IWM CONSULTING GROUP
7428 Rockville Road | Indianapolis, IN 46214 | 317.347.1111 office | 317.347.9326 fax

October 18, 2018

Ms. Carolyn Bury
Project Manager
Corrective Action Section 2
Remediation and Re-use Branch
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: **Off-site Groundwater Investigation Work Plan**
Franklin Power Products, Inc./Amphenol Corporation
Administrative Order on Consent, Docket # R8H-5-99-002
EPA ID # IND 044 587 848
980 Hurricane Road
Franklin, Indiana 46131

Dear Ms. Bury:

In accordance with the United States Environmental Protection Agency (USEPA) letter dated August 30, 2018, Industrial Waste Management Consulting Group, LLC (IWM Consulting), on behalf of the "Performing Respondent", Amphenol Corporation (Amphenol), is submitting this *Off-site Groundwater Investigation Work Plan* (Work Plan). The Work Plan outlines the proposed work activities relating to the investigation and delineation of dissolved phase volatile organic compounds (VOCs) in the groundwater within the Study Area. The Study Area includes portions of streets that are near and downgradient of the Former Amphenol facility located at 980 Hurricane Road, Franklin, IN (Site), including Hurricane Road, Upper Shelbyville Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court.

The objectives of the proposed work activities are as follows:

- Define the lateral extent of dissolved phase VOCs in groundwater to USEPA Maximum Contaminant Levels (MCLs) or Vapor Intrusion Screening Levels (VISLs) and verify groundwater impacts are defined prior to reaching Hurricane Creek.

- Utilize this data to determine if additional delineation activities are warranted, and if additional residences should be evaluated for vapor intrusion (VI).

This Work Plan outlines the proposed methodology and sampling activities that will be utilized during the Work Plan implementation activities. A site vicinity map is provided as **Figure 1**, which displays the location of the Site and properties in the vicinity of the Site. **Figure 2** displays the location of the existing onsite and offsite groundwater monitoring well network and includes proposed locations for the installation of temporary monitoring wells. A copy of the August 30, 2018 USEPA letter is provided as **Attachment A**.

Proposed Boring Advancement and Temporary Well Installation

The primary objectives of this Work Plan is to define the off-site lateral extent of dissolved phase VOCs and to determine if dissolved VOCs are present at concentrations that may warrant further investigation relating to the potential vapor intrusion exposure pathway. These work activities will include the advancement of soil borings and the installation of temporary wells within the first observed saturated sand unit (historically identified as "Unit B") which is typically observed at depths ranging from 2.6 to 19.5 feet below ground surface (bgs). Unit B is an unconfined water bearing sand unit and Unit B is underlain by a silty clay unit (previously identified as "Unit C") with a thickness historically documented to be approximately 20-25 feet. Once the temporary wells have been installed, groundwater samples will be obtained from the saturated interval within Unit B in order to document the presence or absence of dissolved VOCs.

IWM Consulting recommends initially advancing thirteen (13) soil borings which will be converted into temporary wells (TW-1 to TW-13). Based on results from the groundwater samples collected from the temporary wells, up to five (5) additional soil borings will be advanced and converted into temporary wells (TW-14 to TW-18) if the lateral extent of dissolved VOCs have not been adequately defined using the data obtained from the initially installed temporary wells. IWM Consulting will consider groundwater samples obtained from temporary wells within the alley to the west of North Forysthe Street as background dissolved VOC concentrations for western extent of the Study Area. Per discussions with the USEPA, groundwater samples previously collected from onsite monitoring wells will serve as background dissolved VOC concentrations for the northern extent of the Study Area. IWM Consulting will use data collected from monitoring wells MW-20 and MW-29 as background groundwater data.

The proposed boring and temporary well locations are displayed by location on **Figure 2**. Please note that these are proposed locations only and the final locations may have to be relocated in order to accommodate for subsurface or above ground structures/features (i.e. utilities).

Soil borings will be advanced utilizing direct-push technology. The direct-push probe utilizes hydraulics to advance a sampler into the soil; consequently, excess soil cuttings are not generated during direct-push drilling activities. Continuous soil samples will be obtained utilizing dual-tube sampling methods where a four-foot long acetate sleeve contained within a stainless-steel casing is advanced hydraulically to obtain the soil sample. Soil samples pass through the sampler cutting shoe and are retained within a sealed disposable acetate plastic sampling tube for retrieval. The acetate sleeve containing the soil sample is then removed while the stainless-steel outer casing remains in place. A new acetate sleeve is placed inside the casing for continued sampling and advancement of the borehole. Any soil cuttings generated will be placed in a labeled 55-gallon steel drum for characterization and future disposal. The drum will be stored near the existing groundwater treatment building located on the Site.

Strict decontamination procedures will be followed during the investigation activities by IWM Consulting personnel to reduce the potential for cross-contamination. Drilling and all non-disposable, down-hole sampling equipment will be decontaminated prior to first use on-site, and thereafter between uses, using a vigorous wash in Alconox solution, followed by a tap water and/or distilled water rinse. Any decontamination water generated will be temporarily placed in a 55-gallon steel drum, transported back to the Site, and then treated by the onsite groundwater remediation system, prior to discharging to the onsite sanitary sewer per the approved municipal discharge permit with the City of Franklin.

The soil samples collected will be field screened using a photo-ionization detector (PID) in an effort to determine the relative presence of adsorbed VOCs. The soil will also be visually examined and logged in general accordance with the Unified Soil Classification System (USCS). To ensure accurate VOC screening, the quantity of the soil, temperature, and headspace volume are kept as constant as possible. Prior to field activities, the PID will be calibrated in accordance with manufacturer's directions to minimize error through instrument drift. It should be noted that elevated PID readings are not always a reliable indicator of dissolved chlorinated solvent impacts. For this reason, the laboratory analytical results for the groundwater samples obtained from the temporary wells (TW-1 through TW-13) will most likely need to be received and evaluated prior to determining if any secondary borings/temporary wells are necessary.

The borings will be advanced into the first encountered saturated zone (Unit B) and are not anticipated to exceed a total depth of 24 feet bgs. Temporary 1-inch or 2-inch diameter polyvinyl chloride (PVC) screens two foot in length (with varying lengths of PVC risers) will be placed into the boreholes at the top of the observed saturated zone within Unit B to facilitate the collection of the one-time groundwater samples. If the saturated zones are thicker than 5 feet, a second water sample will be collected from the bottom of the saturated zone within Unit B in a similar manner. Although the groundwater sampling points are temporary, washed quartz (#5) sand will be installed within the borehole and extend approximately 1 foot above the top of the screen interval in an effort to assit in filtering any suspended sediment in the groundwater being sampled. The remaining borehole will be filled with bentonite in order to prevent surface water from entering into the borehole after the installation activities.

The existing offsite groundwater monitoring wells (MW-31 through MW-35) and onsite monitoring wells were gauged on September 14, 2018 and the groundwater flow calculated from the gauging event illustrated a groundwater flow direction toward the south-southeast. Low flow groundwater samples were also obtained from the offsite groundwater monitoring wells on September 14, 2018 and thus groundwater samples will not be obtained from the offsite groundwater monitoring wells (MW-31 through MW-35) during this investigation. The offsite groundwater analytical results and groundwater flow map and provided as **Figures 3** and **4**, respectively.

Groundwater Sampling Activities

One-time groundwater samples will be obtained from the temporary wells. A reasonable attempt will initially be made to obtain the groundwater samples from the temporary wells via low-flow sampling methods. If low-flow techniques are not possible (i.e. insufficient volume of water to allow for water to be drawn into the pump intake), the groundwater samples will be obtained from the temporary wells utilizing a disposable bailer. If an insufficient amount of groundwater is recharging into the well during the initial purging activities, then the samples will be obtained with the bladder pump without obtaining any field readings. Disposable tubing and/or bailers are utilized to minimize the risk of cross-contamination. Purge water generated during groundwater sampling activities will be temporarily containerized within a labeled 55-gallon DOT approved steel drum, transported back to the Site, and then treated by the onsite groundwater remediation system, prior to discharging to the onsite sanitary sewer per the approved municipal discharge permit with the City of Franklin.

A portable bladder pump in conjunction with a Horiba U-52 Multi-Probe Field Meter (or equivalent) will be used to collect groundwater samples from the temporary wells, if feasible. The pump is equipped with a disposable bladder sleeve that is exchanged between wells. Dedicated tubing will be used for each well. The Multi-Probe Field Meter includes probes for turbidity, temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential (ORP). Purge rates will be established at a rate that minimizes groundwater drawdown and the primary objective of the purging activities is to reduce the turbidity of the samples, as documented by a stable (±10%) or decreasing trend in turbidity.

Field parameters will be measured continuously, and groundwater samples will be collected after the turbidity has stabilized, after a maximum of 15 minutes of purge time, or once the temporary wells have been purged dry, whichever occurs first. Care will be taken to ensure the bladder pump discharge tubing and flow through cell have evacuated several volumes of water before the samples are obtained. Groundwater criteria which will be monitored during the purging activities are listed below:

•	Turbidity	Nephelometric Turbidity Unit
•	pH	pH units
•	Specific Conductance	Siemens/meter or milli Siemens/centimeter
•	Dissolved Oxygen	milligrams per liter
•	ORP	millivolts

The groundwater samples will then be collected from the temporary wells and placed into the appropriate laboratory provided pre-labeled containers. The groundwater samples will be submitted to Pace Analytical Services, LLC located in Indianapolis, Indiana and analyzed for shortlist VOCs using SW-846 Method 8260 using Level IV Quality Assurance/Quality Control (QA/QC). The shortlist VOCs include the following compounds: vinyl chloride (VC), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA), methylene chloride, 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE). The laboratory results of the sampling event are anticipated to be received within 2 working days from the date the samples are collected in the field and delivered to the laboratory.

A table summarizing the Pace reporting and method detection limits for each compound compared to the MCLs and VISLs is included on the following page:

VOC Compound	Pace Laboratory Reporting Limits (ug/L)	Pace Laboratory Method Detection Limits (ug/L)	MCL (ug/L)	Target Groundwater Concentration for Residential VISLs (ug/L)
1,1-DCA	5.0	0.60	NA	7.6
1,2-DCA	5.0	0.60	5.0	2.2
cis-1,2- DCE	5.0	0.65	70	NA
trans-1,2-DCE	5.0	0.86	100	NA
Methylene Chloride	5.0	5.0	5.0	760
PCE	5.0	0.93	5.0	15
1,1,1-TCA	5.0	0.89	200	7,400
TCE	5.0	0.80	5.0	1.2
Vinyl Chloride	2.0	0.97	2.0	0.15

Assuming no dilutions are required by the laboratory, vinyl chloride is the only constituent that does not meet the VISL reporting requirement, however, the required reporting limit for the MCL will be met. The USEPA has agreed that this is acceptable.

To determine the Site-specific groundwater flow direction, the top-of-casing elevations for the temporary wells will be surveyed to a common benchmark using transit-stadia techniques and depth to groundwater measurements will be obtained from the points approximately 24-hours after they are installed. Once the sampling and subsequent groundwater gauging activities have been completed, the temporary wells will be removed and the boreholes will be backfilled with bentonite and the surface will be capped with like material (e.g., concrete, gravel, or topsoil) to match existing surface conditions in the area of the borehole.

Sample Identification, Collection, & Analysis

Field sample identification for this project should follow the following format: a sample location identification code (TW-1 for Temporary Well-1), a two-letter sample matrix code (GW for groundwater), and numbers designating the screened interval of each sampling location. The trip blank, field duplicate, and equipment blank samples should utilize the identification codes TB, FD, and EB, respectively. Examples of the field sample identification codes for this project are as follows:

- For temporary well groundwater samples: TW-1 GW (14'- 16')
  (Temporary well sampling location No. 1 – groundwater sample, screen interval 14' – 16' bgs)
- For temporary well groundwater samples: TW-1 GW (20'- 22')
  (Temporary well sampling location No. 1 – groundwater sample, screen interval 20' – 22' bgs)
- For temporary well groundwater field duplicate samples: FD-1 GW
  (Groundwater sample field duplicate No. 1)
  Note that no sampling location identification is utilized for the field duplicate. The field duplicate location/sampling identification information is to be recorded in the field project notebook.
- For equipment blank groundwater samples: EB-1 GW
  (Equipment Blank - groundwater sample No. 1)

- For trip blank groundwater samples: TB-1 GW
  (Trip Blank – groundwater sample No. 1)

Standard protocols will be observed for sample collection, sample handling and preservation, and chain-of-custody (COC) documentation. Personnel will utilize clean, disposable, nitrile gloves for each sample obtained. Laboratory provided sample containers will be utilized. Prior to use, the sample containers will be inspected for cracks, chips, cleanliness, and preservative (as appropriate). Container threads will be wiped clean before sealing (if applicable) to ensure proper sealing. The sample containers will be labeled with the appropriate project name and/or number, sample identification designation, date, time, and sampler's name or initials. Samples will be placed in a cooler containing ice and maintained at a temperature of approximately 4° Celsius prior to analysis.

Samples will be analyzed by the laboratory using a 24-hour turnaround time (TAT) and Level IV QA/QC procedures. IWM Consulting anticipates obtaining a total of twelve (12) to eighteen (18) groundwater samples which will be collected from the temporary wells for select VOC analysis. For QA/QC purposes, one (1) field duplicate and one (1) matrix spike/matrix spike duplicate (MS/MSD) sample will be collected at a rate of one (1) sample per every twenty (20) confirmatory samples per sampling media and will be analyzed for the same analytical parameters. One (1) trip blank for VOC analysis will accompany each cooler shipment that contains samples for select VOC analyses. One (1) equipment blank per sampling media will be obtained. The equipment blank will be collected by pouring laboratory-prepared water or distilled water over or through the field sampling equipment (e.g., the cutting shoe or bladder pump) and collecting the rinsate in the proper analytical containers. If only disposable or single use sampling equipment is used, then a field blank, consisting of analyte-free water poured into a laboratory provided container in the field (in order to assess the potential for sample contamination due to field conditions) will be collected in lieu of an equipment blank.

A copy of all of the applicable Standard Operating Procedures (SOPs) which will be followed by IWM Consulting during the groundwater sampling activities is provided as **Attachment B**. A copy of the Pace COC which will be utilized during the work activities is provided as **Attachment C.** Pertinent information such as laboratory certifications for Pace are provided as **Attachment D**. A copy of the applicable USEPA RSLs for this project are included in **Attachment E**.

Reporting

Preliminary results (copy of the laboratory report) will be supplied to representatives from the USEPA as soon as possible once the information has been received and reviewed. A brief letter report will also be generated and submitted to the USEPA within approximately 3-4 weeks of receiving the validated analytical results. The groundwater analytical results will be compared to the USEPA VISLs and MCLs. The analytical results will be validated by a third party and the validation will be included within the letter report being submitted to the USEPA. The letter report will summarize the sampling activities, results, and make recommendations regarding the need for additional sampling or investigation activities.

Timeline

The table below is the estimated timeline associated with implementing this Work Plan.

Task	**Anticipated Estimated Completion Date**	**Comments**
Submittal of Work Plan	October 18, 2018	
USEPA Conditional Approval of the Work Plan	October 22, 2018	Anticipated date based upon previous communication with the USEPA
Installation of Temporary Wells	October 23-24, 2018	
Conduct Low Flow Groundwater Sampling Activities	October 23-25, 2018	
Groundwater Gauging	October 26, 2018	Gauging of all temporary wells and entire monitoring well network
Survey of temporary well top of casings	~October 30, 2018	Survey completed by licensed surveyor, still to be determined
Receipt of Preliminary Laboratory Analytical Results	October 31, 2018	Expedited analysis required, results anticipated to be received by close of business on October 31, 2018
Submittal of Preliminary Laboratory Results to the USEPA	November 5, 2018	
Supplemental Temporary Well Installation (if necessary) and Well Abandonment	~November 15-16, 2018	Abandonment of initial temporary wells. Additional temporary wells will be installed if sampling results suggest additional sampling and/or investigation activities are necessary. Schedule estimated and will be based on availability of drilling contractor.
Conduct Low Flow Groundwater Sampling Activities	~November 15-16, 2018	
Survey of temporary well top of casings	~November 20, 2018	Survey completed by licensed surveyor, still to be determined
Receipt of Preliminary Laboratory Analytical Results	~November 21, 2018	Expedited analysis required, results anticipated to be received by close of business on November 21, 2018
Submittal of Preliminary Laboratory Results to the USEPA	~November 28, 2018	
Submittal of Letter Report to the USEPA	~December 21, 2018	

Please do not hesitate to contact the undersigned with questions or if you need additional information regarding this submittal.

Sincerely,

IWM CONSULTING GROUP, LLC

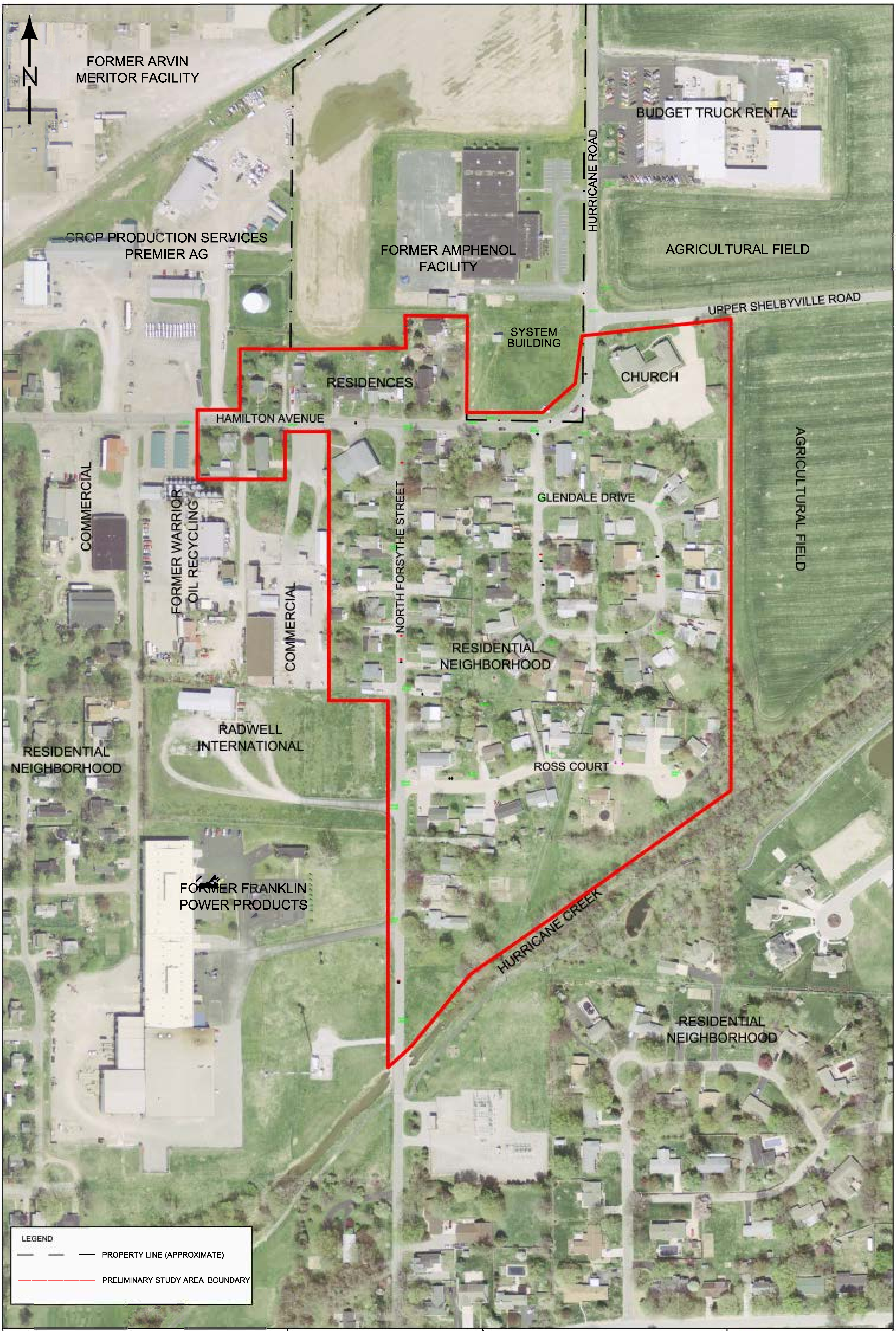
Christopher D. Parks, LPG #2169
Senior Project Manager

Bradley E. Gentry, LPG #2165
Vice President/Brownfield Coordinator

cc: Mr. Joseph Bianchi, Amphenol (electronic only)
Bhooma Sundar, U.S. EPA Region 5, RRB CAS2 (electronic only)
Conor Neal, U.S. EPA Region 5, RRB CAS2 (electronic only)

Attachments

Figures



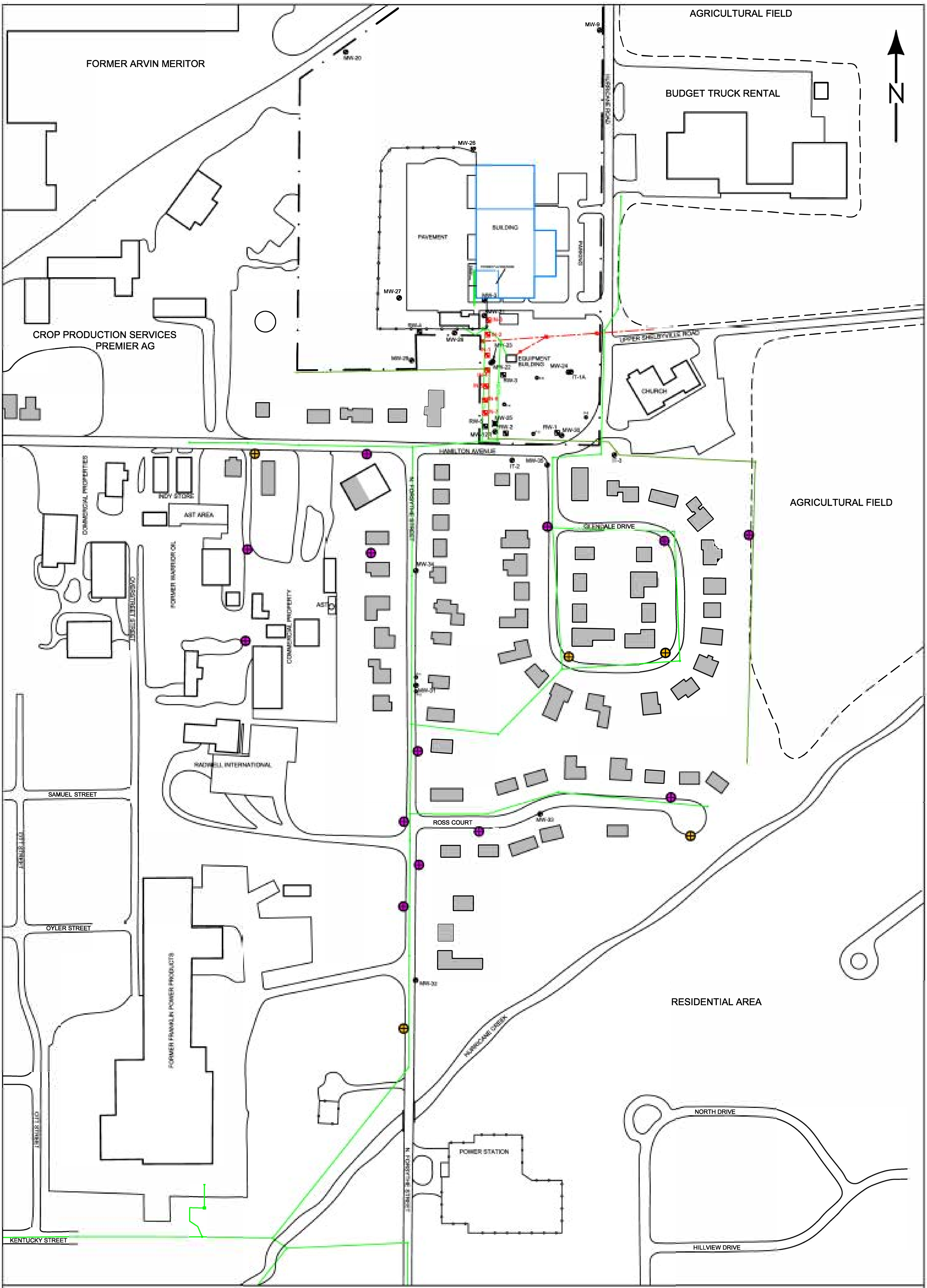
0' 200'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 09/10/2018
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 1
PRELIMINARY STUDY
AREA MAP

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM CONSULTING GROUP



LEGEND

- ☒ ABANDONED MONITORING WELL
- ● MONITORING WELL
- ■ RECOVERY WELL
- 🟥 INJECTION WELL
- ○ PIEZOMETERS

- — — — PROPERTY LINE (APPROXIMATE)
- —— STORM SEWER
- —— SANITARY SEWER
- —·— O/H POWER

- ■ RESIDENTIAL HOME
  * DETACHED GARAGES & SHEDS NOT SHOWN
- □ NON-RESIDENTIAL STRUCTURE
- □ PRIMARY BUILDING WALLS

- ● PRIMARY PROPOSED TEMPORARY MONITORING WELL
- ⊕ SECONDARY PROPOSED TEMPORARY MONITORING WELL

0' 200'
SCALE IN FEET

DRAWN BY: L. STRUM
DATE: 9/27/99
REVISED: 10/18/2018
HWPA #111291-01
DWG. NO. 111291S1

FIGURE 2
PROPOSED TEMPORARY
BORING LOCATIONS

FORMER AMPHENOL RFI/CMS
980 HURRICANE ROAD
FRANKLIN, INDIANA

IWM
CONSULTING GROUP

Attachments

Attachment A

USEPA Letter Dated August 30, 2018

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

LU-16J

Via E-mail and Certified Mail 7009 1680 0000 7671 2323
RETURN RECEIPT REQUESTED

August 30, 2018

Mr. Joseph M. Bianchi	Mr. Matt Kupcak
Group EHS Manager	Director, Global Environmental Programs
Amphenol Corporation	BorgWarner Inc.
40-60 Delaware Avenue	3850 Hamlin Road
Sidney, NY 13838	Auburn Hills, MI 48326

Subject: Franklin Power Products, Inc./Amphenol Corporation
Request for Vapor Intrusion Investigation
Administrative Order on Consent, Docket # R8H-5-99-002
EPA ID# IND 044 587 848

Dear Mr. Bianchi and Mr. Kupcak:

Under Section VIII, Paragraph N (Additional Work) of the RCRA 3008(h) Administrative Order on Consent dated November 24, 1998 (Order), EPA has determined that Respondents Amphenol Corporation and Franklin Power Products, Inc. (FPP/Amphenol), must perform Additional Work at the facility at 980 Hurricane Road in Franklin, Indiana ("Facility" or "Site"). The Additional Work described in this letter is necessary to meet the purposes of the Order, including but not limited to, assuring the selected corrective measures address the actual and potential threats to human health and the environment presented by the actual and potential releases of hazardous wastes or hazardous constituents at or from the Facility.

Summary of Requested Work

EPA met with Amphenol Corp. on August 7 and 8, 2018 to outline the approach to the overall vapor intrusion (VI) investigation in the off-Site Study Area (see below and enclosure). to be proposed to EPA in a Work Plan. The purpose of this investigation is to evaluate the potential for vapors to enter indoor spaces through volatilization from groundwater or *via* direct entry from sewer lines. The Work Plan must propose field and analytical approaches to measuring VOCs in environmental media, including indoor air, and propose measures to mitigate unacceptable exposures and protect human health.

As discussed during the August 7 and 8 meetings, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area to expedite the investigation. Amphenol Corp. met with City of Franklin representatives to discuss an access agreement soon after the meeting with EPA and later, on August 20, 2018, Amphenol Corp. attended a City of Franklin Public Works Board Meeting and formally requested a blanket ROW access agreement for the Study Area.

By September 17, 2018, EPA requests that you submit a Vapor Intrusion Investigation Work Plan ("Work Plan") to investigate potential vapor intrusion (VI) in the Study Area. Respondents must investigate whether a complete pathway of volatile constituents is present from historical solvent releases at the Site to off-Site receptors. Primary migration pathways of concern include storm and sanitary sewers, and groundwater to soil. The Work Plan must be consistent with EPA guidance found in *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (EPA OSWER, 2015).

Respondents and EPA will coordinate closely during plan development with the objective of Work Plan execution upon approval.

Purpose of Sampling Event

The primary objective of the requested investigation is to determine whether potential Study Area vapor intrusion requires mitigation measures to protect human health.

Study Area

The investigation will focus on the Study Area where VOCs were historically present in groundwater, soil gas, and sewer gas downgradient of the Site at elevated levels. EPA evaluated historical environmental data provided under the Corrective Action order (circa 1990's) to guide the planning and scope of the investigation. The Study Area boundary was based on historical data and current remedial operations reports: the remedial facility investigation; corrective measures study; and (ongoing) corrective measures implementation phases of the corrective action work. Data from the VI investigation will be used to inform next steps, including a need to expand the Study Area, and to determine a need for additional remedial measures.

The Study Area includes portions of streets that are near and downgradient of the former facility: Hurricane Road, Hamilton Avenue, Forsythe Street, Glendale Drive, and Ross Court (figure provided by Amphenol Corp. enclosed).

Please provide a draft Conceptual Site Model (CSM) with the investigation report using the collected data for evaluating conditions and informing next steps. In a subsequent work plan request, EPA will require that current groundwater conditions be delineated. This work will update the CSM and inform decisions regarding a need to expand the Study Area.

Work Plan

The Work Plan must describe the general approach to collecting VOC samples for evaluating potential soil vapor intrusion pathways in the Study Area and provide the field and analytical SOPs for completing the work.

Following the demonstration of a complete exposure pathway of VOCs in indoor air, determinations will be made regarding the need for mitigation in individual homes and remediation in areas of preferential pathways. To the extent practical, investigations within buildings and on individual properties should ensue with the goal of limiting return visits, which can cause disruption and inconvenience for building occupants and owners. EPA recognizes potential delays with obtaining formal access to homes/buildings and the potential need for more than one mobilization.

Soil Gas Samples To expedite the investigation, exterior soil gas samples will be taken along rights-of-ways (ROWS) within the Study Area where Amphenol Corp. has formally requested a blanket access agreement with the City of Franklin. Sample results above EPA soil gas screening levels at the ROW locations near homes initiates the requirement for concurrent collection of sub-slab and indoor air samples at adjacent homes.

Sub-Slab and Indoor Air Samples The Work Plan must identify the approach to sub-slab and indoor air sampling and include a summary of the plan to obtain access to homes.

Sewer Gas VOC Samples The Work Plan should propose sample locations and describe the rationale for continuing the VI investigation along the pathway. Include the following locations in the work plan:

1) manholes within the streets identified in the Study Area;
2) lateral sewer lines if sewer gas exceeds EPA indoor air screening levels; and,

3) indoor samples in bathrooms if lateral sewer samples exceed EPA indoor air screening levels.

Where sewer gas levels exceed EPA indoor air screening levels, a sewer video survey should be completed to characterize conditions that could provide a pathway for entry of soil vapors from underlying soil or groundwater (cracks and other defects).

The Work Plan should include a table showing which sample type will be compared to which screening value for each chemical on the analyte list.

Groundwater Samples

As part of this investigation, you must sample groundwater any intact monitoring wells in the Study Area, and measure water levels.

Analyte List

Samples will be analyzed for these Site-related constituents identified in previous investigations and sampling events conducted under the AOCs: vinyl chloride (VC), trans-1,2-dichloroethylene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethylene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA), methylene chloride, 1,1,1- trichloroethane (1,1,1 TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE).

Third-party Validation

Analytical results must be validated by a qualified data validation that is independent of the project.

Quality Assurance

The Quality Assurance (QA) Plan must be consistent with EPA's QA/R-5, *EPA Requirements for Quality Assurance Project Plans* (EPA 2001) found at https://www.epa.gov/sites/production/files/2016-06/documents/r5-final 0.pdf. All samples must be analyzed by a laboratory with appropriate ELAP certification, as specified in the guidance. Please also refer to *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 (EPA 2002) when developing the QA/Quality Control portions of the Work Plan.

Response Plan

Respondents' proposed Work Plan must include the proposed response measures for mitigating vapor entry into buildings from the soil column and terminating the potential migration of soil vapors into buildings via a sewer pathway. If the investigation results in additional VI pathways (along other utilities), then Respondents must propose corresponding remedial measures.

Potential On-Site Investigative Work

During the August 7 and 8, 2018 meeting and site visit, EPA and Amphenol Corp discussed the need for and approach to indoor air sampling in the occupied buildings on the former facility property. Respondents may include the on-Site VI work in the subject Work Plan. Alternatively, that investigation could be included in the second ambient air sampling event scheduled for this fall.

Schedule

The proposed Work Plan must include a schedule of activities from pre-work plan activities through final report submittal.

Next Steps - Other Corrective Action Work

When this investigation is completed, EPA will determine whether there is a need for additional VI investigation in an expanded area. EPA will require a groundwater investigation to determine whether a plume is present downgradient of the Site and whether Site constituents of concern (COCs) impact human health and the environment.

The plume will be defined two ways:

1) COCs exceeding EPA Maximum Contaminant Levels (MCLs) or Vapor Intrusion Screening Levels (VISLs); and,
2) COCs exceeding water quality standards at Hurricane Creek.

In addition, the extent of any source materials must be determined, including DNAPL or contaminated soils contributing to a groundwater plume related to Site activities. The extent of soil contamination will be determined by:

1) COCs exceeding Indiana's Residential Soil Migration to Groundwater Screening Levels (MTGSLs) in unsaturated soils; and,

2) Saturated soils exceeding a soil screening level calculated using EPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA OSWER, 2002). See https://semspub.epa.gov/work/HQ/175878.pdf.

If you have any questions, please contact me at (312) 886-3020. Also, please feel free to contact Dr. Bhooma Sundar, EPA risk assessor, at (312) 886-1660 to assist you in Work Plan development.

Sincerely,

Carolyn Bury

Carolyn Bury
Project Manager
Corrective Action Section 2
Remediation and Re-use Branch

Enclosure

ecc: Brad Gentry, IWM Consulting Group, LLC.
Don Stilz, IDEM
Bhooma Sundar, RRB CAS2
Conor Neal, RRB CAS2

Attachment B

IWM Consulting SOPs

SOP Group C

Standard Operating Procedures for Water Sampling

TABLE OF CONTENTS

SOP Group C

Standard Operating Procedures for Water Sampling

Introduction

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of representative groundwater samples. Analysis of groundwater samples may determine whether concentrations of specific pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health, welfare, or the environment.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in the field book and in the appropriate site report. Mention of trade names or commercial products does not constitute an endorsement or recommendation for use.

SOP C.1 Method Summary

C.1.1 Bailer Method

This method emphasizes the need to remove the stagnant water contained in the monitoring well to collect a representative groundwater sample. Purging at least three well volumes before sample collection is necessary to insure a representative groundwater sample is obtained. Well volumes can be calculated using standard casing volume per foot factors for the appropriate well diameter and the measured length of the water column. The appropriate casing volumes per foot factors for common well casing diameters are:

Well Casing Diameter (inches) vs. Volume (gallons) Per Foot of Water

Casing Diameter (in)	Gallons/ft
¾”	0.023
1”	0.041
2”	0.163
4”	0.653
6”	1.469
12”	5.875

Water level indicators are to be decontaminated prior to the initial measurement and between each monitoring well. Dedicated bailers and rope are to be used to minimize the possibility of cross contamination from previously sampled monitoring wells. The bailer is to be lowered into the water column gently, allowed to fill, and removed slowly to minimize turbidity and disturbance of volatile organic compounds. Sampling is conducted directly from the bailer. Water quality parameters (turbidity, pH, temperature, and conductivity) will also be obtained during the sampling process to document that conditions are suitable for sampling to begin following the procedures in section SOP C.5. When obtaining the volatile samples, if bubbles (>6 mm) are present within the 40-mL vials, please follow the procedures outlined in section SOP C.4.

The bailer method's advantages are that it is very portable, inexpensive compared to low-flow sampling, requires no power source, readily available, and is a rapid and simple method for purging small volumes of groundwater. However, the bailer method suffers from the correct technique being highly operator dependant, being time-consuming when purging large volumes, creating the possibility of the sample being disturbed during transfer to the sample containers, and leakages from the ball check at the bottom of the bailer. This method is recommended for temporary monitoring points constructed with casing and screens, monitoring points with very low groundwater recovery rates, or monitoring points with insufficient standing water (typically <3 feet).

Changes to this SOP should be proposed and discussed when the site Work Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

C.1.2 Low-Flow Method

This method emphasizes the need to minimize stress by low water-level drawdowns, and low pumping rates (usually less than 1 liter/min) in order to collect samples with minimal alterations to water chemistry. This method is aimed primarily at sampling monitoring wells that can accept a submersible pump and have a screen, or open interval length of 10 feet or less (this is the most common situation). However, this procedure is flexible and can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of ground water contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, metals and other inorganics), or other naturally occurring analytes.

The screen, or open interval of the monitoring well should be optimally located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screen, or open interval.

Proper well construction and development cannot be over emphasized, since the use of installation techniques that are appropriate to the hydrogeologic setting often prevents "problem well" situations from occurring. It is also recommended that as part of development or redevelopment the well should be tested to determine the appropriate pumping rate to obtain stabilization of field indicator parameters with minimal drawdown in shortest amount of time. With this information field crews can then conduct purging and sampling in a more expeditious manner.

The mid-point of the saturated screen length is used by convention as the location of the pump intake. However, significant chemical or permeability contrast(s) within the screen may require additional field work to determine the optimum vertical location(s) for the intake, and appropriate pumping rate(s) for purging and sampling more localized target zone(s). Primary flow zones (high(er) permeability and/or high(er) chemical concentrations) should be identified in wells with screen lengths longer than 10 feet, or in wells with open boreholes in bedrock. Targeting these zones for water sampling will help insure that the low stress procedure will not underestimate contaminant concentrations. The Sampling and Analysis Plan must provide clear instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected.

Stabilization or a decreasing trend of the turbidity field parameter will be used to indicate that conditions are suitable for sampling to begin.

Low-flow sampling has distinct advantages and disadvantages. Low-flow sampling maintains the integrity of the sample if a bladder pump is used. Low-flow sampling is easy to use and can sample from distinct locations in the monitoring well. However, bladder pumps used in low-flow sampling are difficult and time-consuming to decontaminate, only useful with sufficient head above the pump, require cumbersome air cylinders or air compressors and a control box for operation, and can only achieve low pumping rates. Low-flow sampling is not recommended for shallow, temporary monitoring points, monitoring points exhibiting very low groundwater recovery rates, or monitoring points with insufficient amount of standing groundwater (typically <3 feet).

Changes to this SOP should be proposed and discussed when the site Work Plan is submitted for approval. Subsequent requests for modifications of an approved plan must include adequate technical justification for proposed changes. All changes and modifications must be approved before implementation in field.

SOP C.2 Sampling Preservation, Containers, Handling and Storage

The type of analysis for which a sample is being collected determines the type of bottle, preservative, holding time, and filtering requirements. Sample containers are provided "pre-preserved" by the analytical laboratory. Samples should be collected directly from the sampling device into appropriate laboratory cleaned containers. Sample containers for volatile compounds should be filled first, followed by containers for semi-volatile compounds and finally non-volatiles such as metals and PCBs. If filtering is required, the sample containers will be unpreserved and the samples will be filtered at the laboratory.

Samples shall be appropriately preserved, labeled, logged, and placed in a cooler to be maintained at $\leq 6°C$. Samples should be shipped within 72 hours of sample collection and ideally should be shipped within 24 hours of sample collection. It is imperative that samples be shipped or delivered daily to the analytical laboratory in order to maximize the time available for the laboratory to perform the analyses. The bottles should be shipped with adequate packing and cooling to ensure that they arrive intact.

The focus of concern must remain to provide a valid sample for analysis, one which has been subjected to the least amount of turbulence possible. Due to the extreme trace levels at which volatile organics are detectable, cross contamination and introduction of contaminants must be avoided. Trip blanks are incorporated into the shipment package to provide a check against cross contamination.

SOP C.3 Equipment

C.3.1 Bailer Sampling

- Disposable bailers and disposable sampling twine or polyethylene rope
- Water level indicator or interface probe (if needed) capable of measuring to 0.01 foot accuracy
- Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.)
- Sample bottles (as required by analytical methods)
- Well construction and field data from the temporary well installation event and a location map
- Field notebook and well sampling logs
- Site specific Work Plan and applicable SOPs

C.3.2 Low-Flow Sampling

- Stainless steel, adjustable rate, submersible bladder pump and disposable polyethylene rope for lowering the pump into the well
- Polyethylene air tubing and Teflon or Teflon-lined polyethylene sampling tubing
- Water level indicator or interface probe (if needed) capable of measuring to 0.01 foot accuracy
- Flow measurement supplies such as a graduated cylinder and stopwatch
- Compressed air tank and control box such as a QED MP10 Controller
- Water quality multi-probe meter such as a Horiba U-52 along with 500 mL flow-through cell for stabilization readings. The Horiba U-52 is to be calibrated daily.
- Decontamination supplies (for example, non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.)
- Sample bottles (as required by analytical methods)
- Well construction and field data from the temporary well installation event and a location map

- Field notebook and well sampling logs
- Site specific Work Plan and applicable SOPs

SOP C.4 Interference and Potential Problems

There are two primary potential problems associated with groundwater sampling - cross contamination of samples and improper sample collection. Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment such as bailers or low-flow sampling tubing. If this is not possible or practical, then decontamination of sampling equipment, such as the low-flow bladder pump, is necessary. Improper sample collection can involve using contaminated equipment or sampling before stabilization has occurred, resulting in variable, non-representative results. Another way to reduce the chances of cross contamination is to begin groundwater sampling with the monitoring well suspected to contain the least amount of contaminants and continue to the monitoring well suspected to contain the most contamination.

When transferring the water sample into the laboratory provided, hydrochloric acid (HCl) preserved 40-mL vials for VOC analysis, fill the vial slowly to the top of the neck minimizing the amount of air mixed in the water as the vial is filled. The vial must be slightly overfilled in order to ensure no air bubbles are contained in the vial once capped. The water should bulge slightly over the top of the vial. Do not excessively overfill the vial as the overflow will contain the HCl preservative and may burn the skin. While holding the vial level, screw the cap on tightly. The septum in the cap should bulge slightly when properly closed. Invert the vial and tap lightly to dislodge any trapped bubbles. If bubbles (>6mm) are present, open the vial and attempt to add additional water to the vial. If bubbles continue to remain within the sampling container, repeat the sampling process while using a new, HCl preserved 40-mL vial. If bubbles continue to be present within the HCl preserved vial, utilize unpreserved 40-mL vials when containerizing the water sample and note on the chain-of-custody (COC) that the VOC water samples were containerized in unpreserved 40-mL vials. This notation must be on the COC since unpreserved VOC samples have a shorter holding time than HCl preserved VOC samples.

SOP C.5 Stabilization For Groundwater Sampling

During low-flow well purging, monitor stabilization parameters (turbidity, ORP, temperature, specific conductance, pH, DO) every three to five minutes (or each time the flow-through cell has cycled its full volume). Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments. Purging is considered complete and sampling may begin when the turbidity parameter has stabilized.

All measurements must be obtained using a flow-through cell. Transparent flow-through cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell and may also cause an underestimation of turbidity values measured after the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. The flow-through-cell must be designed in a way that prevents air bubble entrapment in the cell.

Although it is unlikely that all of the above criteria can be met for samples obtained using the bailer sampling method or direct push sampling method, an attempt should be made to obtain the recommended stabilization criteria. The readings will be obtained from an aliquot of water being containerized during the purging process and if the stabilization criteria has not been met after purging a maximum of five (5) volumes of standing water, then the sample will obtained and the stabilization variations will be noted in the field book.

SOP C.6 Purging and Sampling Procedures

C.6.1 Bailer Purging and Sampling

- Use a water level indicator to measure the water level present in the monitoring well.
- Calculate the well volume using the length of the measured water column and the casing volume per foot factor that corresponds to the appropriate well diameter.
- Gently lower the bailer into the water column by rope and purge three (3) to five (5) well volumes, making sure to minimize turbidity, and placing the purged groundwater into approved containers for disposal.
- Temporarily containerize the purge water into an appropriate purge sampling container (typically a 1-5-gallon container or bucket) then transfer to a 55-gallon drum, after obtaining the appropriate stabilization readings.
- Monitor the stabilization parameters such as DO, pH, specific conductance, ORP, and temperature at the appropriate intervals and log them on the water parameter monitoring form or field book. Readings should be obtained after one (1) well volume of water is removed from the well and this process should be repeated until the stabilization criteria has been met or until a maximum of five (5) volumes of water has been purged from the sampling point.
- After three consecutive readings that are within the limits listed above, the groundwater is considered stabilized and sampling can occur. If stabilization does not occur after three (3) well volumes, continue purging to a maximum of five (5) well volumes before collecting groundwater samples or for a period not exceeding 1-hour.
- After appropriate number of well volume has been purged or the stabilization criteria has been met, sample the groundwater directly from the bailer, starting with filling the volatile compound containers first, then semi-volatile and finally the non-volatile sample containers.
- Temporarily containerize the purge water into an appropriate purge sampling

container (typically a 1-5-gallon container or bucket) then transfer to a 55-gallon drum, after obtaining the appropriate stabilization readings.

- Decontaminate the water level indicator and dispose of the dedicated bailer and rope.

C.6.2 Low-Flow Purging and Sampling

- Use a water level indicator to measure the water level present in the monitoring well.
- Calculate the well volume using the length of the measured water column and the casing volume per foot factor that corresponds to the appropriate well diameter.
- Gently lower the sampling pump and dedicated tubing into the water column to the appropriate depth, generally the midpoint of the water column.
- Insure that the groundwater level equalizes with the inclusion of the sampling pump with the water level indicator.
- Begin the purging process, insuring that the drawdown during the purge cycle does not exceed 0.3 feet.
- Monitor the stabilization parameter turbidity, as well as other parameters DO, pH, specific conductance, ORP, and temperature, at the appropriate intervals and log them on the water parameter monitoring form or field book.
- After three consecutive readings that are within the limits listed above, the groundwater is considered stabilized and sampling can occur. If stabilization does not occur after three well volumes, continue purging to a maximum of six well volumes before collecting groundwater samples or for a period not exceeding 30-minutes.
- Collect groundwater directly from the tubing before the flow-through cell to insure a representative sample is obtained. Purge rates should be adjusted so that the pumping rate does not cause excessive agitation of the groundwater during sampling. Fill the volatile compound containers.
- Temporarily containerize the purge water into a 5-gallon bucket, then transfer to a 55-gallon drum.

SOP C.7 Decontamination

All non-dedicated equipment must be decontaminated between each sampling point or well. Decontamination procedures follow the generalized field procedures in SOP Group D section D.1.2.

APPENDIX

Water Parameter Monitoring Form

Groundwater Sampling Field Information Form

Site Name:

Personnel:

Sample ID:

Sample Date:

Well Data

Depth to Water (feet below TOC):

Initial DTW:

Screen Interval (feet below TOC):

Volume Purged (gallons):

Total Well Depth (feet below TOC):

Purge Start Time:

Well Volume (gallons):

Purge End Time:

Sampling Data

Analysis Type:		Sample Tube Type:	Teflon-lined polyethylene
Sample/Purge Device:	QED Micropurge Pump	Filtered? Yes No	Type:
Pump Intake Elevation (feet below TOC):		**Intake of pump should be the midpoint of the saturated screen/water column.**	

Field Parameters

Time	DTW	Purge Rate	pH	COND (mS/cm)	D.O. (mg/L)	TEMP (°C)	ORP (mV)	Notes
	(ft)	(mL/min)	± 0.1	± 3%	± 10% or ± 0.2 mg/L	± 10%	± 10	

Sample Time:

Notes:

Sample Appearance:

Weather Conditions:

SOP Group D

Standard Operating Procedures for Equipment Cleaning and Decontamination

TABLE OF CONTENTS

SOP Group D

Standard Operating Procedures for Equipment Cleaning and Decontamination

Introduction

The contamination of equipment used at environmental sites is unavoidable. If such contamination goes undetected, inappropriate or even unnecessary remedial actions may result. It is IWM Consulting's policy to use dedicated or disposable sampling equipment whenever feasible. To reduce the possibility of on- or off-site spreading or transferring of contaminants, minimize cross contamination among boreholes and wells, and maintain the integrity of sample analyses, all non-disposable sampling and drilling equipment that contacts potentially contaminated soil, waste, or water must be cleaned and/or decontaminated before it is used.

The following Standard Operating Procedures are minimum guidelines for maintaining analytical integrity and consistency. The Field Team Leader is responsible for implementing these decontamination procedures.

SOP D.1 Decontamination Supplies and General Field Decontamination Procedures

D.1.1 Decontamination Supplies - The following major items are commonly required for avoiding equipment contamination and decontaminating equipment used in the field. The list is not exhaustive and other items may be needed for project-specific decontamination requirements.

1. Latex or nitrile gloves
2. Drums (55-gallon) or other suitable containers for spent wash and rinse water (unless a means for proper on-site disposal exists)
3. Container labels and/or permanent markers
4. Brushes and low-phosphate detergent (e.g., Alconox®)
5. Paper towels
6. Plastic bags to bag disposable items
7. Appropriate decontamination solutions (e.g., de-ionized or distilled water or, more rarely, solvents and acid solutions) specified per the work plan
8. Pails, trays, tubs, squeeze bottles, and other containers
9. High-pressure washer, steam cleaner, or other appropriate equipment (these items may be the responsibility of the drilling or construction contractor)
10. Plastic ground sheeting may be applicable

D.1.2 General Decontamination Procedure - Unless specified in the site-specific work plan, the following general field decontamination procedure is used:

1. Wear clean latex or nitrile gloves during decontamination procedures.
2. Perform the decontamination in an area not subject to combustion engine exhausts or other

potential sources of contaminants.

3. Wash equipment (including cables) that has contacted the sampled media (e.g., water, soil) with an Alconox or low-phosphate detergent solution.
4. Use a brush and/or paper towels as necessary during cleaning. Repeat as necessary. If the wash solution is recycled, the solution is changed periodically.
5. Flush the equipment with potable or distilled/deionized water to remove the detergent solution. If the water is recycled, the water is changed periodically.
6. Final rinse with distilled/deionized water. The final rinse is not reused.

D.1.3 Special Conditions - The use of mineral acids (commonly nitric or hydrochloric) and solvents (e.g., isopropanol, methanol, or hexane) in the field-decontamination process has been greatly reduced or eliminated in recent years. Unless specified in the site-specific work plan, the following additional decontamination steps may be added to the generalized field procedures in D.1.2 if acids or solvents are specified for equipment decontamination.

- If metals are to be analyzed, step 4 of the of the decontamination procedure may be followed with rinsing the sampling equipment with 10% reagent-grade nitric- or hydrochloric- acid solution prior to the final rinse with distilled/deionized water.

- If sampling equipment is contaminated with viscous, adhesive organics (e.g., heavy oils), step 4 of the decontamination procedure may be followed with rinsing the equipment with isopropanol or another organic solvent as specified in the site-specific work plan prior to the final rise with distilled/deionized water.

Drilling equipment and other large field equipment may require high-pressure washer and/or steam cleaners or other appropriate equipment. These items are typically supplied by, and the responsibility of, the drilling or construction contractor. The standard decontamination procedures to be followed for drilling equipment and similar items are presented in section D.3.2.

SOP D.2 Decontamination of Non-Dedicated Equipment

It is IWM Consulting's policy to use dedicated and/or disposable equipment in the field whenever feasible; however, many types of non-disposable, non-dedicated equipment may be used in the course of field operations. The following guidelines provide methods for cleaning non-dedicated equipment used for sampling wells. These methods are observed in the office prior to taking the equipment into the field and in the field between sampling locations.

To minimize equipment contamination during use, sampling operations may be conducted on clean, disposable plastic sheeting or drop cloths placed on the ground around the sampling site. If prior knowledge of site conditions is available, sampling should commence at the least contaminated location and proceed to the most heavily contaminated areas to reduce cross contamination, particularly if reusable sampling equipment is employed.

D.2.1 Water-Level Meters and Interface Probes - Prior to use at each well, water-level meters and interface probes (including cables) are thoroughly cleaned to prevent cross contamination in wells. Unless other methods area specified in the site-specific work plan, the decontamination procedure is as follows:

1. Wear clean latex or nitrile gloves during measurements.
2. Whenever feasible, measurements should proceed from the least contaminated to the most contaminated areas to reduce the likelihood of cross contamination.
3. Prior to use at each location, decontaminate the probe (including the portion of the cable that has contacted the well) following the procedures outlined in the applicable sections of D.1.2 above.
4. While withdrawing the meter cable after gauging, pass the cable through a clean paper towel moistened with distilled/deionized water.

D.2.2 Portable or Submersible Pumps

D.2.2.1 General Procedure. Prior to use at each well, all non-dedicated or non-disposable equipment (pumps, tubing, support and/or electrical cables, etc.) are thoroughly cleaned to prevent cross contamination of samples. Unless specified in the site-specific work plan, decontamination solutions can be pumped from either buckets or short PVC casing sections through the pump, or the pump can be disassembled and flushed with the decontamination solutions. Note that bladder-pump bladders are disposable, designed for one-time use only, and must be replaced between wells. It is recommended that detergents be used sparingly in the decontamination process and that water-flushing steps be extended to ensure that any sediment trapped in the pump is removed. The generalized decontamination procedure is as follows:

1. Wear clean latex or nitrile gloves during decontamination procedures.
2. Flush the equipment/pump with potable water.
3. Flush with an Alconox or low-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

4. Flush with potable or distilled/deionized water to remove the detergent solution. If the water is recycled, the water must be changed periodically.
5. Flush with distilled/deionized water. The final water rinse must not be reused.
6. Place the cleaned pump in an equipment case, a clean polyethylene bag, or protected in a similar manner during storage or transit.

D.2.2.2 Bladder Pumps. Note that for reasons of cross-contamination and leak integrity, bladders are designed for one-time use and are replaced between wells. If the pump is operated outside of the well for decontamination purposes (e.g., in a bucket), an operating pressure of 35 PSI or less should be used to avoid rupturing the bladder. When complete disassembly of a bladder pump is applicable, the decontamination procedure is as follows:

1. Wear clean latex or nitrile gloves during decontamination procedures.
2. Remove pump assembly from air inlet and water discharge tubing.
3. Remove pump-head and bladder covers by unscrewing.
4. Remove grab plate, bladder collar (if used), inlet valve seat, and discharge check-ball stop, o-rings, discharge cover, check balls, and screen (a coin or flat head screwdriver may be necessary to remove the inlet valve seat and discharge check-ball stop, and an o-ring pick or similar device aids greatly in o-ring replacement).
5. Replace expendable bladder.
6. Inspect o-rings, balls, screen, and grab plate for wear and replace if appropriate.
7. The grab plate that secures the air-inlet and water-discharge tubing, which is essential for the pump to function and aid in lowering and raising the pump, is easily deformed and usually require replacing after each use.
8. Clean the disassembled parts including pump covers and support cable, in an Alconox or low-phosphate detergent solution using a brush as necessary to clean the parts.
9. Flush with potable or distilled/deionized water to remove the detergent solution. If the water is recycled, the water must be changed periodically.
10. Flush with distilled/deionized water. The final water rinse must not be reused.
11. Reassemble pump in reverse order.
12. Place the cleaned pump in an equipment case, a clean polyethylene bag, or protected in a similar manner during storage or transit.

D.2.2.3 Electric Submersible Pumps. When disassembly of an electric submersible pump is applicable, the decontamination procedure is as follow:

1. Wear clean latex or nitrile gloves during decontamination procedures.
2. Remove pump assembly from discharge tubing.
3. Disassemble the pump by unscrewing/releasing the discharge adapter, removing the inlet screen, and removing the pump head from the motor case.
4. Inspect the screen and rotor for wear; replace if appropriate.
5. Clean the discharge adapter, inlet screen, rotors, stator, pump-head motor housing support cable, and/or electrical cables in an Alconox or low-phosphate detergent solution using a brush as necessary to clean the parts.
6. Flush with potable or distilled deionized water to remove the detergent solution. If the

water is recycled, the water must be changed periodically.

7. Flush with distilled/deionized water. The final water rinse must not be reused.
8. Place the cleaned pump in an equipment case, a clean polyethylene bag, or protected in a similar manner during storage or transit.

D.2.2.4 Peristaltic Pumps. As water does not pass through (or contact) the working parts of a peristaltic pump, disassembling and decontaminating this type of pump is not necessary; however, the Teflon and polyethylene tubing used during sample collection should be replaced with new, pre-cleaned, disposable tubing between sampling locations to prevent cross-contamination. The pump exterior should be wiped clean if formation water, soil, or similar substance is observed.

D.2.3 Water-Quality Equipment - This category includes pH, conductivity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and multi-probe (e.g., YSI 556 or smarTROLL Handheld Probe) meters; flow-through cells; and similar equipment. Decontamination procedures follow those in section D.1.2. If a flow-through cell is used to monitor field parameters, the cell should be disconnected prior to sample collection even if the cell has been properly decontaminated. The cell is a potential source of contamination and, therefore, ground-water samples collected for laboratory analysis are collected before the water passes through the cell.

D.2.4 Water-Sampling Equipment - This category includes bailers, bailer cord, tubing, and similar equipment. Whenever possible, disposable bailers with inert, disposable, monofilament line (e.g., nylon or polypropylene) is used for sampling. Unless specified in the project-specific work plan, disposable tubing should also be used with sampling pumps. These practices minimize cross contamination among sampling locations. The use of disposable sampling equipment also reduces the volume of de-ionized/distilled water carried into the field and time-consuming decontamination procedures. The need for collecting, characterizing, and disposing of contaminated wash water, rinsate, and spent solvents/acids, and for collecting equipment blanks for analysis is also avoided. In the event that sampling equipment requires field decontamination, the following procedures apply:

1. If a non-disposable bailer is used, the bailer is cleaned prior to each use following the general decontamination procedures described in section D.1.2.
2. If a disposable bailer or bailer cord contacts the ground or other suspected surface, the bailer exterior is thoroughly rinsed with distilled/deionized water. The rinse water is not reused. Alternatively, the bailer and/or cord can be replaced with new disposable equipment.
3. If a bailer or tubing is dedicated to, but not stored (suspended) in, a well, it is stored elsewhere in a manner that protects it from atmospheric and/or other potential sources of contamination (e.g., the bailer may be sealed in plastic, labeled with the well ID and/or location, and stored in a location away from atmospheric and/or other potential contaminant sources).

D.2.5 Field-Filtration Equipment – IWM CONSULTING uses disposable, pre-cleaned, sealed, 0.45-µm filter cartridges (metals analyses only) that are validated for metals under clean-room conditions and do not require cleaning. When practical, approximately 25 to 50 mL of sample are passed through the filter to pre-rinse it prior to filling the sample containers. If the exterior of a filter cartridge contacts the ground or other suspected surface, the filter exterior is thoroughly rinsed with distilled/deionized water. The rinse water is not reused. Alternatively, the filter can be replaced with a new disposable filter.

D.2.6 Sample Bottles - Sample bottles are pre-cleaned at the laboratory and do not require cleaning. Sample bottles should be used directly as obtained from the laboratory; do not reuse sample bottles.

SOP D.3 Field Decontamination of Soil Sampling and Drilling Equipment

D.3.1 Soil Sampling Equipment - Whenever possible, disposable sampling equipment (e.g., geoprobe liners, sampling spatulas, etc.) is used for sampling soil or other solid matrices. Non-disposable soil-sampling equipment includes split spoons, cutting shoes, hand augers, and similar items. If non-disposable equipment is used, the equipment is cleaned prior to each use following the decontamination procedures described in section D.1.2.

D.3.2 Drilling Equipment - To reduce the potential for cross contamination between boreholes, hollow-stem augers, drill rods, bits, core barrels, and portions of the drill rig contacting potentially contaminated materials are decontaminated between holes using the following procedures:

1. Drilling equipment is inspected to verify that it has been properly cleaned before its initial use in the field.
2. After drilling, residual soil is removed from augers, drill rods, and bits using a gloved hand, shovel, screw driver, or similar implements.
3. Upon removing residual soil, drilling equipment is thoroughly cleaned with a high-pressure water washer and/or steam cleaner.
4. A drill bit may be removed from a dirty auger, thoroughly cleaned using either a high-pressure washer or the procedures described in section D.1.2, and used on previously cleaned augers.
5. The cleaning should be performed at a designated area (e.g., on a decontamination pad) where wash water can be readily collected and containerized, if necessary.
6. Wash and rinse water from on-site decontamination is containerized in properly labeled 55-gallon drums or other suitable containers and stored in a designated area pending analysis and ultimate disposal, unless a means for proper disposal exists on site.
7. Where surface soils may potentially contaminate the exterior surfaces of drilling rigs, backhoes, and similar equipment, the equipment is cleaned using one or more of the steps above as appropriate or as specified in the site-specific work plan.

Attachment C

Pace Analytical Services, LLC – Chain of Custody

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company:

Address:

Billing Information:

Report To:

Email To:

Copy To:

Site Collection Info/Address:

Customer Project Name/Number:

State: / County/City:

Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring?
[ ] Yes [ ] No

Collected By (print):

Purchase Order # :
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature):

Turnaround Date Required:

Immediately Packed on Ice:
[ ] Yes [ ] No

Sample Disposal:
[ ] Dispose as appropriate [ ] Return
[ ] Archive: ______________
[ ] Hold: ________________

Rush:
[ ] Same Day [ ] Next Day
[ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day
(Expedite Charges Apply)

Field Filtered (if applicable):
[ ] Yes [ ] No

Analysis: ____________________

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______________

Analyses

Lab Profile/Line:

```
Lab Sample Receipt Checklist:
Custody Seals Present/Intact  Y N NA
Custody Signatures Present    Y N NA
Collector Signature Present   Y N NA
Bottles Intact                Y N NA
Correct Bottles               Y N NA
Sufficient Volume             Y N NA
Samples Received on Ice       Y N NA
VOA - Headspace Acceptable    Y N NA
USDA Regulated Soils          Y N NA
Samples in Holding Time       Y N NA
Residual Chlorine Present     Y N NA
Cl Strips: ___________________
Sample pH Acceptable          Y N NA
pH Strips: ___________________
Sulfide Present               Y N NA
Lead Acetate Strips: ___________

LAB USE ONLY:
Lab Sample # / Comments:
```

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start)		Composite End		Res Cl	# of Ctns											Lab Sample # / Comments
			Date	Time	Date	Time													

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours) : Y N N/A

Lab Tracking #:

Samples received via:
FEDEX UPS Client Courier Pace Courier

```
LAB Sample Temperature Info:
Temp Blank Received:  Y   N   NA
Therm ID#:        ____________
Cooler 1 Temp Upon Receipt: __oC
Cooler 1 Therm Corr. Factor:___oC
Cooler 1 Corrected Temp: _____oC
Comments:
```

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s):
YES / NO

Page: _____
of: _____

Attachment D

Pace Analytical Services, LLC Documentation

STATE OF KANSAS

DEPARTMENT OF HEALTH AND ENVIRONMENT
KANSAS HEALTH & ENVIRONMENTAL LABORATORIES
ENVIRONMENTAL LABORATORY IMPROVEMENT PROGRAM
6810 SE DWIGHT STREET
TOPEKA, KS 66620-0001

PHONE: (785) 296-3811
FAX: (785) 559-5207
KDHE.ELIPO@KS.GOV
WWW.KDHEKS.GOV/ENVLAB

GOVERNOR JEFF COLYER, M.D.
JEFF ANDERSEN, SECRETARY

The Kansas Department of Health and Environment encourages all clients and data users to verify the most current scope of accreditation for certification number E-10177

The analytes tested and the corresponding matrix and method which a laboratory is authorized to perform at any given time will be those indicated in the most recently issued scope of accreditation. The most recent scope of accreditation supersedes all previously issued scopes of accreditation. It is the certified laboratory's responsibility to review this document for any discrepancies. This scope of accreditation will be recalled in the event that your laboratory's certification is revoked.

Accreditation Start: 5/1/2018 Accreditation End: 4/30/2019

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177**

Pace Analytical Services, LLC - Indianapolis IN

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Method ASTM D516-07	
Sulfate	KS
Method EPA 120.1	
Conductivity	KS
Method EPA 1631E	
Mercury	KS
Method EPA 1664A	
Oil & Grease	KS
Method EPA 180.1	
Turbidity	KS
Method EPA 200.7	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Iron	KS
Lead	KS
Magnesium	KS
Manganese	KS

Program/Matrix: *CWA (Non Potable Water)*

	Primary AB
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 200.8	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Lead	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 245.1	
Mercury	KS
Method EPA 300.0	
Bromide	KS
Chloride	KS
Fluoride	KS
Nitrate	KS
Nitrate-nitrite	KS
Nitrite	KS
Sulfate	KS
Method EPA 335.4	
Cyanide	KS

Program/Matrix: *CWA (Non Potable Water)*

	Primary AB
Method EPA 350.1	
Ammonia as N	KS
Method EPA 351.2	
Total Kjeldahl Nitrogen (TKN)	KS
Method EPA 351.2 minus EPA 350.1	
Organic nitrogen	KS
Method EPA 353.2	
Nitrate	KS
Nitrate-nitrite	KS
Nitrite	KS
Method EPA 365.1	
Phosphorus	KS
Method EPA 410.4	
Chemical oxygen demand	KS
Method EPA 420.4	
Total phenolics	KS
Method EPA 6010B	
Arsenic	KS
Cadmium	KS
Copper	KS
Lead	KS
Lithium	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Strontium	KS
Total chromium	KS
Zinc	KS
Method EPA 6020	
Arsenic	KS
Cadmium	KS
Copper	KS
Lead	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Total chromium	KS
Zinc	KS
Method EPA 608.3 GC-ECD	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
Aroclor-1016 (PCB-1016)	KS

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS
Endrin	KS
Endrin aldehyde	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
Heptachlor	KS
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS

Method EPA 624.1

1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Dichloroethane (Ethylene dichloride)	KS
1,3-Dichlorobenzene	KS
1,4-Dichlorobenzene	KS
2-Chloroethyl vinyl ether	KS
Acrolein (Propenal)	KS
Acrylonitrile	KS
Benzene	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
cis-1,3-Dichloropropene	KS
Ethylbenzene	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methylene chloride (Dichloromethane)	KS

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Naphthalene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl chloride	KS
Xylene (total)	KS

Method EPA 625.1

1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,3-Dichlorobenzene	KS
1,4-Dichlorobenzene	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Nitrophenol	KS
3,3'-Dichlorobenzidine	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chlorophenyl phenylether	KS
4-Nitrophenol	KS
Acenaphthene	KS
Acenaphthylene	KS
Anthracene	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
bis(2-Chloroethoxy)methane	KS
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Dibenz(a,h) anthracene	KS
Diethyl phthalate	KS

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachloroethane	KS
Indeno(1,2,3-cd) pyrene	KS
Isophorone	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodimethylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
Pentachlorophenol	KS
Phenanthrene	KS
Phenol	KS
Pyrene	KS

Method EPA 7470A

Mercury	KS

Method EPA 7471A

Mercury	KS

Method EPA 8015D

Propylene glycol	KS

Method EPA 8260C

1,1,2-Trichloro-1,2,2-trifluoroethane	KS
1,3,5-Trichlorobenzene	KS

Method EPA 8270C

1-Methylnaphthalene	KS
Carbazole	KS

Method EPA RSK-175 (GC/FID)

Ethane	KS
Ethene	KS
Methane	KS

Method SM 2310 B-2011

Acidity, as CaCO3	KS

Method SM 2320 B-1997

Alkalinity as CaCO3	KS

Method SM 2320 B-2011

Alkalinity as CaCO3	KS

Method SM 2340 B-1997

Hardness	KS

Method SM 2340 B-2011

Program/Matrix: *CWA (Non Potable Water)*

	Primary AB
Hardness	KS
Method SM 2540 B-2011	
Residue-total	KS
Method SM 2540 C-2011	
Residue-filterable (TDS)	KS
Method SM 2540 D-2011	
Residue-nonfilterable (TSS)	KS
Method SM 2540 F-2011	
Residue-settleable	KS
Method SM 3500-Cr B-2011	
Chromium VI	KS
Method SM 4500-Cl G-2000	
Total residual chlorine	KS
Method SM 4500-Cl G-2011	
Total residual chlorine	KS
Method SM 4500-Cl$^-$ E-1997	
Chloride	KS
Method SM 4500-Cl$^-$ E-2011	
Chloride	KS
Method SM 4500-CN$^-$ C-2011	
Cyanide	KS
Method SM 4500-CN$^-$ E-2011	
Cyanide	KS
Method SM 4500-CN$^-$ G-2011	
Amenable cyanide	KS
Method SM 4500-F$^-$ C-1997	
Fluoride	KS
Method SM 4500-F$^-$ C-2011	
Fluoride	KS
Method SM 4500-H+ B-2000	
pH	KS
Method SM 4500-H+ B-2011	
pH	KS
Method SM 4500-NH3 G-1997	
Ammonia as N	KS
Method SM 4500-NH3 G-2011	
Ammonia as N	KS
Method SM 4500-P E-1999	
Orthophosphate as P	KS
Phosphorus	KS
Method SM 4500-P E-2011	
Orthophosphate as P	KS

	Primary AB
Program/Matrix: *CWA (Non Potable Water)*	
Phosphorus	KS
Method SM 4500-S2^{-} D-2000	
Sulfide	KS
Method SM 5210 B-2011	
Biochemical oxygen demand	KS
Carbonaceous BOD, CBOD	KS
Method SM 5310 C-2011	
Total organic carbon	KS
Method SM 5540 C-2011	
Surfactants - MBAS	KS
Method Sulfate Ion in Water	
Sulfate	KS
Method TKN-NH3-CAL	
Organic nitrogen	KS

Program/Matrix: ***RCRA (Non Potable Water)***

Method **EPA 1010A**

Ignitability	KS

Method **EPA 1311**

Toxicity Characteristic Leaching Procedure (TCLP)	KS

Method **EPA 1312**

Synthetic Precipitation Leaching Procedure (SCLP)	KS

Method **EPA 6010B**

Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Iron	KS
Lead	KS
Magnesium	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS

Method **EPA 6020**

Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Lead	KS
Manganese	KS

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Vanadium	KS
Zinc	KS
Method EPA 7196A	
Chromium VI	KS
Method EPA 7470A	
Mercury	KS
Method EPA 7471A	
Mercury	KS
Method EPA 8011	
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
Method EPA 8015D	
Diesel range organics (DRO)	KS
Ethanol	KS
Ethylene glycol	KS
Gasoline range organics (GRO)	KS
Isobutyl alcohol (2-Methyl-1-propanol)	KS
Isopropyl alcohol (2-Propanol, Isopropanol)	KS
Methanol	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Propanol (1-Propanol)	KS
Method EPA 8081B	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
alpha-Chlordane, cis-Chlordane	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS
Endrin	KS
Endrin aldehyde	KS
Endrin ketone	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
gamma-Chlordane	KS
Heptachlor	KS

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS
Method EPA 8082A	
Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS
Method EPA 8141B	
Atrazine	KS
Azinphos-methyl (Guthion)	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Parathion, ethyl	KS
Phorate	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) E-isomer	KS
Method EPA 8151A	
2,4,5-T	KS
2,4-D	KS
2,4-DB	KS
3,5-Dichlorobenzoic acid	KS
Acifluorfen	KS
Bentazon	KS
Chloramben	KS
Dalapon	KS
DCPA di acid degradate	KS
Dicamba	KS
Dichloroprop (Dichlorprop)	KS
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	KS

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
MCPA	KS
MCPP	KS
Pentachlorophenol	KS
Picloram	KS
Silvex (2,4,5-TP)	KS

Method EPA 8260C

	Primary AB
1,1,1,2-Tetrachloroethane	KS
1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloro-1,2,2-trifluoroethane	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,1-Dichloropropene	KS
1,2,3-Trichlorobenzene	KS
1,2,3-Trichloropropane	KS
1,2,4-Trichlorobenzene	KS
1,2,4-Trimethylbenzene	KS
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Dichloroethane (Ethylene dichloride)	KS
1,2-Dichloropropane	KS
1,3,5-Trichlorobenzene	KS
1,3,5-Trimethylbenzene	KS
1,3-Dichlorobenzene	KS
1,3-Dichloropropane	KS
1,4-Dichlorobenzene	KS
1,4-Dioxane (1,4- Diethyleneoxide)	KS
2,2-Dichloropropane	KS
2-Butanone (Methyl ethyl ketone, MEK)	KS
2-Chloroethyl vinyl ether	KS
2-Chlorotoluene	KS
2-Hexanone	KS
4-Chlorotoluene	KS
4-Isopropyltoluene (p-Cymene,p-Isopropyltoluene)	KS
4-Methyl-2-pentanone (MIBK)	KS
Acetone	KS
Acetonitrile	KS
Acrolein (Propenal)	KS
Acrylonitrile	KS
Allyl chloride (3-Chloropropene)	KS
Benzene	KS
Bromobenzene	KS
Bromochloromethane	KS
Bromodichloromethane	KS

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Bromoform	KS
Carbon disulfide	KS
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
cis-1,2-Dichloroethylene	KS
cis-1,3-Dichloropropene	KS
Dibromomethane (Methylene bromide)	KS
Dichlorodifluoromethane (Freon-12)	KS
Diethyl ether	KS
Ethyl acetate	KS
Ethyl methacrylate	KS
Ethylbenzene	KS
Hexachlorobutadiene	KS
Iodomethane (Methyl iodide)	KS
Isopropylbenzene	KS
Methacrylonitrile	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methyl methacrylate	KS
Methyl tert-butyl ether (MTBE)	KS
Methylene chloride (Dichloromethane)	KS
m-Xylene	KS
Naphthalene	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Butylbenzene	KS
n-Propylbenzene	KS
o-Xylene	KS
Propionitrile (Ethyl cyanide)	KS
p-Xylene	KS
sec-Butylbenzene	KS
Styrene	KS
tert-Butyl alcohol	KS
tert-Butylbenzene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
trans-1,4-Dichloro-2-butene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl chloride	KS
Xylene (total)	KS

Method EPA 8270C

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
1,2,4,5-Tetrachlorobenzene	KS
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Diphenylhydrazine	KS
1,3-Dichlorobenzene	KS
1,3-Dinitrobenzene (1,3-DNB)	KS
1,4-Dichlorobenzene	KS
1,4-Naphthoquinone	KS
1,4-Phenylenediamine	KS
1-Methylnaphthalene	KS
1-Naphthylamine	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,3,4,6-Tetrachlorophenol	KS
2,4,5-Trichlorophenol	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dichlorophenol	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Acetylaminofluorene	KS
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Methylaniline (o-Toluidine)	KS
2-Methylnaphthalene	KS
2-Methylphenol (o-Cresol)	KS
2-Naphthylamine	KS
2-Nitroaniline	KS
2-Nitrophenol	KS
2-Picoline (2-Methylpyridine)	KS
3,3'-Dichlorobenzidine	KS
3,3'-Dimethylbenzidine	KS
3-Methylcholanthrene	KS
3-Methylphenol (m-Cresol)	KS
3-Nitroaniline	KS
4-Aminobiphenyl	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chloroaniline	KS
4-Chlorophenyl phenylether	KS
4-Dimethyl aminoazobenzene	KS
4-Methylphenol (p-Cresol)	KS
4-Nitroaniline	KS
4-Nitrophenol	KS
4-Nitroquinoline 1-oxide	KS

Program/Matrix: *RCRA (Non Potable Water)*

5-Nitro-o-toluidine	KS
7,12-Dimethylbenz(a) anthracene	KS
a-a-Dimethylphenethylamine	KS
Acenaphthene	KS
Acenaphthylene	KS
Acetophenone	KS
Aniline	KS
Anthracene	KS
Aramite	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Benzoic acid	KS
Benzyl alcohol	KS
bis(2-Chloroethoxy)methane	KS
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Carbazole	KS
Chlorobenzilate	KS
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Diallate	KS
Dibenz(a,h) anthracene	KS
Diethyl phthalate	KS
Dimethoate	KS
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Diphenylamine	KS
Disulfoton	KS
Ethyl methanesulfonate	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachlorocyclopentadiene	KS
Hexachloroethane	KS
Hexachlorophene	KS
Hexachloropropene	KS
Indeno(1,2,3-cd) pyrene	KS
Isodrin	KS
Isophorone	KS
Isosafrole	KS

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Kepone	KS
Methapyrilene	KS
Methyl methanesulfonate	KS
Methyl parathion (Parathion, methyl)	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodiethylamine	KS
n-Nitrosodimethylamine	KS
n-Nitroso-di-n-butylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
n-Nitrosomethylethalamine	KS
n-Nitrosomorpholine	KS
n-Nitrosopiperidine	KS
n-Nitrosopyrrolidine	KS
o,o,o-Triethyl phosphorothioate	KS
Parathion, ethyl	KS
Pentachlorobenzene	KS
Pentachloronitrobenzene	KS
Pentachlorophenol	KS
Phenacetin	KS
Phenanthrene	KS
Phenol	KS
Phorate	KS
Pronamide (Kerb)	KS
Pyrene	KS
Pyridine	KS
Safrole	KS
Sulfotep (Tetraethyl dithiopyrophosphate)	KS
Thionazin (Zinophos)	KS
Method EPA 9012A	
Amenable cyanide	KS
Cyanide	KS
Method EPA 9045C	
pH	KS
Method EPA 9056A	
Bromide	KS
Chloride	KS
Fluoride	KS
Nitrate	KS
Nitrite	KS
Sulfate	KS
Method EPA 9066	
Total phenolics	KS
Method EPA 9095B	
Paint Filter Test	KS

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Method EPA 1010A	
Ignitability	KS
Method EPA 1311	
Toxicity Characteristic Leaching Procedure (TCLP)	KS
Method EPA 1312	
Synthetic Precipitation Leaching Procedure (SCLP)	KS
Method EPA 6010B	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Iron	KS
Lead	KS
Magnesium	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 6020	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Lead	KS
Manganese	KS

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Vanadium	KS
Zinc	KS
Method EPA 7196A	
Chromium VI	KS
Method EPA 7470A	
Mercury	KS
Method EPA 7471A	
Mercury	KS
Method EPA 8015D	
Diesel range organics (DRO)	KS
Ethanol	KS
Ethylene glycol	KS
Gasoline range organics (GRO)	KS
Isobutyl alcohol (2-Methyl-1-propanol)	KS
Isopropyl alcohol (2-Propanol, Isopropanol)	KS
Methanol	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Propanol (1-Propanol)	KS
Method EPA 8081B	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
alpha-Chlordane, cis-Chlordane	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS
Endrin	KS
Endrin aldehyde	KS
Endrin ketone	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
gamma-Chlordane	KS
Heptachlor	KS
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

Method EPA 8082A

Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS

Method EPA 8141B

Atrazine	KS
Azinphos-methyl (Guthion)	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Parathion, ethyl	KS
Phorate	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) E-isomer	KS

Method EPA 8260C

1,1,1,2-Tetrachloroethane	KS
1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloro-1,2,2-trifluoroethane	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,1-Dichloropropene	KS
1,2,3-Trichlorobenzene	KS
1,2,3-Trichloropropane	KS
1,2,4-Trichlorobenzene	KS
1,2,4-Trimethylbenzene	KS
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
1,2-Dichloroethane (Ethylene dichloride)	KS
1,2-Dichloropropane	KS
1,3,5-Trichlorobenzene	KS
1,3,5-Trimethylbenzene	KS
1,3-Dichlorobenzene	KS
1,3-Dichloropropane	KS
1,4-Dichlorobenzene	KS
1,4-Dioxane (1,4- Diethyleneoxide)	KS
2,2-Dichloropropane	KS
2-Butanone (Methyl ethyl ketone, MEK)	KS
2-Chloroethyl vinyl ether	KS
2-Chlorotoluene	KS
2-Hexanone	KS
4-Chlorotoluene	KS
4-Isopropyltoluene (p-Cymene,p-Isopropyltoluene)	KS
4-Methyl-2-pentanone (MIBK)	KS
Acetone	KS
Acetonitrile	KS
Acrolein (Propenal)	KS
Acrylonitrile	KS
Allyl chloride (3-Chloropropene)	KS
Benzene	KS
Bromobenzene	KS
Bromochloromethane	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon disulfide	KS
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
cis-1,2-Dichloroethylene	KS
cis-1,3-Dichloropropene	KS
Dibromomethane (Methylene bromide)	KS
Dichlorodifluoromethane (Freon-12)	KS
Diethyl ether	KS
Ethyl acetate	KS
Ethyl methacrylate	KS
Ethylbenzene	KS
Hexachlorobutadiene	KS
Iodomethane (Methyl iodide)	KS
Isopropylbenzene	KS
Methacrylonitrile	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methyl methacrylate	KS

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

Methyl tert-butyl ether (MTBE)	KS
Methylene chloride (Dichloromethane)	KS
m-Xylene	KS
Naphthalene	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Butylbenzene	KS
n-Propylbenzene	KS
o-Xylene	KS
Propionitrile (Ethyl cyanide)	KS
p-Xylene	KS
sec-Butylbenzene	KS
Styrene	KS
tert-Butyl alcohol	KS
tert-Butylbenzene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
trans-1,4-Dichloro-2-butene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl chloride	KS
Xylene (total)	KS

Method EPA 8270C

1,2,4,5-Tetrachlorobenzene	KS
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Diphenylhydrazine	KS
1,3-Dichlorobenzene	KS
1,3-Dinitrobenzene (1,3-DNB)	KS
1,4-Dichlorobenzene	KS
1,4-Naphthoquinone	KS
1,4-Phenylenediamine	KS
1-Methylnaphthalene	KS
1-Naphthylamine	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,3,4,6-Tetrachlorophenol	KS
2,4,5-Trichlorophenol	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dichlorophenol	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Acetylaminofluorene	KS

Program/Matrix: *RCRA (Solid & Hazardous Material)*

	Primary AB
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Methylaniline (o-Toluidine)	KS
2-Methylnaphthalene	KS
2-Methylphenol (o-Cresol)	KS
2-Naphthylamine	KS
2-Nitroaniline	KS
2-Nitrophenol	KS
2-Picoline (2-Methylpyridine)	KS
3,3'-Dichlorobenzidine	KS
3,3'-Dimethylbenzidine	KS
3-Methylcholanthrene	KS
3-Methylphenol (m-Cresol)	KS
3-Nitroaniline	KS
4-Aminobiphenyl	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chloroaniline	KS
4-Chlorophenyl phenylether	KS
4-Dimethyl aminoazobenzene	KS
4-Methylphenol (p-Cresol)	KS
4-Nitroaniline	KS
4-Nitrophenol	KS
4-Nitroquinoline 1-oxide	KS
5-Nitro-o-toluidine	KS
7,12-Dimethylbenz(a) anthracene	KS
a-a-Dimethylphenethylamine	KS
Acenaphthene	KS
Acenaphthylene	KS
Acetophenone	KS
Aniline	KS
Anthracene	KS
Aramite	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Benzoic acid	KS
Benzyl alcohol	KS
bis(2-Chloroethoxy)methane	KS
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Carbazole	KS
Chlorobenzilate	KS

Program/Matrix: *RCRA (Solid & Hazardous Material)*	**Primary AB**
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Diallate	KS
Dibenz(a,h) anthracene	KS
Diethyl phthalate	KS
Dimethoate	KS
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Diphenylamine	KS
Disulfoton	KS
Ethyl methanesulfonate	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachlorocyclopentadiene	KS
Hexachloroethane	KS
Hexachlorophene	KS
Hexachloropropene	KS
Indeno(1,2,3-cd) pyrene	KS
Isodrin	KS
Isophorone	KS
Isosafrole	KS
Kepone	KS
Methapyrilene	KS
Methyl methanesulfonate	KS
Methyl parathion (Parathion, methyl)	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodiethylamine	KS
n-Nitrosodimethylamine	KS
n-Nitroso-di-n-butylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
n-Nitrosomethylethalamine	KS
n-Nitrosomorpholine	KS
n-Nitrosopiperidine	KS
n-Nitrosopyrrolidine	KS
o,o,o-Triethyl phosphorothioate	KS
Parathion, ethyl	KS
Pentachlorobenzene	KS
Pentachloronitrobenzene	KS
Pentachlorophenol	KS
Phenacetin	KS
Phenanthrene	KS

Pace Analytical Services, LLC - Indianapolis IN

	Primary AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***	
Phenol	KS
Phorate	KS
Pronamide (Kerb)	KS
Pyrene	KS
Pyridine	KS
Safrole	KS
Sulfotep (Tetraethyl dithiopyrophosphate)	KS
Thionazin (Zinophos)	KS
Method **EPA 9012A**	
Amenable cyanide	KS
Cyanide	KS
Method **EPA 9045C**	
pH	KS
Method **EPA 9066**	
Total phenolics	KS
Method **EPA 9095B**	
Paint Filter Test	KS

End of Scope of Accreditation

Target Analyte	CAS Number	Method	RL ug/L	MDL ug/L	2018 RCG Ground Water Tap Limit ug/L	LCS Limits % Rec.	MS/MSD Limits % Rec.	RPD Max %
1,1-Dichloroethane (DCA)	75-34-3	8260C	5.0	0.6	28	NA	NA	NA
1,2-Dichloroethane (EDC)	107-06-2	8260C	5.0	0.6	5	NA	NA	NA
cis -1,2-Dichloroethene	156-59-2	8260C	5.0	0.65	70	NA	NA	NA
trans -1,2-Dichloroethene	156-60-5	8260C	5.0	0.86	100	NA	NA	NA
Methylene Chloride (Dichloromethane)	75-09-2	8260C	5.0	5.0	5	NA	NA	NA
Tetrachloroethene (PCE)	127-18-4	8260C	5.0	0.93	5	76-116	34-140	20
1,1,1-Trichloroethane (TCA)	71-55-6	8260C	5.0	0.89	200	74-126	50-141	20
Trichloroethene (TCE)	79-01-6	8260C	5.0	0.8	5	76-120	40-141	20
Vinyl Chloride (Chloroethene)	75-01-4	8260C	2.0	0.97	2	64-155	46-164	20

NOTES:

Compounds, Reporting Limits, Method Detection Limits, Control Limits, and/or Method versions are subject to change.

[a] Limit not achievable

[b] Limit may be achievable based on MDL - check with laboratory

[c] Limit not achievable, must use 8270 PAH-SIM method to achieve this limit

*****Synonym: 1,1,2-Trichloro-1,2,2-trifluoroethane

Attachment E

Applicable USEPA Regional Screening Levels
(Site specific shortlist only)

Resident Vapor Intrusion Screening Levels (VISL) - May 2018

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=1) MIN($C_{ia,c}$,$C_{ia,nc}$) (µg/m^3)	Toxicity Basis	Target Sub-Slab and Near-Source Soil Gas Concentration (TCR=1E-06 or THQ=1) C_{sg},Target (µg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) C_{gw},Target (µg/L)
Dichloroethane, 1,1-	75-34-3	Yes	Yes	Yes	Yes	1.8E+00	CA	5.9E+01	7.6E+00
Dichloroethane, 1,2-	107-06-2	Yes	Yes	Yes	Yes	1.1E-01	CA	3.6E+00	2.2E+00
Dichloroethylene, 1,2-trans-	156-60-5	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-
Methylene Chloride	75-09-2	Yes	Yes	Yes	Yes	1.0E+02	CA	3.4E+03	7.6E+02
Tetrachloroethylene	127-18-4	Yes	Yes	Yes	Yes	1.1E+01	CA	3.6E+02	1.5E+01
Trichloroethane, 1,1,1-	71-55-6	Yes	Yes	Yes	Yes	5.2E+03	NC	1.7E+05	7.4E+03
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	4.8E-01	CA	1.6E+01	1.2E+00
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	1.7E-01	CA	5.6E+00	1.5E-01

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Output generated 17MAY2018:16:51:50