. This Deed Notice shall be binding upon Owner and upon Owner's successors and assigns, and subsequent owners, lessees and operators while each is an owner, lessee, or operator of the Property.

13. MODIFICATION AND TERMINATION.

i. Any person may request in writing, at any time, that the Department modify this Deed Notice where performance of subsequent remedial actions, a change of conditions at the Property, or the adoption of revised remediation standards suggest that modification of the Deed Notice would be appropriate.

ii. Any person may request in writing, at any time, that the Department terminate this Deed Notice because the conditions which triggered the need for this Deed Notice are no longer applicable.

iii. This Deed Notice may be revised or terminated only upon filing of an instrument, executed by the Department, in the office of the County Clerk of Mercer County, New Jersey, expressly modifying or terminating this Deed Notice.

14A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Vicinity Map - A map that identifies by name the roads, and other important geographical features in the vicinity of the Property (for example, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A metes and bounds description of the Property, including reference to tax lot and block numbers for the Property;

iii. Exhibit A-3: Property Map - A scaled map of the Property, scaled at one inch to 200 feet or less, and if more than one map is submitted, the maps shall be presented as overlays,

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keyed to a base map; and the Property Map shall include diagrams of major surface topographical features such as buildings, roads, and parking lots.

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14B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

i. Exhibit B-1: Restricted Area Map - A separate map for each restricted area that includes: **(Note: this exhibit cannot be prepared until following the remediation and collection of post-excavation samples so the areas that have soil exceedances in it are finalized)**

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, ground water monitoring wells, and ground water pumping system;

(B) As-built diagrams of any buildings, roads, parking lots and other structures that function as engineering controls; and

(C) Designation of all soil and sediment sample locations within the restricted areas that exceed any soil or sediment standard that are keyed into one of the tables described in the following paragraph.

ii. Exhibit B-2: Restricted Area Data Table - A separate table for each restricted area that includes: **(Note: this exhibit cannot be prepared until following the remediation and collection of post-excavation samples so the areas that have soil exceedances in it are finalized)**

(A) Sample location designation from Restricted Area map (Exhibit B-1);

(B) Sample elevation based upon mean sea level;

(C) Name and chemical abstract service registry number of each contaminant with a concentration that exceeds the unrestricted use standard;

(D) The restricted and unrestricted use standards for each contaminant in the table; and

(E) The remaining concentration of each contaminant at each sample location at each elevation (or if historic fill, include data from the Department's default concentrations at N.J.A.C. 7:26E-4.6, Table 4-2).

14C. EXHIBIT C. Exhibit C includes narrative descriptions of the institutional controls and engineering controls as follows:

i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice that are in addition to those describe above, as follows: **(Note: this exhibit cannot be prepared until following the remediation and collection of post-excavation samples so the areas that have soil exceedances in it are finalized)**

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(A) General Description of this Deed Notice:

(1) Description and estimated size of the Restricted Areas as described above;

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(2) Description of the restrictions on the Property by operation of this Deed Notice; and

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(3) The objective of the restrictions.

(B) Description of the monitoring necessary to determine whether:

(1) Any disturbances of the soil in the Restricted Areas did not result in the unacceptable exposure to the soil contamination;

(2) There have been any land use changes subsequent to the filing of this Deed Notice or the most recent biennial certification, whichever is more recent;

(3) The current land use on the Property is consistent with the restrictions in this Deed Notice;

(4) Any newly promulgated or modified requirements of applicable regulations or laws apply to the site; and

(5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) Land use at the Property is consistent with the restrictions in this Deed Notice; and

(3) The remedial action that includes this Deed Notice continues to be protective of the public health and safety and of the environment.

ii. Exhibit C-2: *[Insert the name of the first engineering control]*: Exhibit C-2 includes a narrative description of *[Insert the name of the first engineering control]* as follows:

(Note: this exhibit cannot be prepared until following the remediation and collection of post-excavation samples so the areas that have soil exceedances in it are finalized)

(A) General Description of the engineering control:

(1) Description of the engineering control;

(2) The objective of the engineering control; and

(3) How the engineering control is intended to function.

(B) Description of the operation and maintenance necessary to ensure that:

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(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness;

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment;

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment;

(5) A record of the self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control. Sampling, for example, may be necessary if it is not possible to visually evaluate the integrity/ performance of this engineering control; and

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) The engineering controls continue to operate as designed; and

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment.

15. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

ATTEST:

General Motors Corporation

By _____

[Print name and title]

[Signature]

STATE OF MICHIGAN
COUNTY OF WAYNE

SS.: Richard Kowalski
LFR

Jun 17, 2009 14:13

I certify that on _____, 20__, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the Director of Real Estate of General Motors Corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [president/vice president] of General Motors Corporation;

(c) this document was signed and delivered by General Motors Corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of General Motors Corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

[Signature]

[Print name and title of attesting witness]

Signed and sworn before me on _____, 20__

_____, Notary Public

[Print name and title]

Richard Kowalski

EXHIBIT A. MAPS OF THE PROPERTY AND THE VICINITY:

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Exhibit A-1: Vicinity Map - map that identifies the name, the roads and other important geographical features in the vicinity of the property: (USGS topographic map);

Exhibit A-2: Metes and Bounds Description - metes and bounds description of the property, including reference to tax lot and block numbers for the property; and

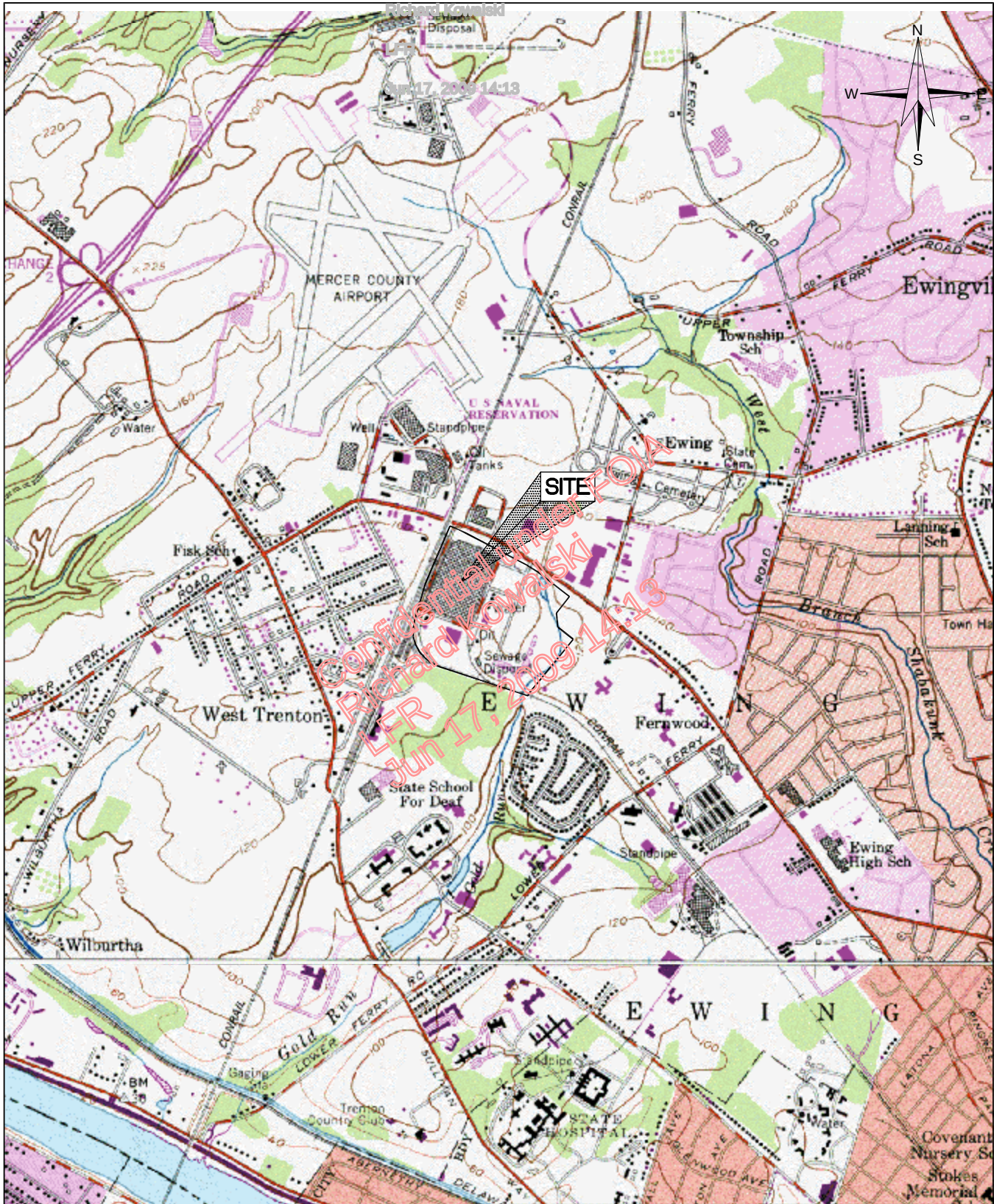
Exhibit A-3: Property Map - a scaled map of the property, scaled at one inch to 150 feet, the property map includes diagrams of former major site features.

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SOURCE:
PENNINGTON QUADRANGLE, NEW JERSEY - PENNSYLVANIA,
USGS 7.5 MINUTE SERIES (TOPOGRAPHIC), DATED 1954,
PHOTOREVISED 1981 AND TRENTON WEST QUADRANGLE,
NEW JERSEY - PENNSYLVANIA, USGS 7.5 MINUTE SERIES
(TOPOGRAPHIC), DATED 1955, PHOTOREVISED 1981.

**HALEY &
ALDRICH**

DRAFT DEED NOTICE
GENERAL MOTORS CORPORATION
TRENTON, NEW JERSEY
ISRA CASE NO. E97070

VICINITY MAP

0 1000 2000
APPROXIMATE SCALE IN FEET

SCALE: AS SHOWN
DECEMBER 2008

EXHIBIT A, MAP A-1

U:\LAND PROJECTS\70170613-125-2008_RAW\70613-125-0A11-LOCUS-DEC08.DWG

EXHIBIT A-2: METES AND BOUNDS DESCRIPTION

Exhibit A-2, Legal Description, indicates the metes and bounds for Tax Lot 1.01 - Lot 343 in the Township of Ewing, County of Mercer, State of New Jersey. The former Delphi Interior & Lighting Systems Division comprised the referenced lot as described in Exhibit A, Map A-2, Metes and Bounds Map.

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U:\LAND PROJECTS\7070613-125-2008_RAW\70613-125-0028-DEED NOTICE M&B.DWG

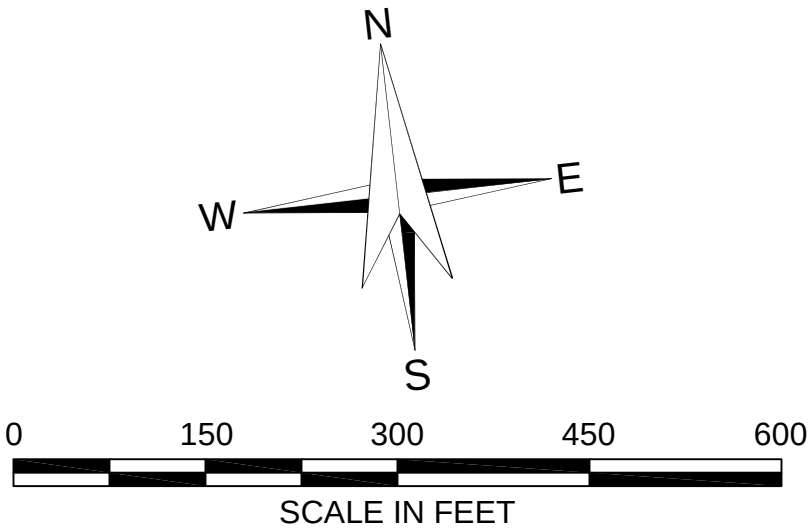


LEGEND:

--- SITE BOUNDARY

NOTES:

1. BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC. DEED REFERENCE : DEED BOOK 4512, PAGE 252 & c.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.. HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED. MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870 N.J. LAND SURVEYOR LIC. NO. 26791 NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"
- LAST REVISED OCTOBER 21, 2008
BENCH MARK - N.J.G.S. MON. 11 B 1
ELEVATION 131.49' (NAVD 1988)
HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)



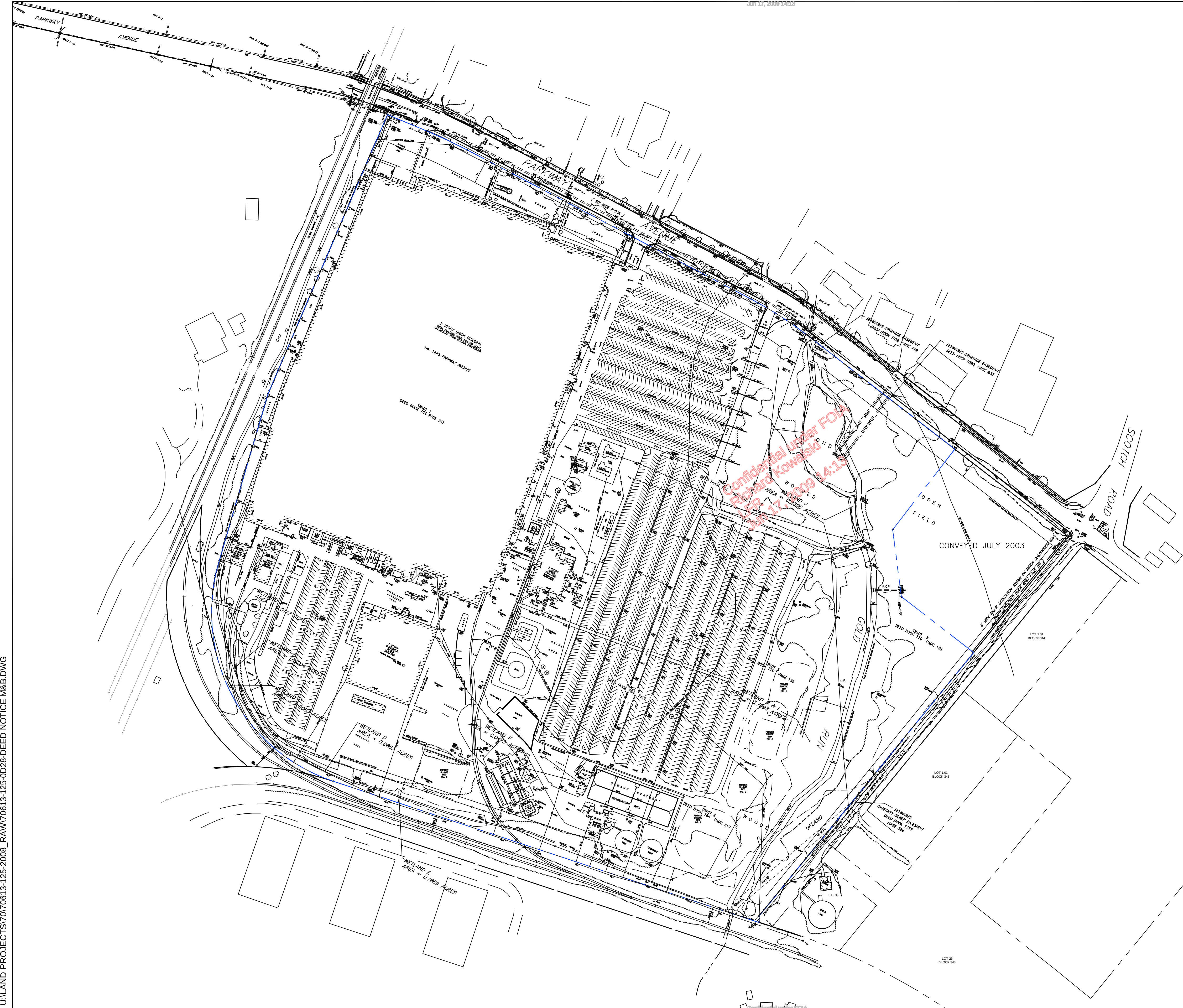
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TRENTON, NEW JERSEY
ISRA CASE NO. E97070

METES & BOUNDS MAP

SCALE: AS SHOWN
DECEMBER 2008

EXHIBIT A, MAP A-2



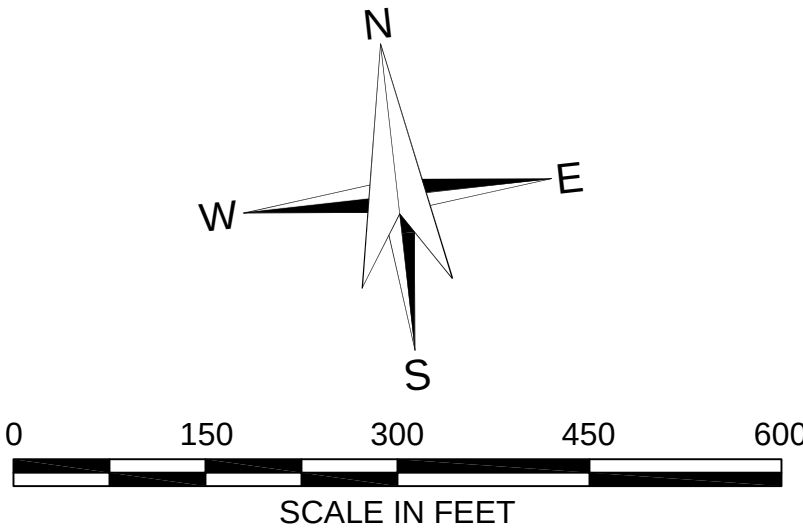
LEGEND:

- SITE BOUNDARY
- RAILROADS

NOTES:

- BASE MAP IS FROM A MAP ENTITLED "ALTA/ACSM LAND TITLE SURVEY FOR GENERAL MOTORS CORPORATION, 1445 PARKWAY AVENUE, TRENTON, N.J." DATED 8/02/93, LAST REVISED 10/19/93, PREPARED BY ROBERT W. ENT, INC. DEED REFERENCE : DEED BOOK 4512, PAGE 252 & c.. MAP REFERENCE : "PLAN OF SURVEY AND MINOR SUBDIVISION OF LOT 1, BLOCK 343, GM CORPORATION SITE SITUATE IN EWING TOWNSHIP, MERCER COUNTY, NEW JERSEY", DATED 12/18/01, REVISED TO 3/27/02, PREPARED BY MASER CONSULTING, P.A.. HORIZONTAL DATUM IS BASED ON THE ABOVE REFERENCED DEED. MONITOR WELL LOCATIONS PREPARED BY GERALD G. DEGROAT L.S. SCHOOLEY'S MOUNTAIN, NEW JERSEY 07870 N.J. LAND SURVEYOR LIC. NO. 26791 NAMED "MONITOR WELL LOCATIONS, TOWNSHIP OF EWING, MERCER COUNTY, NEW JERSEY"

LAST REVISED OCTOBER 21, 2008
BENCH MARK - N.J.G.S. MON. 11 B 1
ELEVATION 131.49' (NAVD 1988)
HORIZONTAL DATUM - N.J. STATE PLANE COORDINATE SYSTEM (NAD 1983)



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TRENTON, NEW JERSEY
ISRA CASE NO. E97070

PROPERTY MAP

SCALE: AS SHOWN
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EXHIBIT A, MAP A-3

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APPENDIX

Health and Safety Plan, Revised

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HALEY & ALDRICH, INC.
SITE-SPECIFIC HEALTH & SAFETY PLAN

for

SOIL REVISED REMEDIAL ACTION WORKPLAN

General Motors Corporation
Former Delphi Interior & Lighting Systems Facility
Trenton, New Jersey

Project/File No. 70613

Prepared by: Amy K. Murphy

Date: November 2008

APPROVALS: The following signatures constitute approval of this Health & Safety Plan

A handwritten signature in cursive script, appearing to read "Amy K. Murphy".

Amy K. Murphy – Regional H&S Coordinator

2 December 2008

Date

A handwritten signature in cursive script, appearing to read "Jeffrey L. Duncan".

Jeffrey L. Duncan – Site/Project Manager

2 December 2008

Date

**Soil Revised Remedial Action Workplan
Site Specific Health & Safety Plan
General Motors Corporation
Former Delphi Interior & Lighting System Facility
December 2008**

PRE-JOB SAFETY CHECKLIST

The following is a checklist that is designed to help Project Managers prepare for the H&S requirements needed for their projects.

The use of this form should be used during the planning stage of the project and not intended to be used the day before the project. This form is to be attached to the front of all HASPs before it goes to the field.

Please initial in each appropriate box and sign on the bottom of the appropriate box that the required materials, equipment, training, etc., has been procured before commencement of work on a site.

#	Project H&S Requirements	Approval by PM or LFR (initial each box or place NA)	Date Approved
1.0	HASP and supporting documentation is complete and signed by all members	AKM	12/2/08
2.0	Task Safety Analysis performed and attached to the HASP	NA	
3.0	All staff scheduled for project current with 40 hour or 8 hour refresher training.	AKM	12/2/08
4.0	Is a Hazwoper site supervisor needed, if so, are they trained?	AKM	12/2/08
5.0	Additional Training Requirements met. e.g.- nuclear density gauge, DOT, CSE, Competent Person Training for Excavation , etc	AKM	12/2/08
6.0	We have met the client's additional H&S requirements above and beyond H&A's requirements. Example: facility safety orientations, safety documentation, meetings, PPE requirements	AKM	12/2/08
7.0	H&A subcontractors have met H&A's minimum requirements, including- - Training - Medical surveillance - Written HASP - Insurance - MSDSs	TBD	
8.0	All H&A staff involved in project have met their Medical Surveillance examination requirements	AKM	12/2/08
9.0	Staff that may be required to wear a respirator medically qualified and fit test card available.	AKM	12/2/08
10.0	MSDSs on site and available for chemicals on site.	AKM	12/2/08
11.0	<u>Safety equipment available, such as:</u> Flashlights, Telephone for communications, Ladders, Cones, Barricade tape, Fire extinguisher, First Aid Kit, PPE, Respiratory Protection, Air Instrumentation and Calibrated, Personal Flotation Device (PFD), 90' life line with ring, Decontamination equipment	AKM	12/2/08

**Soil Revised Remedial Action Workplan
Site Specific Health & Safety Plan
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Former Delphi Interior & Lighting System Facility
December 2008**

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Appendix A – HASP Amendment Form

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ISSUANCE AND COMPLIANCE

- This HASP must be signed by all Haley & Aldrich (H&A) staff members who will work on the project, including H&A visitors.
- This HASP or a current signed copy must be retained at the site at all times when H&A staff are present. Senior management does recognize that it is difficult to utilize one HASP when many staff members are involved and there is no stationary location to maintain the HASP.
- Deviations from this HASP are not permitted without prior approval from the above signed. Unauthorized deviations may constitute a violation of H&A company procedures/policies and may result in disciplinary action.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the LHSC and H&A Project Manager may use Appendix A (HASP Amendment Form) located in the back of this HASP. Any revision to the HASP requires employees to be informed of the changes and they understand the requirements of the change.
- This HASP is not for H&A Subcontractor use. Subcontractors must have their own HASP. This HASP will be made available for review by "reference only" to ensure that H&A has properly informed our subcontractors of the hazards associated with the site to the extent we are aware.

This Site Specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment (PPE) selection, etc. are described in detail in the H&A Corporate Health and Safety Program Manual and within Standard Operating Procedures (SOPs). Both the manual and SOPs can be located on the Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and SOPs are available to clients and regulators per request.

SITE SAFETY OFFICER

This project has identified the following person as the site safety officer (SSO). **The highest ranking person on site on this list will be the designated site safety officer.** The H&A Project Manager may designate any person as the primary. (PMs determine who will be on site and in order of highest level of authority when on site.) **A site safety officer must be on-site at all times.** When none of the following are present on-site, the senior person for H&A on-site will default to the SSO.

1. Amy K. Murphy
2. Aaron Farrell

**Soil Revised Remedial Action Workplan
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Roles and Responsibilities

The SSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SSO functions include:

- Act as H&A's liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by H&A subcontractors.
- Oversee day-to-day implementation of the HASP by H&A employees on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the HASP.
- Inspect and maintain H&A safety equipment, including calibration of air monitoring instrumentation used by H&A.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving H&A and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the H&A PM and Local Health and Safety Coordinator (LHSC) as needed.

The SSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with H&A employees and H&A subcontractors at regular intervals and in accordance with H&A policy and contractual obligations. The SSO will track the attendance of site personnel at H&A orientations, toolbox talks, and safety meetings. Subcontractors will document training and provide training rosters to the H&A SSO.

The SSO will report accidents such as injury, overexposure, or property damage to the Local Health and Safety Coordinator, to the Project Manager, and to the safety managers of other on-site consultants and contractors. The SSO will consult with the safety managers of other on-site consultants and subcontractors on specific health and safety issues arising over the course of the project, as needed.

PRE-WORK HEALTH & SAFETY BRIEFING

Note: Only H&A employees sign this page.

I have attended a briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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**Soil Revised Remedial Action Workplan
Site Specific Health & Safety Plan
General Motors Corporation
Former Delphi Interior & Lighting System Facility
December 2008****1. PROJECT INFORMATION**

Name of Project: GM Trenton	H&A File No.: 70613
Location: 1445 Parkway Avenue, Trenton, New Jersey	
Client/Site Contact: Geraldine Barnuevo	Contact Phone No.: 248.255.2790 (cell)
H&A Project Manager: Jeffrey Duncan	PM Phone No.: 603.391.3312 Cell: 201.317.5531

1.1 Scope of Work

General Motors will excavate contaminated soil as described in the June 2006 Remedial Action Workplan, the November 2007 Remedial Action Workplan Addendum, and the December 2008 Revised Remedial Action Workplan (RRAW). Excavated soil will be transported off-site and recycled at a licensed Class B recycle facility, or disposed of at a landfill or hazardous waste facility depending on the quality of the soil.

The Revised Remedial Action Workplan (RRAW) includes a proposal for post-remediation sampling to: accomplish any outstanding delineation requirements, demonstrate completion of the remediation, and show that the proposed remedy is protective of human health and the environment. Between using field screening (PID and XRF) and laboratory analysis, General Motors will determine if the Remediation Goals for the Site are met. If receipt of the data from the sampling described in the RRAW shows the Remediation Goals were not met, one or more additional iterations of excavation and post-excavation sampling will be performed, if necessary. Soil that contains one or more regulated substance above its respective Remediation Goal following the last excavation will be delineated and included in a Deed Restriction.

An Excavation Competent Person shall be onsite who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to H&A and subcontractor employees, and who has authorization to take prompt corrective measures to eliminate them.

Subcontractor(s) to be involved in on-site activities:

Subcontractor Firm Name	Work Activity
TBD	Soil excavation, concrete removal, backfilling, compaction, restoration

Project Start Date: TBD

Projected Completion Date: TBD

Estimated Number of Days to Complete Field Work: 6 months

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by subcontractors. Subcontractors may use this HASP as reference only.

**Soil Revised Remedial Action Workplan
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General Motors Corporation
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2. SITE DESCRIPTION

Check one of the following:

Site classification:	☒ Industrial	☐ Commercial	☐ Other
-----------------------------	--	-------------------------------------	--------------------------------

2.1 General Description

The General Motors Trenton facility was a vehicle parts assembly operation that had operated at the subject location for 60 years, from 1938 to 1998. These operations included production of steam for its facility, plating, assembly and wastewater treatment. Ancillary activities included dispensing fuel to site vehicles, hazardous substance storage, and waste management. Demolition of the site structures occurred between the fall 2000 and the spring 2002.

The contamination identified at the GM facility includes: fuel-related organic compounds (e.g. benzene, toluene, xylenes), chlorinated volatile organic compounds, metals, polychlorinated biphenyls (PCBs), and petroleum. These substances may be from normal site operations, leaking above ground or underground storage tanks, leaking lines, or other site activities; and, possibly, from unknown, off-site sources.

Chlorinated compounds (e.g. trichloroethylene), Xylenes and Toluene have been detected in groundwater. Metals and PCBs contamination has been discovered in onsite surface and subsurface soils.

Site Status Note: Are there current operations at the site? (mark all that apply):

☐ Active	☒ Inactive
☐ Partially active	☐ Other

Is a **site plan** or sketch available? ☒ Y ☐ N If yes, attach a copy to this plan.

2.2 Work Areas

The majority of the site is relatively flat and open. Surface gradient varies along vegetated areas bordering the southern property boundary and adjacent to the east of the former eastern parking area. All buildings previously located on site have been razed. A small stream known as Gold Run transects the Site from the north to the south along the eastern area of the Site. Large industrial pits and sumps are located on the foundation (pad) of the former manufacturing building, identified as Area 1.

Areas of proposed excavation are shown on RRAW Figure 8.

3. PROJECT TASK BREAKDOWN

List and describe each distinct work task below:

Task No.	Detailed Task Description	Employee(s)	Work Date(s) or Duration
1	Oversight of excavations and management of excavated materials	Various H&A staff	On-going
2	Field screening of excavations and excavated material	Various H&A staff	On-going
3	Post-excavation and waste classification sample collection	Various H&A staff	On-going
4			

4. HAZARD ASSESSMENT

4.1 Chemical Hazards

Material Safety Data Sheets (MSDS) of hazardous materials used during the execution of work shall be available on site. MSDSs are required for chemicals used to prepare samples, calibration gases, etc.

Note: MSDSs are not required for waste materials.

Does chemical analysis data indicate that the site is contaminated? ☒ Y ☐ N

Potential **physical state** of the hazardous materials at the site (mark all that apply):

- | | |
|--|---|
| ☐ Gas/Vapor | ☐ Sludge |
| ☒ Liquid | ☒ Solid/Particulate |

Anticipated/actual **class of compounds** (mark all that apply).

- | | |
|--|--|
| ☐ Asbestos | ☒ Inorganics |
| ☒ BTEX | ☐ Pesticides |
| ☒ Chlorinated Solvents | ☒ Petroleum products |
| ☒ Heavy Metals | ☐ Other |

**Soil Revised Remedial Action Workplan
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Impacted environments (indicate the primary media(s) in which contamination is expected):

- ☐ Air ☒ Groundwater
☒ Soil ☒ Sediment
☒ Surface Water ☐ Other

Estimated concentrations/medium of major chemicals expected to be encountered by onsite personnel:

Work Activity	Media	Chemical	Anticipated Concentration
Excavation oversight and soil sample collection	SO	Volatile organic compounds (TCE, toluene, xylene), metals (hexavalent chromium, zinc, nickel, copper), PCBs, and base neutral compounds.	Varies from one to thousands of mg/Kg or parts per million (ppm)

(Media key: A = Air; GW = Groundwater; SW = Surface Water; SO = Soil; SE = Sediment)

Please indicate the major chemicals of concern and include a description of each.

Arsenic

The Occupational Safety and Health Administration has set limits of 10 microgram arsenic per cubic meter of workplace air (10 µg/m³) for 8 hour shifts and 40 hour work weeks. Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

**Soil Revised Remedial Action Workplan
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BTEX is the common abbreviation for benzene, toluene, ethyl benzene and xylene. OSHA has set permissible exposure limits for all of these contaminants that may be found at this worksite during your work activity. The levels that are set are based on an 8-hour time weighted average. Below are those values-

Benzene	1 ppm / 8 TWA
Toluene	200 ppm / 8 TWA
Ethyl Benzene	100 ppm / 8 TWA
Xylene	100 ppm / 8 TWA

Chromium (Soluble) is a bright, yellowish-red crystalline solid. It is used as an oxidizing agent, an analytical reagent, and in electroplating, explosives, dyeing, and printing.

For chromium (VI) (hexavalent chromium compounds), the action level is 2.5 ug/m³ and the permissible exposure limit (PEL) is 5.0 ug/m³ (both as 8-hour time weighted averages). The PEL for airborne exposures to chromium (III) and (III) compounds is 0.5mg/m³.

All forms of chromium can be toxic at high levels, but chromium(VI) is more toxic than others. Breathing **very high levels** of chromium(VI) in air can damage and irritate your nose, lungs, stomach, and intestines. People who are allergic to chromium may also have asthma attacks after breathing high levels of either chromium(VI) or (III). Long term exposures to **high or moderate levels** of chromium(VI) cause damage to the nose (bleeding, itching, sores) and lungs, and can increase your risk of non-cancer lung diseases. Ingesting very large amounts of chromium can cause stomach upsets and ulcers, convulsions, kidney and liver damage, and even death. It is not known whether chromium harms the fetus or our ability to reproduce. Skin contact with liquids or solids containing chromium(VI) may lead to skin ulcers. Some people have allergic reactions including severe redness and swelling.

Dust controls measures such as water sprays must be used, as necessary, to control dust emissions from the drilling operations at all times.

Cyanides

The Occupational Safety and Health Administration (OSHA) and (other recommendations) the American Conference of Governmental Industrial Hygienists (ACGIH) have set a permissible exposure limit of 5 milligrams of cyanide per cubic meter of air (5 mg/m³) in the workplace during an 8-hour workday, 40-hour work week.

In large amounts, cyanide is very harmful to people. Exposure to high levels of cyanide in the air for a short time harms the brain and heart, and may cause coma and death. Exposure to lower levels of cyanide for a long time may result in breathing difficulties, heart pains, vomiting, blood changes, headaches, and enlargement of the thyroid gland.

No personal protective equipment will be removed from the exclusion zone without proper decontamination or placement in a disposal receptacle.

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Lead

The Occupational Safety and Health Administration (OSHA) limits the concentration of lead in workroom air to 50 µg/cubic meter for an 8-hour workday. Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common after exposure to high levels of lead. In adults, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can cause abortion and damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

Mercury

Mercury vapor is highly toxic via this route. Causes severe respiratory tract damage. Symptoms include sore throat, coughing, pain, tightness in chest, breathing difficulties, shortness of breath, headache, muscle weakness, anorexia, gastrointestinal disturbance, ringing in the ear, liver changes, fever, bronchitis and pneumonia. Can be absorbed through inhalation with symptoms similar to ingestion. May cause burning of the mouth and pharynx, abdominal pain, vomiting, corrosive ulceration, bloody diarrhea. May be followed by a rapid and weak pulse, shallow breathing, paleness, exhaustion, tremors and collapse. Delayed death may occur from renal failure. Gastrointestinal uptake of mercury is less than 5% but its ability to penetrate tissues presents some hazard. Initial symptoms may be thirst, possible abdominal discomfort. Causes irritation and burns to skin. Symptoms include redness and pain. May cause skin allergy and sensitization. Can be absorbed through the skin with symptoms to parallel ingestion. Causes irritation and burns to eyes. Symptoms include redness, pain, and blurred vision; may cause serious and permanent eye damage. Chronic exposure through any route can produce central nervous system damage. May cause muscle tremors, personality and behavior changes, memory loss, metallic taste, loosening of the teeth, digestive disorders, skin rashes, brain damage and kidney damage. Can cause skin allergies and accumulate in the body. Repeated skin contact can cause the skin to turn gray in color. A suspected reproductive hazard; may damage the developing fetus and decrease fertility in males and females. Persons with nervous disorders, or impaired kidney or respiratory function, or a history of allergies or a known sensitization to mercury may be more susceptible to the effects of the substance.

The OSHA Acceptable Ceiling Concentration for mercury and mercury compounds: 0.1 mg/m³ (TWA), skin contact is a parameter in determining exposure for mercury.

Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. Large concentrations of PAHs exist as waste deposits throughout developed countries where MGPs produced gas for lighting and heating from coal and oil. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used to make dyes, plastics, and pesticides.

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The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens. Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people. Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short-and long-term exposure. But these effects have not been seen in people. Some people who have breathed or touched mixtures of PAHs for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Polychlorinated Biphenyl's (PCBs)

Polychlorinated biphenyl's (PCBs) are a group of manufactured organic chemicals that contain 209 individual chlorinated chemicals (known as congeners). PCBs are either oily liquids or solids and are colorless to light yellow in color. They have no known smell or taste. There are no known natural sources of PCBs. Some commercial PCB mixtures are known in the United States by their industrial trade name, Aroclor.

PCBs don't burn easily and are good insulating material. They have been used widely as coolants and lubricants in transformers, capacitors, and other electrical equipment. The manufacture of PCBs stopped in the United States in 1977 because of evidence that they build up in the environment and cause harmful effects. Products containing PCBs are old fluorescent lighting fixtures, electrical appliances containing PCB capacitors, old microscope oil, and hydraulic fluids.

Trichloroethylene (TCE)

Trichloroethylene (TCE) is a colorless, nonflammable, non-corrosive liquid has a "sweet" odor characteristic of some chlorinated hydrocarbons.

The compound is incompatible with strong caustics, it reacts with aluminum when acidic, and it is incompatible with active metals - barium, lithium, sodium, magnesium, and titanium. Decomposition of TCE, due to contact with hot metal or ultraviolet radiation, forms products including chlorine gas, hydrogen chloride, and phosgene. Dichloroacetylene may be formed from the reaction of alkali with TCE.

The OSHA PEL for TCE is 100 ppm as an 8-hour TWA; an acceptable ceiling concentration of 200 ppm; and an acceptable maximum peak ceiling of 300 ppm for no more than 5 minutes in

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any 2-hour period. The standard routes of entry in the body are through inhalation, percutaneous absorption, ingestion, skin and eye contact. The points of attack are the respiratory system, heart, liver, kidneys, central nervous system and skin.

Exposure to TCE vapor may cause irritation of the eyes, nose, and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged skin contact with the liquid may cause dermatitis. Acute exposure to TCE depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported. Alcohol may make the symptoms of TCE overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. TCE addiction and peripheral neuropathy have been reported.

4.2 Physical Hazards

Is any site work area(s) to be entered for this project considered a confined space? ☐ Y ☒ N

If yes, indicate which area(s) and why.

ALL CONFINED SPACE ENTRY PROJECTS REQUIRE SPECIAL PROCEDURES, PERMITS AND TRAINING AND MUST BE APPROVED BY THE CORPORATE HEALTH & SAFETY MANAGER.

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Physical Hazard Checklist

Indicate all hazards that may be present for each task. If any of these potential hazards are checked, it is the project manager's responsibility to determine how to eliminate/minimize the hazard to protect onsite personnel. Note: Task numbers refer to those identified in Section 3.

copy and paste a checkmark "✓" into appropriate boxes)

Potential Job Hazards	Task 1 (Excavation oversight)	Task 2 (Field screening)	Task 3 (Soil sample collection)	Task 4
Underground utilities	✓			
Overhead utilities	✓			
Excavations greater than 4' depth*	✓	✓	✓	
Open excavation fall hazards*	✓	✓	✓	
Heavy equipment		✓	✓	
Drilling hazards				
Noise (above 85 dBA)	✓	✓	✓	
Traffic concerns	✓	✓	✓	
Extreme weather conditions	✓	✓	✓	
Rough terrain for equipment	✓	✓	✓	
Buried drums				
Heavy lifting (more than 50 lbs)				
High risk fire hazard				
Poisonous insects or plants	✓	✓	✓	
Water hazards				
Use of a boat				
Lockout/Tagout requirements				
Other:				

Indicate any **unusual features** at the site (e.g., power lines at low heights, variable terrain, excessive insects, etc.) that are **unique to this project** and steps to be taken to minimize risk:

***Working on the former building slab:** piles of debris, exposed bolts, and open pits are located on the former building slab. Caution shall be taken when walking and driving across the slab.

Cold Stress

Persons working outdoors in low temperatures, especially at or below freezing are subject to cold stress. Exposure to extreme cold for a short time may cause severe injury to the surface of

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the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible.

Two factors influence the development of a cold injury: ambient temperature and the speed of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. In addition, water conducts heat 240 times faster than air. Thus when chemical-protective equipment is removed the body cools suddenly if the clothing underneath is perspiration soaked. Warm, dry clothing must be available and donned as soon as possible when these conditions are present.

Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

Frost nip or incipient frostbite: sudden blanching or whitening of the skin.

Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

To administer first aid for frostbite, bring the victim indoors and heat the areas quickly in water between 102 and 105 degree F. (39 and 41 degree C). Never place frostbitten tissue in hot water as the area will have a reduced heat awareness and such treatment could result in burns. Give a warm drink - not coffee, tea or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws. Then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

After thawing, the victim should try to move the injured areas slightly, but no more than can be done alone, without help.

Do not rub the frostbitten area, use ice, snow, gasoline or anything cold on frostbite, use heat lamps or hot water bottles to rewarm the frostbitten area, place the frostbitten area near a hot stove.

Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- shivering;
- apathy, listlessness, sleepiness, and sometimes rapid cooling of the body to less than 95°F.

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- unconsciousness, glassy stare, slow pulse, and slow respiratory rate;
- freezing of the extremities;
- death.

The ultimate responsibility for postponing or delaying work at a site due to inclement weather rests with the Project Manager.

Heat Stress

Heat stress on hazardous waste sites or construction sites usually is a result of protective clothing decreasing natural body ventilation, although it may occur at any time work is being performed at elevated ambient temperatures. Because heat stress is one of the most common and potentially serious illnesses associated with hazardous waste site work, regular monitoring and other preventative measures are vital.

Site workers must learn to recognize and treat the various forms of heat stress.

The best approach is preventative heat stress management. In general:

- Workers should drink 16 ounces of water before beginning work, such as in the morning or after lunch. The water should be maintained at 50 to 60°F. Workers should drink 1 to 2 4-ounce cups of water every 30-60 minutes. A cool area for rest breaks should be designated, preferably air-conditioned. The use of alcohol during non-working hours and the intake of caffeine during working hours can lead to an increase in susceptibility to heat stress. Monitor for signs of heat stress.
- Workers should acclimate to site work conditions by slowly increasing workloads, i.e., do not begin site work activities with extremely demanding activities. This acclimation process may require up to two weeks for completion.
- Cooling devices should be used to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to help absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- The on-site trailer is air conditioned and a potable water supply is located outside the trailer should be used to reduce body temperature and cool protective clothing in serious heat stress situations.
- In hot weather, field activities should be conducted in the early morning or evening.
- Adequate shelter should be available to protect personnel from heat, as well as cold, rain, snow, etc., which can decrease physical efficiency and increase the probability of both heat and cold stress. Set up a command post in the shade or erect temporary shade at the workstation if practical.
- In hot weather, rotate shifts of workers with potential heat stress exposure.

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- Good hygienic standards must be maintained by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who develop skin problems should immediately consult medical personnel.

Effects of Heat Stress

If the body's physiological process fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur ranging from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to fatal.

Heat-related problems are:

HEAT STROKE: An acute and dangerous reaction to heat exposure caused by failure of heat regulating mechanisms of the body; the individual's temperature control system that causes sweating stops working correctly. Body temperature rises so high that brain damage and death will result if the person is not cooled quickly.

Symptoms: Red, hot, dry skin, although person may have been sweating earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; unconsciousness or coma.

Treatment: Cool the victim quickly and obtain immediate medical assistance. If the body temperature is not brought down fast, permanent brain damage or death may result. Soak the victim in cool but not cold water, sponge the body with rubbing alcohol or cool water, or pour water on the body to reduce the temperature to a safe level (102°F). Observe the victim and obtain medical help. Do not give coffee, tea or alcoholic beverages.

HEAT EXHAUSTION: A state of definite weakness or exhaustion caused by the loss of fluids from the body. This condition is much less dangerous than heat stroke, but it nonetheless must be treated.

Symptoms: Pale, clammy, moist skin, profuse perspiration and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may be dizzy.

Treatment: Remove the person to a cool place, loosen clothing, and place in a head-low position. Provide bed rest. Consult physician, especially in severe cases. The normal thirst mechanism is not sensitive enough to ensure body fluid replacement. Have patient drink 1 to 2 cups water immediately and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to 2 gallons per day.

HEAT CRAMPS: Caused by perspiration that is not balanced by adequate fluid intake. Heat cramps are often the first sign of a condition that can lead to heat stroke.

Symptoms: Acute painful spasms of voluntary muscles (e.g., abdomen and extremities).

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Treatment: Remove the victim to a cool area and loosen clothing. Have the patient drink 1 to 2 cups water immediately, and every 20 minutes thereafter until symptoms subside. Total water consumption should be 1 to gallons per day.

HEAT RASH: Caused by continuous exposure to heat and humid air and aggravated by chaffing clothes. Decreases ability to tolerate heat.

Symptoms: Mild red rash, especially in areas of the body on contact with protective gear.

Treatment: Decrease amount of time in protective gear, and provide powder to help absorb moisture and decrease chaffing.

Lightning

- Always pay attention to the weather conditions. You are responsible for your own safety. Use common sense and do not feel pressure to continue to work if you feel there is a threat and others don't, such as contractors and co-workers.
- If you are using conductive tools and equipment, separate yourself from them as far as practical.
- If you are near a drilling rig, lower the mast and move away from the rig.
- Rule of thumb- wait until 30 minutes after the last observed lightning strike or thunderclap before resuming your outdoor activities, warns the National Lightning Safety Institute.
- Protect yourself by taking cover in the best shelter you can find.
- If you are in or near the water, go to land immediately and find shelter. Take extra precaution when on the water and in a boat.
- If choosing between a building and a car, choose the building.
- If choosing between a hardtop and a convertible, choose the hardtop.
- If you're in a car, keep the windows closed.
- If there is no shelter, find a low-lying, open place that is a safe distance from trees, poles, or metal objects that can conduct electricity. Make sure it is not likely to flood.
- Assume a tucked position: Squat low to the ground. Place your hands on your knees with your head tucked between them. Try to touch as little of your body to the ground as possible.
- Do not lie flat on the ground, as your fully extended body will provide a larger surface to conduct electricity. Stay in a tuck position well after the storm passes.
- Watch for local flooding you may have to move if water begins to accumulate.
- If you feel your hair stand on end in a storm, drop into the tuck position immediately. This sensation means electric charges are already rushing up your body from the ground toward an electrically charged cloud. Minimize your contact with the ground to minimize your injury.

Excavations

Staff Members must be especially careful and alert when working with contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and serious worker injury. Equipment with a fast or wide swing radius should be of special concern. Should these devices fail during operation the likelihood of worker injury is high. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc.

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staff members that supervise projects or are associated with such high risk projects that involve digging should use due diligence when working with a construction firm.

- Excavations greater than 5' in depth are not to be entered unless properly sloped, shored, or benched. Heavy equipment operators are responsible for the safety of the excavation. Operators must be deemed a Competent Person per OSHA regulations and shall ensure that the excavation is safe to enter if any H&A staff member is to enter the hole. H&A staff members are to consult with the competent person prior to entering any excavation. This means that the hole must be sloped, shored or benched in accordance to OSHA's Construction Standard for excavations.
- No H&A staff member is to enter the excavation unless they have determined that there is no potential for injury such as cave ins.
- It is the contractors responsibility to safe guard all effected workers from falling into any excavation by the use of barrier's and warning signs.
- No excavation is to be left open, unattended when there is a possibility for workers to fall into the excavation. Barricades must be placed around the hole at night when the depth is greater than 4'. This is responsibility of the contractor.
- Keep all equipment at a minimum of 10' away from energized electrical lines.
- H&A staff members will be required to wear an orange safety vest while in the immediate area where heavy equipment is being used.

Excavation and Trenching Safety

The following is a list of minimum requirements for trenching and excavating. Each excavation/trench/shoring project is different, therefore the Contractor/Consultant Project Manager is responsible for evaluating site specific conditions and making appropriate provisions in the task-specific health and safety requirements in conformance with 29 CFR 1926 Subpart P - Excavations.

- Contact the proper utilities to obtain clearance. Prior to work, review the utilities in the area and be sure they have been staked properly. Before work begins, a Safe Work Permit must be obtained from the Client/Site manager of Operations Safety Representative.
- Be aware that trenches and excavations deeper than four feet are considered confined spaces and require additional safety precautions, such as shoring. If an excavation exceeds four feet in depth, contact the Client or H&A Safety Representative to review the original Safe Work Permit and ensure that it is adequate.
- The walls and faces of all excavations and trenches more than four feet deep, in which an staff member is exposed to danger from moving ground, will be guarded by a shoring system, sloping of the ground, or some other equivalent means. The design of shoring systems must be done by a registered Professional Engineer as per 29 CFR 1926 Subpart P.
- For excavations or trenches in which a staff member may be required to enter, excavated or other material will be effectively stored and retained at least two feet or more from the edge of the excavation or trench.

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- **An Excavation Competent Person shall be onsite who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to H&A and subcontractor employees, and who has authorization to take prompt corrective measures to eliminate them.**
- The Contractor/Consultant Site Coordinator will make daily inspections of excavations. If evidence of possible cave-ins or slides is apparent, all work in the excavation will cease until the necessary precautions have been taken to safeguard staff members.
- Trenches more than four feet deep will have ladders or steps located so as to require no more than 25 feet of lateral travel.
- Hard hats and other personal protective equipment will be worn at all times during any type of excavating or trenching operation.
- Determine soil composition (e.g., through soil sampling, soil maps, etc.) and other relevant site conditions, with special emphasis on conditions conducive to cave-ins.
- Monitor the atmosphere in and around trenches on a regular basis to check for explosive, toxic or otherwise dangerous gases and vapors.
- The Contractor/Consultant Project Manager will insure that all staff members involved in the excavation activity have appropriate training in safe trenching practices, with emphasis on factors such as:
 - utility line identification
 - cave-in prevention measures
 - recognition of conditions which may cause cave-ins
 - means of egress from trench
- Water will not be allowed to accumulate in any excavation. Utilize ditches, dikes, pumps, or other means to keep surface water out of trenches.
- All open excavations must be well marked and barricaded.

Excavation Cave-In Hazards

- The following conditions increase the likelihood of cave-in: Soil materials composed of unconsolidated, uncompacted, and/or rounded particles (See 29 CFR 1926 Subpart P - Excavation Standard). Special care must be used when trenching in areas that have previously been excavated and backfilled.
- Soils, which have a high water content, or have been subjected to freeze-thaw or frost-heaving.
- Loading of trench walls by adjacent equipment, supplies, structures, "back-dirt" piles, etc.
- Vibration due to equipment operating near excavations.
- Trench walls that are steeper than the angle of repose of the material composing the walls.

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by subcontractors. Subcontractors may use this HASP as reference only.

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- Deep trenches (i.e., high trench walls).

The following precautions should be used to prevent cave-ins in all trenches in excess of 4 ft. deep. These precautions should also be used in trenches less than 4 ft. deep whenever those site conditions just listed indicate the likelihood of a cave-in:

- Sloping: Trench walls should be sloped to the correct angle of repose.
- Shoring: Vertical trench walls (unless composed of solid rock) must be shored and braced, or restrained with movable trench boxes, to prevent cave-in. A registered professional engineer must design shoring systems and meet accepted engineering requirements.

Noise Reduction

Site activities in proximity to heavy equipment often expose workers to excessive noise. It is anticipated that situations may arise when noise levels may exceed the OSHA Action Level of 85 dBA in an 8-hour time-weighted average (TWA). An example of this possibility is working in close proximity to the subcontractor during drilling activities onsite. If excessive noise levels occur, efforts will be made to control this by issuance of earplugs to all personnel and by implementing a system of hand signals understood by all.

Utility Locators and Underground Hazards

Subcontractors conducting intrusive activities are responsible for calling the New Jersey One-Call Notification System (1-800-272-1000) at least 3 business days, but not more than 10 business days in advance of drilling activities. In addition, the subcontractor must refresh the drilling notification every 45 business days. No work shall proceed until Haley & Aldrich staff members ensure that the One-Call has been made and permission has been gained from property owners to access the property. Before marking any proposed exploration or drilling location, it is critical that all readily available information on underground utilities and structures be obtained. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water, or any other underground installation that may be expected to be encountered during drilling work, will be identified with the appropriate authority. Appropriate authorities include client representatives, utility companies, nonprofit organizations (e.g., "Dig-Safe"), and others. A list of all state "utility locators" is posted on the Health and Safety Homepage under "Guidance Documents".

Note: It is important to note that not all utilities are participants in the "one-call" agency or process. As such, inquiries must be made by the driller to the "one-call" agency to determine which entities do not participate, so they can be contacted independently.

Completion of the utility stake out is not a guarantee that the underground facilities will not be encountered in the boreholes; Very few if any guarantee their work nor do they accept the liability for damage or losses if one may occur. Accordingly, Haley & Aldrich field staff are expected to use extreme caution in the upper 4-5 feet in the event the clearance has failed to identify an existing facility. This may necessitate hand-excavation or probing to confirm the presence of shallow utilities.

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When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, geophysical techniques, such as ground penetrating radar and/or magnetometry can be utilized to locate the potential underground hazards. Using any information that can be obtained, the site should be viewed in detail for physical evidence of buried lines or structures. Evidence of surface elements of buried utilities should be documented, such as manholes, gas or water valves, catch basins, etc.

No subsurface drilling activities will be allowed until "all" utilities have been properly located and marked.

Marking locations can be accomplished using spray paint on the ground, stakes, or other similar method. All markings of proposed locations shall be made in white, in accordance with the generally-accepted universal color code for facilities identification (AWMA 4/99).

White:	Proposed excavation or drilling location
Pink:	Temporary Survey Markings
Red:	Electrical, Power Lines, Cables, Conduits, and Lightning Cables.
Yellow:	Gas, Oil, Steam, Petroleum, and Gaseous Materials.
Orange:	Communications, Alarm, or Signal Lines, Cables, and Conduits.
Blue:	Potable Water.
Purple:	Reclaimed Water, Irrigation, and Slurry Lines.
Green:	Sewers and Drain Lines.

The public and private utility entities generally only mark the locations of their respective underground facilities within public rights-of-way. Determination of the locations on private property will most likely be the responsibility of Haley & Aldrich or the contractor. In some cases, it may be necessary to put the ultimate responsibility back on the owner, to assist in the location of the utilities. It is incumbent on Haley & Aldrich and the Contractor to exercise caution and use good judgment when faced with uncertainty.

Working around Heavy Equipment

Staff Members must be especially careful and alert when working with contractors who use heavy equipment, since equipment failure or breakage can lead to accidents and worker injury. Cranes and equipment for drilling, pile driving, test pitting and coring is of special concern. Should these devices fail during operation the likelihood of worker injury is high. Equipment of this nature should be visually inspected and checked for proper working order prior to the commencement of field work. Those that operate heavy equipment must meet all of the requirements to operate heavy equipment. Haley & Aldrich, Inc. staff members that supervise projects or are associated with such high risk projects that involve digging should use due diligence when working with a construction firm.

Consider the following generic hazards and control methods when developing the HASP.

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POTENTIAL ACTIVITY HAZARDS

- | | | |
|--|--|------------------------------------|
| 1. Abrasions | 29. Frost bite/cold | 56. Overloaded Equipment (tipping) |
| 2. Access | 30. Fugitive Dust | 57. Oxygen deficiency |
| 3. Asphyxiation | 31. Generated Wastes | 58. Pinch Points |
| 4. Bacteria | 32. Guards removed | 59. Poisonous Plants |
| 5. Biological Hazards | 33. Hazardous Materials | 60. Poor Housekeeping |
| 6. Bloodborne Pathogens | 34. Heat Stress (cramps, exhaustion, stroke) | 61. Poor illumination |
| 7. Cave ins | 35. Heavy Equipment Operation (improper use) | 62. Poor Visibility |
| 8. Chemical/Thermal Burns | 36. Heavy Lifting | 63. Pressure |
| 9. Chemicals | 37. High crime area (violence) | 64. Pressurized Lines |
| 10. Cold Stress | 38. High Winds | 65. Radiation |
| 11. Compressed Gases | 39. Hoists, Rigging, Slings, Wire, Rope | 66. Repetitive Motion |
| 12. Confined Spaces | 40. Impact | 67. Sharp Objects |
| 13. Congestion | 41. Improper Rigging | 68. Silicosis |
| 14. Cuts | 42. Inability to Maintain Communication | 69. Slips, Trips, and Falls |
| 15. Defective Equipment | 43. Inclement Weather | 70. Sprains and Strains |
| 16. Dermatitis | 44. Inclines | 71. Steam |
| 17. Dropping Materials/Tools to Lower Levels | 45. Insects/Reptiles | 72. Sunburn |
| 18. Drowning or flowing water | 46. Known/Unknown Visitors | 73. Surface Water Run-off |
| 19. Electrical Shock | 47. Mold | 74. Toxicity |
| 20. Elevated /Visibility of Overhead Work | 48. Moving Equipment, Conveyors or Vehicles | 75. Traffic |
| 21. Energized Equipment | 49. Muddy Site Conditions | 76. Underground utilities |
| 22. Ergonomics | 50. New Personnel | 77. Uneven terrain |
| 23. Explosions | 51. New Rental or Change in Equipment Used | 78. Unsafe Atmosphere |
| 24. Fatigue | 52. Noise | 79. Vibration |
| 25. Fire | 53. Odor/VOC Emissions | 80. Weight |
| 26. Flammability | 54. Overhead Utilities | 81. Work at Depth |
| 27. Flying debris | 55. Overhead Work | 82. Work at Heights |
| 28. Foreign Body in Eye | | 83. Work over Water |
| | | 84. Working on Ice |

HAZARD CONTROLS

- | | | |
|--|--|---|
| ▪ Air Monitoring (See Section 6) | ▪ Exclusion/Work Zones | ▪ Manual Lifting Equipment |
| ▪ Appropriate Clothing/Monitoring Of Weather | ▪ Exhaust Ventilation | ▪ Proper Lifting Techniques |
| ▪ Appropriate Labels/Signage | ▪ Fall Protection - Type | ▪ Proper Tool for Job |
| ▪ Barricades/Fencing/Silt Fencing | ▪ Fire Extinguisher/Fire Watch | ▪ Proper Work Position/Tools |
| ▪ Buddy System | ▪ Flotation Devices/Lifelines | ▪ Protective Equipment (Specify) |
| ▪ Confined Space Procedures | ▪ Ground Fault Interrupter | ▪ Radio Communication |
| ▪ Decontamination Procedures | ▪ Ground Hydraulic Attachments | ▪ Respirator |
| ▪ Derived Waste Management Plan | ▪ Grounds on Equipment/Tanks | ▪ Safety Harness/Lanyard/Scaffold |
| ▪ Drinking Water/Fluids | ▪ Hand Signal Communication | ▪ Sloping, Shoring, Trench Box |
| ▪ Dust Abatement Measures | ▪ Hazardous/Flammable Material Storage | ▪ Spill Prevention Measures/Spill Kits |
| ▪ Emergency Action Plan Procedures | ▪ Hearing Protection (ear plugs or muffs) | ▪ Stormwater Control Procedures/Methods |
| ▪ Equipment Inspection | ▪ Hoses, Access to Water | ▪ Vehicle Inspection |
| ▪ Equipment Manuals/Training | ▪ Hotwork Procedures | ▪ Visitor Escort/Orientation/Security |
| | ▪ Isolation of Energy Sources (Lockout/Tagout) | ▪ Window Cleaning/Defrost |
| | ▪ Machine/Equipment Guards | |

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5. PROTECTIVE MEASURES

5.1 Personal Protective Equipment Requirements

(copy and paste a checkmark "✓" into appropriate boxes)

Required PPE	Task 1 (Excavation oversight)	Task 2 (Field screening)	Task 3 (Soil sample collection)	Task 4
Hard hat	✓	✓	✓	
Safety glasses w/side shields	✓	✓	✓	
Steel-toe footwear	✓	✓	✓	
Hearing protection (plugs, muffs)	✓	✓	✓	
Tyvek™ coveralls				
PE-coated Tyvek™ coveralls				
Boots, chemical resistant				
Boot covers, disposable				
Leather work gloves				
Inner gloves - Nitrile	✓	✓	✓	
Outer gloves -				
Tape all wrist/ankle interfaces				
Half-face respirator	✓*	✓*	✓*	
Full-face respirator				
Organic vapor cartridges				
Acid gas cartridges				
Other cartridges: Combination	✓*	✓*	✓*	
P-100 (HEPA) filters				
Face shield				
Personal Flotation Device (PFD)				
High-Visibility Safety Vest	✓	✓	✓	
Other:				
Level of protection required [C or D]:	D	D	D	

**The PPE checked in any box above must be on site during the task being performed.
Work shall not commence unless the PPE is present.**

*In the event of respirator use, H&A staff that may be required to wear a respirator must be:

- Medically qualified
- Fit tested
- Fresh shaven with no facial hair that will interfere with the seal. This includes on day hair growth or more, beards, excessive long side burns, and goatees.

5.2 Personal Hygiene Safeguards

Describe any additional safeguards other than basic decontamination procedures for personal hygiene. The following safeguards, at a minimum, shall be adhered to:

1. No Smoking or tobacco product on any Hazwoper project
2. No eating or drinking in the exclusion (hot) zone; and
3. It is especially important to wash your hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before you leave the site for the day. It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

5.3 Site Safety Equipment

Check all items that are required to be on site:

- | | | |
|---|---|--|
| ☒ Fire Extinguisher | ☒ First Aid Kit | ☐ Flashlight |
| ☐ Air horn/signaling | ☒ Cellular Phone | ☐ Duct tape |
| ☐ Ladder | ☐ Barricade tape | ☐ Drum dolly |
| ☐ Two-way radio | ☐ Safety cones | ☐ Harness/Lanyard |
| ☐ Other | ☒ Traffic Safety Vest | ☐ |

The equipment checked in any box above must be on site during the task being performed. Work shall not commence unless the equipment is present.

5.4 Site Security & Work Area Controls

Access to each contaminated work area will be controlled during on-site activities as follows: Consider protection of both project and non-project personnel (e.g., general public, facility personnel).

Can **site access** be controlled by a perimeter fence or similar means? ☒ Y ☐ N

If not, how will the site/work area be controlled during non-work hours to prevent access by unauthorized persons?

No unauthorized personnel will be permitted in the working zone. We will not have the ability to control access during non-working hours. Every attempt will be made to section off areas that are still in progress (excavations) at the end of working hours to avoid any potential unsafe areas.

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Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. H&A staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The H&A Project Manager/LHSC will be responsible for maintaining and providing to the client/site manager documentation of H&A staff members' compliance with required training as requested. Records shall be maintained per OSHA requirements.

5.5.2 40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120.

5.5.3 8-Hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hr refresher training course within the past 12 months.

5.5.4 8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

5.5.5 Excavation Competent Person Training

On-site managers and supervisors directly responsible for excavation safety should have Excavation Hazards Training for the Competent Person in accordance with 29 CFR 1926, Subpart P. An Excavation Competent Person will be capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to H&A and subcontractor employees, and who has authorization to take prompt corrective measures to eliminate them.

5.5.6 Additional Training for Specific Projects

H&A personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities. Any staff member engaging in the following activities will be required to have additional training:

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- Client specific training or orientation
- Heavy equipment including aerial lifts and forklifts
- First aid/CPR
- Diving
- Use of fall protection
- Commercial Drivers License

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6. AIR MONITORING PLAN AND EQUIPMENT

Is **air/exposure monitoring** required at this work site for personal protection? ☒ Y ☐ N

Is **perimeter monitoring** required for community protection? ☒ Y ☐ N

6.1 Monitoring/Screening Equipment

Required to be on site:

- ☒ HNu analyzer (PID) ☒ 10.2eV ☐ 11.7eV ☐ Combustible Gas Indicator (CGI)
☐ Organic vapor monitor (FID) ☐ Multiple Gas Detector-LEL/O₂/H₂S/CO
☐ Photovac Micro Tip ☒ Dust Monitors (RAMs)
☐ Photovac GC ☐ Colorimetric tubes
☒ Draeger CMS Analyzer (benzene detection capable range of 0.2 – 10.0 ppm)) ☒ Weather monitoring station (wind speed & direction, temperature, relative humidity, barometric pressure)

6.2 Standard Action Levels and Required Responses

Description of Monitoring Requirements (include frequency and location by Task):

Monitoring Plan for Task Number(s)	1-3	Frequency	As noted below	times per year	NA
------------------------------------	-----	-----------	----------------	----------------	----

6.2.1 Measurement Frequency and Locations

Measurements will be taken throughout the workday as described in the following sections, when the subject remedial excavation and materials management activities are being conducted.

Site Perimeter

Particulate and volatile COC concentration measurement frequency for Site perimeters will be every 15 minutes during the subject work activities.

Measurement locations at Site perimeters will be based on prevailing wind direction with monitoring points established within 5 to 15 degrees of the measured upwind/downwind direction. Monitoring locations may be moved throughout the day based on wind direction. Perimeter monitoring locations include:

- One upwind location just inside the property boundary (fence line) at the further upwind direction, and
- One downwind location just inside the property boundary (fence line) at the further downwind direction.

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Particulates will be measured at a frequency of every 15 minutes for areas occupied by workers. When an ambient dust concentration of 0.2 mg/m^3 is detected in the work area, readings will be monitored for a 5-minute period to determine if the measurement above the action level is sustained.

Miniram-dust-monitor action-levels in areas of the Site occupied by workers will be verified by periodic personal air sampling results. In scheduling personal monitoring, consideration will be given to collecting samples at times of maximum potential exposure. Samples will be collected in the staff members' breathing zone (9-inch radius hemisphere centered at the nose and forward of the shoulders). Personal sampling will be conducted periodically for at least the initial two weeks of excavation activities at the Site, but may be curtailed thereafter once representative results have been evaluated and found to have good correlation with MiniRam-dust-monitor results.

Each personal sample will be collected using a calibrated personal air-sampling pump (e.g., Gilian GilAir Sampling Pump or equivalent) equipped with clean tubing, a filter holder, and a laboratory-provided clean filter with a 0.8 micron cellulose ester membrane. The personal air sampling pump shall be calibrated per analytical method guidance. Documentation certifying the pump calibration must be obtained and maintained as part of the project file. The sampling pump shall be clipped to the person being monitored and the filter holder shall remain in the breathing zone of the person during the 8-hour work day. The pump shall remain in the above-noted position, operating during the 8-hour sampling period. The pump shall not be turned off or the filter moved during break periods or other non-work activities. The filter will be removed, labeled, placed in a sealed plastic bag, and transported under chain-of-custody to an AIHA-accredited industrial hygiene laboratory for 24-hour turn around time for total particulates, lead, arsenic, total chrome, and Cr^{+6} analysis. The results of the initial exposure assessment will be compared to the Action Levels in Table 1. These results will also be compared to measured fugitive dust concentrations to further evaluate the protectiveness of the specific worker action level derived for fugitive dust.

Volatile COC concentrations, except benzene, will be monitored in the work area continuously with the PID. Benzene concentrations will be monitored every 15 minutes during the subject work activities with the Draeger CMS Analyzer.

6.2.2 Action Levels**Site Perimeter****Particulates**

The perimeter action level for dust monitoring is 0.1 mg/m^3 (equivalent to $100 \text{ } \mu\text{g/m}^3$) of particulate matter less than 10 microns in size (PM-10) greater than the measured upwind background level for a 15-minute time weighted average, or if visible dust is observed extending beyond the site fence line.

Volatiles

The perimeter action-level for volatile COCs, except for benzene, will be if the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average.

The perimeter action-level for benzene will be if the ambient air concentration of benzene at the downwind perimeter of the work area or exclusion zone exceeds 1 part per million (ppm) above background for the 15-minute average.

Areas Occupied by Workers

Particulates

The Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for respirable dust is 5 mg/m³. PELs are time weighted average concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek.

Volatiles

The action level for volatile COCs, except for benzene, in on-Site areas occupied by workers is the lowest of the 8-hr TWAs (10 ppm) or 15-minute STELs (25 ppm) listed below in Table A.

The action level for benzene in on-Site areas occupied by workers 0.5 ppm (8-hr TWA) and 2.5 ppm (15-min. STEL), as listed below in Table A.

The following Permissible Exposure Limits (PELs) will be used in determination of Action Levels.

Table A. Permissible Exposure Limits for Volatile Constituents of Concern

Constituent of Concern	Reference Exposure Limit (ppm) 8-hr Time Weighted Average	Reference Exposure Limit (ppm) 15-min Short-Term Exposure Limit
Benzene	0.5	2.5
Trichloroethylene	10	25
1,4-Dichlorobenzene	10	na
Chlorobenzene	10	na
1,2-Dichlorobenzene	25	50
Methylene chloride	12.5	125
Ethylbenzene	100	125
Xylene	100	150

NOTES:

1. The reference exposure limit is the lower of either the ACGIH Threshold Limit Value (TLV), or the OSHA Permissible

Exposure Limit (PEL) or Action Level (if established).

6.2.3 Required Responses

If Site action levels are reached, the mitigation measures described below will be implemented.

Site Perimeter

If the difference in the TWA₁₅ total dust readings between the upwind and downwind fence line locations is greater than the action level, excavation activities will be stopped and dust suppression activities will be conducted until the fugitive dust readings are less than the action level.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds the action level, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm over background of the 15-minute average. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown until the source of the vapors is mitigated.

If the ambient air concentration of benzene at the downwind perimeter of the work area or exclusion zone exceeds the action level, work activities must be temporarily halted and the source of the vapors mitigated. Work may resume when benzene concentrations sustained over 15 minutes are below the action level.

Areas Occupied by Workers

If action levels applicable to Site workers are exceeded, then work activities must be halted and measures taken to mitigate the sources of the exposures. If mitigation measures do not successfully reduce COC concentrations in the work area to less than the worker action levels, the excavation activities will be stopped and workers will leave the work area (exclusion zone defined by the HASP). Alternatively, if COC concentrations are less than 50 times the applicable action levels, workers may resume work if they don full-face air-purifying respirators supplied with combination HEPA / VOC cartridges until COC concentrations are reduced to below applicable action levels.

Notes: Exposure Guidelines for common contaminants are listed in attached **Table 1**
Requirements for PPE upgrades based on monitoring are in attached **Table 2**
Record monitoring data and PPE upgrades on **Record of Field Monitoring** form;
maintain with project files.

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6.2.4 Calibration and Use of Equipment

Calibrate all monitoring equipment in accordance with manufacturers requirements and site specific requirements (e.g., at the beginning and end of each work day). Calibration of equipment shall be documented in the field notes or Daily Field Report (DFR).

Calibration data will be recorded in a bound field notebook or in the field notes. Documentation should include:

- Date/time
- Zero reading before calibration
- Concentration of calibration gas
- Reading obtained with calibration gas before adjusting span
- Final reading obtained with calibration gas after adjusting span

Air monitoring for exposure should be based on the frequency established above (see Section 6.2). Record time, location and results of monitoring and actions taken based upon the readings.

Use the H&A established SOPs for equipment calibration in the H&A SOP's located on the Intranet.

7. DECONTAMINATION

7.1 Personnel Decontamination

Are **decontamination procedures** required for personnel working on site? ☐ Y ☒ N
If yes, describe steps:

Location of decontamination station: Not applicable

Disposal of PPE: PPE will be disposed of with other on-site refuse generated during activities.

7.2 Tools & Equipment Decontamination

All decon should be conducted at the site and not at the office or lab.

Check all **equipment and materials needed for decontamination** of tools and other equipment:

- | | | |
|--|--|---|
| ☐ Acetone | ☐ Distilled Water | ☐ Poly sheeting |
| ☒ Alconox soap | ☐ Drums for water | ☒ Steam cleaner |
| ☒ Brushes | ☐ Hexane | ☒ Tap water |
| ☐ Disposal bags | ☐ Methanol | ☒ Washtubs |
| ☐ Other | | |

Disposal methods for contaminated decontamination materials (e.g., wash water rags, brushes, poly sheeting) will consist of:

PPE, rags, brushes will be disposed of in Facility's general trash

7.3 Contaminated Soil Sent to Geotechnical Lab

Assignments that include geotechnical lab testing on contaminated samples must be accompanied with written data that will provide information on the type and extent of contamination. Project Managers **must communicate** any anticipated or known chemical hazards to the lab when assigning geotechnical tests. Preferably, **a copy of this HASP** should be forwarded to the laboratory for their review. If the contamination is not known, the PM must contact the laboratory and discuss the potential source of the sample to help identify any hazards that may be associated with the sample.

8. CONTINGENCY PLANNING

How H&A responds to an emergency depends on whether we are at an active facility or another other location. **Many active facilities have very stringent requirements for the mitigation of emergencies.** Therefore, the PM is responsible for identifying any specific requirements from the client contact.

As a rule of thumb, the following are H&A's basic responses to handling Emergencies. Typically, H&A does not mitigate emergencies. When Clients request or require specific functions such as First Aid/CPR trained personnel on site, we typically conform. Before any Project Manager or LHSC agrees to something more stringent, many issues should be considered such as training, safety, feasibility of an adequate response, insurance requirements, and much more.

8.1 Fire

- Major Fires – Major fires will be mitigated by the local fire departments or by client's on-site fire/emergency response departments.
- Incipient Stage Fires – Incipient stage fires will be extinguished by on-site personnel using fire extinguishers. Only those who have received annual training may use an extinguisher.

8.2 Medical

All H&A employee injuries and illnesses will be documented using the Supervisor's Accident / Injury / Near Miss Report (SAIR). This form is available on the Intranet.

- First Aid – First aid will be addressed using the on-site first aid kit. H&A employees are not required or expected to administer first aid/CPR to any H&A, Contractor, or Civilian personnel at any time; and, it is H&A's position that those who do so are doing it on their behalf and not as a function of their job.
- Trauma – Based upon the nature of the injury, the injured party may be transported to the nearest hospital or emergency clinic by on-site personnel or by ambulance. First response to a trauma incident is to call 911 or facility security. H&A staff members are expected to assist in ancillary roles only such as directing ambulances to the scene. It is the discretion of the staff member on site whether an ambulance should be procured in remote locations where ambulance services will not be effective.

8.3 Hazardous Materials Spill

- Small incidental spills – (e.g. – pint of motor oil) caused by H&A employees and/or by the contractor will be mitigated by the H&A staff member and/or the contractor.
- Large spills – (e.g. – large leak from heavy equipment fuel tank) The contractor is responsible for cleanup. In the event that it possess a serious human or environmental threat, the local Fire Department and/or client emergency response department will be contacted. Once emergency has been mitigated typically clean up will be provided by a vendor.

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8.4 Rescue

H&A employees will not enter any confined spaces for rescue purposes.

8.5 Weather Related Emergencies

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working during inclement weather. If applicable, the effects and hazards of heat stress, cold stress, frostbite, thunderstorms, lightning, etc., should be outlined in Section 4.0, or the H&A SOP should be included in one exists.

8.6 Emergency Alarming and Communication

In the event of an emergency, on site H&A personnel and Subcontractors shall assemble in a designated area. Role shall be completed by the SSO or senior-most H&A person present. No personnel shall leave the assembly area unless directed to do so by Project management, the SSO, or recognized emergency response agency (e.g., police, fire department).

Evacuation alarms and/or emergency information will be communicated among personnel on site by the following means: Verbal communication.

If communication will be by other means, describe:

Not applicable

Emergency services will be summoned: Via on-site phone. If contact will be by other means, describe:

Not applicable

The **site evacuation plan** is as follows:

Shopping center across from the site located at 1400 Parkway Avenue.

EMERGENCY RESPONSE RESOURCES

Nearest Hospital: (see attached map) Address: Phone Number:	Mercer Medical Center 446 Bellevue Avenue Trenton, NJ 609-394-4000
Emergency Response Number	911
Local Emergency Response Number (if not 911 system):	
Other Ambulance, Fire, Police or Environmental Emergency Resources	Poison Control 1-800-962-1253 NJDEP Emergency Hotline 609-292-7172
H&A Project Manager: Phone Number: Emergency Phone Number:	Jeff Duncan (603) 391-3312 (201) 317-5531
Client Contact/Project Manager: Phone Number: Emergency Phone Number:	Geraldine Barnuevo (248) 255-2790 (248) 255-2790
Other Entity:	
Address:	
Phone Number:	

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Map to Hospital

1: Start out going SOUTHEAST on PARKWAY AVE / CR-634 toward SCOTCH RD / CR-611 / CR-8. 2.3 miles

2: Turn RIGHT onto PARKSIDE AVE / CR-636. 0.5 miles

3: Turn LEFT onto BELLEVUE AVE. 0.7 miles

4: End at Mercer Medical Center
446 Bellevue Ave, Trenton, NJ 08618, US

Total Est. Time: 10 minutes Total Est. Distance: 3.61 miles



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APPENDIX A

HASP Amendment Form

This appendix is to be used whenever there is an immediate change in the project scope that would require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the H&A Project Manager.

Amendment No.	
Site Name:	
Work Assignment No.:	
Date:	
Type of Amendment:	
Reason for Amendment:	
Alternate Safeguard Procedures:	
Required Changes in PPE:	

Project Manager Signature: _____ Date: _____

Local Health and Safety Coordinator: _____ Date: _____

This original form must remain on-site with the original HASP. If additional HASPs are in the field, it is the PMs responsibility to forward a signed copy of this amendment to those who have copies.

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APPENDIX G

Schedule, Revised

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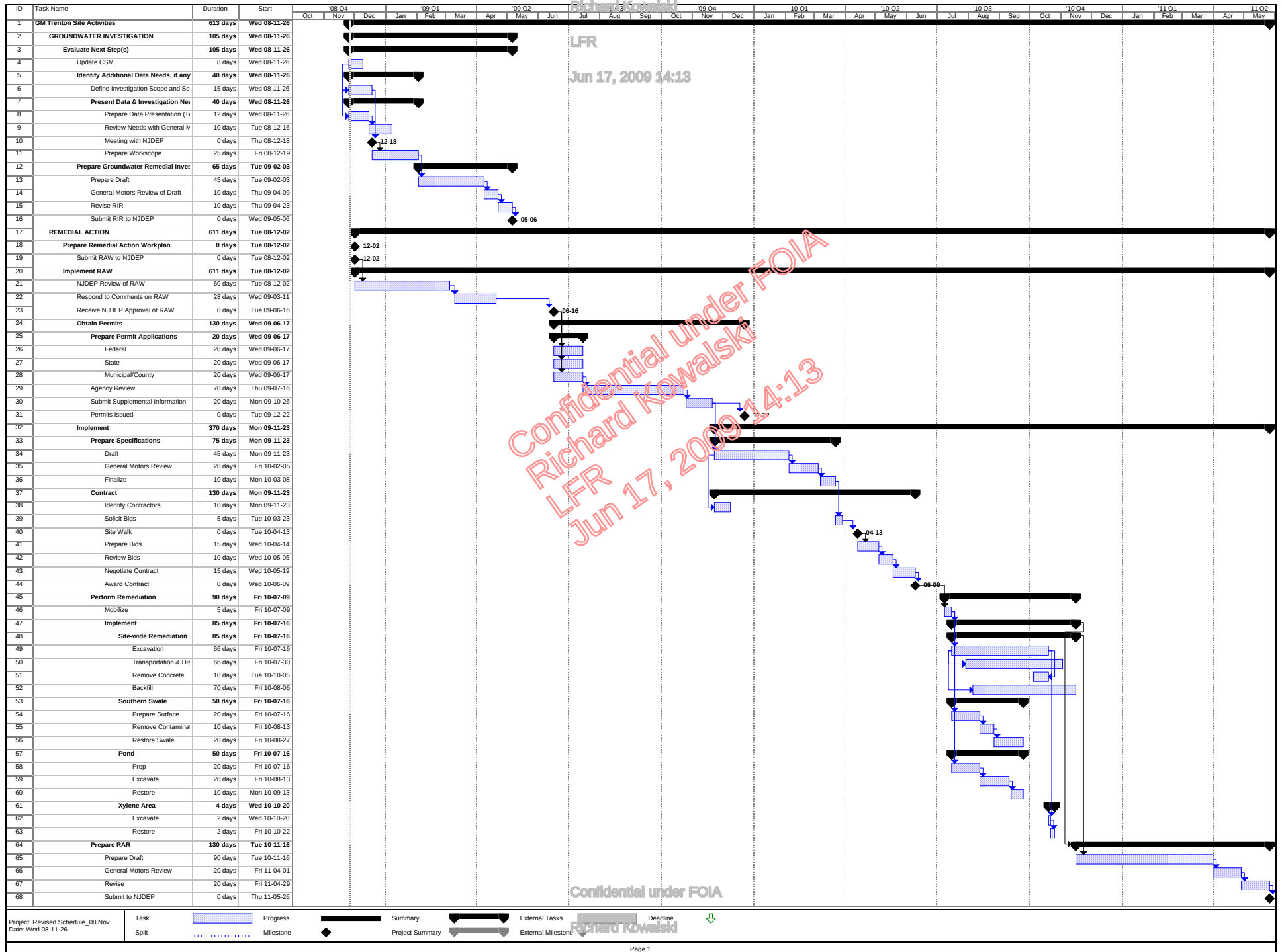
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APPENDIX II

Remediation Cost Estimate, Revised

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OPINION OF PROBABLE COST SITEWIDE EXCAVATION AND MOVE ONSITE (SCC)	Jun 17, 2009 14:13 GM TRENTON	70613-125 26-Nov-08
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ESTIMATED INSTALLATION COSTS

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST
PRE-FIELD ACTIVITIES					
1	Prepare Specs, Plans, Designs	1	LS	\$70,000.	\$70,000
2	Prepare /Revise Health and Safety Plan	1	LS	\$8,000.	\$8,000
3	Permitting	1	LS	\$10,000.	\$10,000
4	Contractor Selection and Contracting	1	LS	\$12,000.	\$12,000
5	Soil Erosion and Sediment Control Plan	1	LS	\$20,000.	\$20,000
6	Wetlands Restoration Plan	1	LS	\$20,000.	\$20,000
	Subtotal				\$140,000
HEALTH AND SAFETY					
7	Air and Dust Monitoring and Suppression, Coordinator	14	WK	\$5,000.	\$70,000
8	Equipment Decontamination	1	LS	\$5,000.	\$5,000
	Subtotal				\$75,000
SLAB REMOVAL & DISPOSAL					
9	SLAB REMOVAL	1	LS	\$920,000	\$1,472,000
10	CONCRETE TRANSPORTATION	49350	TON	\$15	\$740,250
11	CONCRETE RECYCLE	49350	TON	\$30	\$1,480,500
	Subtotal				\$3,692,750
EXCAVATION					
12	Excavation Monitoring (non-personnel related)	3	MO	\$2,000.	\$6,000
13	Excavation Costs (Contractor)	70	DAY	\$6,000.	\$420,000
	Subtotal				\$426,000
POST-EXCAVATION SAMPLING					
14	PID & XRF	3	MO	\$6,000.	\$18,000
15	Waste Characterization Sampling	30	EA	\$636.	\$19,080
16	Post-Excavation Samples	350	LS	\$200.	\$70,000
	Subtotal				\$107,080
SOIL TRANSPORT					
17	Transport of Excavated Soil to Logan, NJ	39239	TON	\$15.	\$588,592
CONTAMINATED SOIL TRANSPORT & DISPOSAL					
18	Transportation	13080	TON	\$15.	\$196,197
19	Disposal (through Mercer County Waste Flow)	13080	TON	\$100.	\$1,307,981
	Subtotal				\$1,504,178
SITE RESTORATION / CAP INSTALLATION					
20	Backfill and Compaction Monitoring (Nuclear Density Gauge & Operator)	14	WK	\$3,000.	\$42,000
21	Certified Clean Backfill	34879.5	CY	\$11.	\$383,675
22	Recycle Excavated Soil	39239.4375	TON	\$30.	\$1,177,183
23	Placement and Compaction of Excavation Backfill Materials	34879.5	CY	\$5.	\$174,398
	Subtotal				\$1,777,256
24	FIELD OVERSIGHT	22	WK	\$10,200.	\$224,400
25	REMEDIAL ACTION REPORT (including record drawings of placed material and cap; Deed Restriction)	1	LS	\$70,000.	\$70,000
26	CONTINGENCY	15%	1	LS	\$1,290,788.4
SUBTOTAL INSTALLATION COSTS:					\$9,896,044

ASSUMPTIONS:

*
*
*

ESTIMATED O & M COSTS

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST

ASSUMPTIONS:

*
*
*

ADDITIONAL COMMENTS

* O&M costs presented herein represent the mid-point of a range (\$30,000 to 60,000/year)

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OPINION OF PROBABLE COST SOUTHERN SWALE EXCAVATION AND RECYCLE (SRS)	Jun 17, 2009 14:13 GM TRENTON	70613-125 26-Nov-08
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ESTIMATED INSTALLATION COSTS

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST
PRE-FIELD ACTIVITIES					
1	Prepare Specs, Plans, Designs	1	LS	\$15,000.	\$15,000
2	Prepare /Revise Health and Safety Plan	1	LS	\$6,000.	\$6,000
3	Permitting	1	LS	\$15,000.	\$15,000
4	Contractor Selection and Contracting	1	LS	\$7,500.	\$7,500
5	Soil Erosion and Sediment Control Plan	1	LS	\$10,000.	\$10,000
	Subtotal				\$53,500
HEALTH AND SAFETY					
6	Air and Dust Monitoring and Suppression, Coordinator	52	DAY	\$1,000.	\$52,000
7	Equipment Decontamination	1	LS	\$5,000.	\$5,000
	Subtotal				\$57,000
EXCAVATION					
8	Excavation Monitoring (non-personnel related)	32	DAY	\$500.	\$16,000
9	Clearing of Vegetation	1	LS	\$40,957.	\$40,957
10	Rough Grading (Contractor)	6696	CY	\$10.	\$66,960
11	Excavation Costs (Contractor)	7	DAY	\$3,000.	\$21,000
	Subtotal				\$144,917
POST-EXCAVATION SAMPLING					
12	PID & XRF	32	DAY	\$750.	\$24,000
13	Waste Characterization Sampling	7	EA	\$636.	\$4,452
14	Post-Excavation Samples	33	LS	\$100.	\$3,300
	Subtotal				\$31,752
TRANSPORT AND RECYCLE					
15	Transport of Excavated Soil to Logan, NJ	10044	TON	\$15.	\$150,660
16	Recycle Excavated Soil	10044	TON	\$30.	\$301,320
	Subtotal				\$451,980
SITE RESTORATION					
17	Backfill and Compaction Monitoring (Nuclear Density Gauge & Operator)	20	DAY	\$1,000.	\$20,000
18	Certified Clean Backfill	5022	CY	\$11.	\$55,242
19	Top Soil	1674	CY	\$25.	\$41,850
20	Placement and Compaction of Excavation Backfill Materials	6696	CY	\$5.	\$33,480
21	Geotextile to stabilize Slope	10044	SY	\$2.22	\$22,298
22	Hydroseeding	90396	SF	\$0.17	\$15,367
23	Watering to establish slope vegetation (8 passes)	17	AC	\$60.	\$1,020
	Subtotal				\$189,257
24	FIELD OVERSIGHT	52	DAY	\$2,040.	\$106,080
25	REMEDIAL ACTION REPORT	1	LS	\$30,000.	\$30,000
26	CONTINGENCY (15%)	1	LS	\$159,672.9	\$159,673

ASSUMPTIONS:

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SUBTOTAL INSTALLATION COSTS: \$1,224,159**ESTIMATED O & M COSTS**

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST
27	Vegetation Maintenance	5	YRS	\$10,000.	\$50,000
28	Slope Maintenance	5	YRS	\$20,000.	\$100,000

ASSUMPTIONS:

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SUBTOTAL O & M COSTS: \$150,000ADDITIONAL COMMENTS

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Richard Kowalski

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OPINION OF PROBABLE COST GOLD RUN POND SEDIMENT EXCAVATION AND DISPOSE OFF-SITE	Jun 17, 2009 14:13 GM TRENTON	70613-125 26-Nov-08
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ESTIMATED INSTALLATION COSTS

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST
	PRE-FIELD ACTIVITIES				
1	Prepare Specs, Plans, Designs	1	LS	\$30,000.	\$30,000
2	Prepare /Revise Health and Safety Plan	1	LS	\$5,000.	\$5,000
3	Permitting	1	LS	\$10,000.	\$10,000
4	Contractor Selection and Contracting	1	LS	\$8,000.	\$8,000
5	Soil Erosion and Sediment Control Plan	1	LS	\$12,000.	\$12,000
6	Wetlands Restoration Plan	1	LS	\$10,000.	\$10,000
	Subtotal				\$75,000
	HEALTH AND SAFETY				
7	Air and Dust Monitoring and Suppression, Coordinator	2	WK	\$5,000.	\$10,000
8	Equipment Decontamination	1	LS	\$5,000.	\$5,000
	Subtotal				\$15,000
	EXCAVATION				
9	Excavation Monitoring (non-personnel related)	2	WK	\$750.	\$1,500
10	Excavation Costs (Contractor)	10	DAY	\$6,000.	\$60,000
	Subtotal				\$61,500
	POST-EXCAVATION SAMPLING				
11	PID & XRF	2	MO	\$2,000.	\$4,000
12	Waste Characterization Sampling	10	EA	\$636.	\$6,360
13	Post-Excavation Samples	40	LS	\$200.	\$8,000
	Subtotal				\$18,360
	SOIL EXCAVATION & TRANSPORT				
14	Construct Diversion Piping	1	LS	\$50,000.	\$50,000
14	Dewater Pond & Treat Water (Sediment & TCE)	1	LS	\$30,000.	\$30,000
15	Transportation	6330	TON	\$15.	\$94,950
16	Disposal (through Mercer County Waste Flow) - Sediment & Water Treatment By-products	6330	TON	\$100.	\$636,000
	POND RESTORATION				
17	Backfill and Compaction Monitoring (Nuclear Density Gauge & Operator)	2	WK	\$3,000.	\$6,000
18	Certified Clean Backfill	4200	CY	\$20.	\$84,000
19	Restoration of Disturbed Wetlands Around Pond	1	LS	\$25,000.	\$25,000
20	Restoration of Dam	1	LS	\$25,000.	\$25,000
20	Placement and Compaction of Excavation Backfill Materials	4200	CY	\$5.	\$21,000
	Subtotal				\$161,000
21	FIELD OVERSIGHT	10	WK	\$10,200.	\$102,000
22	REMEDIAL ACTION REPORT	1	LS	\$70,000.	\$70,000
	(including record drawings of placed material and cap; Deed Restriction)				
23	CONTINGENCY 15%	1	LS	\$170,829.	\$170,829

ASSUMPTIONS:

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SUBTOTAL INSTALLATION COSTS:**\$1,309,689****ESTIMATED O & M COSTS**

NO.	ITEM	ESTIMATED QUANTITY	UNIT (EA, LF, LS)	UNIT PRICE	ESTIMATED COST

ASSUMPTIONS:

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SUBTOTAL O & M COSTS:**\$0**ADDITIONAL COMMENTS

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* O&M costs presented herein represent the mid-point of a range (\$30,000 to 60,000/year)
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SUBTOTAL INSTALLATION COSTS:	\$380,684
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SUBTOTAL O & M COSTS:		\$0
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