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Department of Energy

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May 1, 2020

PPPO-02-10004497-20D

Mr. Brian Begley
Federal Facility Agreement Manager
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Boulevard, 2nd Floor
Frankfort, Kentucky 40601

Ms. Julie Corkran
Federal Facility Agreement Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Dear Mr. Begley and Ms. Corkran:

TRANSMITTAL OF THE PADUCAH GASEOUS DIFFUSION PLANT INDUSTRIAL AREA VAPOR INTRUSION PRELIMINARY INVESTIGATION WORK PLAN FOR THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, DOE/LX/07-2447&D1

Please find enclosed for review the *Paducah Gaseous Diffusion Plant Industrial Area Vapor Intrusion Preliminary Investigation Work Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-2447&D1. This work plan was developed to implement, in part, the signed "Memorandum of Agreement for Resolution of Final Dispute Concerning Kentucky Department for Environmental Protection Nonconcurrence and U.S. Environmental Protection Agency Conditions Submitted on the *Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision, Fiscal Year 2018*, DOE/LX/07-2418&D2," and the work plan is consistent with subsequent scoping discussions among the Federal Facility Agreement parties held September 2019 through January 2020.

In accordance with Section XX.G of the Federal Facility Agreement, the Kentucky Department for Environmental Protection and the U.S. Environmental Protection Agency have a 90-day review and comment period.

If you have any questions or require additional information, please contact Rich Bonczek at (859) 219-4051.

Sincerely,

Tracey Duncan
Federal Facility Agreement Manager
Portsmouth/Paducah Project Office

Enclosure:
Vapor Intrusion Preliminary Investigation Work Plan, DOE/LX/07-2447&D1

Administrative Record File—ARF ARR and GWARC

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DOE/LX/07-2447&D1
Secondary Document

Paducah Gaseous Diffusion Plant Industrial Area Vapor Intrusion Preliminary Investigation Work Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

DEPARTMENT OF ENERGY
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DOE/LX/07-2447&D1
Secondary Document

Paducah Gaseous Diffusion Plant Industrial Area Vapor Intrusion Preliminary Investigation Work Plan for the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—May 2020

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under Contract DE-EM0004895

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FIGURES

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ACRONYMS

amsl	above mean sea level
bgs	below ground surface
CSM	conceptual site model
DNAPL	dense nonaqueous-phase liquid
DOE	U.S. Department of Energy
DPT	direct-push technology
EPA	U.S. Environmental Protection Agency
HU	hydrogeologic unit
HVAC	heating, ventilation, and air conditioning
IH	industrial hygiene
KDEP	Kentucky Department for Environmental Protection
MOA	memorandum of agreement
mya	million years ago
OREIS	Oak Ridge Environmental Information System
PEGASIS	PPPO Environmental Geographic Analytical Information System
PEM	preemptive mitigation
PGDP	Paducah Gaseous Diffusion Plant
PI	preliminary investigation
PPPO	Portsmouth/Paducah Project Office
QAPP	quality assurance project plan
RGA	Regional Gravel Aquifer
SOP	standard operating procedure
SWMU	solid waste management unit
UCRS	Upper Continental Recharge System
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VI	vapor intrusion
VISL	vapor intrusion screening level
VOC	volatile organic compound
WP	work plan

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1. INTRODUCTION

This work plan (WP) has been developed in response to the March 2019 *Memorandum of Agreement for Resolution of Formal Dispute Concerning Kentucky Department for Environmental Protection Nonconcurrence and U.S. Environmental Protection Agency Conditions Submitted on the Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Annual Revision-Fiscal Year 2018*, DOE/LX/07-2418&D2 (MOA) (DOE 2019a). The Paducah Site generally means the property, programs, and facilities at or near Paducah Gaseous Diffusion Plant (PGDP) for which the U.S. Department of Energy (DOE) has ultimate responsibility. The WP will (1) document the DOE PGDP industrial area vapor intrusion (VI) conceptual site model (CSM) for facilities within the PGDP industrial area; (2) document the CSM-based selection process for facilities that will be included in the preliminary investigation (PI); and (3) provide assessment methods to guide collection of vapor samples during the PI to evaluate if the VI pathway presents an unacceptable risk to human health under current conditions. Based on the MOA, the following text was added to Appendix 3 of the Site Management Plan (SMP) in the Dissolved-Phase Groundwater Operable Unit section:

> DOE will develop a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Work Plan and Report to focus on PGDP buildings located over the groundwater plumes, consistent with EPA vapor intrusion guidance, with input from EPA and KDEP…. The work plan will identify the information to be obtained and decision criteria for responding to the question of whether vapor intrusion from volatile organic compounds in soils and groundwater poses a potential threat to human health in buildings located over these areas at the Paducah Site and if human exposure to vapor intrusion is under control. Upon completion of the assessment, a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report will be issued by DOE (scheduled in FY 2021).
>
> …The report will specify whether any additional actions are necessary to satisfy the question of potential threat to human health from vapor intrusion and/or to bring human exposure to vapor intrusion under control…(DOE 2019b).

Scoping meetings relating to the PI were held among DOE, the Kentucky Department for Environmental Protection (KDEP), and the U.S. Environmental Protection Agency (EPA) on September 27, 2019; October 17, 2019; October 30, 2019; November 22, 2019; December 18, 2019; and January 14, 2020. Slides from the presentations are provided as Appendix A. The path forward based on these meetings was to (1) compile and evaluate the available historical data in the context of a sitewide VI CSM; (2) use the VI CSM to prioritize the buildings with the greatest potential for a complete vapor intrusion pathway for sampling during the PI; (3) generate a PI WP for VI sampling to evaluate the impact of potential VI on the prioritized buildings indoor air; and (4) provide recommendation for further investigation, as necessary.

DOE's compilation of available historical data identified existing information relevant to the assessment of sitewide VI. The 2015 EPA VI Technical Guide, *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (EPA 2015), distinguishes "two general levels of VI assessments," which include (1) a preliminary analysis that uses available information to develop an initial understanding of the potential for human health risks to be posed by VI; and (2) a detailed investigation recommended when the preliminary VI analysis indicates that subsurface contamination with vapor-forming chemicals may be present underlying or near buildings. EPA VI guidance states, "the approach for assessing VI will vary from site to site" and the "Technical Guide, therefore, recommends a framework for planning and conducting VI investigations, rather than a prescriptive step-by-step approach to be applied at every site."

The following details the organization of the remainder of this WP.

- Section 2 summarizes the purpose of this PGDP Industrial Area VI Preliminary Investigation WP.
- Section 3 defines the investigation boundaries.
- Section 4 presents background information on PGDP and its investigation history consistent with the 2015 EPA VI Technical Guide.
- Section 5 provides documentation that a preliminary assessment of the PGDP industrial area VI pathway indicates additional evaluation of the VI pathway is warranted and presents the selection process for prioritizing buildings for additional evaluation of the VI pathway during the PI.
- Section 6 presents a detailed evaluation of the existing site information and data in the context of a PGDP Industrial Area VI CSM.
- Section 7 provides the locations and rationale based on the CSM for the proposed sampling needed to help evaluate the completeness of the VI pathway at PI buildings.
- Section 8 documents how vapor samples will be collected and analyzed.
- Section 9 summarizes how the sampling results will be evaluated.
- Section 10 provides decision rules to develop conclusions about the impact of VI on the indoor air of PI buildings and recommendations for further investigation, as necessary.
- Section 11 discusses implementing preemptive mitigation measures as necessary to protect human health.
- Section 12 references the project quality assurance project plan (QAPP).
- Section 13 discusses how the VI PI results will be presented.
- Section 14 provides references.

The information gathered as a result of this WP and evaluated in the context of the PGDP industrial area and building-specific VI CSMs will be used to help evaluate whether measured volatile organic compound (VOC) concentrations in indoor air [primarily trichloroethene (TCE)] present an unacceptable risk to human health due to VI in PI buildings.

2. PURPOSE

This WP has the following purposes:

1. Provide a compilation and summary of existing information and data relevant to the PGDP Industrial Area VI CSM at PGDP;
2. Summarize the PGDP Industrial Area VI CSM and present rationale for prioritizing certain facilities with the highest likelihood of a complete VI pathway for further VI evaluation during the PI;

3. Present the rationale for VI sampling at PI buildings (those facilities that meet the definition of building and were retained for sampling);

4. Recommend screening levels based on current toxicity values and risk assessment methodology;

5. Describe the sampling and analysis needed to evaluate whether VOC (primarily TCE) concentrations from VI present an unacceptable risk to human health in selected PI buildings; and

6. Provide decision rules for evaluating the data collected as part of this study and recommending further VI investigation, as necessary.

3. INVESTIGATION BOUNDARIES

The PGDP Industrial Area VI PI study area is bounded on the bottom by the first available groundwater, either in the Regional Gravel Aquifer (RGA) to the north or in the terrace deposits to the south. The PI study area is bounded on top by indoor air and the outdoor air surrounding PI facilities. The lateral boundaries include occupied or potentially occupiable buildings[1] (PI facilities) within PGDP industrial area, including buildings at the C-746-U Landfill area.

Historical soil data collected since 1989 and groundwater data collected between 2014 and 2019 were used to make decisions about which facilities to sample during the PI. The heating season is the target time frame for VI sampling, when stack effects that can enhance VI are more likely to be active.

4. SITE BACKGROUND

4.1 FACILITY DESCRIPTION

PGDP (EPA site identification number KY8890008982) is located in McCracken County in western Kentucky, about 3.5 miles south of the Ohio River and approximately 10 miles west of the city of Paducah (Figure 1). The DOE-owned PGDP site is 3,556 acres (Figure 2). The site and buffer zone were approximately 750 acres in size when the plant was operational (Figure 3).

PGDP is an inactive gaseous diffusion plant that was used to produce enriched uranium beginning in 1952. The facility first was owned and managed by the Atomic Energy Commission and the Energy Research and Development Administration, DOE's predecessors; DOE then managed PGDP until 1993. On July 1, 1993, United States Enrichment Corporation assumed management and operation of the PGDP enrichment facility under a lease agreement with DOE that continued until October 2014 when the facility was returned to DOE. DOE retains ownership of PGDP.

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[1] Definition is based on EPA's definition of "building" in the 2015 EPA VI Guidance.

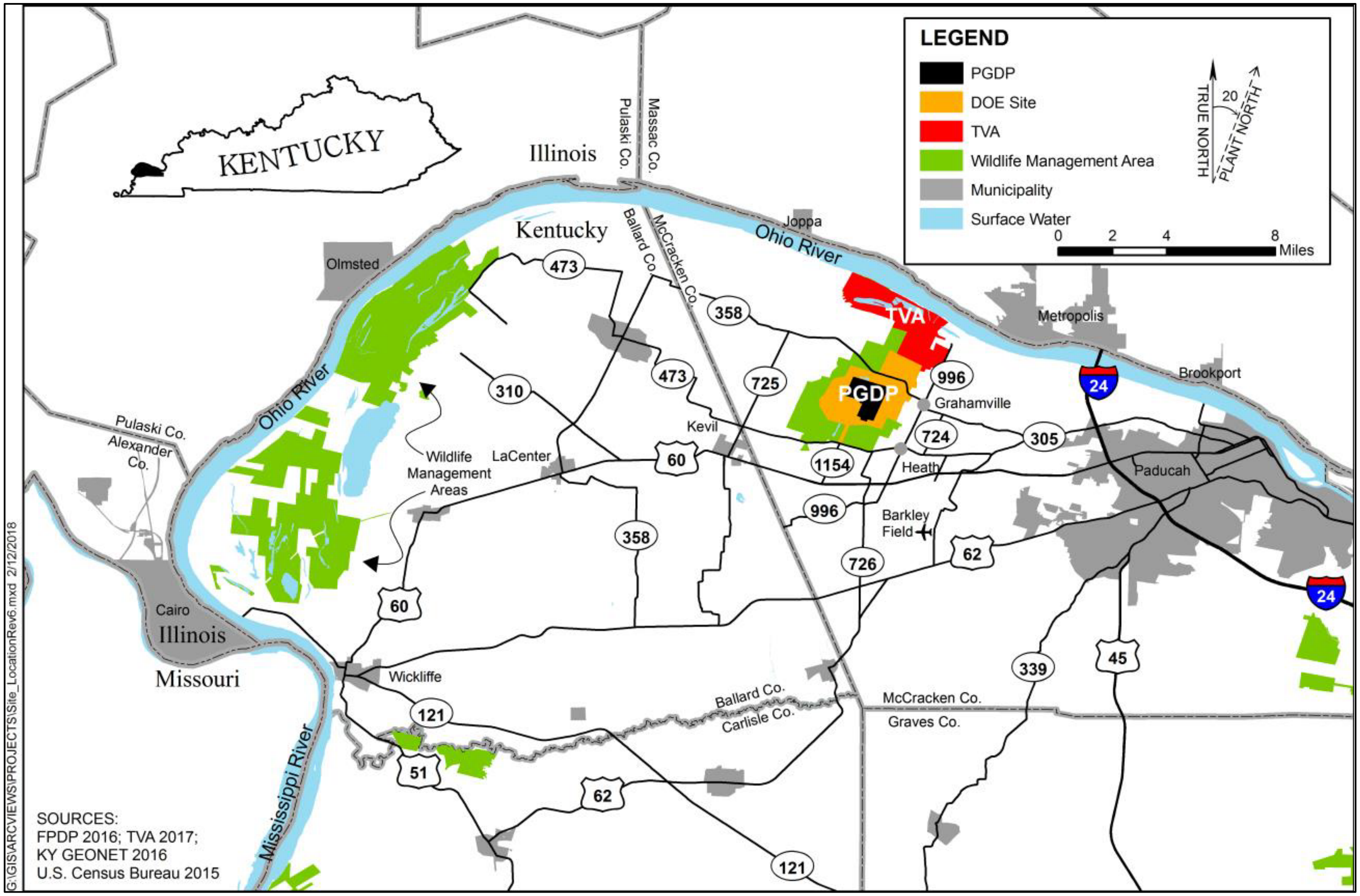

Figure 1. PGDP Vicinity Map

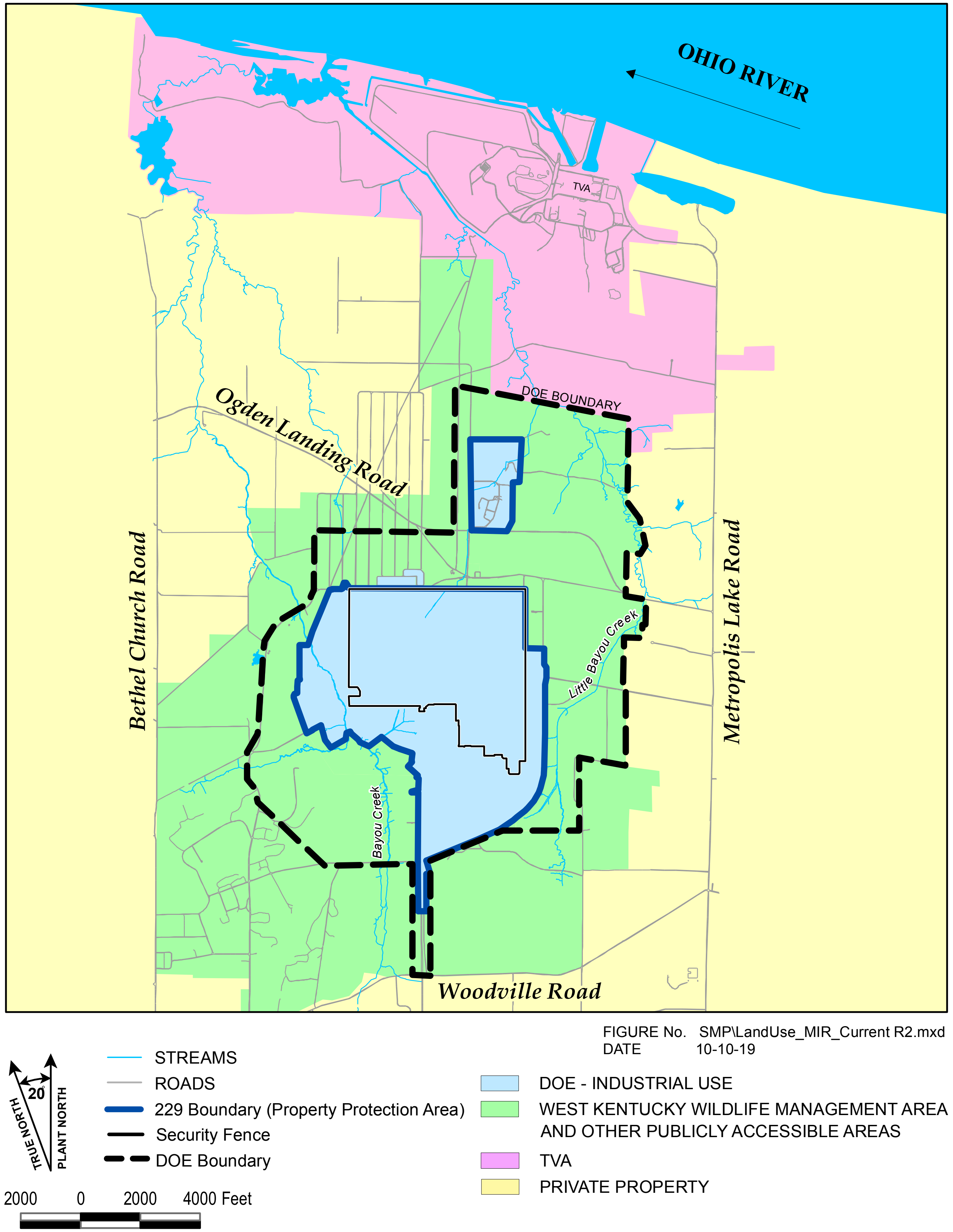

Figure 2. PGDP Current Land Use

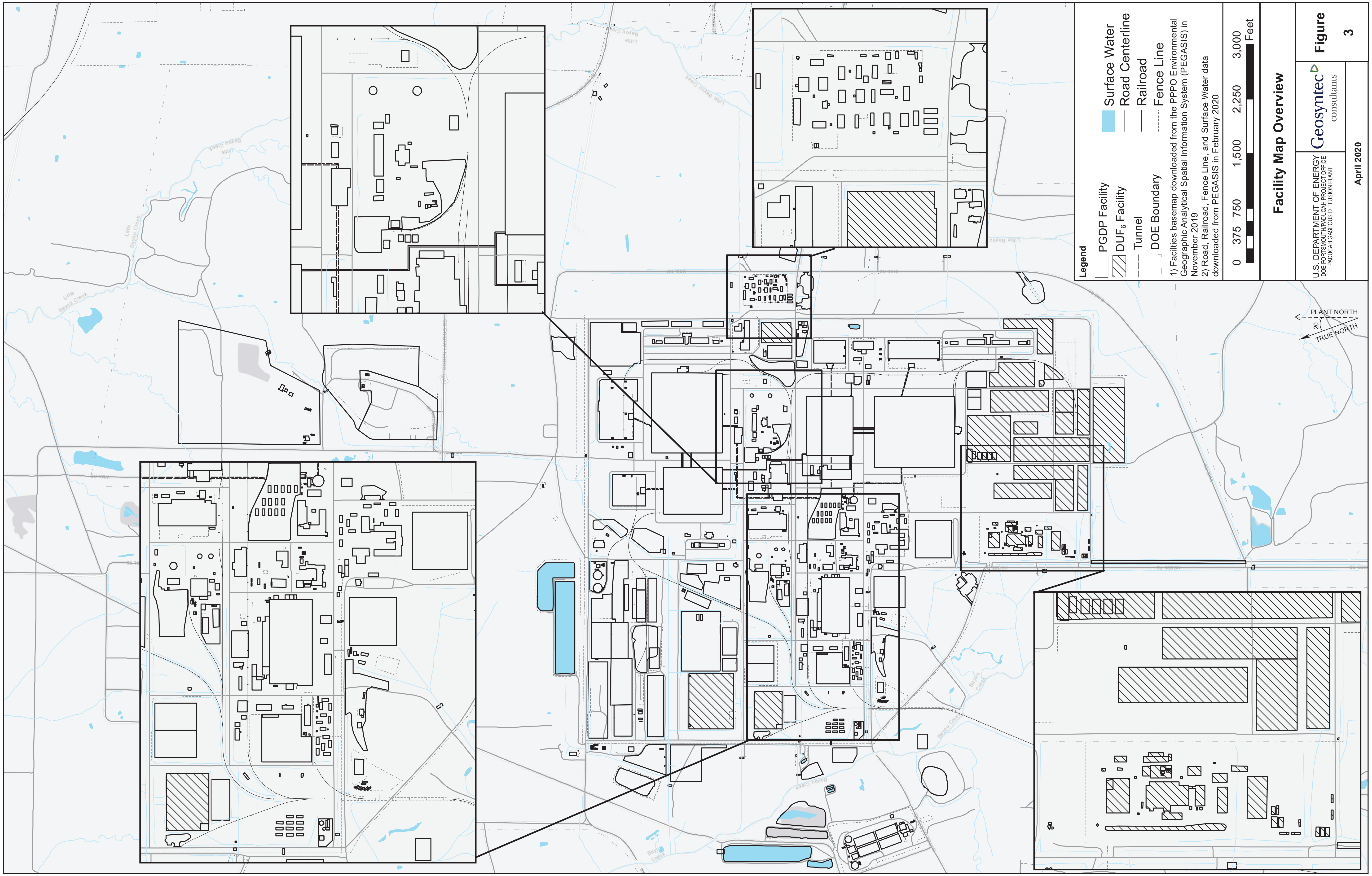

Figure 3. Facility Map Overview

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4.2 REGIONAL GEOLOGIC SETTING

The Paducah Site is located in the Jackson Purchase region of western Kentucky, which represents the northern most extent of the Mississippi Embayment portion of the Coastal Plain Province. The stratigraphic sequence in the region consists of Cretaceous [144 to 65 million years ago (mya)]; Tertiary (65 to 1.8 mya); and Quaternary (1.8 mya to present) sediments unconformably overlying Paleozoic (543 to 248 mya) bedrock (Paleozoic strata younger than Mississippian are not present at the Paducah Site) shown on Figure 4.

4.3 GEOLOGY OF THE PADUCAH SITE

The Paducah Site is underlain by a sequence of clay, silt, sand, and gravel layers uncomformably overlying limestone bedrock. The sediments above the limestone bedrock are grouped into three major stratigraphic units (loess, Continental Deposits, and McNairy Formation) and three major hydrogeologic units (HUs) (UCRS, RGA, and McNairy Flow System) as shown in Figure 5. Additional information on Paducah Site geology can be found in numerous documents, including in the *Remedial Investigation/Feasibility Study Work Plan for the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2019c).

4.3.1 Porters Creek Clay/Porters Creek Clay Terrace Slope

The Paleocene (65 to 54.8 mya) Porters Creek Clay occurs in the southern portions of the Paducah Site and consists of dark gray to black silt with varying amounts of clay and micaceous, commonly glauconitic, sand. In the southern portions of the Paducah Site, it can be up to 200-ft thick. The Porters Creek Clay subcrops along a buried terrace slope that extends east–west across the site. This subcrop is the northern limit of the Porters Creek Clay and the southern limit of the Pleistocene (1.8 mya to 12,000 years) Lower Continental Deposits under PGDP. Hydrologically the Porters Creek clay is an important unit because of its function as an aquitard, which also serves to inhibit VI in the context of PGDP.

4.3.2 Continental Deposits

Continental sediments [Pliocene (?-age uncertain) to Pleistocene (1.8 mya to 11,000 years)] unconformably overlie the Cretaceous through Eocene (54.8 to 33.7 mya) strata throughout the area. These continental sediments were deposited on an irregular erosional surface consisting of several terraces and have a total thickness from near zero to about 120 ft. The thicker Continental Deposits sections represent Pleistocene valley fill sediments that comprise a fining-upward cycle. The continental sediments are divided into the following two distinct facies.

(1) Lower Continental Deposits. The Lower Continental Deposits is a gravel facies consisting of chert, ranging from pebbles to cobbles, in a matrix of poorly sorted sand and silt. Gravels of the Lower Continental Deposits overlie three distinct terraces in the Paducah Site area.

    - The upper terrace of the Lower Continental Deposits consists of Pliocene (?-age uncertain) gravel units, ranging in thickness from near 0 to 30 ft, occurring in the southern portion of the Paducah Site at elevations greater than 350 ft above mean sea level (amsl). This gravel unit overlies the Eocene sands and Porters Creek Clay (where the Eocene sands are missing).

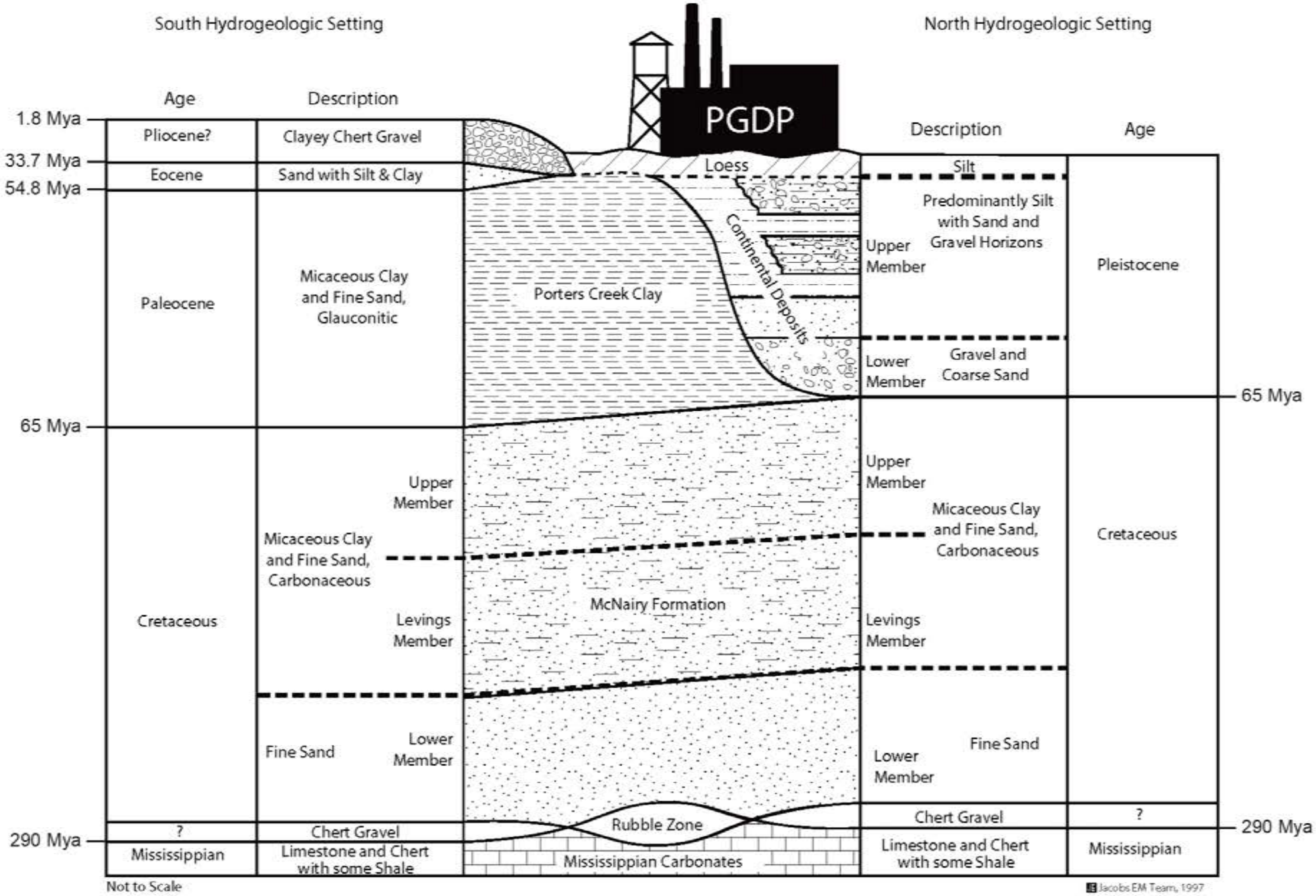

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Figure 4. Stratigraphy in the Vicinity of PGDP (DOE 2019c)

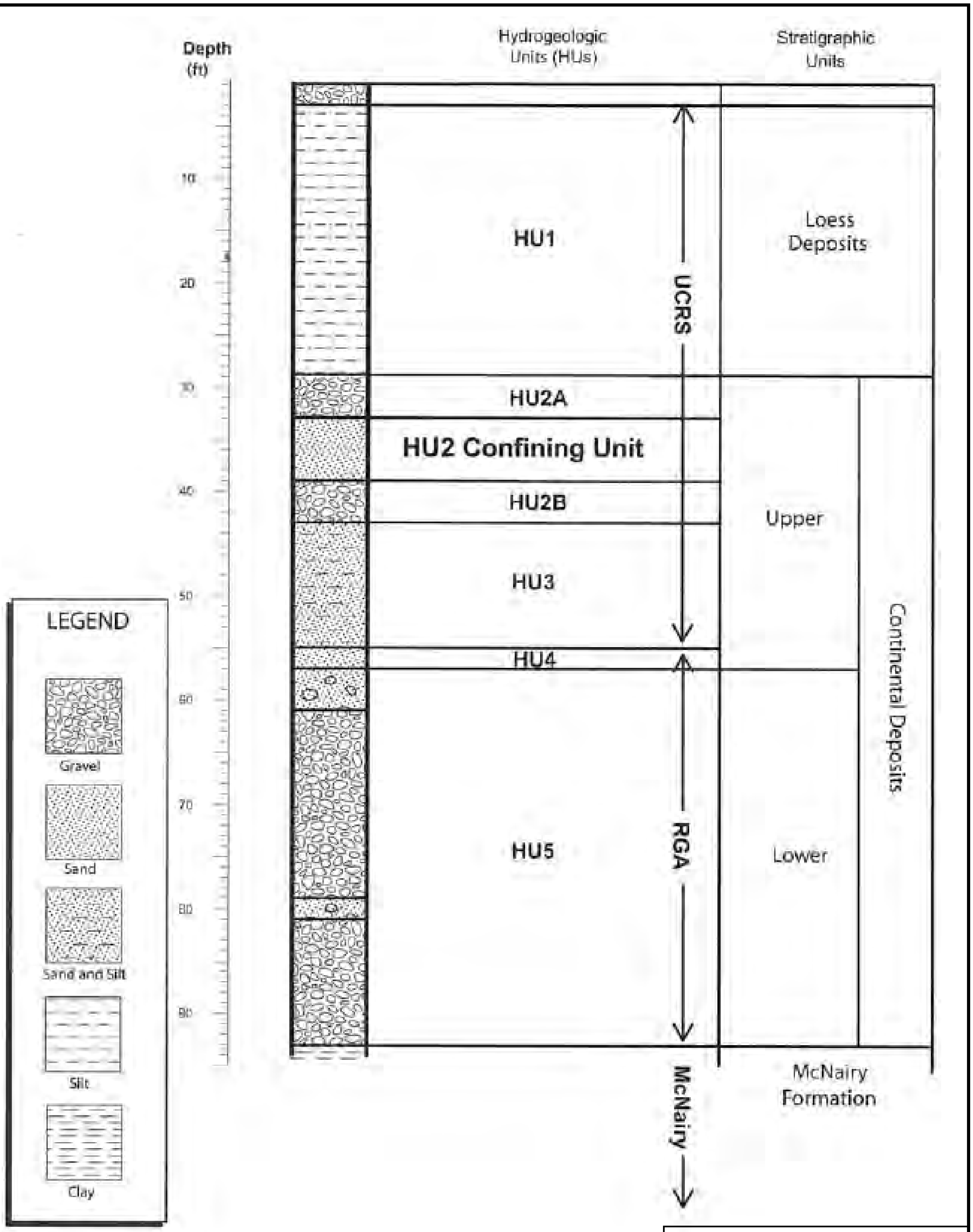

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Figure 5. Major Hydrogeologic Units beneath the Paducah Site (DOE 2019c)

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- Pliocene (?-age uncertain) gravels of the Lower Continental Deposits also occur on an intermediate terrace eroded into the Porters Creek Clay at an elevation of approximately 320 to 345 ft amsl in the southeastern and eastern portions of the Paducah Site. The thickness of this unit typically ranges from 15 to 20 ft.

  The Lower Continental Deposits of the upper and intermediate terraces collectively are referred to as the Terrace Gravel.

- The third and most prominent of the Lower Continental Deposits members consists of a Pleistocene gravel deposit resting on an erosional surface at an elevation of approximately 280 ft amsl. This gravel underlies most of the Paducah Site and the region to the north, but pinches out under the south side of the Paducah Site along the subcrop of the Porters Creek Clay. The Pleistocene member of the Lower Continental Deposits averages approximately 30 ft in thickness. Trends of greater thickness, as much as 50 ft, fill deeper scour channels.

(2) Upper Continental Deposits. The Upper Continental Deposits is a Pleistocene age, fine-grained facies that commonly overlies the Lower Continental Deposits. This unit ranges in thickness from 15 to 55 ft. The Upper Continental Deposits includes three general horizons beneath the Paducah Site: (1) an upper silt and sand interval; (2) an intermediate interval of common sand and gravel lenses (sand and gravel content generally diminishes northward); and (3) a lower silt, sand, and clay interval. The upper silt and sand interval consists of the Peoria Loess and Roxana Silt (KRCEE 2006). The Peoria Loess and Roxana Silt blanket the entire Paducah Site area and range from zero to about 43 ft in thickness.

4.3.3 Surficial Deposits/Soils

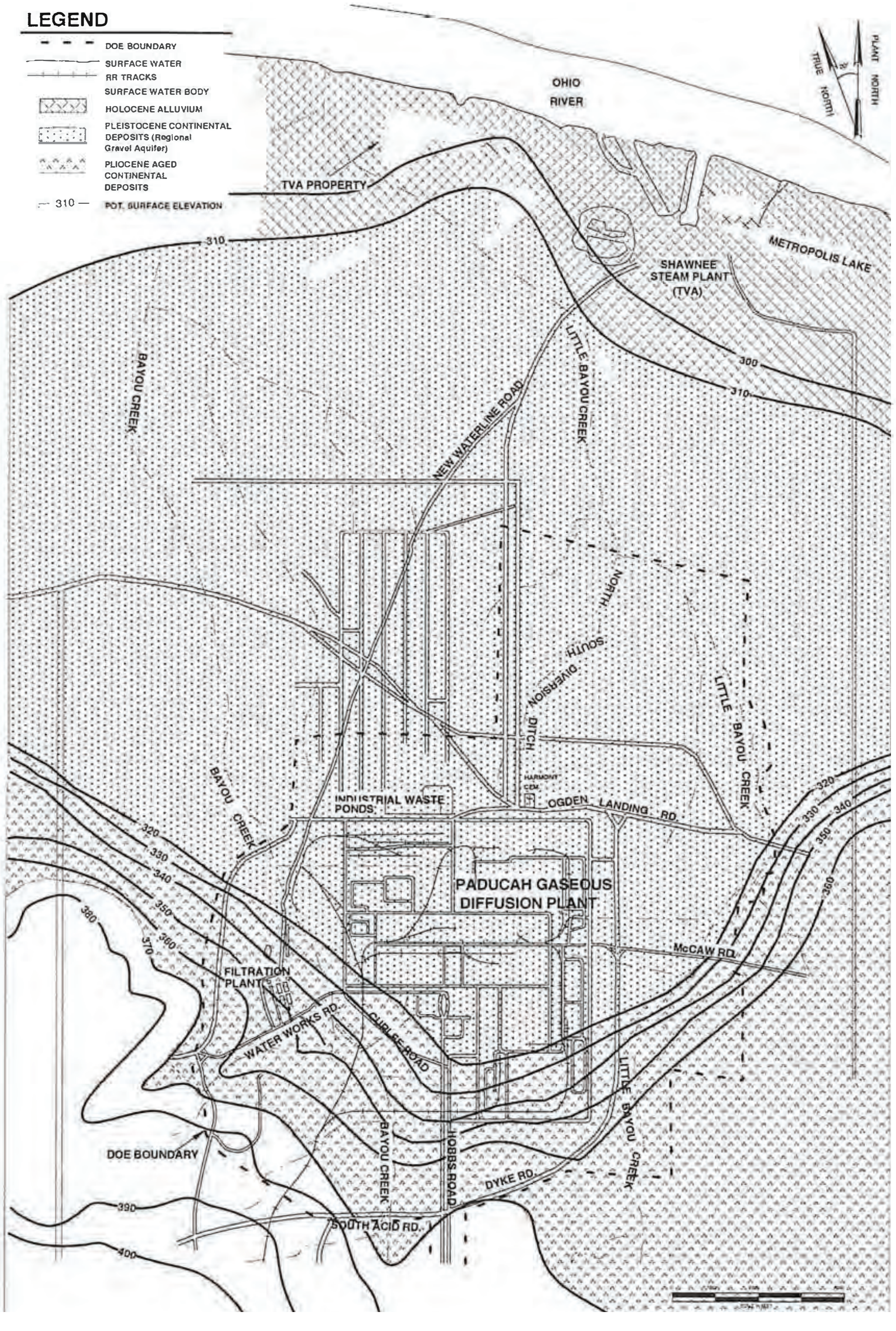
The surficial deposits found in the vicinity of the Paducah Site are Pleistocene loess and Holocene alluvium (11,000 years ago to present). Both units commonly consist of silt or clayey silt and range in color from yellowish-brown to brownish-gray or tan, making field differentiation difficult.

Loess deposition probably occurred in upland areas during all stages of the glaciation that extended into the Ohio and Mississippi River Valleys. The upland areas are located in the southern portion of the Paducah Site and are characterized by a gently northward sloping plain that is generally above 350 ft amsl. This area is underlain by loess soils, along with ridges with elevations above 380 ft amsl that are underlain by sand, clay, or silt.

The general soil map for Ballard and McCracken Counties delineates three soil associations within the vicinity of the Paducah Site: the Rosebloom-Wheeling-Dubbs association, the Grenada-Calloway association, and the Calloway-Henry association (USDA 1976). Inside the fenced area of the plant, the best description of the soil would be urban, because many of the characteristics of these soil types have been changed due to construction and maintenance activities (USDA 2005).

4.4 HYDROGEOLOGY

The geologic units that control shallow groundwater flow at PGDP include the Terrace Gravel and Porters Creek Clay, which underlie the south sector of PGDP, and the Pleistocene Continental Deposits and McNairy Formation, which underlie PGDP and adjacent areas to the north. Figure 6 illustrates the water level trends in geologic units of the shallow groundwater flow systems at PGDP. Groundwater flow in the Pleistocene Continental Deposits is a primary pathway for transport of dissolved contamination from PGDP. Of these, the groundwater flow regimes most relevant to the PGDP Industrial Area VI PI are the Terrace Gravel flow system, the UCRS, and the RGA. Subsequent subsections briefly discuss these



DOE 1999

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Figure 6. Water Level Trends of the Shallow Groundwater Flow Systems in the Vicinity of the Paducah Site

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formations. Additional information on Paducah Site hydrogeology can be found in numerous documents, including the *Remedial Investigation/Feasibility Study Work Plan for the C-400 Complex Operable Unit at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2019c).

4.4.1 Terrace Gravel Flow System

The Porters Creek Clay acts as a confining unit to downward groundwater flow south of the Paducah Site with a vertical hydraulic conductivity of 1.5×10^{-4} to 1.4×10^{-1} ft/day (DOE 2004). This aquitard creates a shallow water table flow system in the Terrace Gravel where it overlies the Porters Creek Clay south of the Paducah Site. Discharge from this water table flow system provides baseflow to Bayou Creek and underflow to the Pleistocene Continental Deposits to the east of the Paducah Site.

To the east of PGDP, the Terrace Gravel overlies a lower terrace, and a thick sequence of Terrace Gravel is adjacent to the Pleistocene Continental Deposits, allowing significant underflow from the Terrace Gravel. Surface drainages in this area typically discharge (losing reaches). Figure 7 presents hydraulic potential trends for the Terrace Gravel flow system (DOE 1997). The water table contours are based on information in the United States Geological Survey (USGS) Hydrologic Atlas of the Heath Quadrangle, stream elevations, and water levels in abandoned gravel pits, although there is uncertainty due to limited monitoring well data from the area depicted in Figure 7 (USGS 1966).

4.4.2 Upper Continental Recharge System

The UCRS is the upper strata where infiltration of surface water occurs and where the water table is found north of the Porters Creek Clay Terrace slope. The infiltration rate for the Paducah Site area is approximately 6.6 inches/year. Groundwater flow is primarily downward in the Upper Continental Deposits; however, lateral flow may occur over short distances. Steep vertical hydraulic gradients are characteristic of the UCRS (DOE 1997). Vertical hydraulic gradients generally range from 0.5 to 1 ft/ft, as measured in wells completed at different depths in the UCRS. The UCRS is composed predominately of silt and fine sand members with a large range of hydraulic conductivity. Overall, the depth-averaged UCRS lateral hydraulic conductivity is approximately 0.001 ft/day (DOE 2017).

Beneath PGDP and adjacent land to the north, the water table is found within the UCRS. Water table elevations are best known in the immediate vicinity of the fenced security area and in the area of the C-746-S&T and C-746-U Landfills to the north. Within the west area of the fenced security area, the elevation of the water table is controlled by the bottom of drainage ditches and the water level in the bordering Bayou Creek. The water table is as shallow as 5 to 10 ft in some localities and less than 20-ft deep throughout the western portion of the Paducah Site. Depth to the water table is much greater (as much as 40 ft) in the northeastern portion of the Paducah Site, where a storm sewer system is present to collect storm runoff. In the northeastern portion of the Paducah Site, the water table is believed to slope east toward bordering Little Bayou Creek.

At the currently operating C-746-U Landfill, trends and the elevation of the water table are controlled by water levels in the North-South Diversion Ditch on the south side of the landfill and by water levels in Little Bayou Creek on the east and north sides. The water table slopes northward toward Little Bayou Creek at depths of 20 to 40 ft.

These depths represent the expected range of water table elevations and depths associated with the UCRS. In general, the water table in the UCRS slopes away from areas of tributaries and higher land surface toward Bayou and Little Bayou Creeks. The depth to the water table is very shallow in the vicinity of tributaries, and wetlands are present on the highlands and in the vicinity of the creeks.

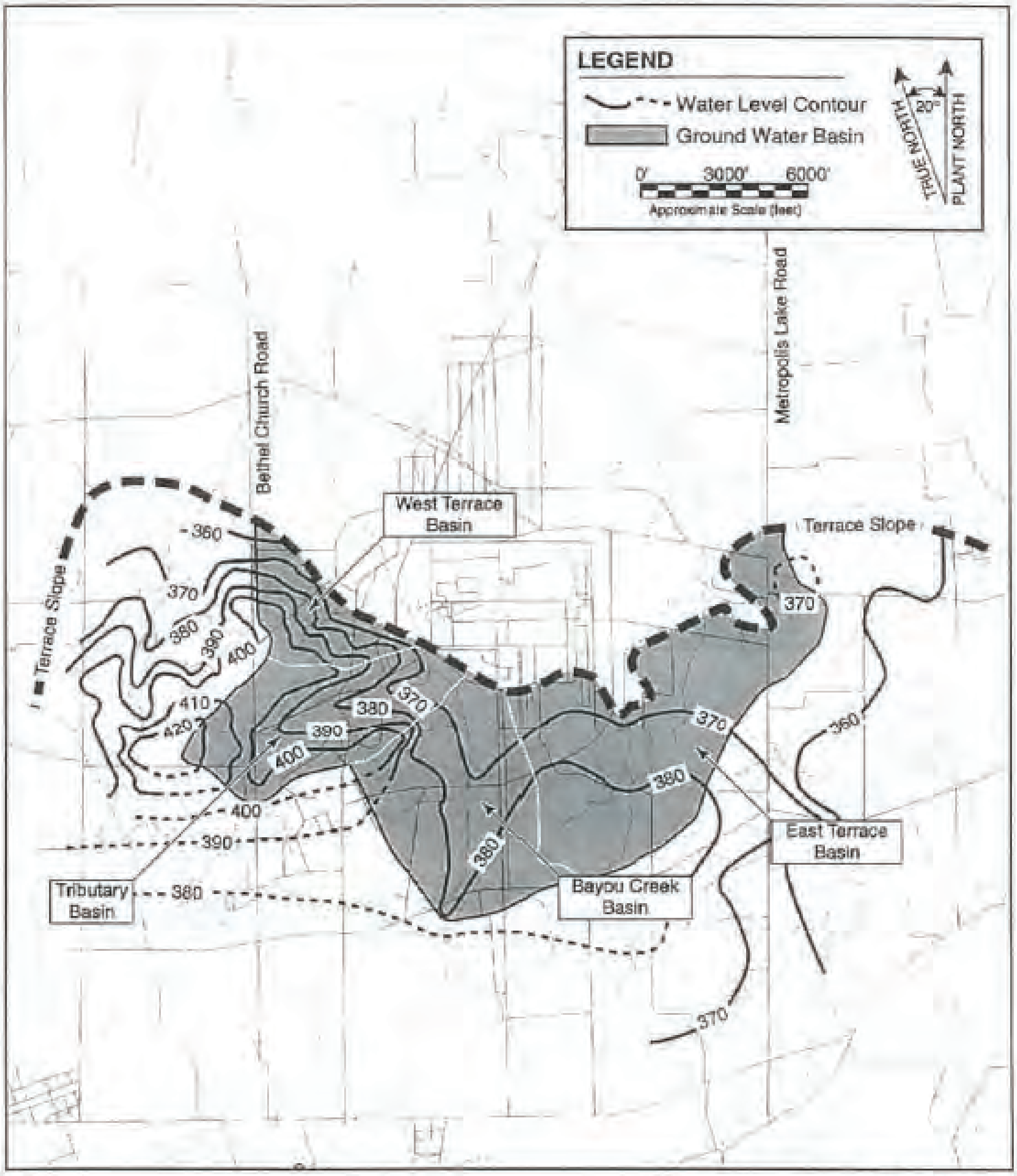

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Figure 7. Water Level in the Terrace Deposits South of the Paducah Site (DOE 2019c)

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4.4.3 Regional Gravel Aquifer

Vertically infiltrating water from the UCRS primarily moves downward into a basal sand member of the Upper Continental Deposits and the Pleistocene gravel member of the Lower Continental Deposits and then laterally north toward the Ohio River. This lateral flow system is called the RGA. As documented in the Paducah Site groundwater flow model and based on site specific lithological data, the RGA is the shallow aquifer beneath the Paducah Site and contiguous lands to the north (DOE 2017).

Hydraulic potential in the RGA declines toward the Ohio River, which controls the base level of the region's surface water and groundwater systems. The RGA potentiometric surface gradient beneath the Paducah Site is commonly 10^{-4} ft/ft, but increases by an order of magnitude near the Ohio River. Vertical gradients are not well documented, but small vertical gradients measured at nested wells at the C-404 Burial Ground, for example, range from 0.001 to 0.01 ft/ft, but are not consistently upward or downward (dependent on season and location relative to areas of recharge).

The hydraulic conductivity of the RGA varies spatially. Pumping tests have documented the hydraulic conductivity of the RGA ranges from 53 ft/day to 5,700 ft/day (DOE 2017). The overall flow in the RGA is northward to the Ohio River, but there are localized northeast and northwest flow regimes in response to anthropogenic recharge and anisotropy of the hydraulic conductivity. Ambient groundwater flow rates in the more permeable pathways of the RGA commonly range from 1 to 3 ft/day.

4.4.4 Hydrogeologic Settings

The Paducah Site is predominantly located over the ancestral Tennessee River channel. The ancestral Tennessee River channel is filled with thick sand and gravel deposits overlaid by a sequence of silts and clays. Southward advance of the ancestral Tennessee River during the Pleistocene Epoch eroded away the Porters Creek Clay immediately beneath and north of PGDP. The presence of the Porters Creek Clay south of PGDP and the absence of the Porters Creek Clay beneath PGDP and to the north define the two hydrogeologic settings (see Figure 4).

South Hydrogeologic Setting

South of the Paducah Site, significant groundwater flow is restricted to the sediments above the Porters Creek Clay. A shallow water table system is developed in the Pliocene (?-age uncertain) gravels and Eocene sands where they overlie the Porters Creek Clay. Groundwater flow in this shallow water table system discharges as baseflow to Bayou Creek and its tributaries and also may migrate across the buried terrace slope as underflow to the UCRS/RGA flow system.

North Hydrogeologic Setting

Beneath the Paducah Site and north, shallow groundwater flows downward through the silts and fine sands (i.e., UCRS) until it encounters the RGA sand and gravel deposit. Once in the RGA, groundwater flow is generally north, toward the Ohio River. Lateral flow in the RGA dominates this hydrologic regime, with comparatively little groundwater migrating downward into the underlying McNairy Formation. Lateral groundwater flow in the more permeable pathways of the RGA is approximately 1 to 3 ft/day.

4.4.5 Hydrogeologic Units

Five HUs are commonly used to describe the shallow groundwater flow system beneath the Paducah Site and the contiguous lands to the north. In descending order, as shown on Figure 5, the following are the HUs.

- HU 1 (UCRS): Loess that covers most of the site.
- HU 2 (UCRS): Discontinuous sand and gravel lenses in a clayey silt matrix.
- HU 2 Confining Unit (UCRS): Discontinuous silt unit.
- HU 3 (UCRS): Relatively impermeable unit that acts as the upper semiconfining-to-confining layer for the RGA. The lithologic composition of HU 3 is predominantly silt and fine sand.
- HU 4 (RGA): Sand unit with a silt matrix that forms the top of the RGA, where present.
- HU 5 (RGA): Sand and gravel, primary member of the RGA.

4.5 PGDP VI-RELATED INVESTIGATION HISTORY

Several VI-related investigations have been completed previously at PGDP (investigation areas shown on Figure 8). These investigations are summarized in the following subsections.

4.5.1 1986 Tracer Soil Gas Survey

A shallow soil gas survey was conducted in August 1986 (Tracer Research Corporation 1986) to identify any locations along a sewer line where contaminants may have leaked out into the subsurface. A total of 28 soil gas samples was taken and analyzed for 1,1,1-trichloroethane (TCA), TCE, and tetrachloroethene (PCE); however, TCE was found to be the primary contaminant. The results of this investigation indicated that the source of TCE contamination was located where the sewer line leaves the C-400 Building and, while concentrations of TCE in soil and groundwater were high, vapor intrusion was not evident.

4.5.2 1990 Soil Gas Survey Phase I/II Site Investigation

A soil gas survey was completed as part of the first phase of a two-phase Site Investigation at PGDP (CH2M Hill 1991; CH2M Hill 1992). The soil gas survey was conducted in June and July 1990 to (1) evaluate the extent of VOC contamination around the C-400 Building, as well as around and beneath other on-site PGDP areas where releases or contaminant migration may have occurred; and (2) evaluate potential contaminant migration pathways via pipeline beddings. Of the 41 soil gas samples collected during this survey, TCE was detected in two samples (1,505 $\mu g/m^3$ to 10,748 $\mu g/m^3$), and TCA was detected in seven samples (1,091 $\mu g/m^3$ to 3,820 $\mu g/m^3$). Some of these detections likely were due to the TCE release that had occurred by the C-400 Building; however, the source of the other detections was unknown.

4.5.3 2005 EPA Soil Gas Sampling

A soil gas study was conducted in September 2005 in the residential neighborhood adjacent to PGDP to evaluate VOC concentrations near the soil surface that may be caused by contaminated groundwater emanating from PGDP (EPA 2005). Three sampling locations were selected for soil gas sampling; however, due to tight soils, a complete soil gas sample was collected at only one location. Chloroform was the only VOC detected in the sample (an estimated concentration of 0.50 $\mu g/m^3$).

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Figure 8. Previous VI-Related Investigation Areas

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4.5.4 2012 SWMU 4 Passive Vapor Study

A soil gas survey was performed as part of an investigation of Solid Waste Management Unit (SWMU) 4 using passive-soil gas samplers in 2012 (DOE 2012). SWMU 4 overlies the southwestern portion of the TCE plume in RGA groundwater having concentrations an order of magnitude higher than in distal plumes off-site. Two of the 69 passive samples had detectable TCE [29 nanogram (ng) and 54 ng with a detection limit of 25 ng].

4.5.5 Water Policy Area VI Screening Study

This Water Policy Area VI Screening Study was completed as part of the 2013 Five-Year Review of Remedial Actions at the PGDP (DOE 2016). The VI screening study was conducted at four locations within the Water Policy Area. At each of the four locations, direct-push technology (DPT) rods were advanced to three depths, and the depth to water then was measured within the shallowest DPT. Discrete depth samplers were used to collect groundwater samples from the first available UCRS groundwater for selected VOC [*cis*-1,2-dichloroethene (DCE), *trans*-1,2-DCE, TCE, vinyl chloride (VC)] analysis. Based on the results of this VI screening study, historical information provided in the Sampling and Analysis Plan, and the 2015 EPA VI Technical Guide, an additional VI study (i.e., a detailed investigation) is not warranted in the Water Policy Area (DOE 2016).

4.5.6 C-400 Vapor Intrusion Study

The C-400 VI Study was completed as part of the 2013 Five-Year Review for Remedial Actions at PGDP (DOE 2018). The groundwater under the C-400 Cleaning Building has been found to contain the highest concentrations of TCE at PGDP. The C-400 VI Study consisted of eight co-located locations for subslab air and indoor air, four locations for ambient air, and collection of temperature and differential pressure readings during sampling. The results of this VI Study indicated that the VI pathway in the C-400 Cleaning Building, particularly in the southern portion of the building, was complete. The C-400 Study also found that the measured VOC concentrations in the indoor air of the C-400 Cleaning Building did not pose an unacceptable risk to workers.

4.5.7 Summary of Prior Investigations

Based on the results of the previous four soil gas investigations, TCE and other VOCs are known to be present in soil gas beneath at least some facilities in the PGDP industrial area, potentially leading to a complete VI pathway for those facilities.

5. PRELIMINARY VI ANALYSIS AND FACILITY RANKING

The 2015 EPA VI Technical Guide recommends a preliminary analysis of “available and readily ascertainable information to develop an initial understanding of the potential for human health risk that are or may be posed by VI.” This involves (1) assembling, evaluating, and reviewing available information; (2) determining the presence of vapor-forming chemicals under buildings; (3) developing an initial VI CSM; and (4) evaluating preexisting and readily ascertainable sampling data. The guide further recommends the preliminary analysis include evaluating the available Paducah Site data to evaluate whether subsurface sources that remain have the potential to pose an unacceptable risk to human health due to VI and whether the VI pathway likely is to be “complete.”

The following three datasets were used in the PI. The datasets are provided in Appendix B.

1. The facility database lists PGDP facilities and notes whether they are considered buildings and whether they are occupiable.[2]

2. The groundwater database includes groundwater data collected at the Paducah Site from 2014-2019 in the RGA and UCRS.

3. The soil database includes soil data collected at the Paducah Site since 1989.

Existing soil and groundwater data were used to develop the PI CSM and rank PGDP buildings to prioritize them for consideration for sampling. The following decision rules were used in determining the usability of historical soil and groundwater data.

- Historical data approved for release to PEGASIS [Portsmouth/Paducah Project Office (PPPO) Environmental Geographic Analytical Information System] and collected by DOE programs was used.

- Groundwater data collected from the UCRS and RGA were used. Groundwater samples from residential wells were considered sourced from the RGA. Process knowledge was applied for determining sample formation if not available in Paducah Oak Ridge Environmental Information System (OREIS).

- Groundwater data for samples collected from 2014-present will be used to focus on current conditions. For locations where samples were not collected 2014-present, the most recent sample from that location was used.

- A result is considered a nondetect if it is qualified by the reporting laboratory and includes a "U" qualifier or a "<" qualifier.

- A result is considered a nondetect if it has a "U" validation code or a "U" data assessment code, including "UJ" and "JU" validation codes and "U,J" data assessment code.

- Historical data qualified as rejected by the laboratory, data validation, or by data assessment are not included in the historical dataset.

- Historical data containing units inconsistent with the sampled media are not included in the historical dataset [e.g., a soil sample with analytical units reported in milligrams per liter (mg/L)].

- Data no longer representative of current characteristics are not included in the historical dataset. The body of data related to a particular geographic area may represent its past and present characteristics, and it is difficult to identify which data no longer represent the current characteristics due to remediation efforts. A data field is included in Paducah OREIS that can be used to flag data that is not representative of the current characteristics of an area:

    — Soil and sediment samples in Paducah OREIS have been flagged as "RA" if they were collected in a location that has been removed (e.g., excavated) since sampling. These samples were collected *in situ* prior to removal and no longer are representative of current conditions.

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[2] Definitions of "building" and "occupiable" used in the ranking and prioritization of PGDP facilities for PI sampling are presented in Section 5.3.

  - — Soil samples in Paducah OREIS have been flagged as “RM” if they were collected in a location that has undergone remediation, with an additional denotation for the type of remediation (e.g., VO for volatiles).

- Soil and sediment data not collected from stations named “waste” are not included in the historical dataset.

- Groundwater data collected from stations where treatment has been performed (e.g., the Northwest Plume Pump-and-Treat facility and the Northeast Plume facility) are not included in the historical dataset.

A review and evaluation of the available Paducah Site information showed that VOCs are present in concentrations in the subsurface groundwater at levels above the EPA VI Screening Levels (VISLs) (Table 1) and also are present in soil. The concentration data are viewed in the context of EPA VISLs because a chemical’s VISL value represents the level at which chemical volatilization from a given media may become a health concern. These values are used as proxies for potential VI concerns. The following subsections provide additional detail to support these conclusions including (1) a preliminary evaluation of the subsurface sources with the potential to pose a VI concern; (2) a preliminary evaluation of the likelihood for VI pathway to be complete at PGDP buildings; and (3) the selection process for the inclusion of buildings for PI sampling. Seven chemicals shown in Table 1 have been chosen for evaluation in this PI. These chemicals, referred to as PI analytes, are chemicals that (1) are present in groundwater above their respective VISL, and/or (2) have been used in operations or processes at PGDP, and/or (3) provide information about contaminant degradation.

5.1 IDENTIFICATION OF POTENTIAL VI SOURCES

Historical evaluations conducted at PGDP have identified several sources that have the potential to yield PI analyte concentrations above VISL concentrations in indoor air:

- RGA groundwater contaminated with TCE and other PI analytes underlying PGDP

- UCRS groundwater contaminated with TCE and other PI analytes underlying PGDP;

- UCRS soils with historical dense nonaqueous-phase liquid (DNAPL) TCE contamination adjacent to and potentially extending under PGDP buildings; and

- UCRS soils with TCE and other PI analyte contamination including UCRS soils adjacent to PGDP soils that were remediated previously.

- Figure 9 presents a map of the TCE plume in the RGA at PGDP that demonstrates TCE is present at concentrations of potential VI concern. The RGA Plume moves principally to the northwest (from the southeast) beneath the Paducah Site. This map shows that as recently as 2018, concentrations of TCE ranging from nondetect to as high as 10,000 to 100,000 micrograms per liter (µg/L) are present in RGA groundwater beneath the site. The higher concentrations are not ubiquitous across PGDP and tend to be concentrated in areas that saw operational use of TCE such as C-400 Building. These levels exceed EPA’s VISL of 7.4 µg/L for groundwater. The most widespread PI analyte in the UCRS is TCE with concentrations ranging up to 438,000 µg/L (Figure 10).

Table 1. VISLs for PI Analytes of Interest for PGDP Area IV, Commercial[3]

Chemical	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk via Vapor Intrusion from Soil Source?	Is Chemical Sufficiently Volatile and Toxic to Pose inhalation Risk via Vapor Intrusion from Groundwater Sources?	Target Indoor Air Concentration (µg/m^3) at TCR = 1E-06 or THQ = 1	Toxicity Basis	Target Sub-Slab and Exterior Soil Gas Concentration (µg/m^3) at TCR = 1E-06 or THQ = 1	Target Groundwater Concentration (µg/L) at TCR = 1E=06 or THQ = 1
	Cvp > Cia, target?	**Chc > Cia, target?**	**Min (Cia, c; Cia, nc)**	**C or NC**	**Csg**	**Csg**
Chloroform	Yes	Yes	0.533	C	17.8	3.55
DCE, 1,2-*cis*-	No Inhalation Toxicological Information	No Inhalation Toxicological Information	NVA*, 3,500	--, NC	--	--
DCE, 1,2-*trans*-	No Inhalation Toxicological Information	No Inhalation Toxicological Information	NVA*, 3,500	--, NC	--	--
Mercury (elemental)	Yes	Yes	1.31	NC	43.8	3.73
TCA, 1,1,1-[3]	Yes	Yes	21900	NC	730000	31100
TCE	Yes	Yes	2.99	C	99.7	7.43
VC	Yes	Yes	2.79	C	92.9	2.45

C = carcinogenic
Cia = concentration, indoor air
Cia, target = concentration, indoor air, target
Chc = concentration, groundwater vapor
Csg = concentration, subslab and exterior soil gas concentration
Cvp = concentration, pure phase vapor
NVA* = no VISL value available; provisional value provided by EPA as documented in Appendix E (E.9) of the Draft Risk Methods Document (DOE 2019d). Value for *cis*-1,2-DCE uses *trans*-1,2-DCE value as surrogate
NC = noncarcinogenic
TCR = target risk for carcinogens
THQ = target hazard quotient for noncarcinogens

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[3] 1,1,1-TCA will be considered only when there is documented use within a facility. It was not considered in ranking PI facilities, but will be sampled in each building identified for PI sampling.

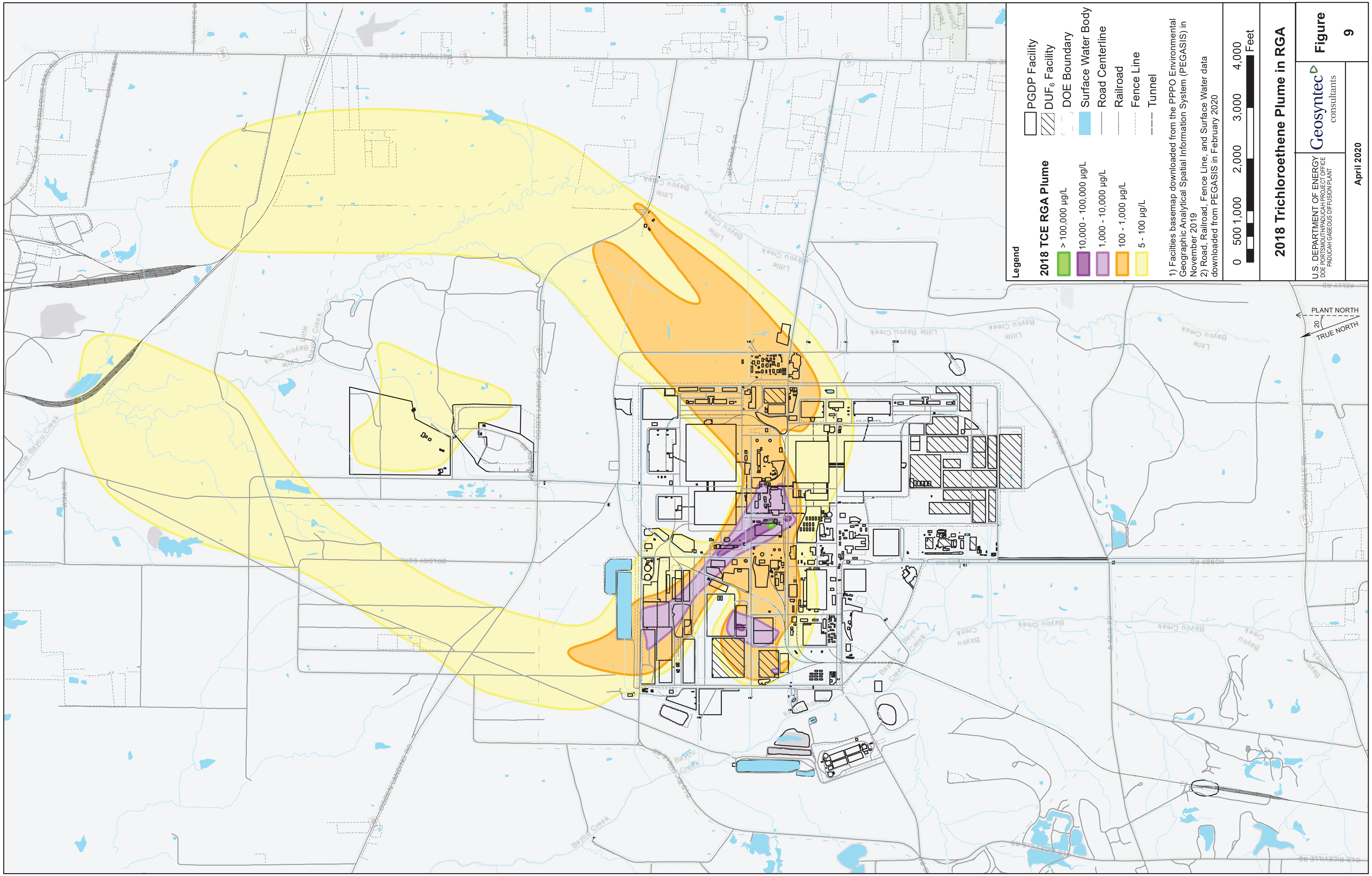

Figure 9. 2018 Trichloroethene Plume in RGA

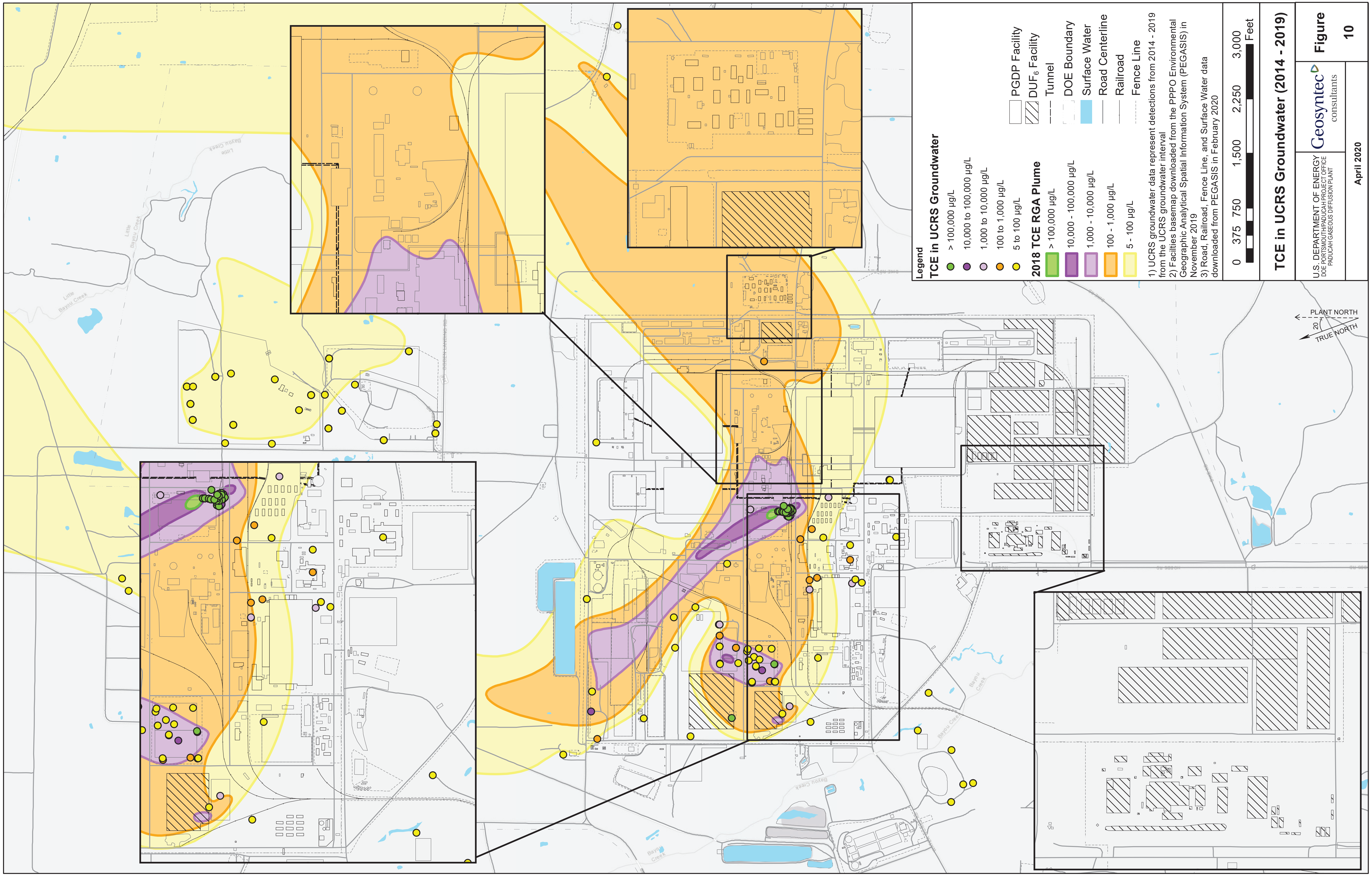

Figure 10. TCE in UCRS Groundwater (2014-2019)

Soil data was collected from multiple projects spanning the duration of the Paducah Site's investigatory timeline (1989-2018). The most commonly detected PI analytes are mercury and TCE, and both have widespread spatial distributions both on-site and off-site. Off-site detections tend to be in association with the RGA TCE plume in the case of TCE (Figure 11). The other PI analytes tend to be co-located with TCE and clustered around buildings that were associated with use of TCE, such as C-400 and C-720 Buildings.

Tabulation of historical data relevant to these sources and further analysis of data are presented in the site-specific VI CSM in Section 6.

5.2 PRELIMINARY EVALUATION OF THE VI PATHWAY COMPLETENESS

EPA's VI guidance (EPA 2015) states that a potential VI pathway should be considered complete when the following five key conditions are present:

1. Subsurface sources of vapor-forming chemicals are present;
2. There is a route for the vapors to migrate;
3. The building is susceptible to VI;
4. Vapors are present in the indoor environment; and
5. People are in the indoor environment.

The following discussion presents a preliminary evaluation of the applicability of these conditions at PGDP facilities (a preliminary sitewide VI CSM). A prioritized list of facilities with the highest likelihood of a complete VI pathway (PI facilities) is presented in Section 5.3 and additional evaluation of the completeness of the VI pathway in these PI facilities is presented in Section 6.

1. **Subsurface sources of vapor-forming chemicals are present.** As described above in Section 5.1, there are three potential sources of VOCs that may cause unacceptable vapor concentrations in the indoor air at PGDP facilities.

2. **Routes for vapor migration likely are present.** The documented presence of sand in a portion of the UCRS and the presence of gravel immediately beneath some buildings (presented in Section 6) may allow vapor migration through the vadose zone. The large number of utilities present in the vicinity of buildings also may serve as preferential pathways for vapor migration into PGDP buildings. Thus, it is reasonable to infer that subsurface routes for vapor migration are present in some areas of the PGDP industrial area.

3. **Building is susceptible to VI.** Deteriorated concrete in some building slabs and other unidentified VI conduits in the building may exist, which could provide pathways for vapor migration into a building. Thus, it is reasonable to infer some PGDP facilities are potentially susceptible to VI.

4. **Vapors have been present and may continue to be present in the indoor air environment above VISL values.** Previous industrial hygiene (IH) sampling of the indoor air in some PGDP buildings has detected TCE and other VOCs.[4] Based on this information, it is reasonable to infer that TCE may be present in the indoor air of some PGDP facilities at concentrations above VISL values.

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[4] Other IH sampling results have yielded no detectable VOCs; however, the detection limits were substantially greater than VISL values.

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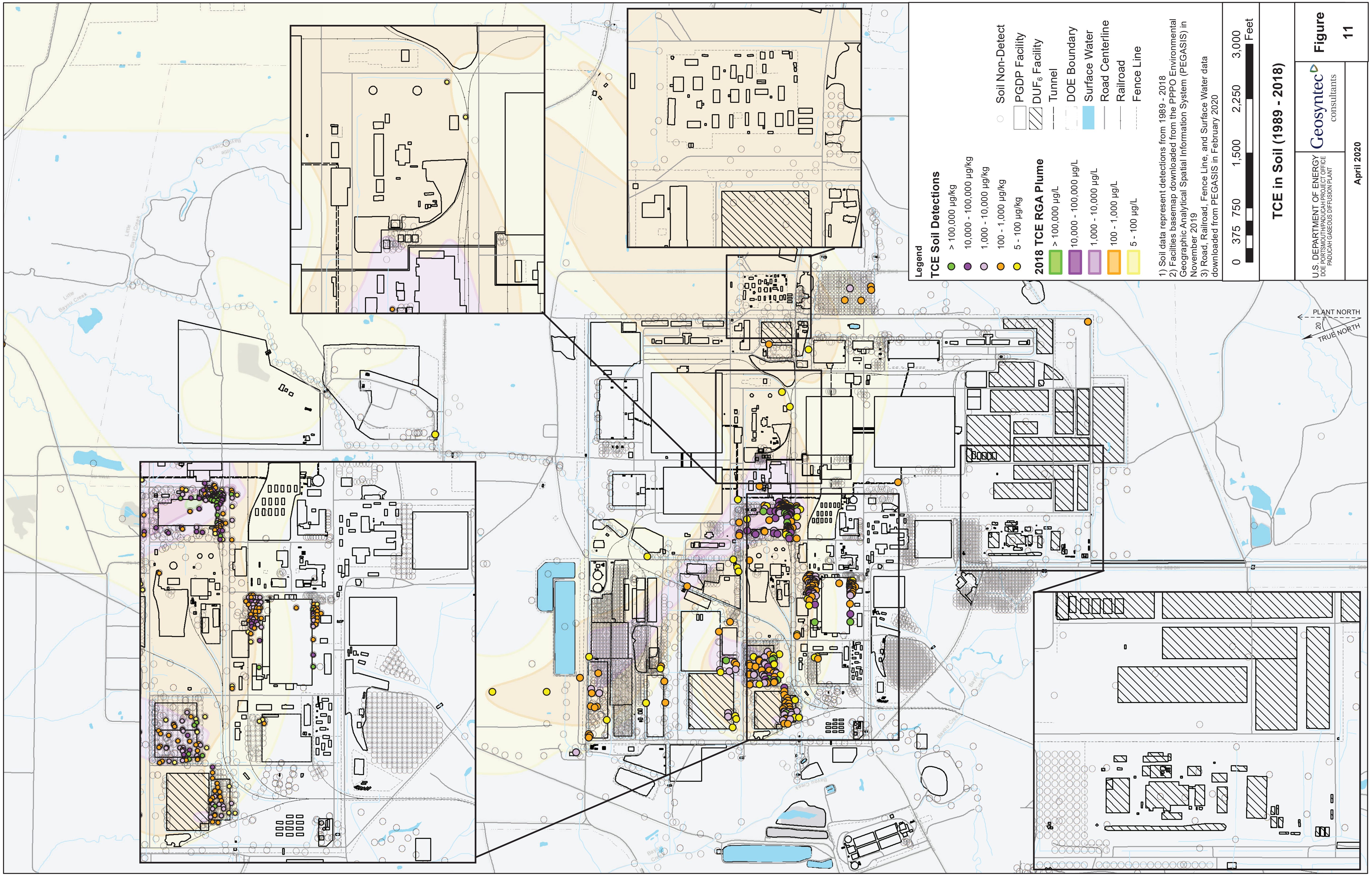

Figure 11. TCE in Soil (1989–2018)

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5. **People are in the indoor environment.** Several PGDP buildings currently are occupied. As a result, workers in these buildings have the potential to be exposed to TCE and other VOCs through the VI pathway if that pathway is complete.

Figure 12 presents a schematic sitewide VI CSM based on the conceptual model in the 2015 EPA VI Technical Guide and adapted to PGDP. This figure provides a general illustration of the subsurface sources of contamination with the potential to pose a VI concern at PGDP.

The 2015 EPA VI Technical Guide notes that, "…when these conditions are not well established from existing information…EPA recommends that a detailed VI investigation be scoped and conducted to address these data gaps." The corollary is that, when conditions are well established from existing information, additional investigation should focus on the conditions that have not yet been well established.

Alternatively, 2015 EPA VI Technical Guide states that it may be appropriate to implement VI mitigation as an early action, though all pertinent lines of evidence have not been developed completely to characterize the potential VI pathway, when sufficient site-specific data indicate that VI may pose a health concern to building occupants.

For PGDP, four (1, 2, 3, and 5) of the five key conditions regarding completeness of the VI pathway are documented with site-specific data in Section 6. The remaining key condition (4) is considered potentially to exist at PGDP, but represents a data gap that needs to be filled (e.g., by collection of indoor air and subslab vapor samples) to evaluate whether there are vapors present in the indoor environment at levels that pose an unacceptable risk to workers. Section 6 further evaluates the existing data in the context of a site-specific VI CSM, discusses the likelihood that the VI pathway is complete, and identifies data needs that need to be addressed with additional VI investigation.

5.3 PI BUILDING SELECTION PROCESS AND PRELIMINARY BUILDING-SPECIFIC CSMS

PGDP has a large number of facilities with a variety of preliminary VI CSMs, ranging from the VI pathway being incomplete (e.g., does not meet the definition of a building or no known source) to the VI pathway being potentially complete. For the PI, facilities were selected with the highest likelihood of a completed VI pathway based on their preliminary facility-specific CSMs constructed from existing information and data. The following are the criteria devised to prioritize the PI facilities.

1. The facility is considered to be a building—Each facility in the PGDP facility database was classified as a building or non-building based on the following definition of "building" in the 2015 EPA VI Technical Guide:

   "For purposes of this Technical Guide and its recommendations for evaluating human health risk posed by vapor forming chemicals, 'building' refers to a structure that is intended for occupancy and use by humans. This would include, for instance, homes, offices, stores, commercial and industrial buildings, etc., but would not normally include sheds, carports, pump houses, or other structures that are not intended for human occupancy."

   AND

2. The facility is considered to be occupiable—Occupiable buildings are those that could be occupied by workers without major renovations to the building structure. Figure 13 presents occupiable buildings at PGDP.

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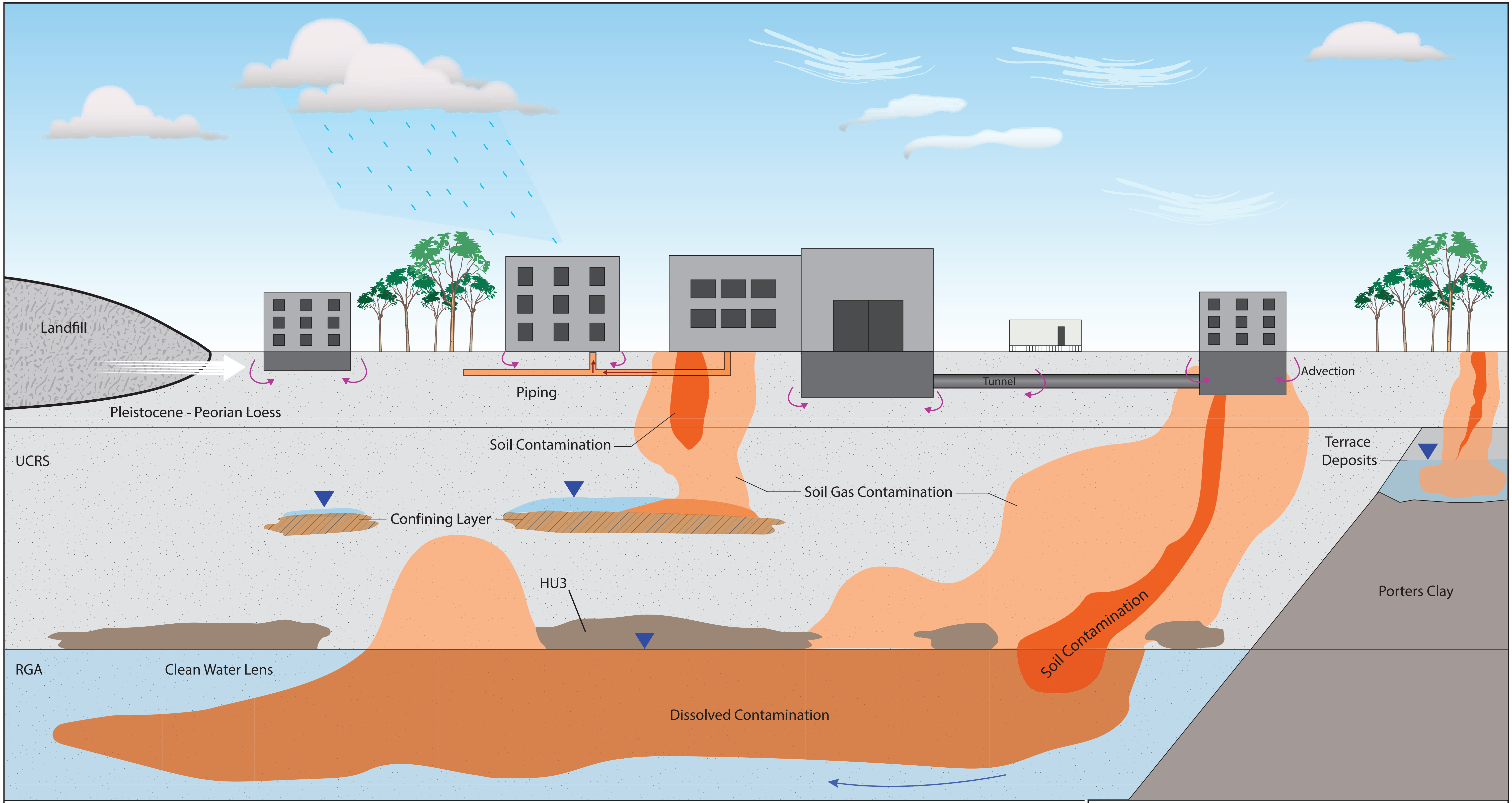

Conceptual Site Model Schematic

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Geosyntec consultants

FIGURE 12

NOVEMBER 2019

Figure 12. Conceptual Site Model Schematic

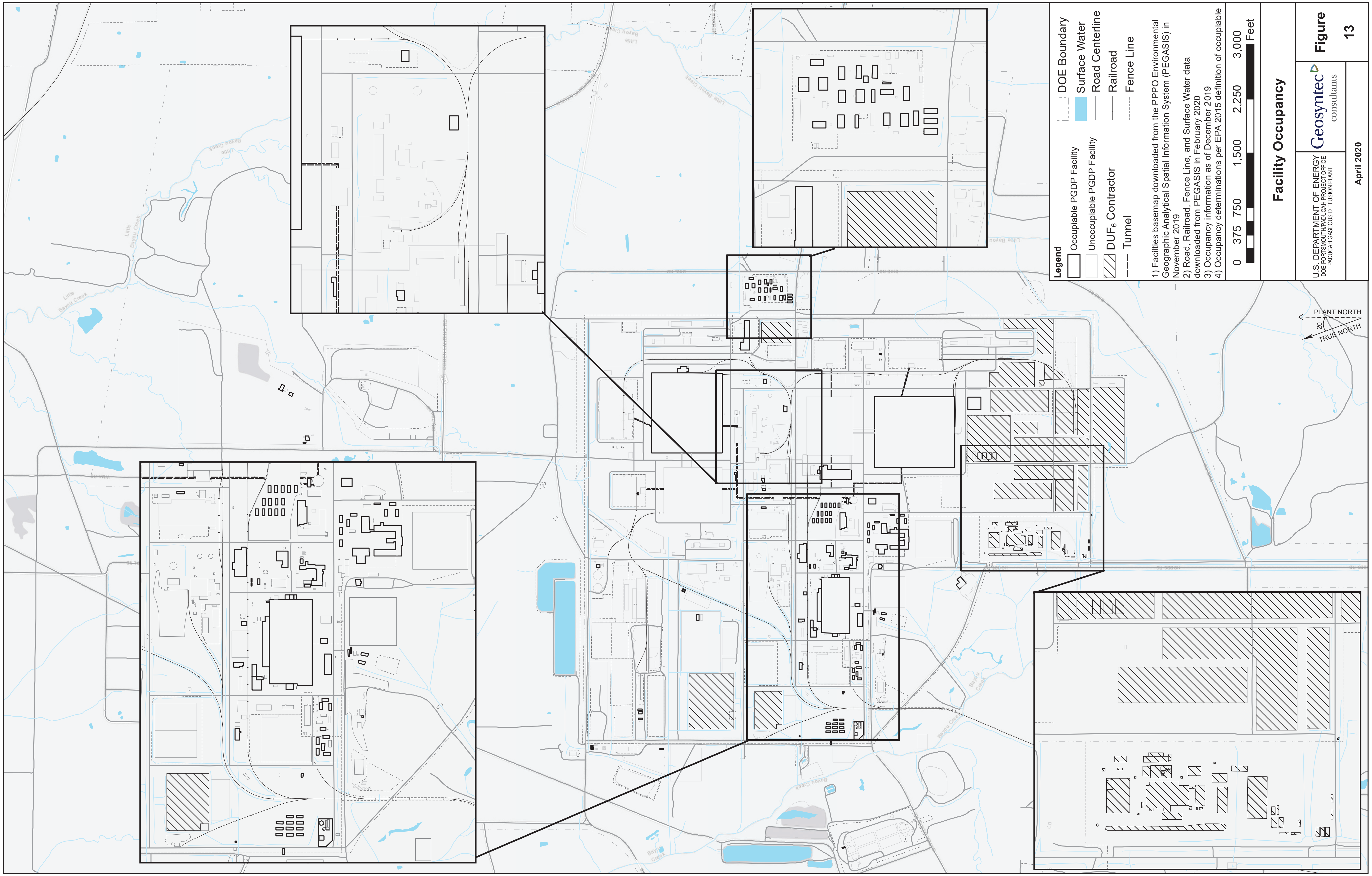

Figure 13. Facility Occupancy

3. The TCE in RGA groundwater exists beneath the building and is ≥ 100 µg/L (see Figure 14).

   OR

4. There has been a VISL exceedance of the sum of VISL-normalized PI analyte concentrations in UCRS groundwater within 100 ft of the building (see Figure 15).

   $$[(\text{analyte } 1/\text{VISL } 1) + (\text{analyte } 2/\text{VISL } 2) + (\text{analyte } 3/\text{VISL } 3) + \ldots] \geq 1$$

   OR

5. There has been a PI analyte detection in soil within 100 ft of the building (see Figure 16).

Facilities meeting the above criteria are presented on Figure 17 and in Table 2. The information in this figure and table represents elements of the building-specific CSMs (potential sources and receptors). Several buildings have been grouped allowing for maximum spatial coverage of the PGDP industrial area and of potential VI source areas. One to two buildings have been selected from these groups for inclusion in PI sampling to be representative of the group as a whole, and those facilities that could not be grouped will be sampled on an individual basis. PI facilities are presented on Figure 18 and in Table 3, and the groups were chosen based on the criteria detailed below.

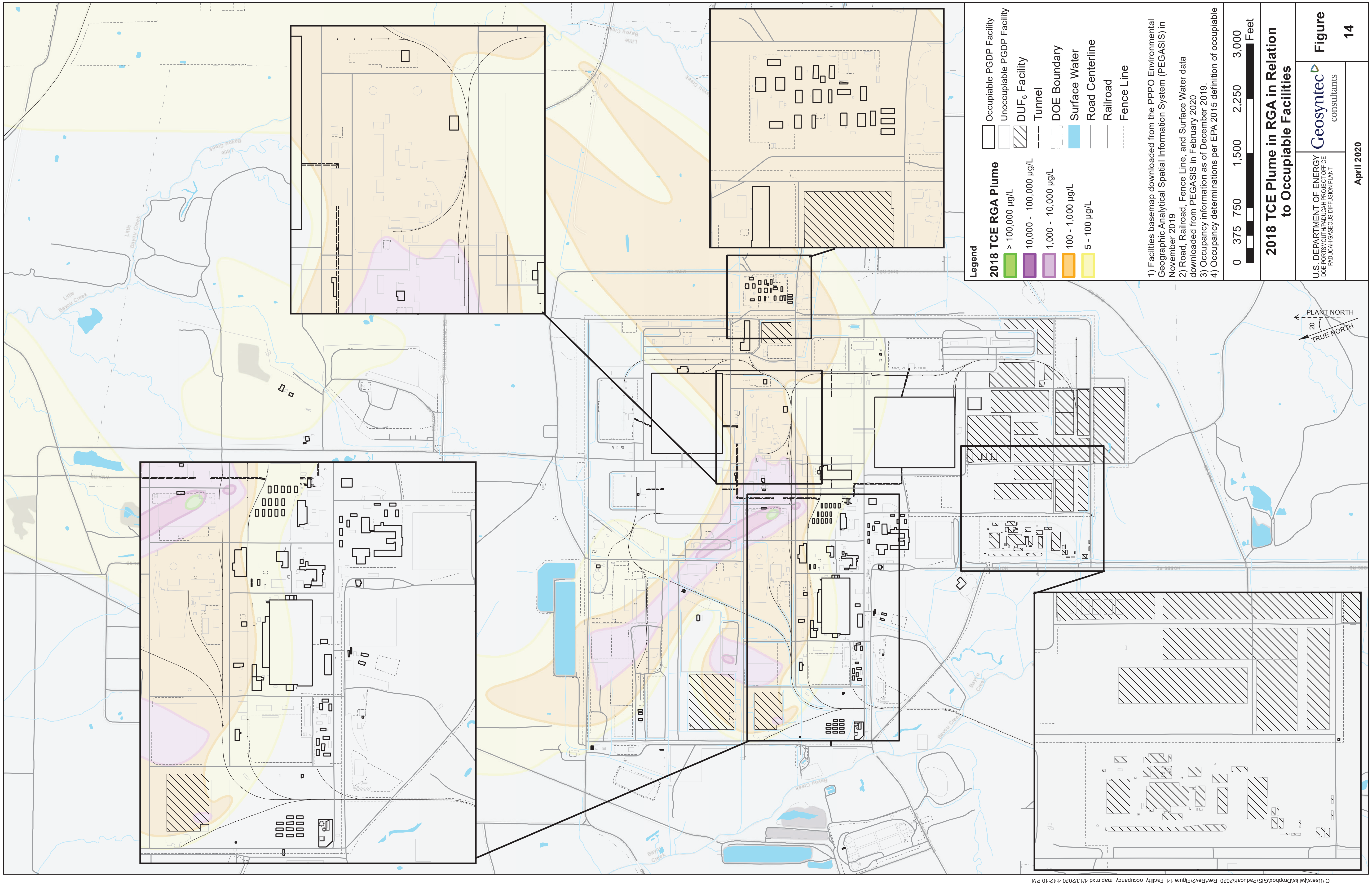

Figure 14. 2018 TCE Plume in RGA in Relation to Occupiable Facilities

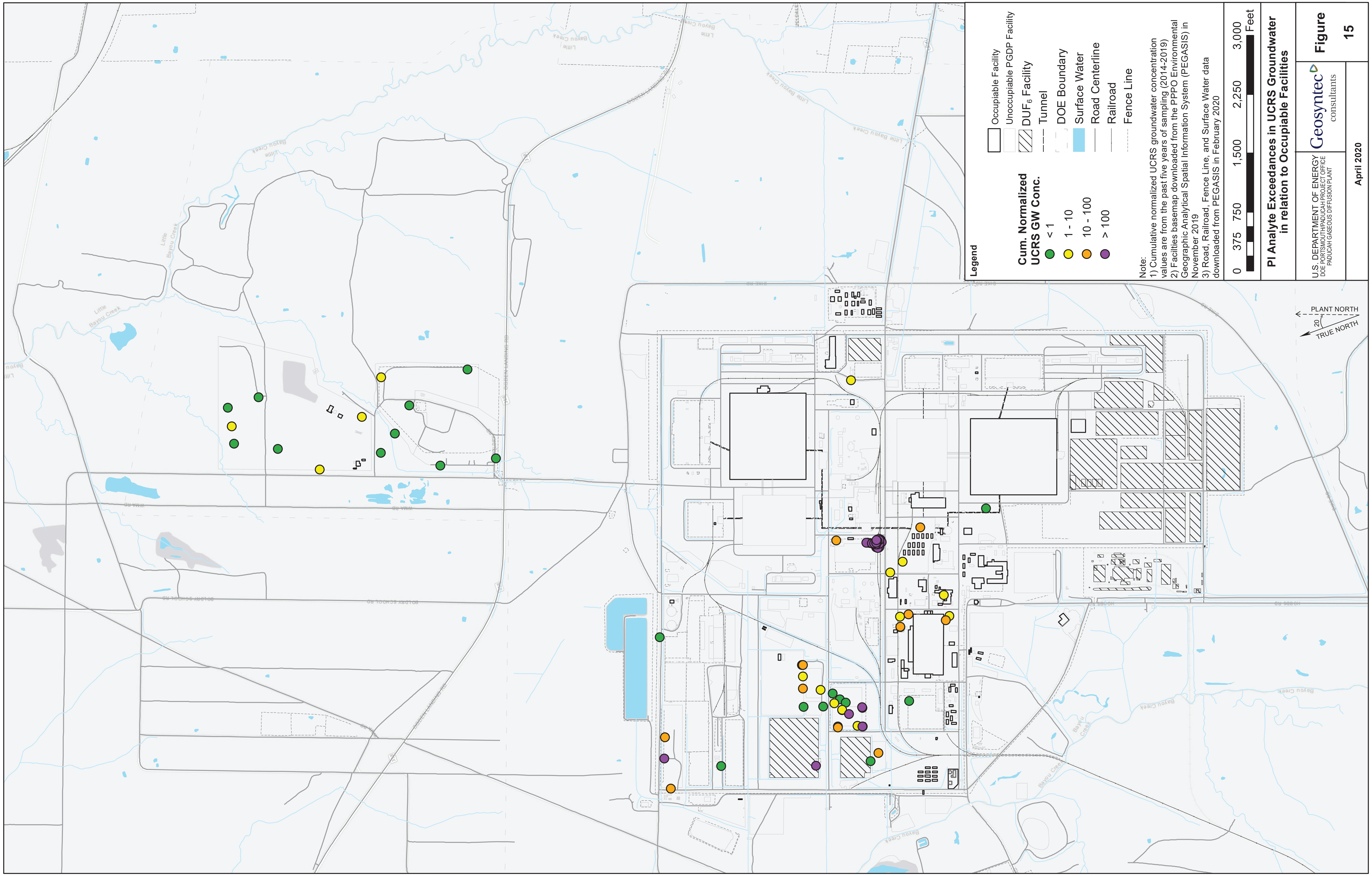

Figure 15. PI Analyte Exceedances in UCRS Groundwater in Relation to Occupiable Facilities

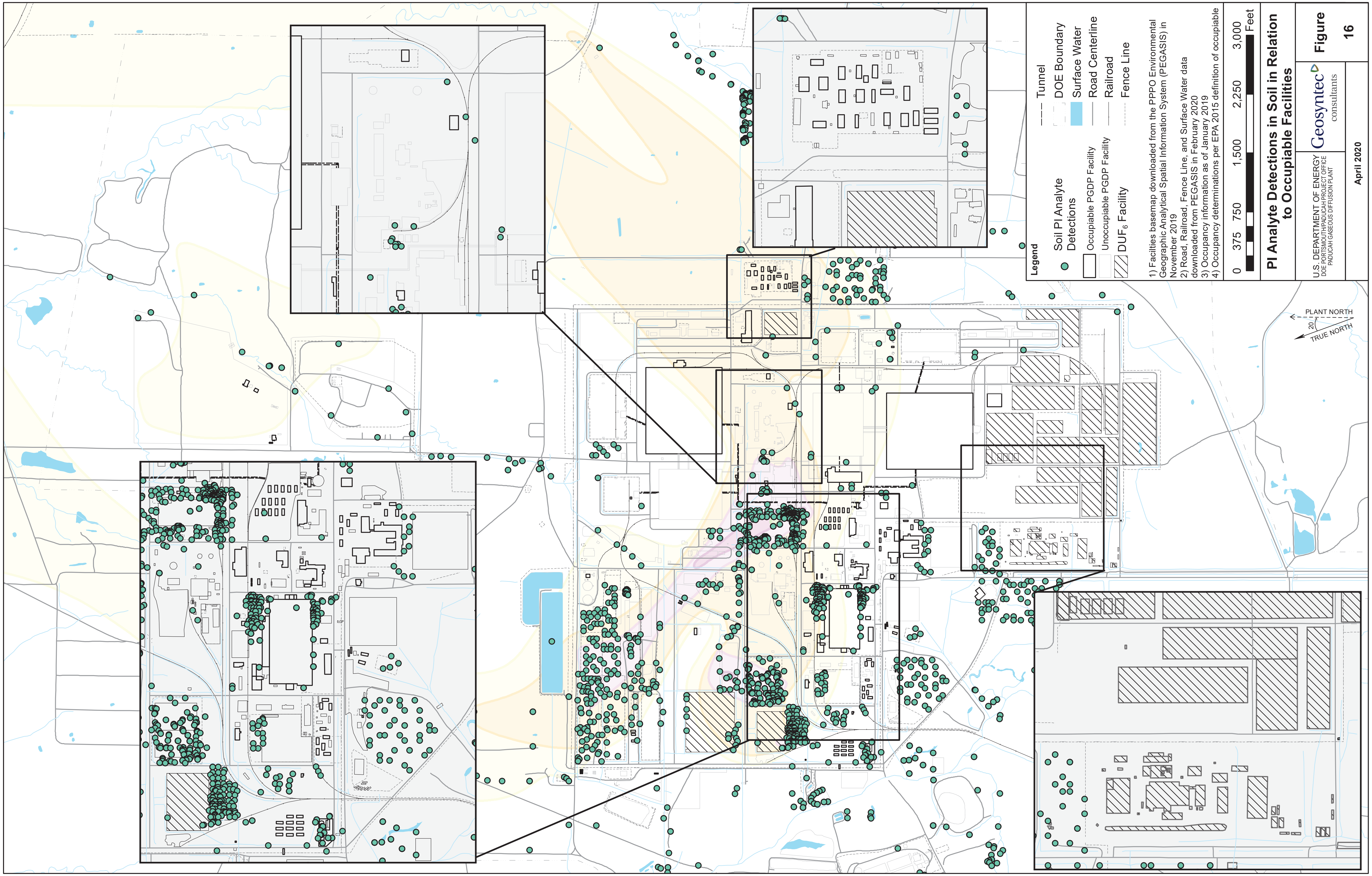

Figure 16. PI Analyte Detections in Soil in Relation to Occupiable Facilities

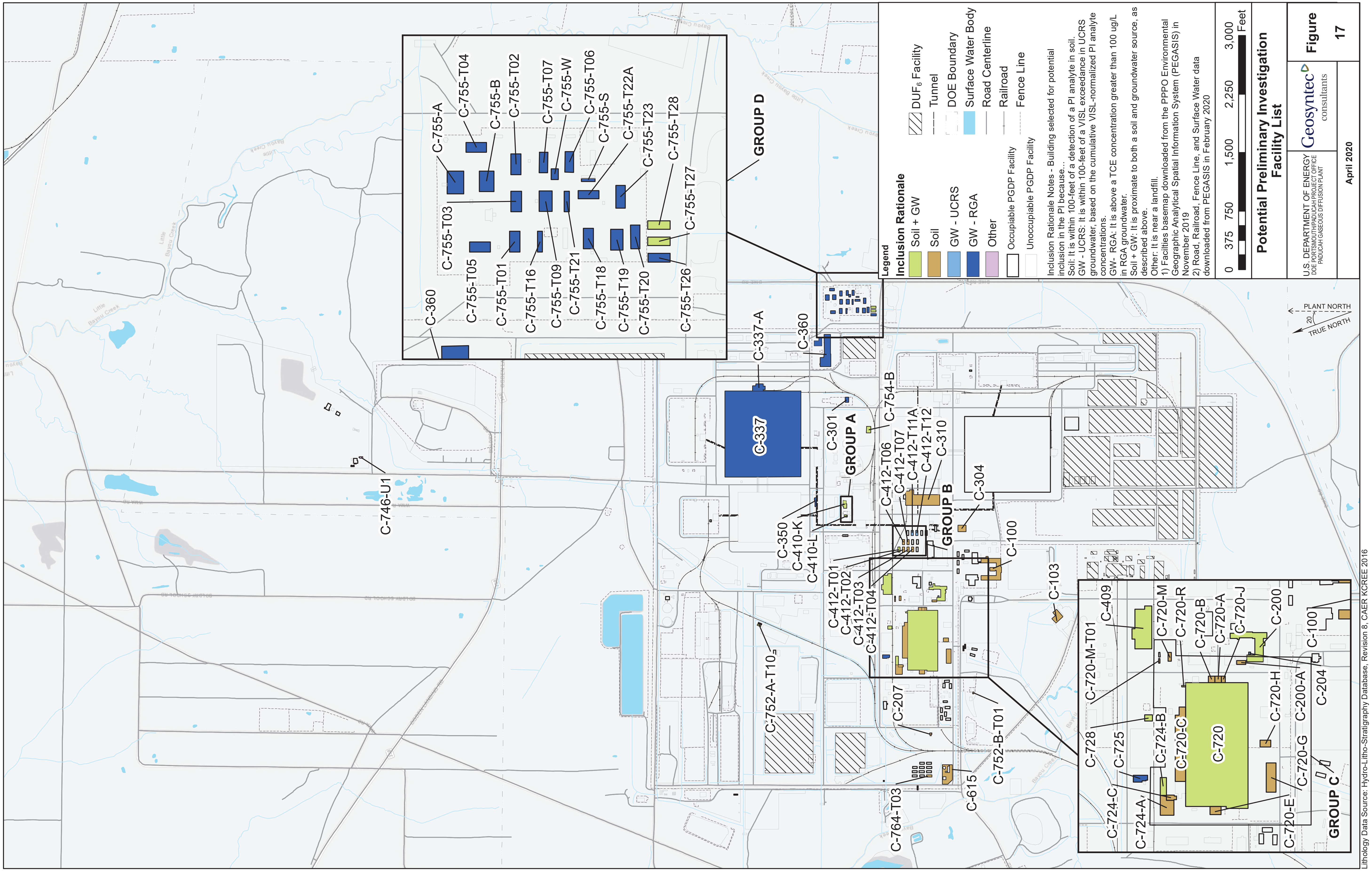

Figure 17. Potential Preliminary Investigation Facility List

Table 2. Potential Preliminary Investigation Facility List and Rationale

Facility Number	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)[1]
C-100	ADMINISTRATION BUILDING	Occupied	Soil	Outside plume	N/A[2]	Yes	20000–50000
C-103	DOE SITE OFFICE & ANNEX	Occupied	Soil	Outside plume	N/A[2]	Yes	5000–20000
C-200	GUARD & FIRE HEADQUARTERS	Occupied	UCRS GW and Soil	Outside plume	1–10	Yes	5000–20000
C-200-A	C-200 ANNEX	Occupiable	Soil	Outside plume	N/A[2]	Yes	1000–5000
C-204	DISINTEGRATOR BUILDING	Occupiable	UCRS GW	Outside plume	1–10	No	< 1000
C-207	FIRE TRAINING FACILITY	Occupiable	Soil	Outside plume	N/A[2]	Yes	< 1000
C-301	FIRE TRAINING BUILDING	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-304	TRAINING & CASCADE OFFICE BUILDING	Occupiable	Soil	Outside plume	N/A[2]	Yes	5000–20000
C-310	PURGE & PRODUCT BUILDING	Occupiable	Soil	5–100	N/A[2]	Yes	> 50000
C-337	PROCESS BUILDING	Occupied	RGA GW	100–1000	N/A[2]	No	> 50000
C-337-A	FEED VAPORIZATION FACILITY	Occupiable	RGA GW	100–1000	N/A[2]	No	5000–20000
C-350	DRYING AGENT STORAGE BUILDING	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-360	TOLL TRANSFER & SAMPLING BUILDING	Occupiable	RGA GW	100–1000	N/A[2]	No	20000–50000
C-360-A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Occupiable	RGA GW	100–1000	N/A[2]	No	5000–20000
C-409	STABILIZATION BUILDING	Occupied	RGA/UCRS GW and Soil	100–1000	1-10	Yes	20000–50000
C-410-D	F2 STORAGE BUILDING	Occupiable	RGA GW and Soil	1000–10000	N/A[2]	Yes	1000–5000
C-410-K	FLUORINE FACILITY BUILDING	Occupiable	RGA GW and Soil	1000–10000	N/A[2]	Yes	1000–5000
C-410-L	QUONSET HUT	Occupied	RGA GW and Soil	1000–10000	N/A[2]	Yes	< 1000
C-412-T01	OFFICE TRAILER	Occupied	UCRS GW and Soil	5–100	1-10	Yes	1000–5000
C-412-T02	OFFICE TRAILER	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-412-T03	OFFICE TRAILER	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-412-T04	OFFICE TRAILER	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-412-T06	OFFICE TRAILER	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-412-T07	SHOWER & CHANGE TRAILER	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-412-T11A	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5–100	10-100	No	1000–5000
C-412-T12	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5–100	10-100	No	1000–5000
C-615	SEWAGE DISPOSAL PLANT	Occupiable	Soil	Outside plume	N/A[2]	Yes	20000–50000
C-720	MAINTENANCE & STORES BUILDING	Occupiable	UCRS GW and Soil	5–100	10-100	Yes	> 50000
C-720-A	COMPRESSOR SHOP	Occupiable	Soil	<5 (Inferred)	N/A[2]	Yes	1000–5000
C-720-B	MACHINE SHOP ADDITION	Occupied	Soil	5–100	N/A[2]	Yes	1000–5000
C-720-C	CONVERTOR SHOP ADDITION	Occupiable	Soil	5–100	N/A[2]	Yes	20000–50000
C-720-E	CHANGE HOUSE ADDITION	Occupiable	Soil	5–100	N/A[2]	Yes	1000–5000

Table 2. Potential Preliminary Investigation Facility List and Rationale (Continued)

Facility Number	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)[1]
C-720-G	WAREHOUSE	Occupiable	Soil	Outside plume	N/A[2]	Yes	5000–20000
C-720-H	WAREHOUSE	Occupiable	Soil	Outside plume	N/A[2]	Yes	1000–5000
C-720-J	AIR LOCK	Occupiable	Soil	< 5 (Inferred)	N/A[2]	Yes	< 1000
C-720-M	COMPUTER MAINTENANCE TRAILER	Occupiable	Soil	5-100	N/A[2]	Yes	1000–5000
C-720-M-T01	IT STORAGE TRAILER	Occupiable	Soil	5–100	N/A[2]	Yes	< 1000
C-720-R	MASS SPECTROMETER REPAIR TRAILER	Occupiable	UCRS GW and Soil	5–100	10-100	Yes	< 1000
C-724-A	CARPENTER SHOP ANNEX	Occupiable	Soil	5–100	N/A[2]	Yes	5000–20000
C-724-B	CARPENTER SHOP	Occupiable	RGA GW and Soil	100–1000	N/A[2]	Yes	1000–5000
C-724-C	PAINT SHOP	Occupiable	Soil	5–100	N/A[2]	Yes	1000–5000
C-725	PAINT SHOP	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-728	MOTOR CLEANING FACILITY	Occupiable	RGA/UCRS GW and Soil	100–1000	10–100	Yes	1000–5000
C-746-U1	LEACHATE OFFICE BUILDING	Occupiable	Unique CSM[3]	5–100	N/A[2]	No	< 1000
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	Occupiable	RGA GW and Soil	1000–10000	N/A[2]	Yes	< 1000
C-752-B-T01	FUELING STATION TRAILER	Occupiable	Soil	Outside plume	N/A[2]	Yes	< 1000
C-754-B	LOW LEVEL WASTE STORAGE	Occupied	RGA GW and Soil	100–1000	N/A[2]	Yes	1000–5000
C-755-A	MAINTENANCE SHOP	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-B	CHANGE HOUSE BUILDING	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-S	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	< 1000
C-755-T01	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T02	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T03	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T04	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T05	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T06	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T07	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T09	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T16	RADCON TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	< 1000
C-755-T18	FIELD OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T19	OFFICE BREAK TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T20	OFFICE BREAK TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T21	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	< 1000
C-755-T22A	INSTRUMENT LAB TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T23	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000

Table 2. Potential Preliminary Investigation Facility List and Rationale (Continued)

Facility Number	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)[1]
C-755-T26	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	1000–5000
C-755-T27	OFFICE TRAILER	Occupiable	RGA GW and Soil	100–1000	N/A[2]	Yes	1000–5000
C-755-T28	OFFICE TRAILER	Occupiable	RGA GW and Soil	100–1000	N/A[2]	Yes	1000–5000
C-755-W	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[2]	No	< 1000
C-764-T03	OFFICE TRAILER	Occupied	Soil	Outside plume	N/A[2]	Yes	1000–5000

Notes: All Preliminary Investigation Facilities were determined to be "buildings" based on the 2015 OSWER VI guidance.

[1] Facility size not used in PI facility ranking process.

[2] Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are nondetect.

[3] Facility included for sampling because it is located near a landfill.

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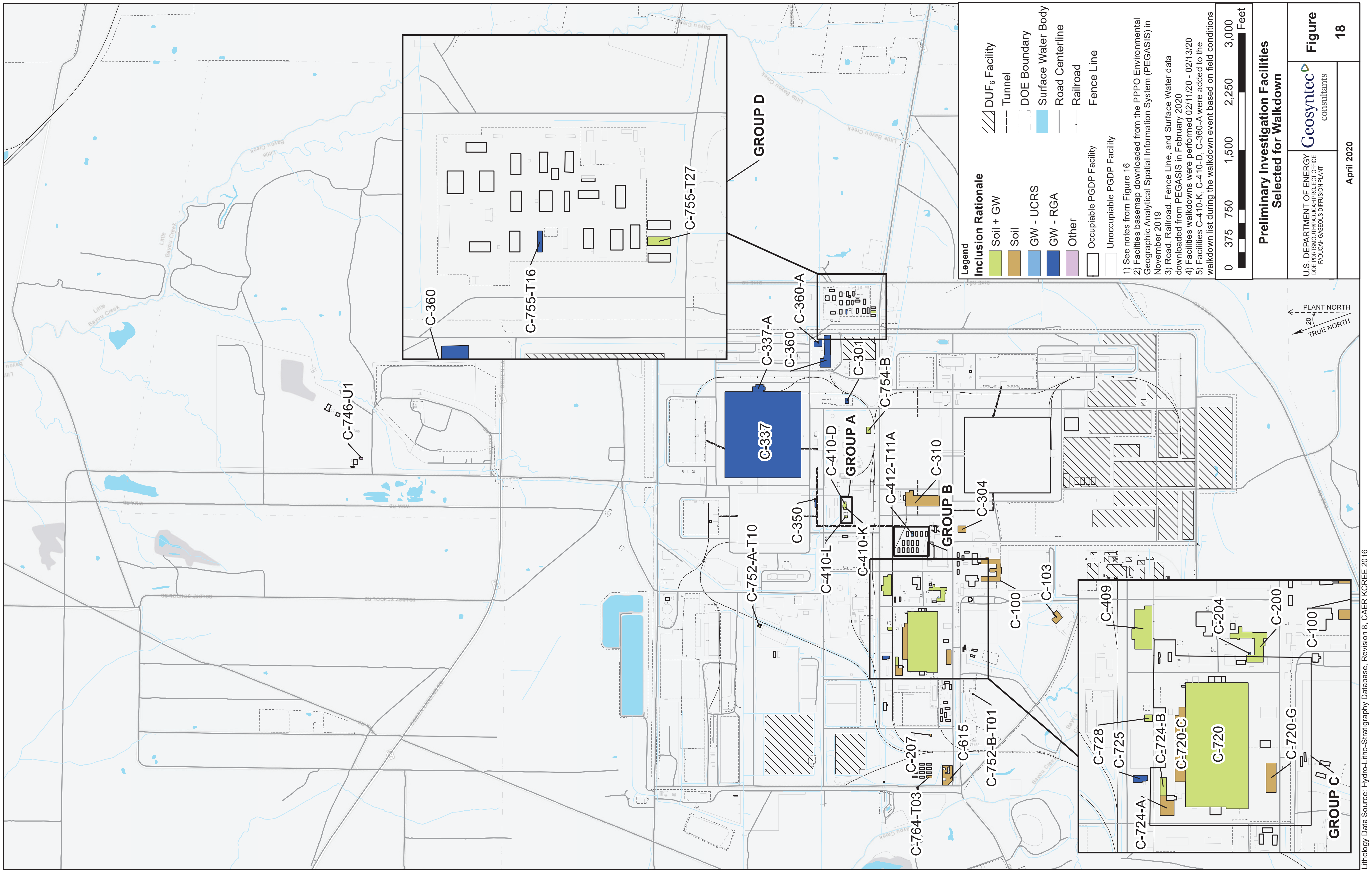

Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

Figure 18. Preliminary Investigation Facilities Selected for Walkdown

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Table 3. Preliminary Investigation Facilities for Walkdowns

Facility Number	Facility Description[1]	Occupancy Status[1]	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)	PI Facility Groups[2]
C-100	ADMINISTRATION BUILDING	Occupied	Soil	Outside plume	N/A[3]	Yes	20000-50000	-
C-103	DOE SITE OFFICE & ANNEX	Occupied	Soil	Outside plume	N/A[3]	Yes	5000-20000	-
C-200	GUARD & FIRE HEADQUARTERS	Occupied	UCRS GW and Soil	Outside plume	1–10	Yes	5000–20000	-
C-204	DISINTEGRATOR BUILDING	Occupiable	UCRS GW	Outside plume	1–10	No	< 1000	-
C-207	FIRE TRAINING FACILITY	Occupiable	Soil	Outside plume	N/A[3]	Yes	< 1000	-
C-301	FIRE TRAINING BUILDING	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	-
C-304	TRAINING & CASCADE OFFICE BUILDING	Occupiable	Soil	Outside plume	N/A[3]	Yes	5000–20000	-
C-310	PURGE & PRODUCT BUILDING	Occupiable	Soil	5–100	N/A[3]	Yes	>50000	-
C-337	PROCESS BUILDING	Occupied	RGA GW	100–1000	N/A[3]	No	>50000	-
C-337-A	FEED VAPORIZATION FACILITY	Occupiable	RGA GW	100–1000	N/A[3]	No	5000–20000	-
C-350	DRYING AGENT STORAGE BUILDING	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	-
C-360	TOLL TRANSFER & SAMPLING BUILDING	Occupiable	RGA GW	100–1000	N/A[3]	No	20000–50000	-
C-360-A[4]	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Occupiable	RGA GW	100–1000	N/A[3]	No	5000–20000	-
C-409	STABILIZATION BUILDING	Occupied	RGA/UCRS GW and Soil	100–1000	N/A[3]	Yes	20000–50000	-
C-410-D[4]	F2 STORAGE BUILDING	Occupiable	RGA GW	1000–10000	N/A[3]	No	1000–5000	A
C-410-K[4]	FLUORINE FACILITY BUILDING	Occupiable	RGA GW and Soil	1000–10000	N/A[3]	Yes	1000–5000	
C-410-L	QUONSET HUT	Occupied	RGA GW	1000–10000	N/A[3]	No	< 1000	
C-412-T01	OFFICE TRAILER	Occupied	UCRS GW	5–100	1–10	No	1000–5000	B
C-412-T02	OFFICE TRAILER	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-412-T03	OFFICE TRAILER	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-412-T04	OFFICE TRAILER	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-412-T06	OFFICE TRAILER	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-412-T07	SHOWER & CHANGE TRAILER	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-412-T11A	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5–100	10–100	No	1000–5000	
C-412-T12	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5–100	10–100	No	1000–5000	
C-615	SEWAGE DISPOSAL PLANT	Occupiable	Soil	Outside plume	N/A[3]	Yes	20000–50000	-
C-720	MAINTENANCE & STORES BUILDING	Occupiable	UCRS GW and Soil	5–100	10–100	Yes	>50000	-
C-200-A	C-200 ANNEX	Occupiable	Soil	Outside plume	N/A[3]	Yes	1000–5000	C
C-720-A	COMPRESSOR SHOP	Occupiable	Soil	< 5 (Inferred)	N/A[3]	Yes	1000–5000	
C-720-B	MACHINE SHOP ADDITION	Occupied	Soil	5–100	N/A[3]	Yes	1000–5000	
C-720-E	CHANGE HOUSE ADDITION	Occupiable	Soil	5–100	N/A[3]	Yes	1000–5000	
C-720-H	WAREHOUSE	Occupiable	Soil	Outside plume	N/A[3]	Yes	1000–5000	
C-720-J	AIR LOCK	Occupiable	Soil	< 5 (Inferred)	N/A[3]	Yes	< 1000	
C-720-R	MASS SPECTROMETER REPAIR TRAILER	Occupiable	UCRS GW and Soil	5–100	10–100	Yes	< 1000	
C-720-M	COMPUTER MAINTENANCE TRAILER	Occupiable	Soil	5–100	N/A[3]	Yes	1000–5000	
C-720-M-T01	IT STORAGE TRAILER	Occupiable	Soil	5–100	N/A[3]	Yes	< 1000	
C-724-B	CARPENTER SHOP	Occupiable	RGA GW and Soil	100–1000	N/A[3]	Yes	1000–5000	
C-724-C	PAINT SHOP	Occupiable	Soil	5-100	N/A[3]	Yes	1000–5000	
C–720–C	CONVERTOR SHOP ADDITION	Occupiable	Soil	5–100	N/A[3]	Yes	20000–50000	-
C-720-G	WAREHOUSE	Occupiable	Soil	Outside plume	N/A[3]	Yes	5000–20000	-

Table 3. Preliminary Investigation Facilities for Walkdowns (Continued)

Facility Number	Facility Description[1]	Occupancy Status[1]	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)	PI Facility Groups[2]
C-724-A	CARPENTER SHOP ANNEX	Occupiable	Soil	5–100	N/A[3]	Yes	5000–20000	-
C-725	PAINT SHOP	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	-
C-728	MOTOR CLEANING FACILITY	Occupiable	RGA/UCRS GW and Soil	100–1000	10-100	Yes	1000–5000	-
C-746-U1	LEACHATE OFFICE BUILDING	Occupiable	Unique CSM[5]	5–100	N/A[3]	No	< 1000	-
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	Occupiable	RGA GW and Soil	1000-10000	N/A[3]	Yes	< 1000	-
C-752-B-T01	FUELING STATION TRAILER	Occupiable	Soil	Outside plume	N/A[3]	Yes	< 1000	-
C-754-B	LOW LEVEL WASTE STORAGE	Occupied	RGA GW	100–1000	N/A[3]	Yes	1000–5000	-
C-755-A	MAINTENANCE SHOP	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	D
C-755-B	CHANGE HOUSE BUILDING	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-S	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	< 1000	
C-755-T01	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T02	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T03	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T04	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T05	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T06	OFFICE TRAILER	Occupied	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T07	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T09	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T16	RADCON TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	< 1000	
C-755-T18	FIELD OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T19	OFFICE BREAK TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T20	OFFICE BREAK TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T21	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	< 1000	
C-755-T22A	INSTRUMENT LAB TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T23	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T26	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	
C-755-T27	OFFICE TRAILER	Occupiable	RGA GW and Soil	100–1000	N/A[3]	Yes	1000–5000	
C-755-T28	OFFICE TRAILER	Occupiable	RGA GW and Soil	100–1000	N/A[3]	Yes	1000–5000	
C-755-W	OFFICE TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	< 1000	
C-764-T03	OFFICE TRAILER	Occupied	Soil	Outside plume	N/A[3]	Yes	1000–5000	-

Notes:

[1] Information checked and revised as of February 14, 2020.

[2] Facilities grouped based on similarities in spatial proximity, analyte source(s), and building size.

[3] Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are nondetect.

[4] Facilities C-410-K, C-410-D, C-360-A were added to the walkdown list during the walkdown event based on field conditions.

[5] Facility included for sampling because it is located near a landfill.

🟨 Facility selected for walkdown

- Similarities in facility construction. Facilities such as trailers may feature the same construction characteristics (e.g., poured slab foundation) and be of similar size. Within a reasonable spatial distribution, they will likely have similar VI profiles.

- Proximity to PI analyte source. It is expected that facilities nearer to potential VI sources (e.g., groundwater wells with VISL exceedances) would exhibit stronger VI signals. Thus, given otherwise similar characteristics, facilities nearer to potential VI sources were given priority. Groups A–D were established based on the criteria above. From Group A, Facility C-410-L originally was selected for potential inclusion in the PI because it had the smallest footprint size in the group. Smaller spaces generally have higher relative concentrations of analytes in indoor air, if VI is occurring. From Group B, C-412-T11A was selected because of its proximity to a UCRS groundwater well recording a VISL exceedance, in addition to being over the edge of the RGA TCE plume. From Group C, C-724-B was selected because the interpolated RGA TCE groundwater concentrations are highest under the building's footprint relative to the other Group C buildings. And in Group D, two buildings were selected: C-755-T16 and C-755-T27. As noted above, smaller footprints are more likely to be demonstrative of VI, should VI be occurring. Trailers C-755-S, C-755-T16, and C-755-T21 share construction properties and footprint sizes, so C-755-T16 was chosen at random to be representative of the group. C-755-T27 was chosen because, in addition to possible VI from RGA groundwater, there also were detections of soil PI analytes nearby. Each of the locations selected from each group is considered to be representative of the groups, and their results will be used as a proxy to evaluate whether VI may be occurring at the other grouped buildings.

Before selecting sampling locations, staff conducted PI facility walkdowns to confirm building construction characteristics; heating, ventilation, and air conditioning (HVAC) and ventilation characteristics; building occupancy; and identify potential indoor contaminant sources and preferential pathways. Facility walkdowns were completed February 11–14, 2020. Completed forms used during the facility walkdowns are included in Appendix C. The walkdowns helped provide other elements of the building-specific CSMs. Information gathered from the walkdowns is summarized in Table 4, and facilities proposed for sampling based on this information are presented in Table 5 and shown on Figure 19. Notable changes to the PI scope that occurred during walkdowns are as follows:

- Facility C-410-D was added to the walkdown list for consideration for PI sampling because C-410-L was deemed unoccupiable during the walkdown.

- Facility C-410-K was added to the walkdown list for consideration for PI sampling because C-410-L was deemed unoccupiable during the walkdown.

- Facility C-360-A was added to the walkdown list for consideration for PI sampling because C-360 was deemed unoccupiable during the walkdown.

6. VAPOR INTRUSION CONCEPTUAL SITE MODELS

The 2015 EPA VI Technical Guide recommends using available site data to develop a VI CSM that addresses, at a minimum, the nature, location, spatial extent of the vapor sources in the subsurface and location, use, occupancy, and construction of the existing buildings. EPA also recommends that the CSM portray the current understanding of the hydrologic and geologic setting and its influence on vapor migration and attenuation in the vadose zone. To address these needs, a VI CSM generally includes descriptions of the following:

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Table 4. Facility Walkdown Summary

Facility Number	Facility Description	Occupancy Status[1]	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (µg/L)	Max Cumulative Normalized UCRS GW Conc w/in 100 ft of Facility (µg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)	Walkdown Notes	Plan to Sample?	Sampling Rationale if Not Planned to Sample	Building Type
C-100	ADMINISTRATION BUILDING	Occupied	Soil	Outside plume	N/A[3]	Yes	20000–50000	Offices with Basement	Yes	-	Building with Basement
C-103	DOE SITE OFFICE & ANNEX	Occupied	Soil	Outside plume	N/A[3]	Yes	5000–20000	Site Offices	Yes	-	Slab on Grade Structure
C-200	GUARD & FIRE HEADQUARTERS	Occupied	UCRS GW and Soil	Outside plume	1-10	Yes	5000–20000	Police/Fire	Yes	-	Building with Basement
C-204	DISINTEGRATOR BUILDING	Not Occupiable	UCRS GW	Outside plume	1-10	No	< 1000	Incinerator	No	Holes in walls; not occupiable. Not part of building group.	Slab on Grade Structure
C-207	FIRE TRAINING FACILITY	Not Occupiable	Soil	Outside plume	N/A[3]	Yes	< 1000	Fire Training	No	Holes in walls; not occupiable. Not part of building group.	Slab on Grade Structure
C-301	FIRE TRAINING BUILDING	Not Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	No Roof	No	No roof	Slab on Grade Structure
C-304	TRAINING & CASCADE OFFICE BUILDING	Occupiable	Soil	Outside plume	N/A[3]	Yes	5000–20000	Offices	Yes	-	Slab on Grade Structure
C-310	PURGE & PRODUCT BUILDING	Occupiable	Soil	5–100	N/A[3]	Yes	> 50000	Former Process Building	Yes	-	Building with Basement
C-337	PROCESS BUILDING	Occupied	RGA GW	100–1000	N/A[3]	No	> 50000	Former Process Building	Yes	-	Building with Basement
C-337-A	FEED VAPORIZATION FACILITY	Occupiable	RGA GW	100–1000	N/A[3]	No	5000–20000	Office/Bath	Yes	-	Slab on Grade Structure
C-350	DRYING AGENT STORAGE BUILDING	Not Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	CIF_3 Tanks	No	Not occupiable tank buildings. Not part of building group.	Slab on Grade Structure
C-360	TOLL TRANSFER & SAMPLING BUILDING	Not Occupiable	RGA GW	100–1000	N/A[3]	No	20000–50000	Deactivated	No	Building deactivated	Building with Basement
C-360-A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Not Occupiable	RGA GW	100-1000	N/A[3]	No	5000–20000	Vehicle/Heavy Equipment Maintenance	Yes	-	Slab on Grade Structure
C-409	STABILIZATION BUILDING	Occupied	RGA/UCRS GW and Soil	100–1000	1–10	Yes	20000–50000	Big Ovens/Lab	Yes	-	Slab on Grade Structure
C-410-D	F2 STORAGE BUILDING	Not Occupiable	RGA GW	1000–10000	N/A[3]	No	1000–5000	Three 1000-ft yellow tanks for F2 gas	No	Not occupiable	Slab on Grade Structure
C-410-K	FLUORINE FACILITY BUILDING	Occupiable	RGA GW and Soil	1000–10000	N/A[3]	Yes	1000–5000	F2 Process	Yes	-	Slab on Grade Structure
C-410-L	QUONSET HUT	Not Occupiable	RGA GW	1000–10000	N/A[3]	No	< 1000	Spill Quonset	No	Not occupiable spill response. Part of building group; include C-410K instead.	Slab on Grade Structure
C-412-T11A	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5–100	10–100	No	1000–5000	Female and Male Change Trailer	Yes	-	Trailer (Skirted)
C-615	SEWAGE DISPOSAL PLANT	Occupiable	Soil	Outside plume	N/A[3]	Yes	20000–50000	Sewage Plant	Yes	-	Building with Basement
C-720	MAINTENANCE & STORES BUILDING	Occupiable	UCRS GW and Soil	5–100	10–100	Yes	> 50000	Stores; Maintenance Shops. C-720 and C-720-C are connected; will be assessed together.	Yes	-	Slab on Grade Structure
C-724-B	CARPENTER SHOP	Occupiable	RGA GW and Soil	100–1000	N/A[3]	Yes	1000–5000	Carpenter Shop. C-724-A and C-724-B are connected; will be assessed together.	Yes	-	Slab on Grade Structure
C-720-C	CONVERTOR SHOP ADDITION	Occupiable	Soil	5–100	N/A[3]	Yes	20000–50000	Stores; Maintenance Shops. C-720 and C-720-C are connected; will be assessed together.	Yes	-	Slab on Grade Structure
C-720-G	WAREHOUSE	Occupiable	Soil	Outside plume	N/A[3]	Yes	5000–20000	Warehouse; intended for future occupancy.	Yes	-	Slab on Grade Structure
C-724-A	CARPENTER SHOP ANNEX	Occupiable	Soil	5–100	N/A[3]	Yes	5000–20000	Carpenter Shop. C-724-A and C-724-B are connected; will be assessed together.	Yes	-	Slab on Grade Structure
C-725	PAINT SHOP	Occupiable	RGA GW	100–1000	N/A[3]	No	1000–5000	Paint Shop/Storage; Occupied	Yes	-	Slab on Grade Structure
C-728	MOTOR CLEANING FACILITY	Not Occupiable	RGA/UCRS GW and Soil	100–1000	10–100	Yes	1000–5000	Holes in Walls; Abandoned	No	Not occupiable; holes in walls; abandoned	Slab on Grade Structure
C-746-U1	LEACHATE OFFICE BUILDING	Occupiable	Unique CSM[2]	Outside plume	N/A[3]	No	< 1000	Landfill Leachate Office	Yes	-	Trailer (No Skirt)
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	Occupied	RGA GW and Soil	1000–10000	N/A[3]	Yes	< 1000	Breakroom	Yes	_	Trailer (Skirted)
C-752-B-T01	FUELING STATION TRAILER	Occupiable	Soil	Outside plume	N/A[3]	Yes	< 1000	AST Trailer	Yes	-	Trailer (Skirted)
C-754-B	LOW LEVEL WASTE STORAGE	Occupied	RGA GW	100–1000	N/A[3]	Yes	1000–5000	Police Training; No Floor Slab	Yes	-	No Slab
C-755-T16	RADCON TRAILER	Occupiable	RGA GW	100–1000	N/A[3]	No	< 1000	Change/Shower Trailer	Yes	-	Trailer (Skirted)
C-755-T27	OFFICE TRAILER	Occupiable	RGA GW and Soil	100–1000	N/A[3]	Yes	1000–5000	Operations & Maintenance Office	Yes	-	Trailer (Skirted)
C-764-T03	OFFICE TRAILER	Occupied	Soil	Outside plume	N/A[3]	Yes	1000–5000	Offices	Yes	-	Trailer (Skirted)

Notes: Information checked and revised as of 2/14/2020; all Preliminary Investigation Facilities were determined to be "buildings" based on the 2015 OSWER VI guidance.

[1] Facility walkdowns completed 2/11/2020-2/14/2020. Occupancy status current as these dates.

[2] Facility included for sampling because it is located near a landfill.

[3] Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are nondetect.

Table 5. Sampling Locations and Types of Samples PGDP Industrial Area Vapor Intrusion

Facility Number	Facility Description	Facility Walkdown Description	PI Inclusion Rationale	Building Type	Number of Indoor Air Samples	Number of Sub-Slab Samples	Number of Crawlspace Samples	Number of Outdoor Air Samples
C-100	ADMINISTRATION BUILDING	Offices with Basement	Soil	Building with Basement	4 (2 first floor; 2 basement)	4 (2 first floor; 2 basement)	0	1
C-103	DOE SITE OFFICE & ANNEX	Site Offices	Soil	Slab on Grade Structure	3	3	0	1
C-200	GUARD & FIRE HEADQUARTERS	Police/Fire	UCRS GW and Soil	Building with Basement	4 (3 first floor; 1 basement)	4 (3 first floor; 1 basement)	0	1
C-304	TRAINING & CASCADE OFFICE BUILDING	Offices	Soil	Slab on Grade Structure	3	3	0	1
C-310	PURGE & PRODUCT BUILDING	Former Process Building	Soil	Building with Basement	4 (3 first floor; 1 basement)	4 (3 first floor; 1 basement)	0	1
C-337	PROCESS BUILDING	Former Process Building	RGA GW	Building with Basement	1 (tunnel)	4 (3 first floor; 1 basement)	0	0
C-337-A	FEED VAPORIZATION FACILITY	Office/Bath	RGA GW	Slab on Grade Structure	0	2	0	0
C-360-A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Vehicle/Heavy Equipment Maintenance	RGA GW	Slab on Grade Structure	0	3	0	0
C-409	STABILIZATION BUILDING	Big Ovens/Lab	RGA/UCRS GW and Soil	Slab on Grade Structure	3	3	0	1
C-410-K	FLUORINE FACILITY BUILDING	F2 Process	RGA GW and Soil	Slab on Grade Structure	0	1	0	0
C-412-T11A	SHOWER & CHANGE TRAILER	Female and Male Change Trailer	UCRS GW	Trailer (Skirted)	0	0	1	1
C-615	SEWAGE DISPOSAL PLANT	Sewage Plant	Soil	Building with Basement	2 (basement)	2 (basement)	0	1
C-720 & C-720-C	MAINTENANCE & STORES BUILDING; CONVERTOR SHOP ADDITION	Stores; Maintenance Shops. C-720 and C-720-C are connected; will be assessed together.	UCRS GW and Soil	Slab on Grade Structure	7	7	0	1
C-720-G	WAREHOUSE	Warehouse; intended for future occupancy.	Soil	Slab on Grade Structure	4	4	0	1
C-724-A & C-724-B	CARPENTER SHOP; CARPENTER SHOP ANNEX	Carpenter Shop. C-724-A and C-724-B are connected; will be assessed together.	RGA GW and Soil	Slab on Grade Structure	4	4	0	1
C-725	PAINT SHOP	Paint Shop/Storage; Occupied	RGA GW	Slab on Grade Structure	0	2	0	0
C-746-U1	LEACHATE OFFICE BUILDING	Landfill Leachate Office	Unique CSM[1]	Sealand Container	1	0	0	1
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	Breakroom	RGA GW and Soil	Trailer (Skirted)	0	0	1	1
C-752-B-T01	FUELING STATION TRAILER	AST Trailer	Soil	Trailer (Skirted)	0	0	1	1
C-754-B	LOW LEVEL WASTE STORAGE	Police Training; No Floor Slab	RGA GW	Quonset Hut (No Slab)	1	0	0	1
C-755-T16	RADCON TRAILER	Change/Shower Trailer	RGA GW	Trailer (Skirted)	0	0	1	1
C-755-T27	OFFICE TRAILER	Operations & Maintenance Office	RGA GW and Soil	Trailer (Skirted)	0	0	1	1
C-764-T03	OFFICE TRAILER	Offices	Soil	Trailer (Skirted)	0	0	1	1

Notes: Information checked and revised 2/14/2020.

1. Facility included for sampling because it is located near a landfil

AST = aboveground storage tank

GW = Groundwater

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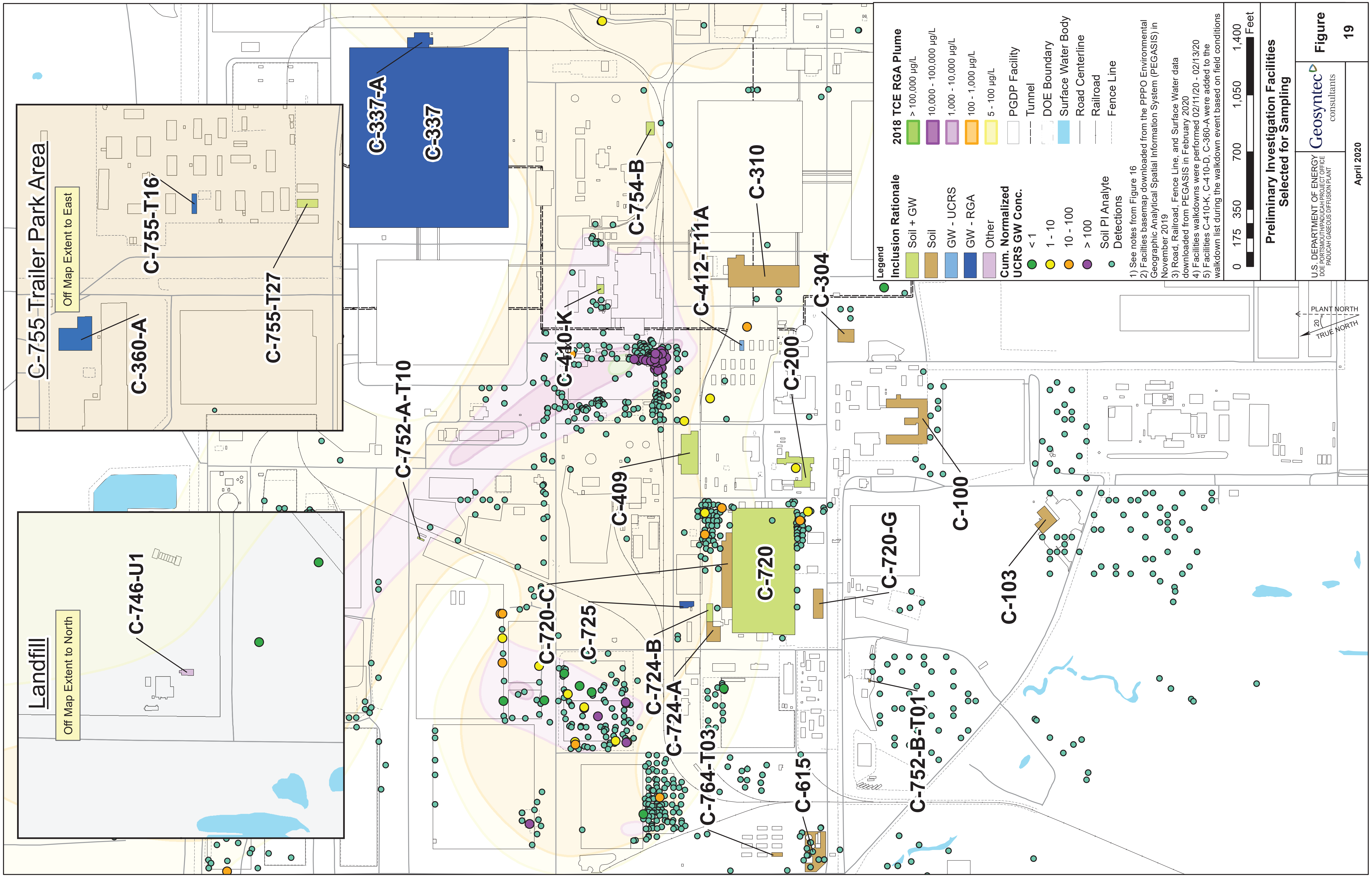

Figure 19. Preliminary Investigation Facilities Selected for Sampling

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- Site operations and activities—the types of site operations and activities that occurred on or near the site that could have released VOCs to the subsurface;

- Chemicals of interest—the types of VOCs that may have been used or disposed of at the site;

- Land and facility use—current and reasonably anticipated land and building use and occupancy;

- Building characteristics—such as layout; type and integrity of the building foundation, and heating, ventilating, and air conditioning operations;

- Potential subsurface sources—types, locations, and concentrations of vapor-forming sources under or near the building; and

- Potential vapor migration pathways—descriptions of vadose zone features conducive to vapor transport and potential vapor entry points into the building, including potential preferential pathways, such as subsurface utility corridors.

DOE's compilation of available historical data has identified considerable existing information relevant to the assessment of VI at PGDP. The following sections present a compilation of the data relevant to the VI pathway and the use of that data to develop building-specific VI CSMs, evaluate the completeness of the VI pathway, and identify data needs to be addressed. Many elements of the sitewide VI CSM, such as sitewide groundwater plumes and vadose zone characteristics, are used to build the building-specific CSMs, alongside building specific information such as location, occupancy, and building characteristics.

6.1 SITE OPERATIONS THAT COULD HAVE RELEASED VOCS

TCE was used as an industrial cleaning solvent at PGDP. TCE was used in industrial processes from the 1960s until use ended on-site in 1993. TCE degreasing processes at C-720 and C-400 Buildings, TCE washing of switchyard transformers, TCE disposal in on-site landfills and landfarming operations, and possible construction-related use in the C-745 Kellogg Building, previously located in the east-central portion of the plant site and currently designated SWMU 99, all are potential historical sources of TCE. There also have been significant point sources of TCE release. A sump pump near building the C-400 degreasing area discharged TCE for many years when it was found to be inadvertently releasing TCE to a storm sewer in 1986. Water from this storm sewer was found to have leaked into surrounding soil. In the mid-1960s and briefly in 1979, TCE was used in cylinder drop tests within the C-745-B yard (located in the east-central portion of the facility). TCE was used in belowground surface pits with dry ice to cool cylinders for testing. The TCE in these pits eventually vaporized or leaked into soil (DOE 2018).

6.2 CHEMICALS OF INTEREST (PI ANALYTES)

Large volumes of TCE were used in historical operations at PGDP, and releases of TCE inside and outside of site buildings have contaminated site media. The VOCs of interest are TCE and its breakdown products *cis*-1,2-DCE, *trans*-1,2-DCE, and VC. As part of the VISL calculator, EPA has not assigned inhalation toxicity values for *cis*-1,2-DCE and *trans*-1,2-DCE; thus, these chemicals do not have VISLs. EPA has provided provisional values to use on this project as listed in Table 1.

Degradation pathways for TCE are well understood (see Figure 20). TCE degrades faster in a reducing environment to DCE isomers, and then DCE degrades in a reducing environment to VC. As shown in the Figure 19, once DCE or VC is present, it may degrade at significant rates via either a reductive or

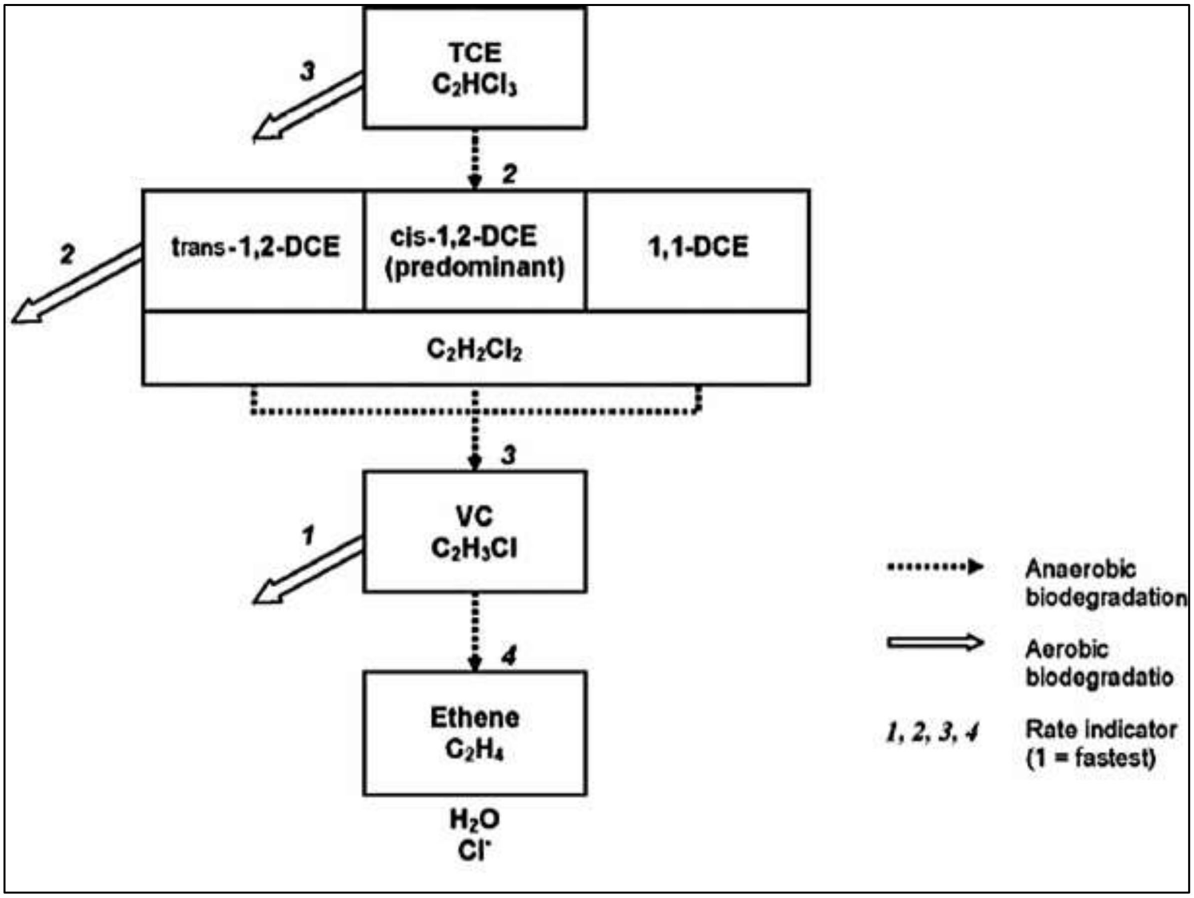

Figure 20. Degradation Pathways for TCE (adapted from Morrison 2006)

oxidative path. At PGDP, the RGA is not a reducing environment; thus, TCE will tend to persist in the RGA, but DCE and VC typically will be degraded via the oxidizing environment present there. There is evidence that TCA was used in some site buildings; thus, TCA will be evaluated in PI buildings with a known history of use. Please see Table 1 for the list of PI analytes and associated VISLs.

6.3 LAND AND FACILITY USE

Current and reasonably foreseeable future land uses at and adjacent to PGDP are industrial for areas located primarily inside the security fence, industrial or recreational for areas located outside the security fence, and residential for areas beyond the DOE property (DOE 2005). This land use determination was made after consideration of (1) existing lease agreements, (2) the nature of contamination currently present at the facility, and (3) stakeholder input. Data used to determine land uses were obtained through a land use survey performed in 1995 and future land use public workshops conducted in 1994 and 1995. Additionally, the subject has been discussed with a number of organizations, including city and county officials and the Citizens Advisory Board.

The Kentucky Research Consortium for Energy and Environment worked with federal, commonwealth, and local government representatives and community stakeholders to complete a risk-based end state vision for the site, *The PGDP Future Vision Project*, in 2011 (KRCEE 2011). The process included structured public involvement and technology integration. This end state vision informs DOE of current community preferences for future use of the Paducah Site.

TCE and other VOCs in soil and groundwater originate in an area where current and expected future land use is industrial. There are no current exposures to on-site groundwater by nonremediation workers or the general public because of existing on-site restrictions and controls (e.g., the current excavation/penetration permit program). A Land Use Control Implementation Plan (DOE 2008) identifies specific controls and mechanisms to ensure four objectives:

1. Maintain the integrity of any current or future remedial or monitoring system;

2. Prohibit the development and use of the study area for residential housing, elementary and secondary schools, child care facilities, and playgrounds;

3. Prevent exposure of current and future on-site industrial workers to groundwater/soils and prevent use of the groundwater within the study area through institutional controls (e.g., access controls, Excavation/Penetration Permits Program) and through deed restrictions; and

4. Provide notice in property records regarding contamination and response actions within the study area.

There is a potential for TCE vapors from subsurface (and potentially indoor) sources to impact indoor air in the study area; therefore, both the remediation workers currently deactivating buildings in anticipation of eventual demolition and nonremediation workers working in the building may come in contact with these vapors.

6.4 BUILDING CHARACTERISTICS

Table 6 presents PGDP building characteristics for PI buildings to be sampled based on conditions during the February 11–14, 2020, walkdowns.

6.5 POTENTIAL SOURCES OF CHEMICALS OF INTEREST

The following subsections discuss the soil and groundwater sources present beneath the Paducah Site. Figure 19 and Table 5 also show building-specific CSM elements related to these sources.

6.5.1 Subsurface Sources

Leaks and spills from past operations at PGDP have affected soil and groundwater at the site with TCE as dissolved-phase contamination in groundwater and as DNAPL in soil and groundwater in various locations through the UCRS and RGA, potentially extending into the McNairy formation. This section presents analytical data that documents presence of TCE in subsurface media adjacent to and under PGDP buildings with the potential to pose an unacceptable risk to human health via the VI pathway.

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Table 6. Building Construction PGDP Industrial Area Vapor Intrusion

Facility Number	Walkdown Notes	Building Type	Above Grade Construction	Concrete Floor	Foundation Walls	Sump Present?	How air tight?	Describe Location of Any Tunnels	Does a gap exist between footings and the floor slab?	Type of Heating System	Air Conditioning	Are there air distribution ducts present?	Loading dock doors left open?
C-100	Offices with Basement	Building with Basement	Concrete	Unsealed	Poured	Yes	Tight	Tunnel/utility corridors to C-102 and outdoors	NA	Hot Air Circulation	Central Air	Yes	NA
C-103	Site Offices	Slab on Grade Structure	Concrete	Unsealed	Poured	NA	Tight	NA	NA	Hot Air Circulation	Central Air	Yes	NA
C-200	Police/Fire	Building with Basement	Block Concrete	Unsealed; basement floor damages from flooding	Block	Yes	Tight	NA	Not observable	Hot Air Circulation	Central Air	Yes	No
C-204	Incinerator	Slab on Grade Structure	Steel	unsealed	NA	No	Not Tight	NA	No	None	Window Units	No	NA
C-207	Fire Training	Slab on Grade Structure	Steel	Unsealed	NA	NA	Not Tight	NA	No	NA	NA	NA	NA
C-301	No Roof	Slab on Grade Structure	Steel	Unsealed	NA	NA	Not Tight	none	NA	NA	NA	NA	NA
C-304	Offices	Slab on Grade Structure	Brick	Unsealed	Poured	NA	Tight	na	No	Hot Air Circulation	Central Air	Yes	NA
C-310	Former Process Building	Building with Basement			Poured	Yes	Average	Tunnel to 300 and 331	No	Space Heaters	None	No	No
C-337	Process Building	Building with Basement	Corrugated Steel	Unsealed	Poured	Yes	Average	From basement to north and south	Yes, all are caulked	Hot Air Circulation, Space Heaters	Central Air	Yes	No
C-337-A	Office/Bath	Slab on Grade Structure	Block Concrete	Flooring	Block	No	Average	NA	Not observable	Space Heaters	Window Units	No	No
C-350	CIF$_3$ Tanks	Slab on Grade Structure	Block Concrete	Unsealed	NA	No	Average	NA	Yes, small gap	None	Window Units	No	None
C-360	Deactivated	Building with Basement	Concrete/Steel	Unknown	Unknown	Unknown		NA		None	None	None	None
C-360A	Vehicle and heavy equipment maintenance	Slab on Grade Structure	Steel	Unsealed	Poured	NA	Not Tight	NA	No	None	None	None	No
C-409	Big Ovens/Lab	Slab on Grade Structure	Steel	Sealed with Paint	NA	No	Average	NA	Yes	Hot Air Circulation		RCRA Lab only	No
C-410-K	F2 Process	Slab on Grade Structure	Steel	Unsealed	Poured	No	Average	NA	Yes	None	NA	No	No
C-410-L	Spill Quonset	Slab on Grade Structure	Steel	Unsealed	NA	No	Average	NA	NA	None	NA	No	2
C-412-T11A	Female and Male Change Trailer	Trailer (Skirted)	Trailer	NA	NA	NA	Tight	None	NA	Hot Air Circulation	Central Air	Yes	NA
C-615	Sewage Plant	Building with Basement	Concrete	Unsealed	Poured	Yes	Average	NA	No	Space Heaters	Window Units	No	NA
C-720	Stores; Maintenance Shops. C-720 and C-720C are connected; will be assessed together.	Slab on Grade Structure	Concrete	Sealed with Paint	Steel/Poured and block concrete	NA	Average	NA	Expansion Joints	Hot Air	Central Air	Yes	No
C-724-B	Carpenter Shop. C-724A and C-724B are connected; will be assessed together.	Slab on Grade Structure	Steel	Unsealed	Block	NA	Varies	NA	No	Steam Radiation, Radiant Floor	Central Air	Yes	No
C-720-C	Stores; Maintenance Shops. C-720 and C-720C are connected; will be assessed together.	Slab on Grade Structure	Concrete	Sealed with Paint	Steel/Poured and block concrete	NA	Average	NA	Expansion Joints	Hot air	Central Air	Yes	No
C-720-G	Future Occupied	Slab on Grade Structure	Steel	Unsealed	NA	NA	Average	NA	No	NA	NA	NA	No
C-724-A	Carpenter Shop. C-724A and C-724B are connected; will be assessed together.	Slab on Grade Structure	Steel	Unsealed	Block	NA	Varies	NA	No	Steam Radiation, Radiant Floor	Central Air	Yes	No
C-725	Paint Shop/Storage; Occupied	Slab on Grade Structure	Steel	Unsealed	NA	NA	Not Tight	NA	No	Space Heaters	NA	NA	No
C-728	Holes in Walls; Abandoned	Slab on Grade Structure	Steel	unsealed	block	NA	Not Tight	NA	No	NA	NA	NA	NA
C-746-U1	Landfill Leachate Office	Trailer (No Skirt)	Trailer	NA	NA	NA	Average	NA	NA	Heat Pump, Space Heaters	Central Air	Yes	NA
C-752-A-T10	Breakroom	Trailer (Skirted)	Trailer	NA	NA	NA	Average	NA	NA	Hot Air Circulation	Central Air	Yes	NA
C-752-B-T01	AST Trailer	Trailer (Skirted)	Trailer	NA	NA	NA	Average	NA	NA	Window Unit	Window Units	No	NA
C-754-B	Police Training; No Floor Slab	No Slab	Steel	Unsealed	NA	NA	Not Tight	NA	NA	None	NA	NA	NA
C-755-T16	Change/Shower Trailer	Trailer (Skirted)	Steel/Trailer	NA	NA	NA	Average	NA	NA	Hot Air Circulation	Central Air	Yes	NA
C-755-T27	Operations & Maintenance Office	Trailer (Skirted)	Wood frame Trailer	NA	NA	NA	Average	NA	NA	Hot Air Circulation	Central Air	Yes	NA
C-764-T03	Offices	Trailer (Skirted)	Wood frame Trailer	NA	NA	NA	Tight	NA	NA	Hot Air Circulation	Central Air	Yes	NA

Notes: Information checked and revised 2/14/2020.

6.5.1.1 Groundwater

At PGDP, groundwater is encountered at approximately 30 to 35 ft bgs in the UCRS. The sands and gravels of the RGA are encountered at about 50 ft bgs. The sands and gravels of the RGA are highly permeable, and groundwater velocity is thought to be on the order of 0.1 to 0.3 ft per day.

Groundwater flow in the RGA is generally to the north. Figures 5, 6, and 7 illustrate the hydrogeology of the PGDP area.

UCRS

The UCRS is the surficial or near surface soil facies at PGDP that directly underlies many buildings. At each sampling location, data for the PI analytes taken at UCRS monitoring wells were normalized to the appropriate VISL and then summed. These values are shown in Figure 15.

The most widespread PI contaminant in the UCRS groundwater, as well as the contaminant most frequently detected above VISL, is TCE (Table 7). It is followed by collocated *cis*-1,2-DCE, and both are primarily on the western side of PGDP. VC is present within the high concentration contours (100+ µg/L) of the TCE plume near buildings C-400 and C-747/C-748-B. These occurrences may be indicative of reducing conditions and natural attenuation of TCE in those areas. Mercury and TCE also are found in and around the C-746-S&T and C-746-U Landfills in the northern portion of the site. Detections of the other contaminants are not widespread enough or numerous enough to display obvious spatial distributions.

Table 7. UCRS Groundwater Summary Data

PI Analyte	Number of Detections	VISL (µg/L)	Number of Detections over VISL	Minimum Detection (µg/L)	Maximum Detection (µg/L)	Median Detection (µg/L)
TCE	367	7.4	268	0.31	438,324	1,100
cis-1,2-DCE	238	N/A	N/A	0.41	12,000	79
trans-1,2-DCE	8	N/A	N/A	0.12	4.2	0.96
VC	38	2.5	32	0.1	200	30
Chloroform	2	3.6	2	5	1,200	N/A
Mercury	16	3.7	3	0.067	27.2	0.2615

RGA

As detailed in the report *Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2018 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, (FRNP 2019), monitoring well data throughout PGDP was used to update the RGA TCE plume map (Figure 9). The plume's extents were produced "…by hand, using interpolation between observed concentrations. The contouring also incorporated historical source information and previous plume interpretations." Figure 9 illustrates how the plume splits into a northeast and northwest branch as it migrates through the RGA away from PGDP.

These data support the inference that TCE likely is present in RGA groundwater surrounding and below PGDP facilities at aqueous concentrations potentially high enough to result in TCE soil vapor concentrations under the buildings that exceed EPA's soil gas TCE VISL of 100 micrograms per cubic meter (µg/m^3).

6.5.1.2 Vadose zone

At PGDP, the vadose zone generally is comprised of fine-grained sediments (mostly silt and fine sand) of the UCRS, which overlies the RGA (Figure 4); however, sand and gravel layers also exist. These sandy zones would be more amenable to vapor migration. The UCRS typically is unsaturated for approximately the first 35 ft bgs.

Soil data have been collected from multiple projects at the Paducah Site since 1989. Most VOC detections are proximal to the C-748-B, C-400, C-720, and C-747 Building complexes, with a small cluster of detections in the northwest portion of PGDP near the C-746-U Landfill. TCE also is detected south of C-333 Building. Table 8 is a description of the detections of individual PI analytes in soil.

Table 8. Soil Summary Data

PI Analyte	Number of Detections	Minimum Detection (µg/kg)	Maximum Detection (µg/kg)	Median Detection (µg/kg)	Spatial Distribution
TCE	1,821	0.3	8,208,600	42	Detected in source areas throughout footprint of RGA TCE plume.
cis-1,2-DCE	741	0.341	130,000	13	Most detections near C-400/C-720/C-747.
trans-1,2-DCE	56	0.542	450,000	330	Detections generally collocated with *cis*-1,2-DCE.
VC	143	0.39	2,800	8.6	Most detections near C-400/C-720/C-747.
Chloroform	75	0.2	4,000	3.1	Detections follow northwest branch of TCE RGA plume.
Mercury	1,908	0.271	43,710	30.7	Most detections near streams and tributaries adjacent to the Paducah Site. Also detected within C-746 S & T and C-746-U Landfills.

6.5.2 Potential Indoor Sources

Although the historical industrial operations at PGDP were terminated, potential indoor sources of TCE may remain in PI buildings, such as TCE in concrete that may continue to off-gas. Additionally, there may have been other sources not identified at the time operations ceased. During the facility walkdowns, elevated concentrations of VOCs, as measured by photoionization detector, were not detected in the indoor air of any building.

6.5.3 Summary of Potential Vapor Sources and Migration Pathways

The VI CSM uses sitewide information collected during characterization studies to describe the nature, location, spatial extent of the vapor sources in the subsurface, as well as building-specific information such as potential indoor vapor sources, occupancy, and construction of PI buildings. The VI CSM also portrays the hydrologic, hydrogeologic, and geologic setting and its influence on vapor migration and attenuation in the vadose zone.

As described above, TCE contaminated groundwater and soil adjacent to and under PI buildings are considered potential sources of vapors that may impact PI buildings. Subsurface conditions near the PI buildings are considered to assess the potential vapor transport toward the buildings. Groundwater concentrations exceed EPA's groundwater VISLs. Similarly, PI analytes historically have been detected in postremediation soil samples. Vapor concentrations associated with the remaining TCE contamination in groundwater and soil have the potential to pose an unacceptable health risk to workers in PI buildings.

Vapor migration from subsurface groundwater and soil sources through the vadose zone is promoted by the presence of sand in the UCRS, as well as the presence of gravel immediately beneath PI buildings. Utilities or tunnels may serve as atypical preferential pathways for VI if they intercept contaminated groundwater or contaminated soil. The presence of deteriorated concrete in some building slabs and other potential, but unidentified VI conduits may provide potential pathways for vapor migration into the buildings.

6.5.4 Evaluation of VI Pathway Completeness

As described earlier in Section 5, EPA's VI Guide states that a potential VI pathway should be considered complete when the following five key conditions are present:

1. A subsurface source of vapor-forming chemicals exists;
2. There is a route for the vapors to migrate;
3. The building is susceptible to VI;
4. Vapors are present in the indoor environment; and
5. People are in the indoor environment.

The building-specific VI CSMs document the presence of sources of TCE immediately under and adjacent to PI buildings in the form of dissolved-phase groundwater contamination and/or adsorbed TCE in soil. TCE concentrations in groundwater underlying PGDP exceed the groundwater screening levels for TCE in EPA's VISL calculator (EPA 2019). PI analytes also have been detected in soil adjacent to PI buildings.

Known subsurface conditions, including the presence of sandy material in the vadose zone and gravel under building slabs, favor vapor migration. Although nearly laterally continuous low-permeability layers (generally considered to inhibit vapor transport between subsurface sources and buildings) exist at PGDP, these may not be sufficient to limit the intrusion to below VISL levels. The presence of deteriorated concrete flooring in some buildings and potentially unidentified VI conduits in some buildings may provide pathways for vapor migration into these structures. Thus, vapors may be migrating from the documented source materials under PGDP, through the vadose zone (preferentially through sand and gravel layers), and into overlying buildings. Openings in building foundations—openings such as perimeter cracks, stress relief seams, and perforations for utility conduits and structural supports—also could serve as a pathway for vapor entry into the building.

These factors indicate that four of the five conditions regarding completeness of the VI pathway are present and documented with the following site-specific data: (1) subsurface sources of vapor are present in soil and/or groundwater underneath or near PI buildings; (2) routes exist for vapor transport to the underside of the buildings; (3) PI buildings are susceptible to VI; and (4) the PI buildings are occupied or occupiable by site workers.

Vapor sampling is needed to evaluate the remaining condition regarding completeness of the VI pathway (i.e., one or more of the chemicals in subsurface sources also are present in subslab gas and/or in the indoor environment and, if present in indoor air, pose an unacceptable health risk). This approach is supported by EPA's 2015 VI Guide, which states that "…if reliable pre-existing sampling data are available and an adequate CSM has been developed (i.e., sufficient subsurface characterization information exists to adequately characterize the locations, forms, and extent of site-specific vapor-forming chemicals and general subsurface conditions (e.g., hydrologic and geologic setting in and around the source(s) and the buildings), then a risk-based screening may be useful to obtain some preliminary insights about the potential level of exposure and risk posed by vapor intrusion."

7. SAMPLING LOCATIONS AND RATIONALE

Based on the building-specific CSMs, indoor air samples will be collected in areas believed to be susceptible to VI, along with subslab or crawl space and outdoor air samples, depending on building design. The results will be used to evaluate whether the VI pathway requires further investigation and whether building occupants are exposed to contaminants of interest at concentrations that may pose unacceptable risk. Those concentrations will depend in part on the amount of time individuals spend in the buildings. Subslab vapor, crawl space air samples, and outdoor air samples will be collected concurrently with indoor air samples to give indoor air results context in the VI CSM. Table 5 and Figure 19 present the PI buildings to be sampled. Table 5 also presents the type and number of samples to be collected in each PI building. The projected location for each planned sample to be collected in each PI building is presented in Appendix D. Outdoor air sampling locations are not shown on the drawings in Appendix D, but will be collected in accordance with considerations described in Section 8.3.

The following CSM-based concepts were applied to sample planning for PI buildings.

- In skirted trailers with crawl spaces, crawl space air samples are planned because crawl spaces underlie the entire PI building and, therefore, intercept soil gas that may migrate to indoor air.
- In PI buildings with slabs that overlie a source of TCE in RGA groundwater only, subslab vapor samples are planned because the dissolved TCE plume in the RGA is delineated.
- In PI buildings with slabs that overlie or are adjacent to detections of PI analytes in soil and/or UCRS groundwater, which can serve as sources of VI soil gas, subslab vapor samples will be paired with indoor air samples because the extent of PI analytes in soil and/or UCRS groundwater have more spatial uncertainty than the TCE plume in the RGA.
- In PI buildings with no slab or crawl space (C-746-U1 and C-754-B), indoor air sampling is planned because samples in indoor breathing space provide direct exposure point concentrations.
- An outdoor air sample is planned for each PI building where crawl space or indoor air sampling is planned because outdoor air samples provide concentrations of analytes in ambient air that may impact analyte concentrations in indoor and crawl space air.

Sampling locations will be adjusted within the areas shown in Appendix D during fieldwork as appropriate and will be optimized considering factors such as the following:

- Bias toward areas anticipated to have greater concentrations of PI analytes from subsurface sources;
- Bias away from hazards associated with active facility operations (e.g., forklifts carrying loads);
- Bias away from traces of utilities; and
- Place at least 5 ft away from floor joints/cracks (to the extent possible).

Changes made in the field to sampling locations will be documented in the field notes.

Weather reporting data, including temperature, barometric pressure, and wind speed/direction, from the weather station located at the Paducah airport (i.e., official weather data) also will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report. The heating season is the target time frame for VI sampling, when stack effects that can enhance VI are more likely to be active.

8. VI ASSESSMENT METHODS

The VI assessment methods described below are used to understand the range of current indoor air concentrations and potential pathways of vapor intrusion into PI buildings. Standard operating procedures (SOPs) for each of the sampling methods are described in the QAPP (Appendix E).

8.1 INDOOR AIR SAMPLING

Indoor air samples will be collected at locations that are representative of occupied areas of slab-on-grade and crawl space buildings or in the basements of buildings that include them. The indoor air samples will be collected in individually certified clean, evacuated 6-L Summa® canisters (or equivalent) equipped with individually certified, clean flow controllers designed to collect a sample over a 10-hour period. These samples will be outfitted with particulate filters. Protection will be employed for SUMMA® canisters during sampling to ensure the safety/integrity of the device.

A digital vacuum gauge will be used to verify that the Summa® canister has an adequate vacuum (27 inches of mercury [in Hg]) prior to sampler deployment, and that a small vacuum (e.g., 2 to 5 in Hg) remains at the end of the sampling period. After sample collection, the canisters will be shipped to a certified laboratory via chain of custody for analysis by EPA Method TO-15 SIM for PI analytes. Appendix E includes a description of the Summa® canister sampling SOP and a list of the compounds and reporting limits included in the TO-15 SIM analysis.

Indoor air samples will be collected under normal occupational conditions including the operation of the HVAC system. Indoor air samples are intended to be representative of inhalation exposure point concentrations for the building occupants. Therefore, indoor air samples will be collected at breathing zone height approximately 3 to 5 ft above the floor. The exact indoor air sampling locations and deployment heights will be documented in the field records.

Building occupants will be advised to temporarily cease activities involving the use of products that typically contain TCE (e.g., painting, waxing, polishing floors) at least 72 hours before any indoor air sampling event. Occupants will also be requested to maintain their usual operation of the ventilation systems during sampling.

8.2 INDOOR AIR SCREENING FOR MERCURY

Indoor air will be screened for mercury using a Jerome® J505 Mercury Vapor Analyzer or equivalent. The Jerome® J505 is a fluorescence spectroscopy analyzer with a mercury detection range of 0.05 $\mu g/m^3$ to 500 $\mu g/m^3$. The Jerome® J505 pulls air in through the intake by the pump at a flow rate of 1 Liter/minute. The air then flows through a scrubber filter and into the sample cell, or directly into the sample cell, where it is then exposed to light with a 254 nanometer wavelength. Mercury atoms in the sample cell absorb the light at this wavelength, which is then re-emitted at the same wavelength. The concentration of mercury is determined by the amount of light emitted at a 90° angle. The Jerome® J505 has three test modes:

(1) STANDARD for normal sampling or detection of EPA cleanup levels, which has a test time of 2 seconds; (2) QUICK for faster sampling, which has a test time of 16 seconds; and (3) SEARCH for scanning an area to locate the source of contamination, which has a test time of eight seconds for the first reading then continuous updates every second. Additionally, the Jerome® J505 can be set to take samples automatically ranging from every minute to every 120 minutes. Appendix E includes the Jerome® J505 Mercury Vapor Analyzer Manual.

8.3 OUTDOOR AIR SAMPLING

Each time an indoor or crawl space air sample is collected, an outdoor ambient air sample will also be collected within 100 ft of the building. Outdoor air samples will be collected upwind of each sampled structure to evaluate whether PI analytes in ambient air serve as a background source. Based on the wind rose (Figure 21) for Barkley Airport, Paducah, Kentucky, the prevailing winds come from the southwest; however, field conditions at the time of sampling will be used to select the exact outdoor air sampling location. Outdoor air samples will be collected over approximately the same sampling period as the associated indoor air sample(s) using the same sampling and analytical protocols used for the indoor samples. These samples will be used to differentiate outdoor air contributions to concentrations in indoor air. Sampling will not be attempted during inclement weather (e.g., when there is a sustained wind speed of 25 miles per hour or greater, thunderstorms, lightning, or other weather conditions considered unsafe for personnel or that may affect the integrity of the samples).

8.4 CRAWL SPACE AIR SAMPLING

Many PGDP buildings have crawlspaces or subfloor areas that are generally not accessed by occupants. Where possible, a 10-hour time integrated Summa® canister sample will be collected from below the subfloor area using the same techniques used for indoor air samples, except the height at which the sample is collected will be adjusted based on the configuration of the crawlspace.

8.5 SUBSLAB SOIL GAS SAMPLING

If the building foundation includes a slab, subslab samples will be collected to evaluate if VOC concentrations present beneath the slab, if any, have the potential to contribute to VI. Upon arrival at the building, the field sampling team will conduct a building walk through to identify and mark out proposed subslab probe locations. A photographic log of marked locations and distance measurements between sample points and distinct building features also will be collected. A survey will be performed to confirm whether utilities are present in locations where subslab probes are proposed. If a utility may be present in the immediate vicinity of a proposed sample point, it will be moved to a suitable location nearby.

The subslab vapor probes will be installed with compression-style tubing connectors following the SOP for Vapor Pins (Appendix E). They will be sealed temporarily with a cap to prevent indoor/subslab air exchange across the point when testing is not in progress. Subslab gas samples will be collected after indoor air sampling in a building, as appropriate.

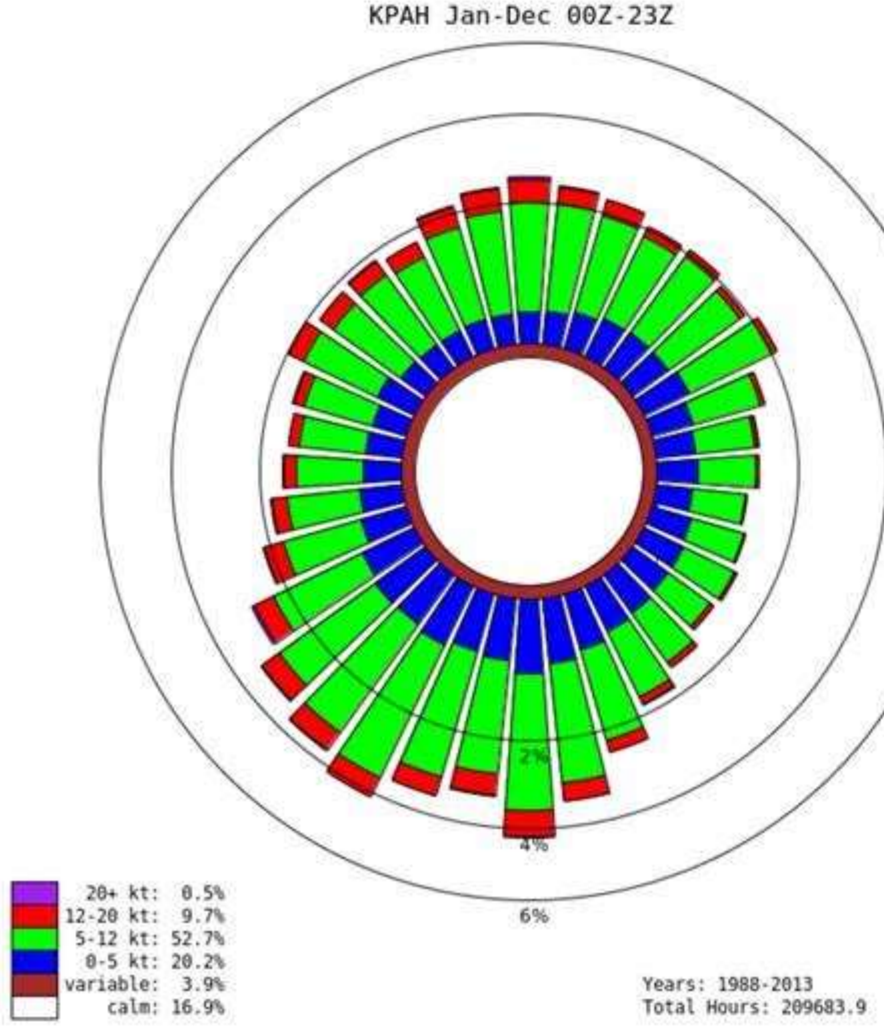

Figure 21. Wind Rose for the Barkley Airport, Paducah, Kentucky

Prior to collecting samples for VOC analysis, subslab probes will be purged via a vacuum box fitted with a Tedlar™ bag and field screened with a photo ionization detector to measure total VOC concentrations and a GEM 2000 Landfill Gas meter (or equivalent) to measure oxygen, carbon dioxide and methane concentrations. A minimum of three purge volumes, (or more if field readings have not stabilized) will be removed from the probe prior to collection of a batch certified 1 L Summa® canister grab sample connected to the probe via a tee fitting. A water dam will be placed around the probe to prevent air from entering the subslab environment along the annular space between the tubing and the slab, and a shut-in test of the sampling train will be performed prior to purging to verify that there are no leaks in the tubing or connections. A detailed description of the subslab purging and sampling SOPs are included in Appendix E. After sampling, the Summa® canister will be shipped via chain of custody to a certified laboratory for analysis of VOCs by EPA Method TO-15 Open Scan.

8.6 DIFFERENTIAL PRESSURE MONITORING

The differential pressure between subslab soil gas and indoor air at the temporary subslab probes will be measured and data logged using a DG-700 differential pressure meter (or equivalent) to document whether pressure conditions consistent with vapor intrusion were present during indoor air sampling. Monitoring will be conducted during the time period when indoor air samples are collected, as appropriate. The field sampling team will consult with building personnel to confirm that the placement of the differential pressure meters does not interfere with building operations. Should a conflict arise, meter placement will be adjusted to meet building personnel preference and monitoring goals. Once the differential pressure monitoring is complete, the subslab sample will be collected as described above and, afterward, the vapor pin will be removed and the hole in the slab will be filled with expanding cement.

9. RESULTS EVALUATION

The VI pathway sampling to be conducted in PI buildings (described in Section 7 and Appendices D and E) includes indoor and outdoor air samples along with concurrent subslab or crawl space vapor samples. These samples will be analyzed for TCE and the other PI analytes. The concentrations of VOCs in the indoor air samples will be compared to EPA's indoor air VISLs for default commercial scenarios (see Table 1). The outdoor air sample results will be used to evaluate potential outdoor air source contributions to indoor air, but the measured concentrations will not be subtracted from the indoor air results. EPA maintains a Web-based VISL calculator (EPA 2019), which last was updated in November 2019. The results of these comparisons will be evaluated in the context of the site-specific VI-CSM to develop conclusions about VI impacts to each PI building using the decision rules described in Section 10.

The results also will be compared to other benchmarks if the VI pathway is determined to be complete. As described in a recent "Strategic Environmental Research and Development Program-Environmental Security Technology Certification Program VI" seminar (SERDP-ESTCP 2016), a number of commercial/industrial screening levels are available for TCE (as shown in Figure 22), including those intended for IH applications such as Occupational Safety and Health Administration permissible exposure limits of 537,000 $\mu g/m^3$ and the American Conference of Governmental Industrial Hygienists threshold limit value of 54,000 $\mu g/m^3$. EPA's commercial indoor air VISL of 3.0 $\mu g/m^3$ is the same as EPA's commercial regional screening level of 3.0 $\mu g/m^3$. Both are based on default commercial worker exposure conditions and correspond to a 1×10^{-6} carcinogenic risk (for a 25-year exposure duration, 250 days per year exposure frequency, and 8-hour per day exposure time), which is less than the level corresponding to a hazard quotient of 1.0. Under differing site-specific conditions, where workers may be subject to different exposure durations, other target levels may be applicable. EPA's toxicity values and the Comprehensive Environmental Response, Compensation, and Liability Act risk range will be used to make risk evaluation and risk management decisions using the data generated from this approved WP.

10. INVESTIGATION DECISION RULES

The results of the PI investigation sampling will be evaluated to develop conclusions about the impact of VI on the indoor air of PI buildings at PGDP. DOE will present the results and evaluations in a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report, and subsequent actions, if indicated, will be proposed in the report. The results will be compared to EPA's VISLs for default commercial exposure scenarios and site-specific benchmarks established for the types of workers present for the exposure durations that are representative of the types of workers. This evaluation will seek to understand

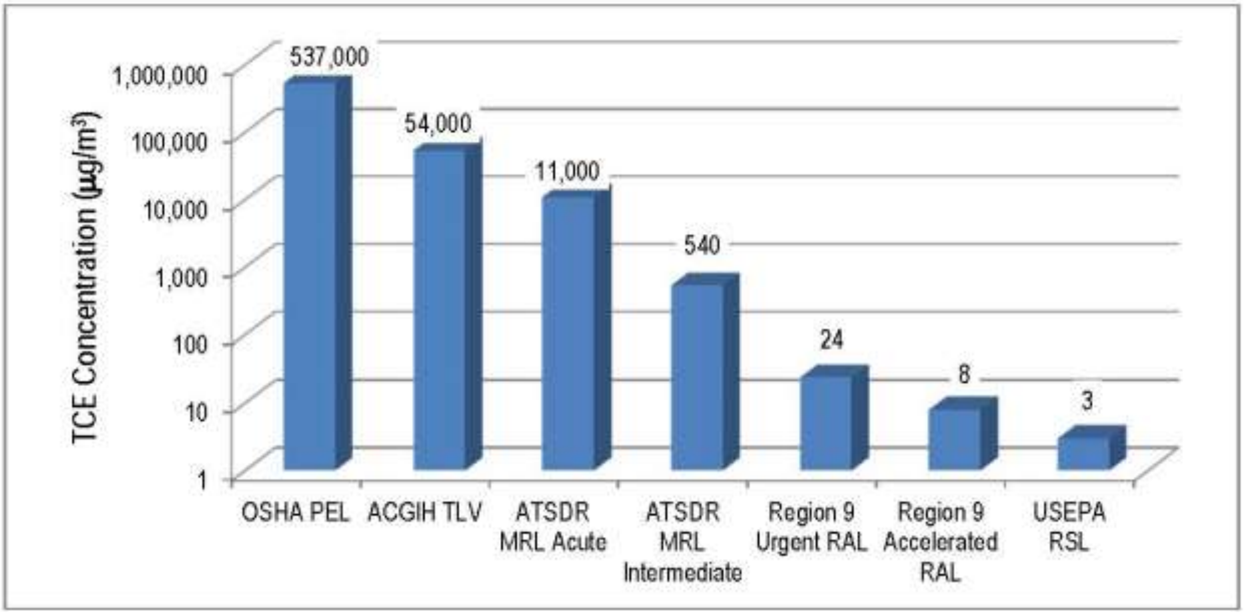

Figure 22. TCE Regulatory Levels for Commercial Industrial Scenarios (SERDP-ESTCP 2016)
(Note: RSL = VISL for commercial settings)

the range of indoor air concentrations and, to the extent practicable from these data, the general location(s) of VI entry points.

Depending on results of this study, the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report will include recommendations for additional activities, which may include sampling, personnel monitoring, or other response actions needed to control worker exposure, including additional ventilation, building pressurization, and/or building evacuation. Any contingent sampling recommended to address the conclusions of this study will be discussed in the report and are not included in this WP.

The following are the decision rules that will guide the evaluations and inform the conclusions.[5]

- **IF** the building ranking process (based on the CSM) indicates a facility does not have a potentially complete VI pathway (no source, pathway, and/or potential receptors), **THEN** that facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report.

- **IF** the facility walkdown indicates a facility does not have a potentially complete VI pathway (no source, pathway, and/or potential receptors), **THEN** that facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report.

- **IF** subslab vapor concentrations for selected analytes in a facility are less than their respective VISL values, **THEN** the VI pathway is considered to be incomplete, **AND** the facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report.

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[5] These decision rules are based on current conditions at the time of PI sampling. If site conditions change, the rules may need to be reevaluated.

- **IF** the subslab concentrations for selected analytes in a facility are greater than their respective VISL values and the indoor air concentrations for same selected analytes are less than their respective VISL values, **THEN** the pathway is considered to be incomplete and/or not to result in unacceptable concentrations under current conditions, **AND** the facility will be excluded from further VI consideration.

- **IF** subslab vapor concentrations for selected analytes in a facility are greater than their respective VISL values **AND** the indoor air samples for the same selected analytes are greater than their respective VISL values, **THEN** the pathway is considered potentially complete and recommendations for further assessment will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report.

- **IF** outdoor air concentrations are comparable to those in indoor air samples in a facility, **THEN** the above conclusions will be reevaluated to determine the degree of certainty of the relative contributions of subslab, indoor, and outdoor sources.

- **IF** the above evaluation indicates that background sources are the cause of indoor air exceedances, **THEN** the VI pathway is considered to be incomplete, **AND** the facility will be excluded from further VI consideration.

- **IF** a facility is retained following the previous steps, **THEN** recommendations for further desktop or field VI investigation will be included in the Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report.

11. TAKING ACTION WITH LIMITED DATA

Interim Actions. EPA has emphasized the importance of interim actions and site stabilization to control or abate "ongoing risks" to human health and the environment while site characterization is underway or before a final remedy is selected. Interim actions encompass a wide range of institutional and physical corrective action activities and can be implemented at any time during the corrective action process. The 2015 EPA VI Technical Guide states that interim actions, including preemptive mitigation, should be employed as early in the corrective action process as possible, consistent with the human health and environmental protection objectives and priorities for the site.

<u>Preemptive Mitigation (PEM):</u> The 2015 EPA VI Technical Guide says it may be appropriate to implement mitigation of the VI pathway as an early action, though all pertinent lines of evidence have not been developed completely to characterize the VI pathway for the subject building(s), when sufficient site-specific data indicate that VI (1) is occurring or may occur due to subsurface contamination that is being addressed by federal statutes, regulations, or guidance for environmental protection; and (2) is posing or may pose a health concern to occupants of an existing building(s).

To consider PEM, the 2015 EPA VI Technical Guide recommends obtaining reliable data supporting a preliminary and risk-based screening. In appropriate circumstances (e.g., where time is of the essence to ensure protection of human health), a formal human health risk assessment need not be conducted and documented before selecting PEM, but a preliminary evaluation of human health risk using individual building data or aggregated community data generally is recommended.

If there are insufficient data to perform a preliminary risk analysis, but subsurface vapor sources are known to be present near buildings (see Section 5.3), the 2015 EPA VI Technical Guide states that an appropriate

VI investigation (see Section 6) be conducted to obtain sufficient data. The planned investigation is considered an appropriate investigation to fill the data needs associated with determining the potential for VI at PGDP.

Note that "…when these conditions are not well established from existing information…EPA recommends that a detailed VI investigation be scoped and conducted to address these data gaps" (EPA 2015). The corollary is that when conditions are well established from existing information, additional investigation should focus on the conditions that have not yet been well established.

In summary, PEM, based on limited, but credible, subsurface and building data, can be an appropriate approach to begin to implement response actions quickly and ensure protectiveness of current building occupants. In such circumstances, resources can be used appropriately to focus first on mitigation of buildings and subsurface remediation, rather than on the site and building characterization efforts, which may be prolonged.

12. QUALITY ASSURANCE

Appendix E provides the QAPP.

13. PROJECT DOCUMENTATION

The results of this investigation will be documented in a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report that will document the sampling procedures and results from the VI investigation at each PI building.

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APPENDIX A

SCOPING PRESENTATION SLIDES

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ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
BPC	building pressure control
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CVOC	chlorinated volatile organic compound
DOE	Department of Energy
DPT	direct push technology
DQO	data quality objective
DTW	depth to water
ELCR	excess lifetime cancer risk
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FRNP	Four Rivers Nuclear Partnership, LLC
FY	fiscal year
GW	groundwater
HI	hazard index
HU	hydrogeological unit
HVAC	heating, ventilation, and air conditioning
HVS	high volume sampling
IH	industrial hygiene
KDEP	Kentucky Department for Environmental Protection
KY	Commonwealth of Kentucky
MOA	memorandum of agreement
mya	millions of years ago
N/A	not applicable
ND	non-detect
NIOSH	National Institute for Occupational Safety and Health
O/P	occupied/potentially occupied building
OSHA	Occupational Safety and Health Administration
OU	operable unit
OWSER	Office of Solid Waste and Emergency Response
PAL	project action limit
PEGASIS	PPPO Environmental Geographic Analytical Spatial Information System
PEL	permissible exposure limit
PGDP	Paducah Gaseous Diffusion Plant
PI	preliminary investigation
PID	photoionization detector
PPPO	Portsmouth/Paducah Project Office
ppb	parts per billion
ppm	parts per million
PRG	preliminary remediation goal
PUF	polyurethane foam cartridge
RAIS	Risk Assessment Information System
RGA	Regional Gravel Aquifer
RI	remedial investigation
RL	reporting limit
SAP	sampling and analysis plan

SMP	site management plan
SVOC	semi volatile organic compound
SWMU	solid waste management unit
TLV	threshold limit value
UCRS	Upper Continental Recharge System
µg/l	microgram per liter
US	United States
VI	vapor intrusion
VISL	vapor intrusion screening level
VOC	volatile organic compound

U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Paducah Site Industrial Area Vapor Intrusion Study

September 27, 2019

FOR DISCUSSION ONLY

Outline

- Introductions
- Site Management Plan Memorandum of Agreement
- Background and Prior VI Investigations
- US EPA Vapor Intrusion (VI) Guidance
- Developing the VI Conceptual Site Model (CSM)
- Next steps/meetings

Site Management Plan Memorandum of Agreement

The following text has been added to Appendix 3 of the Site Management Plan (SMP) in the Dissolved Phase Groundwater OU section.

> DOE will develop a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Work Plan and Report to focus on PGDP buildings located over the groundwater plumes, consistent with EPA vapor intrusion guidance, with input from EPA and KDEP utilizing a project team developed from the technical working groups established to evaluate and make recommendations to FFA Managers on programmatic issues at the PGDP. Work plan development will begin in FY 2019 and be completed in FY 2020. The work plan will identify the information to be obtained and decision criteria for responding to the question of whether vapor intrusion from volatile organic compounds in soils and groundwater poses a potential threat to human health in buildings located over these areas at the Paducah Site and if human exposure to vapor intrusion is under control. Upon completion of the assessment, a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report will be issued by DOE (scheduled in FY 2021). The Work Plan and Report will be FFA Secondary Documents subject to regulatory review and concurrence, and DOE written responses to comments, consistent with FFA Section XX, Review/Comment on Draft/Final Documents. The report will specify whether any additional actions are necessary to satisfy the question of potential threat to human health from vapor intrusion and/or to bring human exposure to vapor intrusion under control. Additional FFA actions may include Remedial Investigation, Removal Actions, and early (remedial) actions. EPA and KY reserve the right to request Additional Work (FFA Section XIX) in the absence of either party's concurrence on the Work Plan or Report.

Site Management Plan Memorandum of Agreement, Continued

Because plume conditions are dynamic and will change over the next several decades, the Dissolved Phase Operable Unit will include a data quality objective to address the site-wide vapor intrusion pathway for the site. Prior to the Dissolved Phase Operable Unit, a data quality objective to address vapor intrusion will be included in other operable units' project RI scoping and subsequent investigations and decision-making, as appropriate.

Site Management Plan Memorandum of Agreement Summary

- DOE will develop a Plant Industrial Area VI Preliminary Risk Assessment Work Plan and Report
    - Focus on PGDP buildings located over the groundwater plumes.
    - Consistent with EPA VI guidance.
    - Input from EPA and KDEP.
- Work plan development will begin in FY 2019 and be completed in FY 2020.
    - Will identify the information to be obtained and decision criteria.
- A Plant Industrial Area VI Preliminary Risk Assessment Report will be issued by DOE (scheduled in FY 2021).
- The Work Plan and Report will be FFA Secondary Documents.
- The report will specify whether any additional actions are necessary to satisfy the question of potential threat to human health from VI and/or to bring human exposure to VI under control.
- Because plume conditions are dynamic and will change over the next several decades, the Dissolved Phase Operable Unit will include a data quality objective to address the site-wide VI pathway for the site.

SMP MOA: VI Investigation Draft Schedule

- July 2019: Begin Work plan development
  - September 27, 2019: First scoping meeting with EPA and KY
  - October 2019: Second scoping meeting with EPA and KY
  - October/November 2019: Third scoping meeting with EPA and KY
- Second Quarter FY20: Submittal of D1 Plant Industrial Area VI Work Plan to EPA and KY
- Fourth Quarter FY20: EPA and KY Approval of Work Plan
- FY21: Field Sampling
- FY21: Submittal of D1 Plant Industrial Area VI Preliminary Risk Assessment Report

A-10

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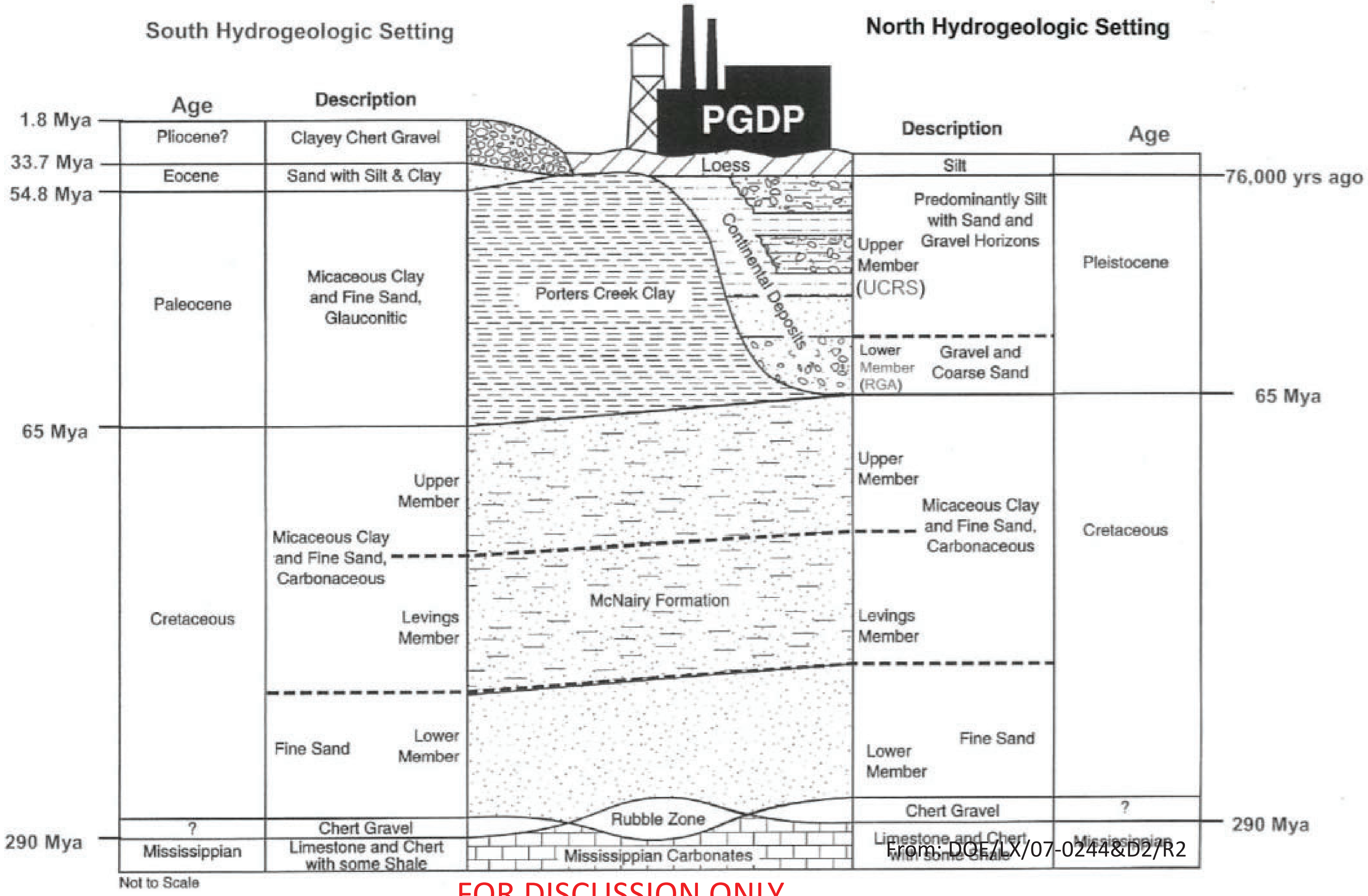
Background: Geologic Setting



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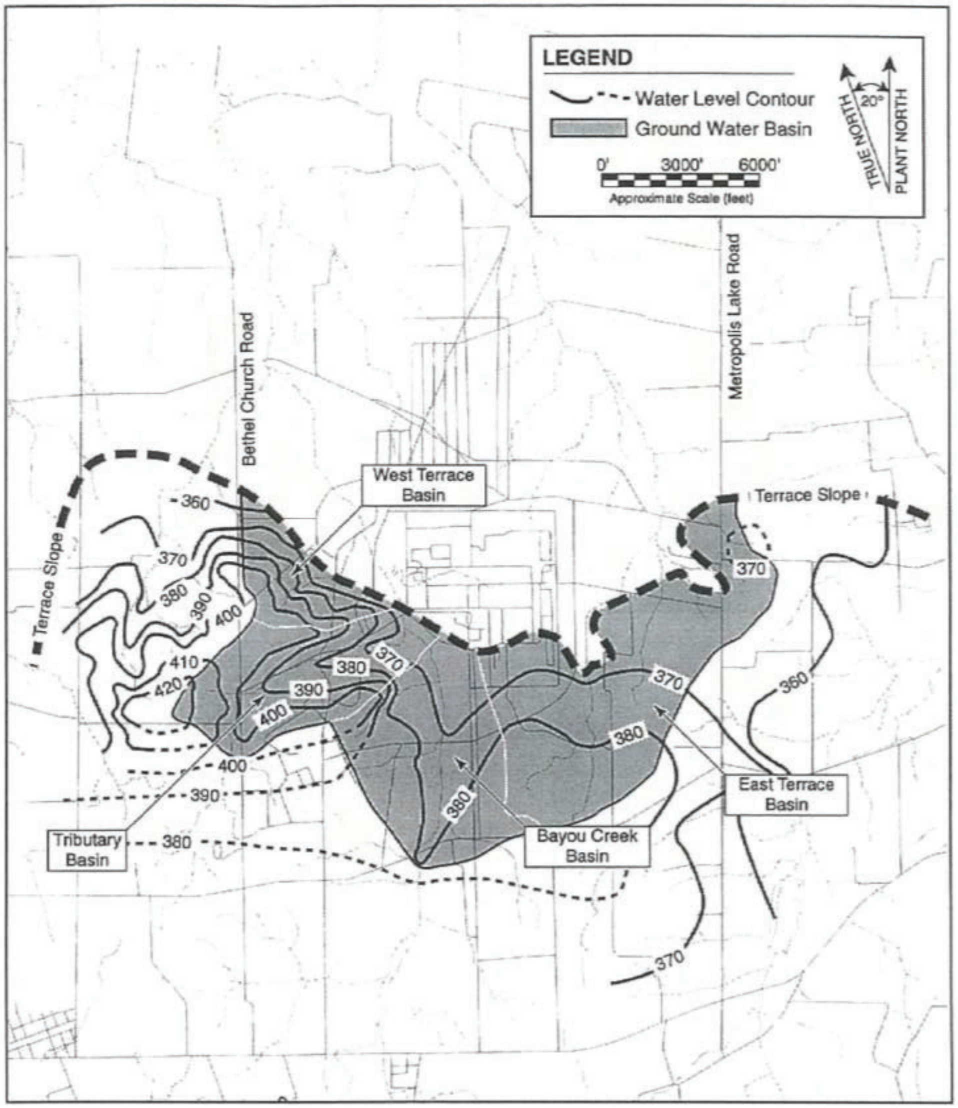
FOR DISCUSSION ONLY

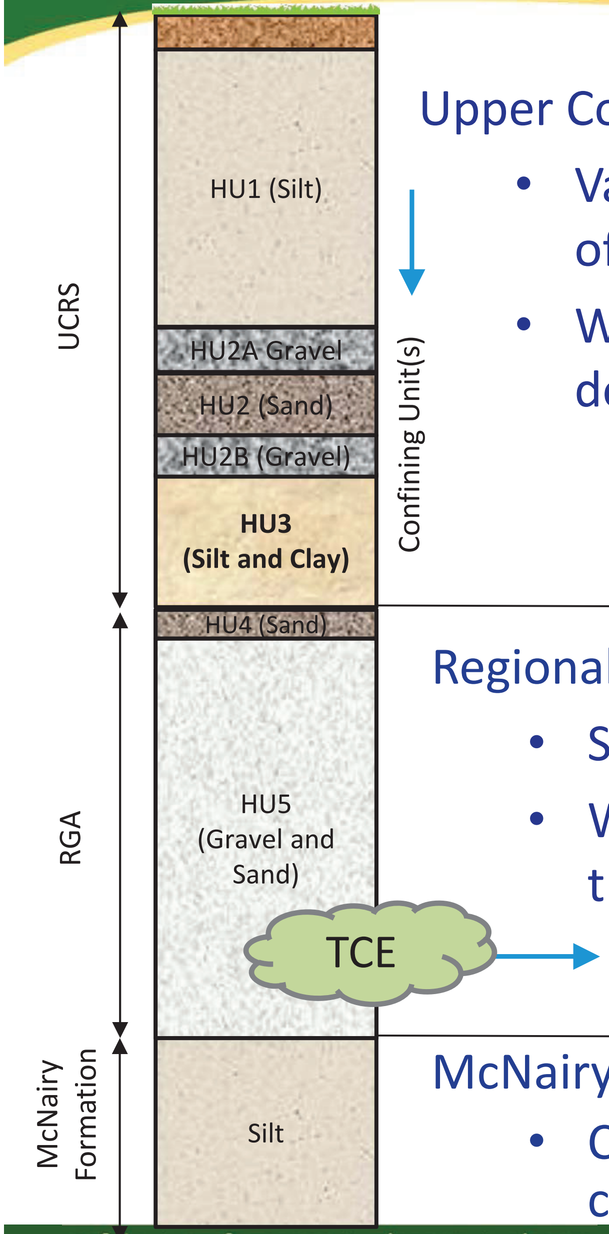
Background: Geologic Setting



DOE 1997

From: DOE/LX/07-0244&D2/R2

Background: Geology



Upper Continental Recharge System (UCRS)

- Vadose zone and confining layer comprised of predominantly silt and clay
- Water movement is mostly vertical, downward to recharge the RGA

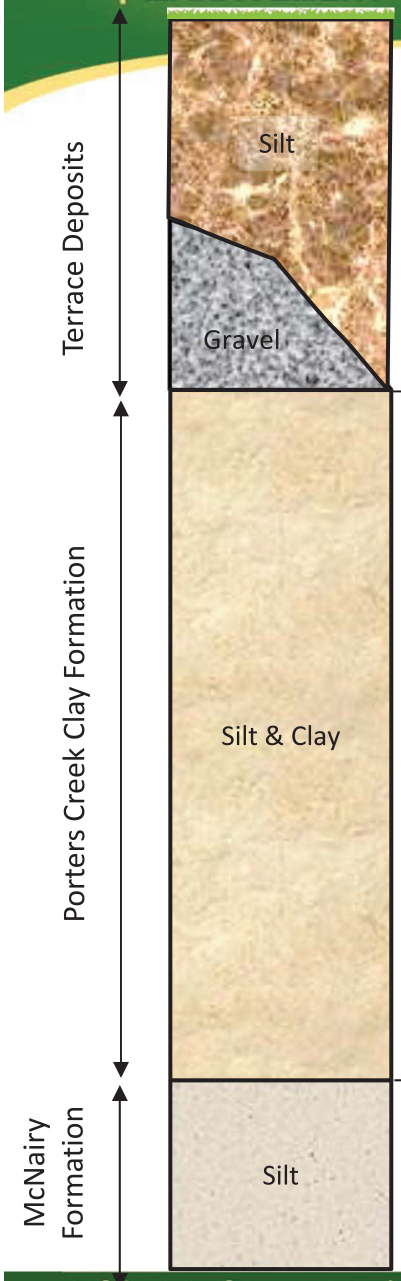
Regional Gravel Aquifer (RGA)

- Shallow aquifer
- Water movement is lateral, discharges into the Ohio River

McNairy Formation

- Cretaceous marine sediments comprised of silts, sands, and clays

Background: Geology



Terrace Deposits

- Cover of soil and Holocene/Pleistocene loess (silt)
- Pliocene gravel south of plant

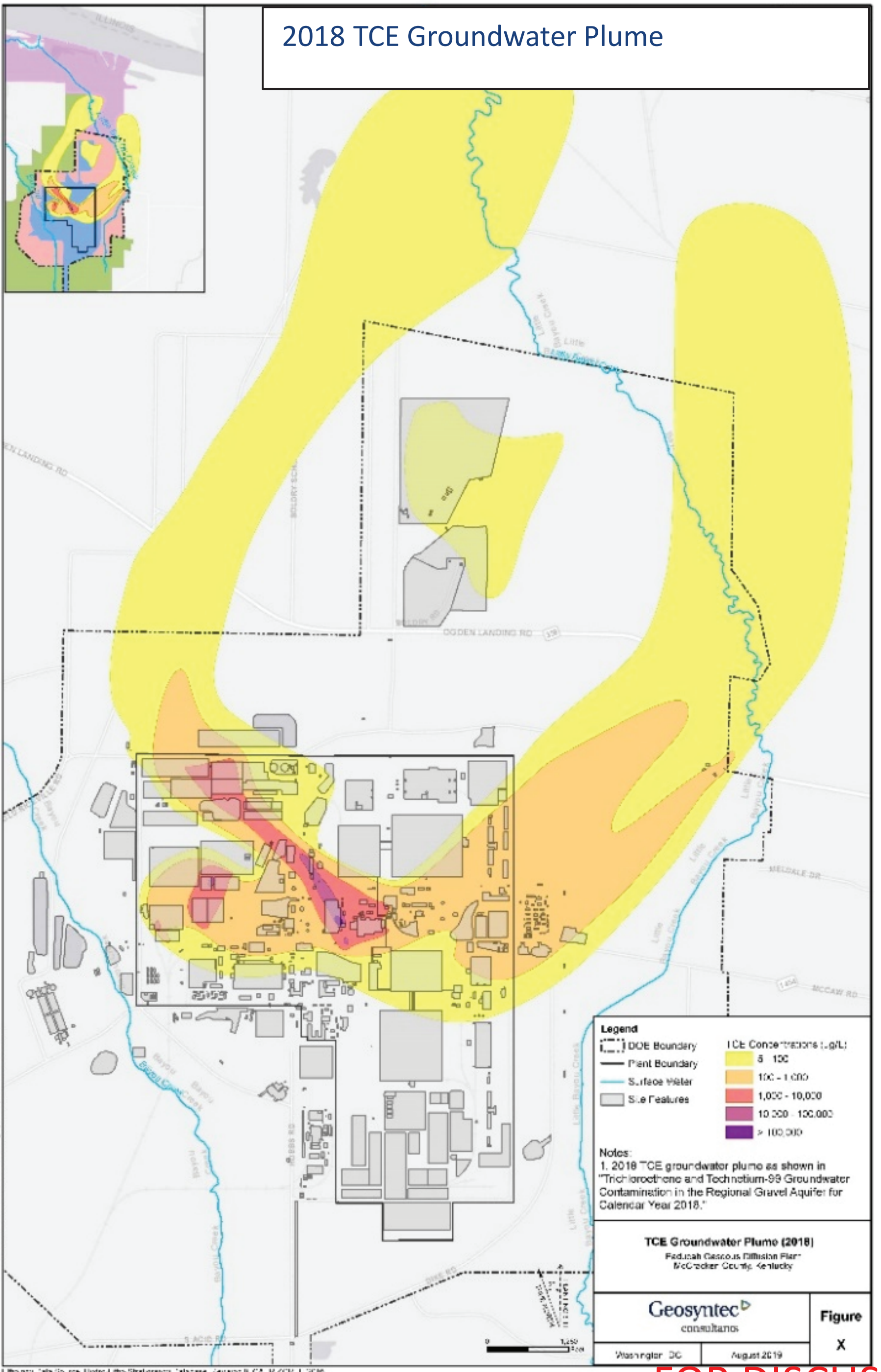
Porters Creek Clay

- Paleocene micaceous clay and fine sand, glauconite
- Confining unit

McNairy Formation

- Cretaceous marine sediments comprised of silts, sands, and clays

Background: TCE Plume



2018 TCE Groundwater Plume

Notes:
1. 2018 TCE groundwater plume as shown in "Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2018."

TCE Groundwater Plume (2018)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

From: FRNP-RPT-0074

FOR DISCUSSION ONLY

Prior VI-Related Investigations

- 1986 Tracer Soil Gas Survey
- 1990 Soil Gas Survey Phase I/II Site Investigation
- 2005 EPA Soil Gas Sampling
- 2013 SWMU 4 Passive Vapor Study
- Two most recent VI investigations performed at the Paducah Site in accordance with EPA guidance
  - Water Policy Areas
  - C-400 Building

Prior VI-Related Investigations

- 1986 Tracer Soil Gas Survey[a]
  - Soil Gas found only in on-site major source areas
  - Vapor migration not evident even though high soil and GW conc's nearby
- 1990 Soil Gas Survey Phase I/II Site Investigation[b,c]
  - Soil Gas found only near largest on-site major source areas
  - Vapor migration not evident

[a] Shallow Soil Gas Survey at Martin Marietta Energy Systems Facility Paducah Kentucky, August 1986 Tracer Research Corporation

[b] CH2M HILL 1991. Results of the Site Investigation, Phase I, at the Paducah Gaseous Diffusion Plant

[c] CH2M HILL 1992. Results of the Site Investigation, Phase II

Prior VI-Related Investigations

- 2005 EPA Soil Gas Sampling[d]
  - Soil gas had no TCE
  - Tight soils provided no recovery in 2 locations
  - Samples collected over 100-1000 µg/L RGA contour
- 2013 SWMU 4 Passive Vapor Study[e]
  - Two (of 69 passive samples) had detectable TCE [29 ng and 54 ng (detection limit of 25 ng)]
  - SWMU 4 overlies SW Plume with conc's an order of magnitude higher than in distal plumes off-site

[d] EPA 2005. Memorandum: Laboratory Results of Paducah Gaseous Diffusion Plant

[e] DOE 2012. Beacon Environmental Services Project 2480, Passive Soil Gas Survey

Water Policy Area VI Study

- Completed as part of the 2013 Five-Year Review
- VI Study Work Plan
  - DOE/LX/07-2200&D2, approved May 2015
- VI sampling consisted of:
  - At each of four locations, DPT rods were advanced to three depths.
  - Identified the shallowest DPT with water. Using a water level probe, measured the depth to water within the shallowest DPT rod with water.
  - Discrete depth samplers were used to collect samples from the first available water for VOC analysis.
  - The temperature of the water sample was documented.
- VI sampling completed February 2018

Water Policy Area Sampling Locations

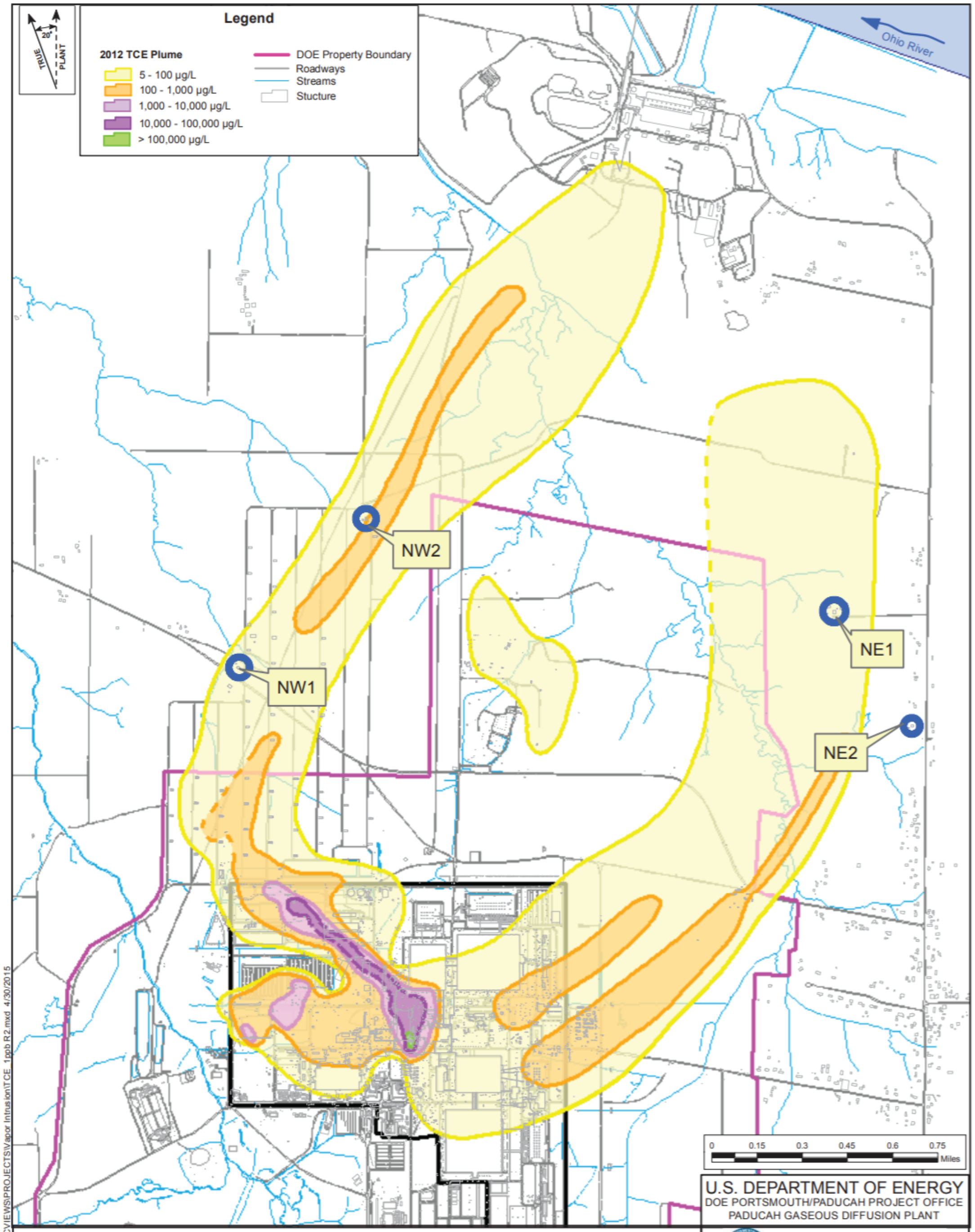


Figure 1. Map of Proposed DPT Sample Boring Locations

LATA Environmental Services of Kentucky, LLC

G:\GIS\ARCVIEWS\PROJECTS\Vapor Intrusion\TCE_1ppb R2.mxd 4/30/2015

A-20

From: DOE/LX/07-2200&D2

Water Policy Area VI Study Conclusions

- Water Policy Area VI Screening Study Report for residential properties
  - DOE/LX/07-1289&D2/R1/A1/R1, approved November 2017
- Conclusions
  - The groundwater data for all the selected VOCs was nondetect at a reporting limit of 1 µg/L.
  - VI does not pose a concern for area residences.
  - Based on the results of this VI screening study, historical information provided/referenced in the SAP, and the VI guidance (EPA 2015b), an additional VI study (i.e., a detailed investigation) is not warranted in the Water Policy Area.

C-400 Building VI Study

- Completed as part of the 2013 Five-Year Review
- VI Study Work Plan for C-400 Building
    - DOE/LX/07-2403&D2/R1, approved August 2017
- VI sampling consisted of
    - 8 Co-located locations for subslab air and indoor air
    - 6 locations for ambient air
    - Temperature and differential pressure readings collected during sampling
- VI sampling completed February 2018

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C-400 VI Sampling Locations

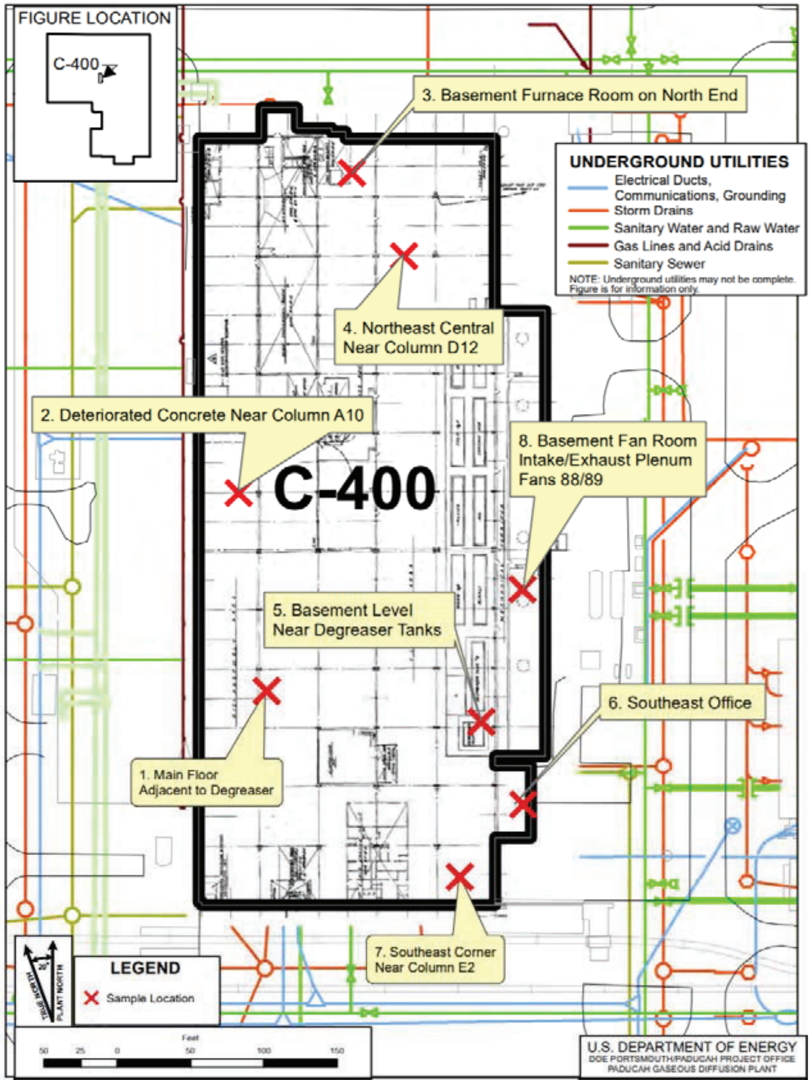

Figure 12. Indoor Sampling Locations for C-400 Building Vapor Intrusion Study

G:\GIS\ARCVIEWS\PROJECTS\Vapor Intrusion\MOA 400\Figure 12. C-400 Map (with Approximate Sampling Locations for VI).mxd

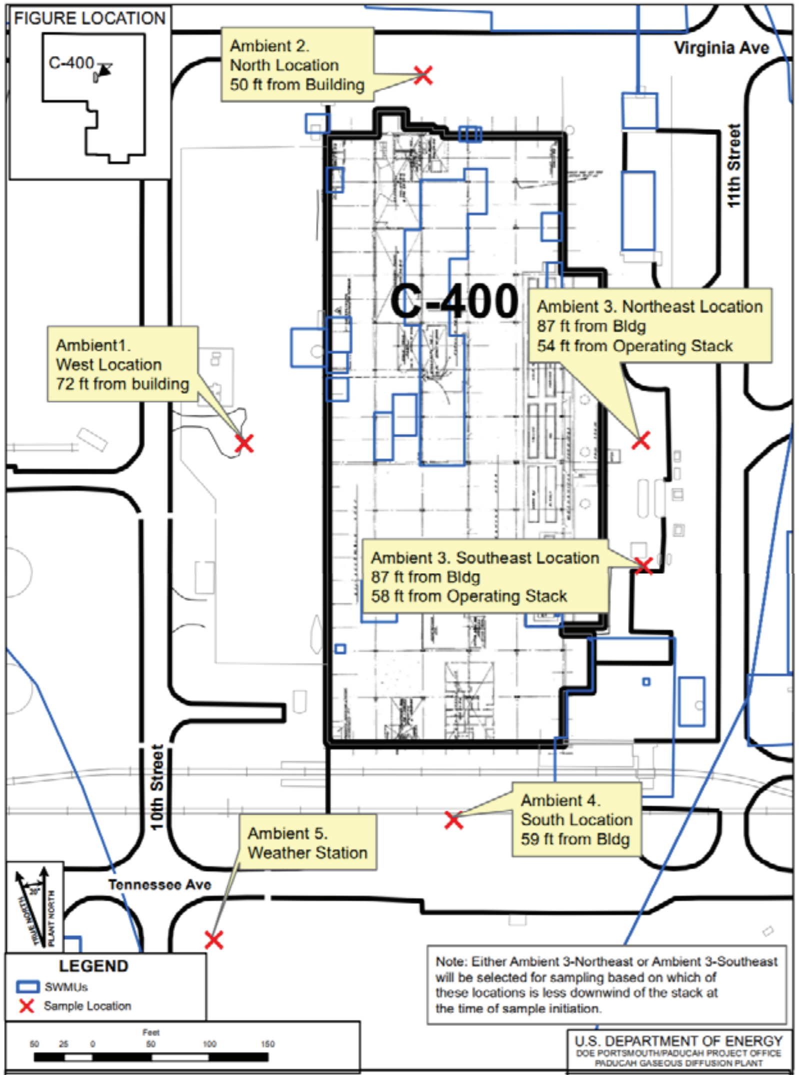

Figure 13. C-400 Map (with Approximate Ambient Sampling Locations)

G:\GIS\ARCVIEWS\PROJECTS\Vapor Intrusion\MOA 400\Figure 13. C-400 Ambient Sampling Locations.mxd
7/25/2017

FOR DISCUSSION ONLY

From: DOE/LX/07-2403&D2/R1

C-400 VI Study Conclusions

- C-400 VI Study Results
  - Appendix D to DOE/LX/07-1289&D2/R1/A3/R1, approved November-December 2018
- Conclusions
  - Actual exposures and, therefore, risks likely are lower than calculated because the indoor air sampling locations were biased toward likely areas of subsurface vapor entry, whereas exposures experienced by workers engaged in deactivation activities will represent all areas of the building undergoing deactivation activities.
  - The VI pathway is either incomplete (i.e., indoor air sampling result is nondetect) or is complete with a sampling result below the PAL, at all other sampled locations.
  - A conservative (based on default worker exposure parameters) preliminary risk evaluation showed the calculated cumulative ELCRs are within EPA's acceptable cancer risk range of 1.0E-6 to 1.0E-4.
  - Considering all the data, the cumulative excess lifetime cancer risk was 1.6E-6 and the cumulative hazard index was 0.53.
  - The groundwater under C-400 Cleaning Building contains the highest concentrations of TCE at the Paducah Site. The VOC concentrations in the C-400 Cleaning Building have been shown through this study not to pose an unacceptable risk to workers.

2015 US EPA VI Guidance

5.0 Preliminary Analysis of VI

- **5.1 Assemble, evaluate and review available information**
- 5.2 Identify and respond to conditions that warrant prompt action
- **5.3 Determine presence of structures and vapor forming chemicals**
- **5.4 Develop initial VI Conceptual Site Model (CSM)**
- 5.5 Evaluate pre-existing and readily ascertainable sampling data

6.0 Detailed Investigation of VI Pathway Sources

- 6.1 Common Vapor Intrusion Scenarios
- **6.2 Planning and Scoping**
  - 6.2.1 Vapor inclusion zones
  - **6.2.2 Prioritizing investigations with multiple buildings**

Preliminary VI Analysis: Available Information

US EPA 2015: 5.0 Preliminary Analysis of VI

5.1 Assemble, Evaluate and Review Available Information:

AVAILABLE INFORMATION:

- Historical and post-remediation VOC soil and groundwater analytical data (e.g., PEGASIS)
- Geologic information (e.g., lithological data from multiple documents)
- Historical, current, and future building type and use (administrative record, facility information provided by DOE)

Preliminary VI Analysis: Determine Presence of Structures

US EPA 2015: 5.0 Preliminary Analysis of VI

5.2 Determine Presence of Structures:

PADUCAH SITE FACILITIES:

- Paducah site has 843 "facilities."
- Approximately 369 of the facilities are occupied or potentially occupiable buildings, including buildings at the landfill.
- For the purposes of this study, a "building" is defined as a facility categorized as one of the following types in the Paducah Site databases:
  - Building
  - Trailer
  - Shed/Shack
  - Office
  - Change House
  - Pump House
  - Warehouse
  - Storage Facility

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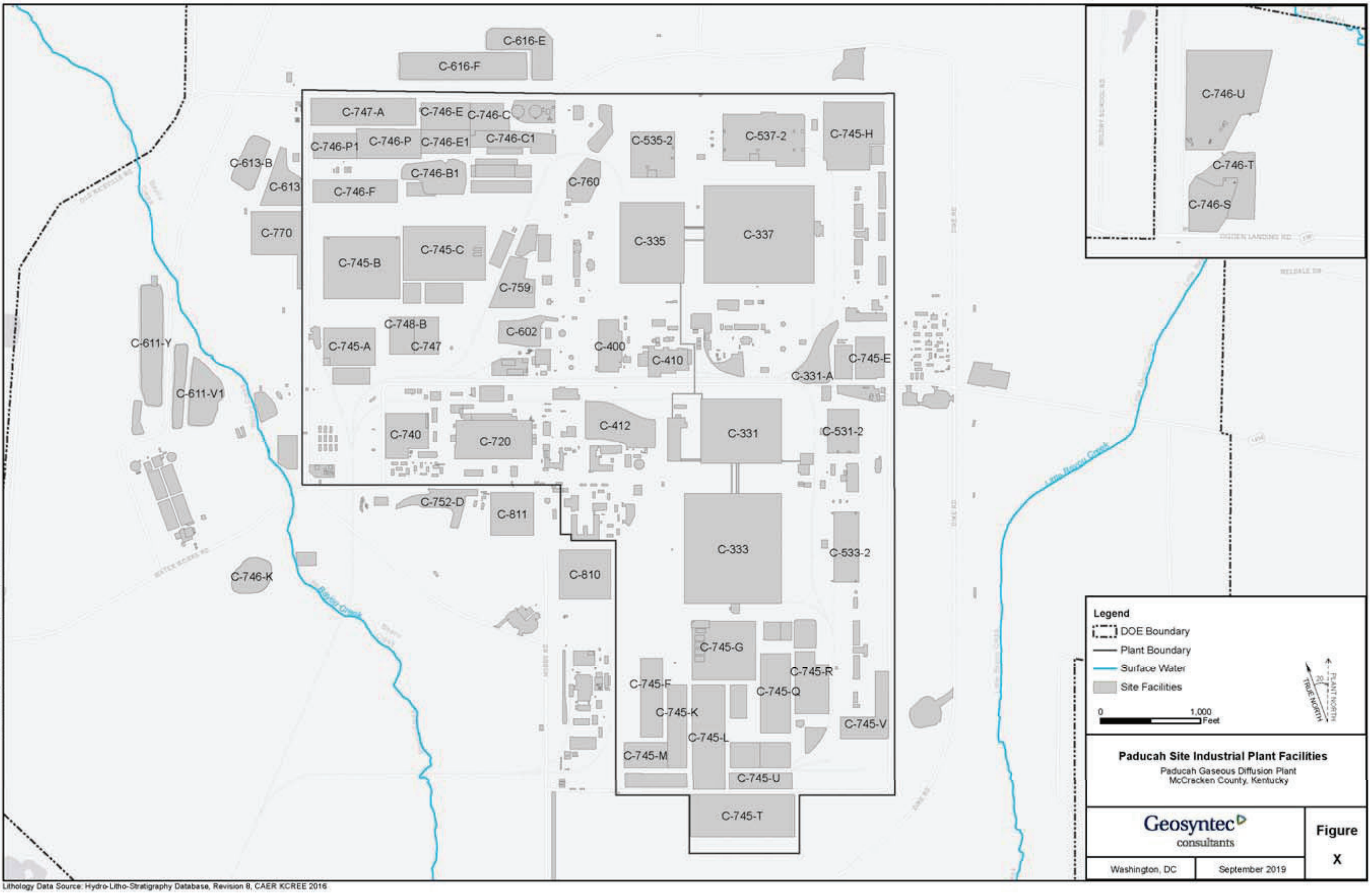
Paducah Industrial Plant - All Facilities



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

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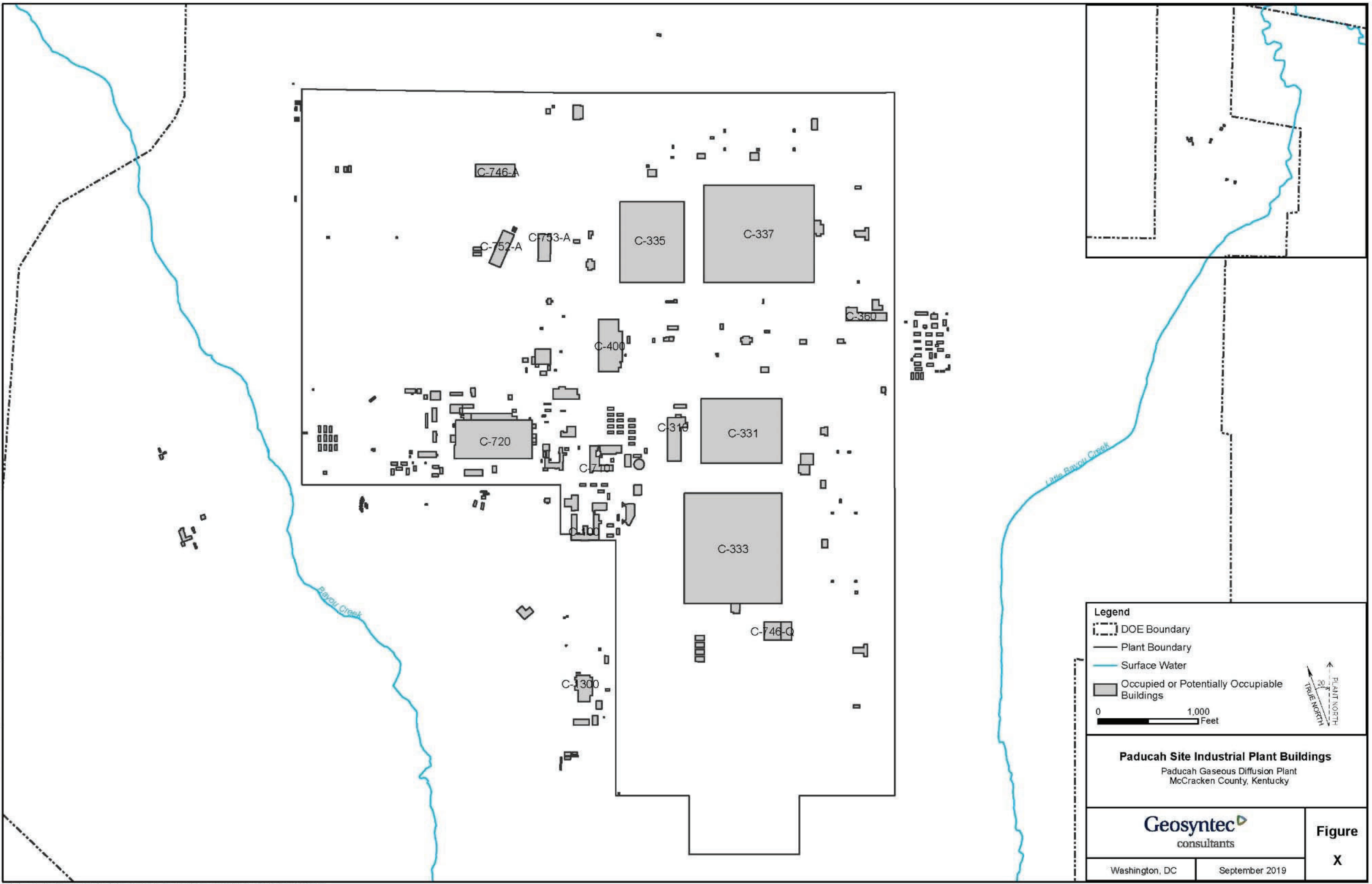
Paducah Industrial Plant Occupied & Occupiable Buildings



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

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Preliminary VI Analysis: Developing the VI CSM

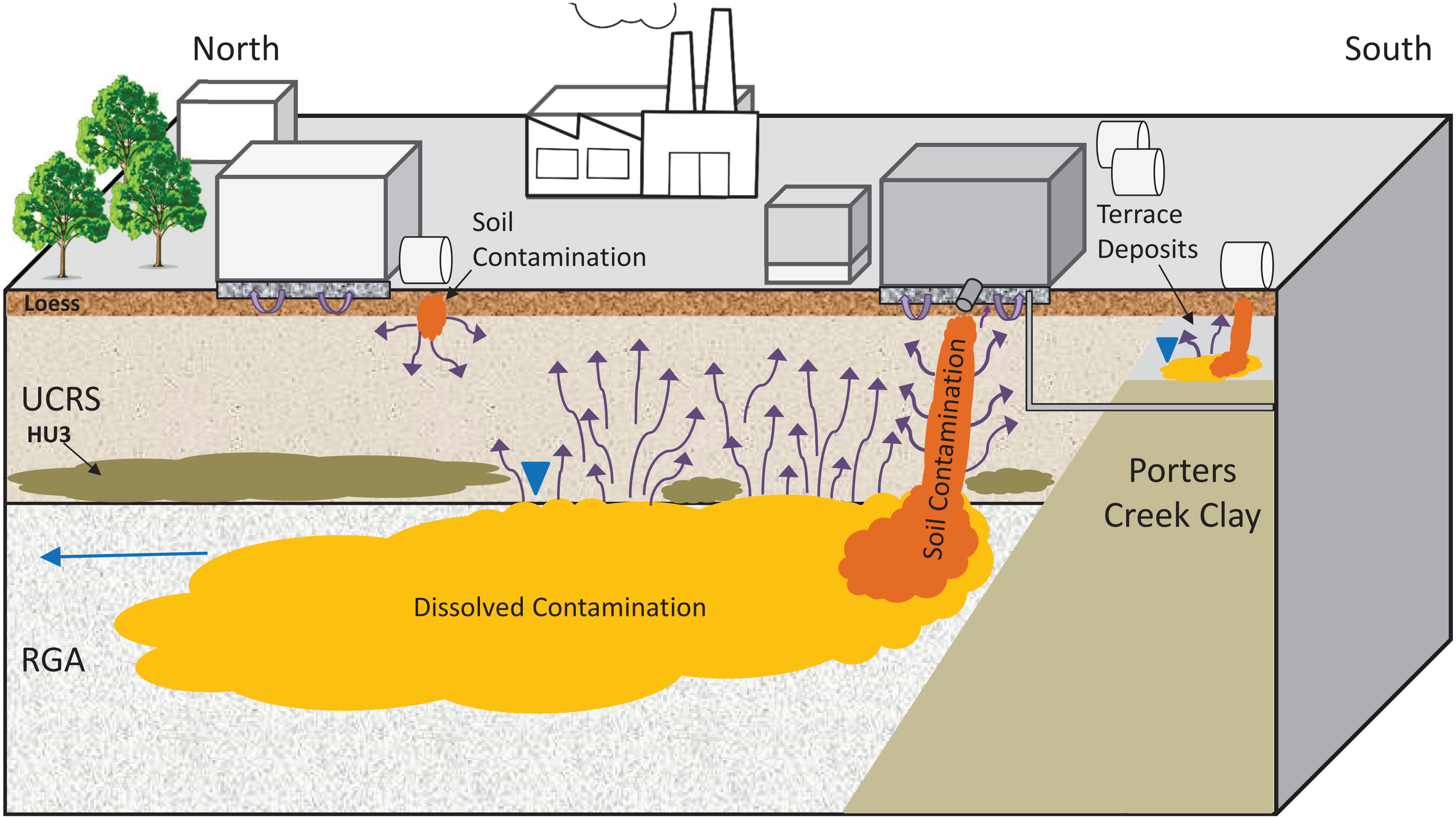
US EPA 2015: 5.0 Preliminary Analysis of VI

5.4 Develop Initial VI Conceptual Site Model (CSM):

INITIAL VI CSM COMPONENTS:

- Vapor sources: TCE and associated VOCs in groundwater and soil
- Vapor migration pathways: vadose zone characteristics
- Areas with occupied and occupiable buildings

Initial PGDP VI CSM Schematic



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VI INVESTIGATION PLANNING AND SCOPING

US EPA 2015: 6.0 Detailed Investigation of VI

6.2 Planning and Scoping

6.2.2 Prioritizing investigations with multiple buildings

FOR PLANNING AND SCOPING PURPOSES:

- This study proposes using a phased investigation approach to evaluate occupied and potentially occupiable buildings
- Occupied buildings will be assigned higher priority for initial phases of investigation, based on ranking criteria developed from the VI CSM.
- Buildings with lower ranking will be included in the initial investigation phases to verify ranking criteria.

Next Steps/Meetings

- Develop Data Quality Objectives
- Develop specific CSM
- Develop screening criteria
- Develop list of buildings to screen
- Selected data collection approaches
- Develop preliminary risk assessment approach

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Paducah Site Industrial Area Vapor Intrusion Study Scoping – Presentation 2

October 17, 2019

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Outline

- Data Quality Objectives (DQOs)
- Facility Screening and Prioritization Criteria
- Work Plan Development

DQO Process Steps for Scoping VI Study

1. State the Problem
2. Identify the Goal of the VI Study
3. Identify Scoping Information Inputs
4. Define VI Study Boundaries
5. Develop Scoping Analytic Approach - VI CSM
6. Specify Screening and Prioritization Criteria
7. Develop a Work Plan for Obtaining Data

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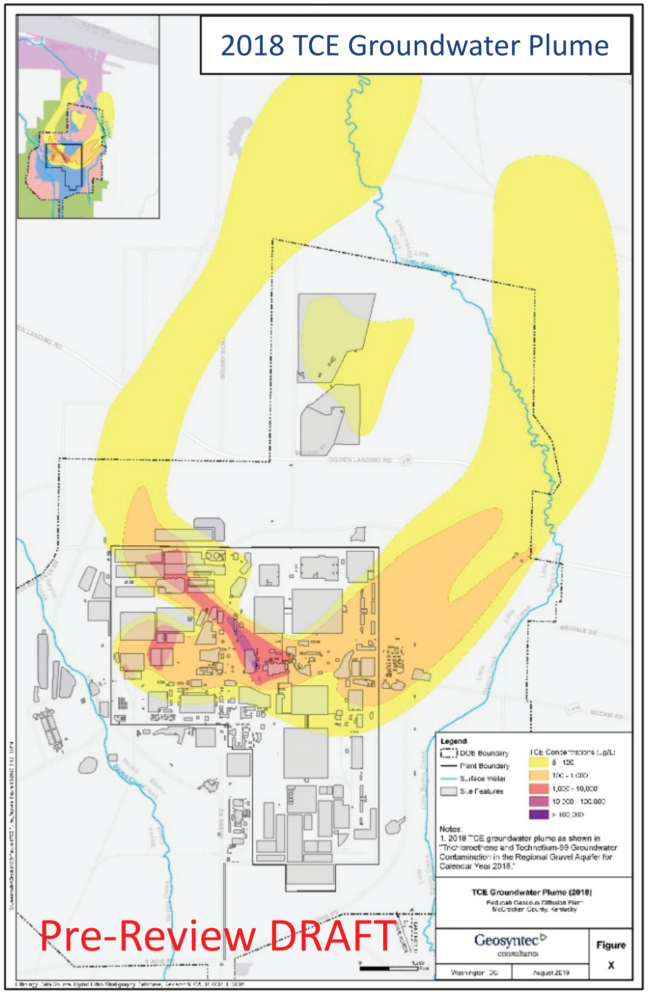
DQO Step 1: State the Problem

Volatile organic compounds (VOCs) present in groundwater and soil have the potential to migrate via vapor intrusion into overlying structures.

For example, the TCE plume underlies portions of the Paducah Site Industrial Area.



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DQO Step 2: Identify the Goal

Consistent with EPA vapor intrusion guidance, work with the project team to develop a phased VI Investigation Work Plan and Risk Assessment Report for the Plant Industrial Area to determine whether VI presents an unacceptable risk to building occupants.

Project Team:

- DOE
- EPA
- KDEP
- FRNP

DQO Step 2: Study Questions

Does vapor intrusion from VOCs in soils and groundwater pose a potential threat to human health in buildings located over these areas at the Paducah Site?

- What are the appropriate criteria for identifying and prioritizing buildings needing investigation of the VI pathway?

- What data are needed to determine if the VI pathway is complete and poses a threat to human health in buildings?

DQO Step 2: Associated Questions

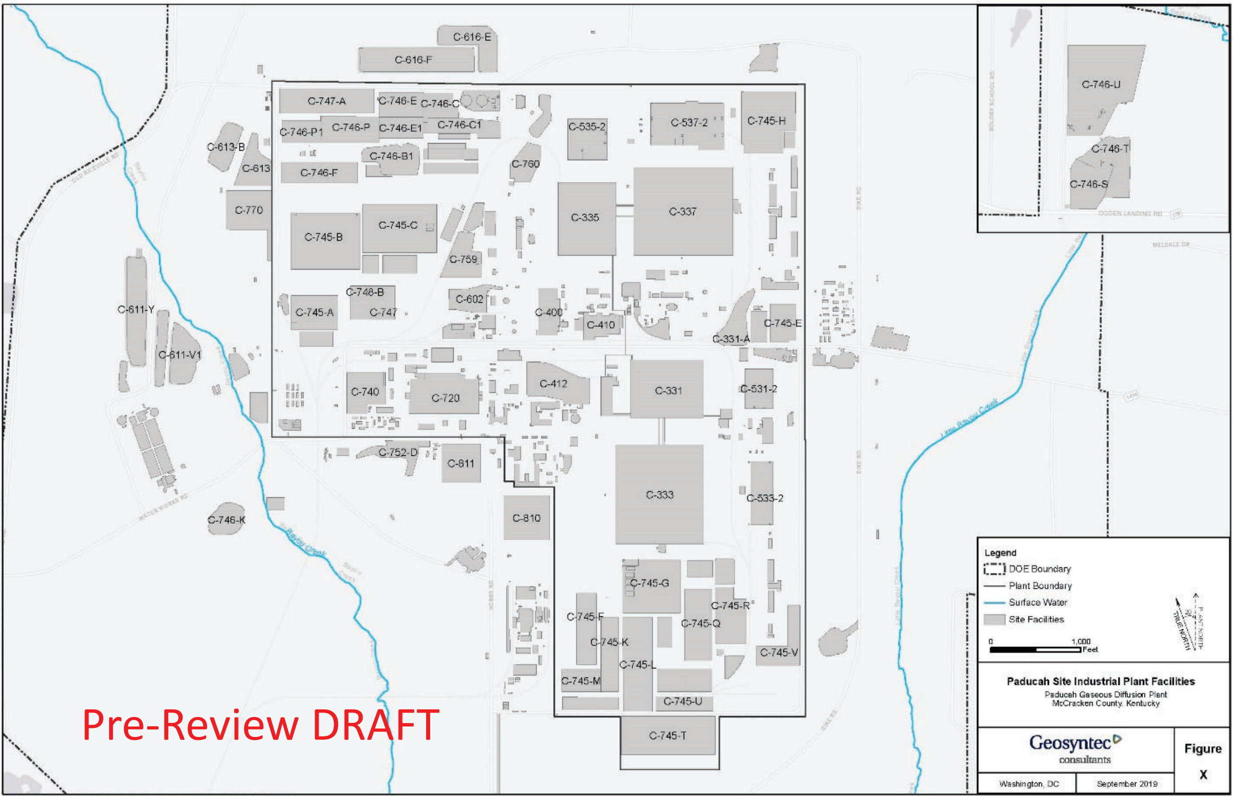
- What are the appropriate prioritization criteria for identifying and ranking buildings needing investigation?
  - Which Paducah Site Industrial Area facilities are currently occupied or potentially occupied buildings (O/P buildings)? **[Building Occupancy]**
  - What building foundation features or construction styles exist that may enhance VI (e.g., basements, sumps, pits) or inhibit VI (e.g., vapor barriers, sealed slabs)? **[Building Construction]**
  - Which O/P buildings are near VOC (TCE/associated CVOCs/other VOCs) contamination in groundwater and soil? **[Subsurface VOC Contamination]**
  - What subsurface conditions or features exist that may enhance VI (e.g., preferential pathways, sands and gravels) or inhibit VI (e.g., high silt/clay content)? **[Subsurface Geology] & [Subsurface Utilities]**
- What data are needed to determine if the VI pathway is complete and poses a threat to human health in buildings?
  - To be addressed in the third scoping presentation.

DQO Step 3: Identify Information Inputs

- **Building occupancy**
  - Historical, current, and future building use (administrative record, facility information)
- **Building construction**
  - Facility information, as-built diagrams where available
- **Subsurface VOC contamination**
  - Recent groundwater VOC analytical data (e.g., 2018 TCE plume map and more recent data in PEGASIS)
  - Qualitative consideration of historical and post-remediation VOC soil analytical data (e.g., PEGASIS)
- **Subsurface Geology**
  - Bore log geologic information (e.g., lithological data from multiple documents)
- **Subsurface Utilities**
  - Subsurface utility diagrams (data compilation and review in progress)

DQO Step 4: Define Study Boundaries

- Investigation will evaluate all facilities that are occupied or potentially occupiable within the Industrial Area, including buildings at the S/T/U-landfill areas.



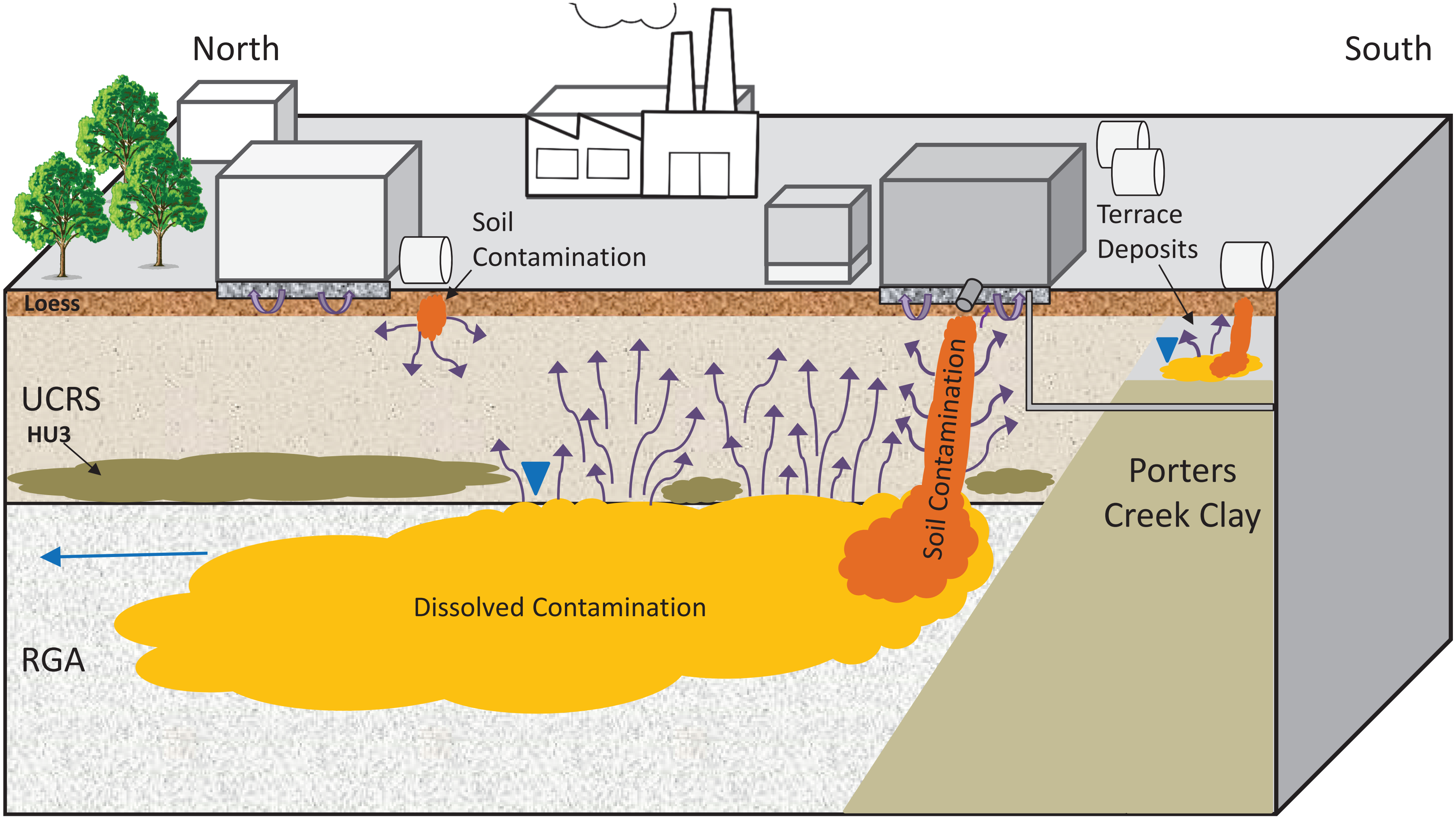
Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2018

DQO Step 5: Analytic Approach

- Develop updated VI CSM
  - Identify extent of TCE and related chlorinated VOCs in groundwater and soil.
  - Compile geologic data, historical building use information, building use/foundation type/construction features.

- Develop screening and prioritization criteria and approach
  - Define prioritization criteria
  - Define prioritization approach

Initial PGDP VI CSM Schematic



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Screening & Prioritization Approach

Criterion	Description	Prioritization Rationale
Building Identification & Occupancy	Identify facilities that are buildings and categorize each facility according to occupancy: Occupied, Potentially Occupiable, Not Occupiable	Higher priority assigned to currently occupied buildings.
Groundwater Contamination (TCE/CVOCs/other VOCs)	Categorize each facility according to underlying groundwater concentration: e.g., TCE concentration <5, 5-100, 100-1,000, 1,000-10,000, 10,000-100,000, >100,000 μg/L	Higher priority assigned to buildings with higher underlying TCE/VOC concentrations.
Vadose Zone Lithology: Percent Clay & Silt in UCRS HU3 Clay & Silt Thickness	Categorize each facility according to percent clay and silt content of UCRS or clay and silt thickness in HU3, based on contouring of borehole data.	Clay and silt restrict vapor migration from aquifer to surface; higher priority assigned to buildings with lower underlying percent clay and silt.
Depth to Groundwater	Categorize each facility according to depth to the groundwater: 0-10, 10-30, 30-60 ft.	The shallower the water table, the higher potential for VI migration from groundwater sources; higher priority assigned to buildings with shallower water tables.
Soil Contamination (TCE/CVOCs/other VOCs)	Categorize each facility according to available soil TCE/VOC contamination data: (detected value, ND [sampled and analyzed but not detected @ RL], NA [not sampled or analyzed])	Higher priority assigned to buildings with detected soil TCE/VOC concentrations.
Building Construction (to be identified during building surveys)	Categorize buildings based on constructed features such as foundation type: basement, slab on grade, or raised foundations	Buildings with deeper foundations are more susceptible to VI; higher priority assigned to buildings with basements.
Preferential Pathways: (to be identified during building surveys)	Categorize buildings according to presence or absence of atypical utility connections, e.g., tunnels, large conduits.	Utility conduits can serve as preferential pathways for VI; higher priority assigned to buildings proximal to large connected conduits

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Screening & Prioritization Criteria

- Goal: Identify and prioritize buildings at which, based on the updated VI CSM and building characteristics, vapor intrusion has the potential to result in indoor air concentrations that may exceed acute or chronic screening levels.
- Screening and Prioritization Criteria:
    1. Building occupancy
    2. Groundwater contamination: TCE/CVOCs/other VOCs
    3. Vadose zone lithology
    4. Depth to groundwater
    5. Soil contamination: TCE/CVOCs/other VOCs
    6. Building construction[1]
    7. Preferential pathways[1]
- GIS will be used to categorize buildings for criteria 2, 3, 4, and 5.

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[1] Building type/construction and preferential pathways are not part of the preliminary screening/ranking criteria. Once a preliminary list has been developed, these characteristics will be determined for the building prioritized as high priority for the first phase of investigation.

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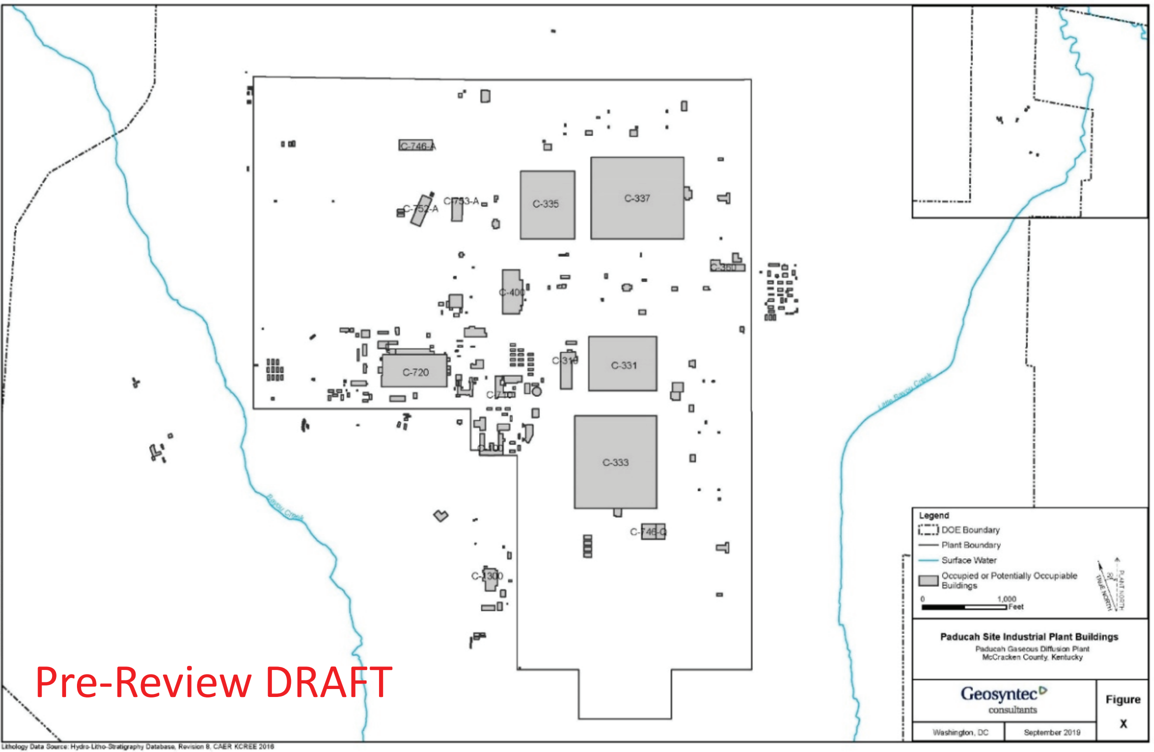
Building Identification

- Is the Facility an Occupied or Potentially Occupied Building?
  - Y (Yes, occupancy indicated)
    - Facility identified as “buildings” with “personnel use” and “occupied” or “number of occupants” exceeded zero.
  - P (Potentially occupiable) (still under evaluation)
    - Facilities identified as “buildings, but “not in use”, or “unoccupied.”
    - Supply storage facilities? Industrial facilities: e.g., pump houses, fire valve houses?
  - N (Not occupiable)
    - Facilities identified as “non-building”, “demolished”, “KPDES outfall”, or having designations such as “deactivation complete,” “out of service,” “removed,” or “shutdown.”

Building Identification

- Paducah site has 843 "facilities."
- Approximately 369 of the facilities are occupied or potentially occupiable buildings.
- For the purposes of this study, a "building" is defined as a facility categorized as one of the following types in the Paducah Site databases:
  - building
  - trailer
  - shed
  - shack
  - office
  - change house
  - pump house
  - warehouse
  - storage facility



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

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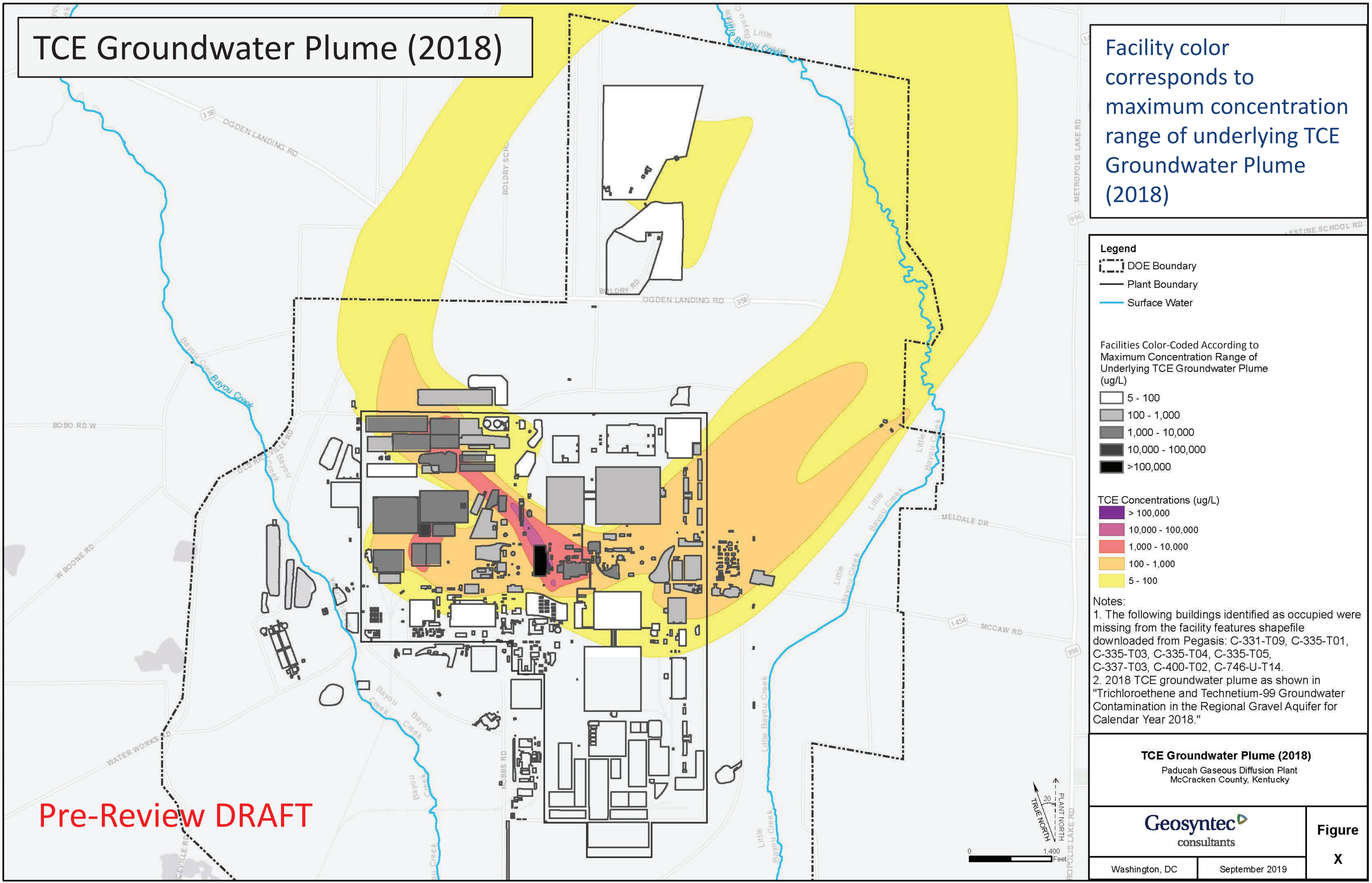
Groundwater Contamination



Facility color corresponds to maximum concentration range of underlying TCE Groundwater Plume (2018)

Notes:
1. The following buildings identified as occupied were missing from the facility features shapefile downloaded from Pegasis: C-331-T09, C-335-T01, C-335-T03, C-335-T04, C-335-T05, C-337-T03, C-400-T02, C-746-U-T14.
2. 2018 TCE groundwater plume as shown in "Trichloroethene and Technetium-99 Groundwater Contamination in the Regional Gravel Aquifer for Calendar Year 2018."

C:\Users\mallen\Dropbox\GIS\Paducah\Site Features Colorized by TCE Groundwater Plume_no borders.mxd 9/6/2019 3:46:31 PM

Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

safety ❖ performance ❖ cleanup ❖ closure

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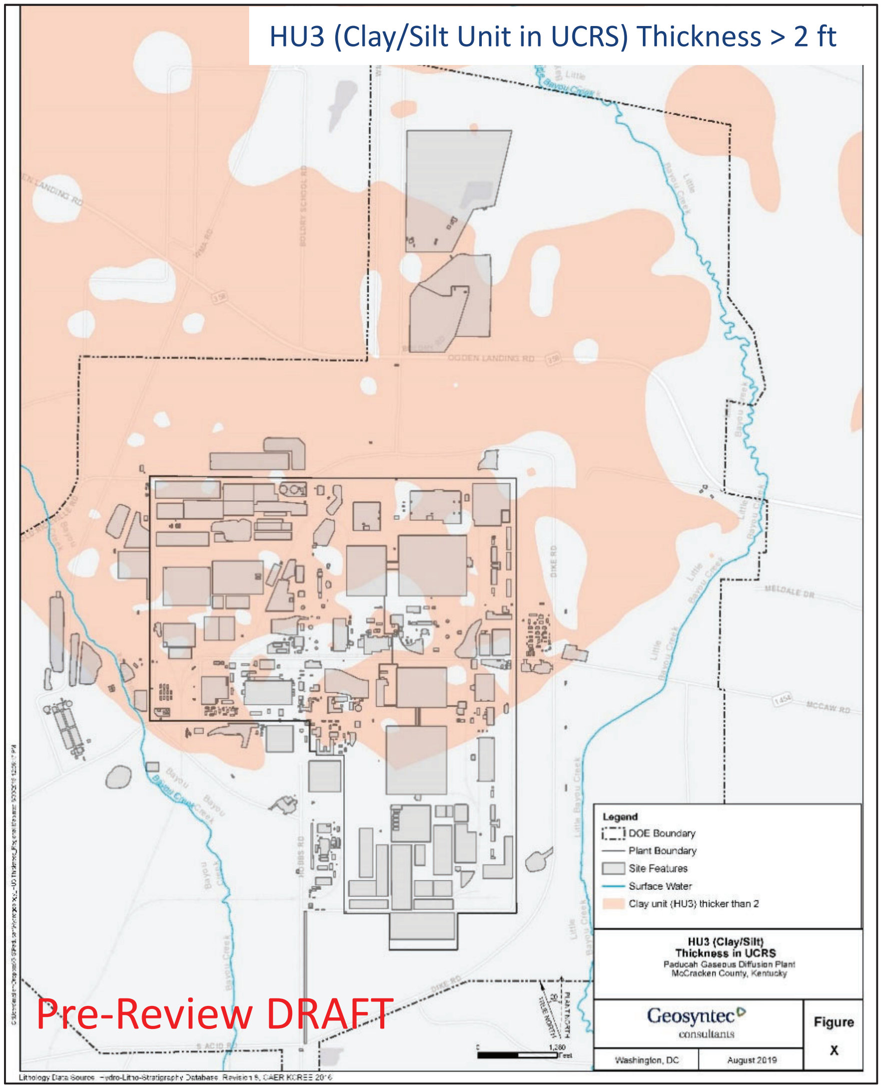
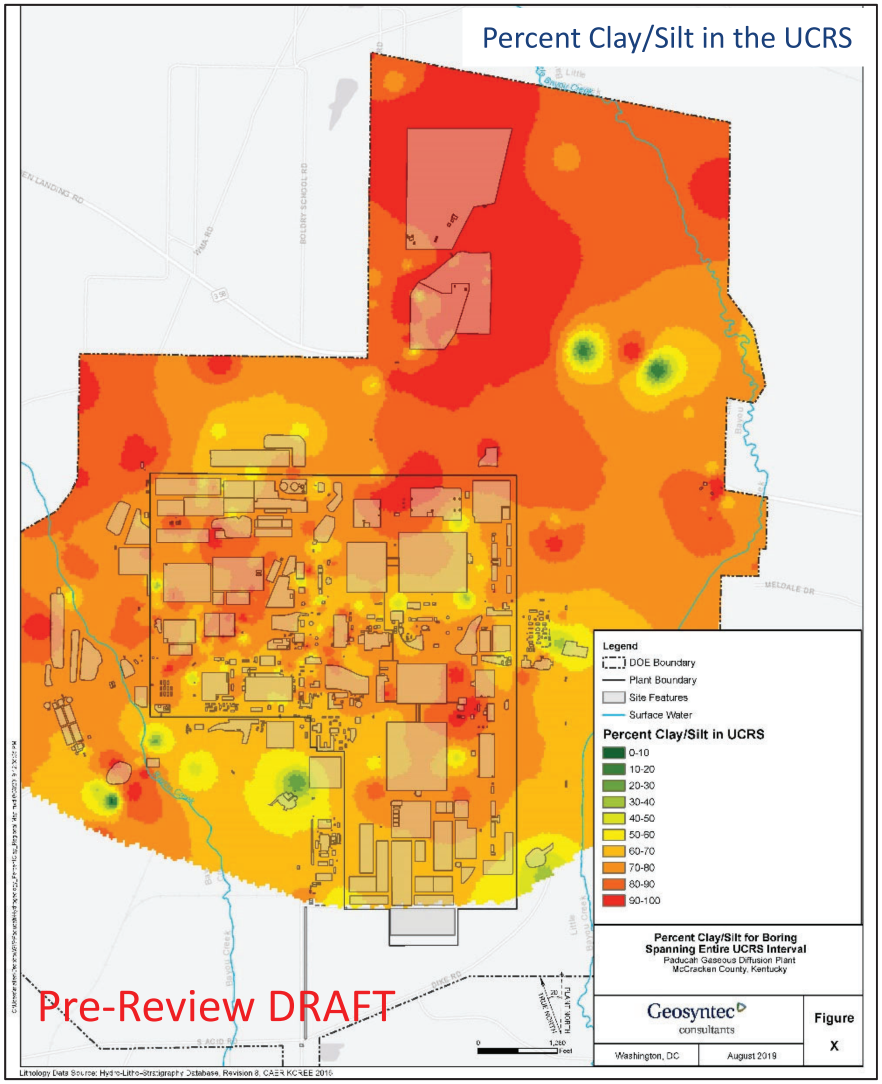
Vadose Zone Lithology

HU3 (Clay/Silt Unit in UCRS) Thickness > 2 ft



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

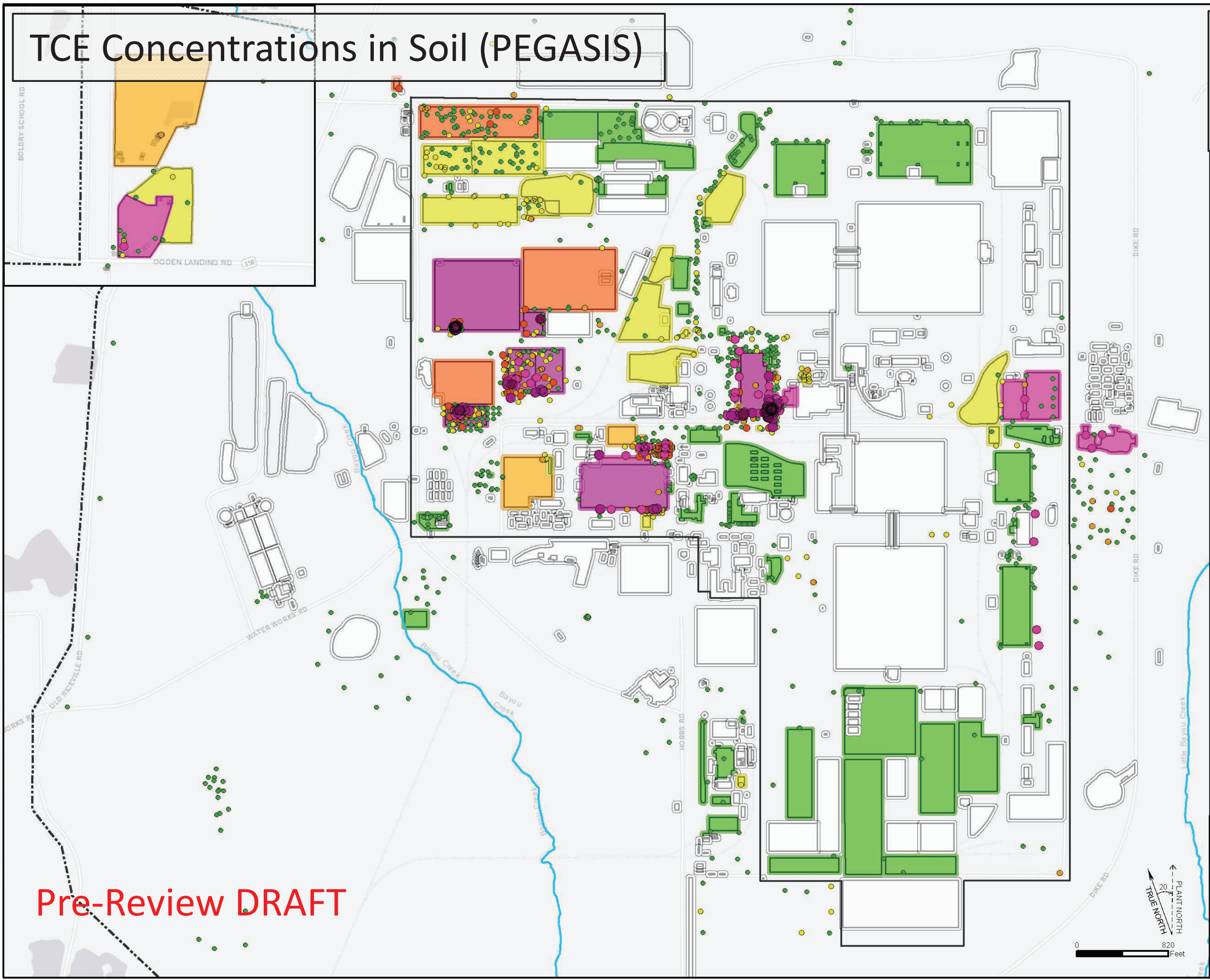
Percent Clay/Silt in the UCRS



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

Soil Contamination

TCE Concentrations in Soil (PEGASIS)



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Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

Colored areas represent maximum soil TCE concentration within 25 feet of building(s).

Legend

DOE Boundary
Plant Boundary
Surface Water
TCE Concentration in Soil (ug/kg)
● 0.34 - 10
● 10 - 100
● 100 - 1,000
● 1,000 - 10,000
● 10,000 - 100,000
● >100,000
● TCE Concentration in Soil (ug/kg) - Nondetect

25ft Buffer around each Facility Colorized According to Maximum TCE Soil Concentration within Said Buffer
🟨 2.000000 - 10.000000
🟧 10.000001 - 100.000000
🟧 100.000001 - 1000.000000
🟪 1000.000001 - 10000.000000
🟪 10000.000001 - 100000.000000
🟪 100000.000001 - 1.000000e+24
☐ No Available TCE Soil Concentration Data within 25 ft of Facility
🟩 Maximum Concentration within a 25 ft Buffer of the Facility is Nondetect

Notes:
1. The following buildings identified as occupied were missing from the facility features shapefile downloaded from Pegasis: C-331-T09, C-335-T01, C-335-T03, C-335-T04, C-335-T05, C-337-T03, C-400-T02, C-746-U-T14.
2. TCE soil concentration data were downloaded from the Pegagsis Anatlyical Data Query Tool. All available data are posted.

TCE Concentrations in Soil
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

Geosyntec consultants
Washington, DC
September 2019

Figure
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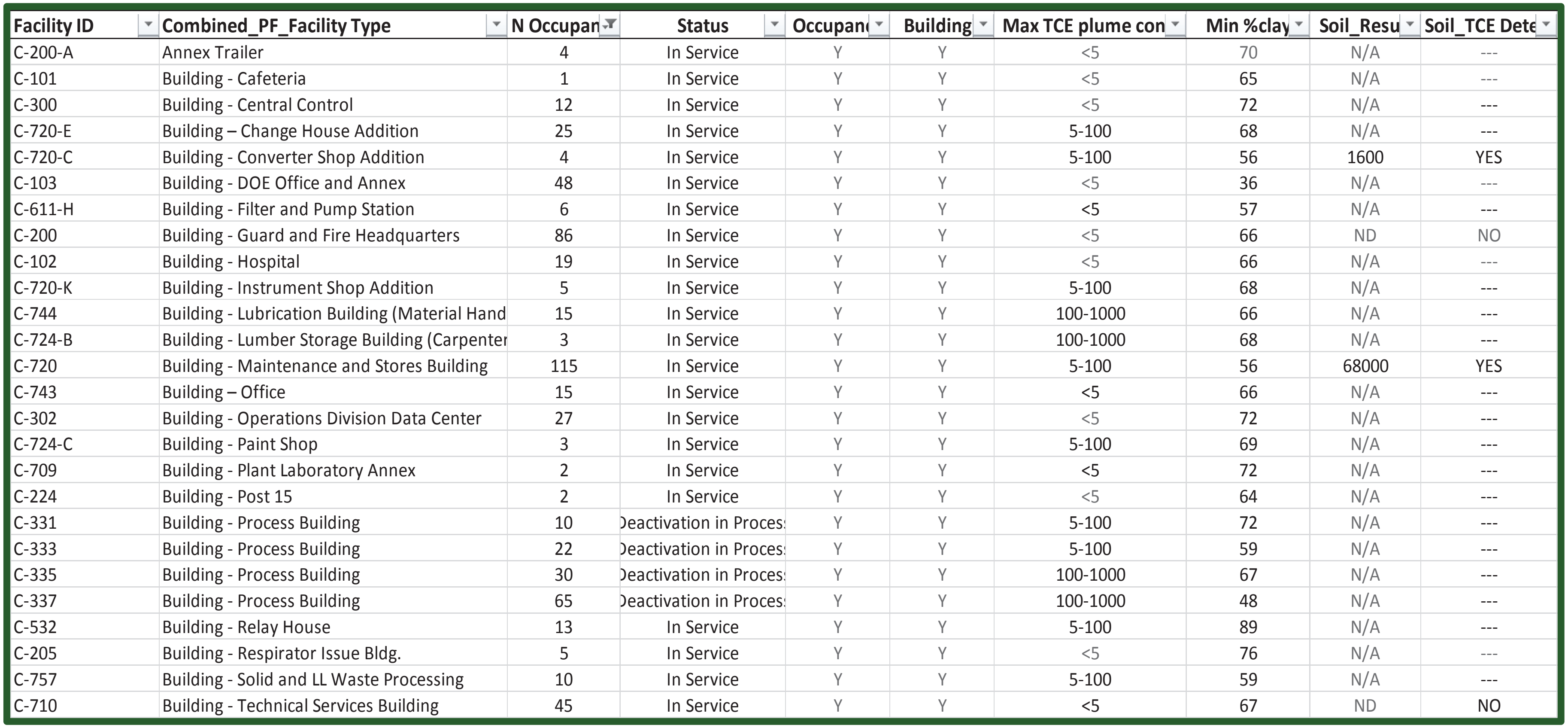
Spreadsheet Screening/Prioritization Tool

- Example screening & prioritization spreadsheet



Facility ID	Combined_PF_Facility Type	N Occupan	Status	Occupan	Building	Max TCE plume con	Min %clay	Soil_Resu	Soil_TCE Dete
C-200-A	Annex Trailer	4	In Service	Y	Y	<5	70	N/A	---
C-101	Building - Cafeteria	1	In Service	Y	Y	<5	65	N/A	---
C-300	Building - Central Control	12	In Service	Y	Y	<5	72	N/A	---
C-720-E	Building – Change House Addition	25	In Service	Y	Y	5-100	68	N/A	---
C-720-C	Building - Converter Shop Addition	4	In Service	Y	Y	5-100	56	1600	YES
C-103	Building - DOE Office and Annex	48	In Service	Y	Y	<5	36	N/A	---
C-611-H	Building - Filter and Pump Station	6	In Service	Y	Y	<5	57	N/A	---
C-200	Building - Guard and Fire Headquarters	86	In Service	Y	Y	<5	66	ND	NO
C-102	Building - Hospital	19	In Service	Y	Y	<5	66	N/A	---
C-720-K	Building - Instrument Shop Addition	5	In Service	Y	Y	5-100	68	N/A	---
C-744	Building - Lubrication Building (Material Hand	15	In Service	Y	Y	100-1000	66	N/A	---
C-724-B	Building - Lumber Storage Building (Carpenter	3	In Service	Y	Y	100-1000	68	N/A	---
C-720	Building - Maintenance and Stores Building	115	In Service	Y	Y	5-100	56	68000	YES
C-743	Building – Office	15	In Service	Y	Y	<5	66	N/A	---
C-302	Building - Operations Division Data Center	27	In Service	Y	Y	<5	72	N/A	---
C-724-C	Building - Paint Shop	3	In Service	Y	Y	5-100	69	N/A	---
C-709	Building - Plant Laboratory Annex	2	In Service	Y	Y	<5	72	N/A	---
C-224	Building - Post 15	2	In Service	Y	Y	<5	64	N/A	---
C-331	Building - Process Building	10	Deactivation in Proces	Y	Y	5-100	72	N/A	---
C-333	Building - Process Building	22	Deactivation in Proces	Y	Y	5-100	59	N/A	---
C-335	Building - Process Building	30	Deactivation in Proces	Y	Y	100-1000	67	N/A	---
C-337	Building - Process Building	65	Deactivation in Proces	Y	Y	100-1000	48	N/A	---
C-532	Building - Relay House	13	In Service	Y	Y	5-100	89	N/A	---
C-205	Building - Respirator Issue Bldg.	5	In Service	Y	Y	<5	76	N/A	---
C-757	Building - Solid and LL Waste Processing	10	In Service	Y	Y	5-100	59	N/A	---
C-710	Building - Technical Services Building	45	In Service	Y	Y	<5	67	ND	NO

Preliminary Screening and Prioritization Example Results

- 843 Facilities
  - ~369 facilities are O/P buildings
    - ~120 **occupied** buildings
    - ~68/120 **occupied** buildings with TCE in groundwater > 5 µg/L
    - ~16/68 **occupied** buildings with TCE in groundwater > 5 µg/L and < 60% clay/silt in UCRS
    - ~2/16 **occupied** buildings with TCE in groundwater > 5 µg/L and < 60% clay/silt in UCRS AND detected concentrations of TCE in soil within 25 feet of building (C-720 and C-720-C)

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Work Plan Development

- VI Study Work Plan:
  - Identify highest priority buildings for sampling based on screening criteria
  - Develop a phased investigation plan, starting with the highest priority buildings (as well as a subset of lower priority buildings so that the initial investigation is representative of all building types and uses)
  - Describe data collection approaches and rationale:
    - Co-located indoor air and subslab/crawlspace samples
    - Cross-slab pressure differential data
    - Forensic tools, as needed
  - Describe preliminary risk assessment approach
  - Specify decision rules to determine "whether any additional actions are necessary to satisfy the question of potential threat to human health from vapor intrusion and/or to bring human exposure to vapor intrusion under control." [SMP MOA, March 2019]

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Paducah Site Industrial Area Vapor Intrusion Study Scoping – Presentation 3

October 30, 2019

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Agenda

- Clarifications to Proposed Investigation Approach
- Action Items from 9/27 and 10/17 Scoping Meetings
  - Vapor Intrusion (VI) Conceptual Site Model (CSM)
  - Ranking Criteria
  - Data Use
  - VI Compounds of Potential Concern (COPCs)
  - Study Area
  - Gore-Sorbers®
- Facility Screening, Ranking, and Prioritization Criteria (revised based on discussion during 10/17 meeting)
- VI Investigation Work Plan Development

Clarifications to Investigation Approach

- Screening:
  - Not occupiable facilities – screen out of the VI study
  - Occupiable facilities (including enclosed buildings, subgrade shelters, and tunnels; called “buildings”) – screen in to VI study
- Ranking:
  - To prioritize sampling where completed pathways are more likely
  - Ranking criteria drawn from the CSM
  - Purposes: identify completed VI pathways early, develop a testable logic on why to sample fewer than all buildings
- Sampling:
  - Sampling proposed to be conducted using phased approach
  - Initial phase findings will be used to revise VI CSM, rankings and inform subsequent phases (if needed)
  - Initial sampling phase will include:
    - Occupiable facilities ranked highest
    - Some lower-ranked facilities that share qualities with higher-ranked ones (e.g., construction style & age)

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Action Items – VI CSM

- Add utility corridors between sources and buildings with flow arrows
- Add basements (and other subgrade features) to buildings
- Add subgrade bunkers, shelters and tunnels as occupiable buildings
- Add potential clean water lens overlying RGA
- Add potential UCRS contamination overlying RGA

VI CSM will be revised to include these items, using multiple VI CSM schematics to visualize

Action Items – Ranking Criteria

- Add TCE use in buildings
  - Will review historical documents and perform interviews
- Add utilities as preferential pathways
  - Propose using density of subsurface utilities as ranking category
- Add data gaps
  - Lack of data increases ranking (qualitative uncertainty factor)
- Facilities to be grouped by shared characteristics (e.g., trailer, age, size, foundation type) to select subset of lower-ranked buildings for phase 1 sampling
- Consider building future use
  - Occupiable buildings will be ranked as "occupied", "planned for occupancy" and "unoccupied"
- Consider seasonal variability in depth to water
  - Propose to use shallowest depth to water from last 5 years
- Consider UCRS contamination/clean water lens
  - UCRS contamination increases ranking; clean water lens decreases ranking.

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Action Items – Data Use

- Use groundwater data from last 5 years to evaluate variability
  - Older data used on case-by-case basis with written justification (e.g., for terrace and UCRS wells)
- Review and present summary of industrial hygiene data
  - Will use only for increasing ranking (e.g., detected compounds may be added to the COPC list)
- Pre- v. post-remediation soil data
  - Post-remediation soil data (where available) will be used for ranking
  - No pre-remediation soil data to be used
  - Qualitatively consider historical soil excavation/remediation areas on case-by-case basis
- Non-detects (both groundwater and soil data)
  - Propose to use maximum Reporting Limit (RL) in ranking
- Normalized concentration data (COPC/VISL)
  - Propose to use sum of normalized concentration data to rank groups of chemicals (e.g., chlorinated VOCs, PHCs, PCBs, PAHs)

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Action Items – VI COPCs

- Proposed VI COPC Selection Process[1]

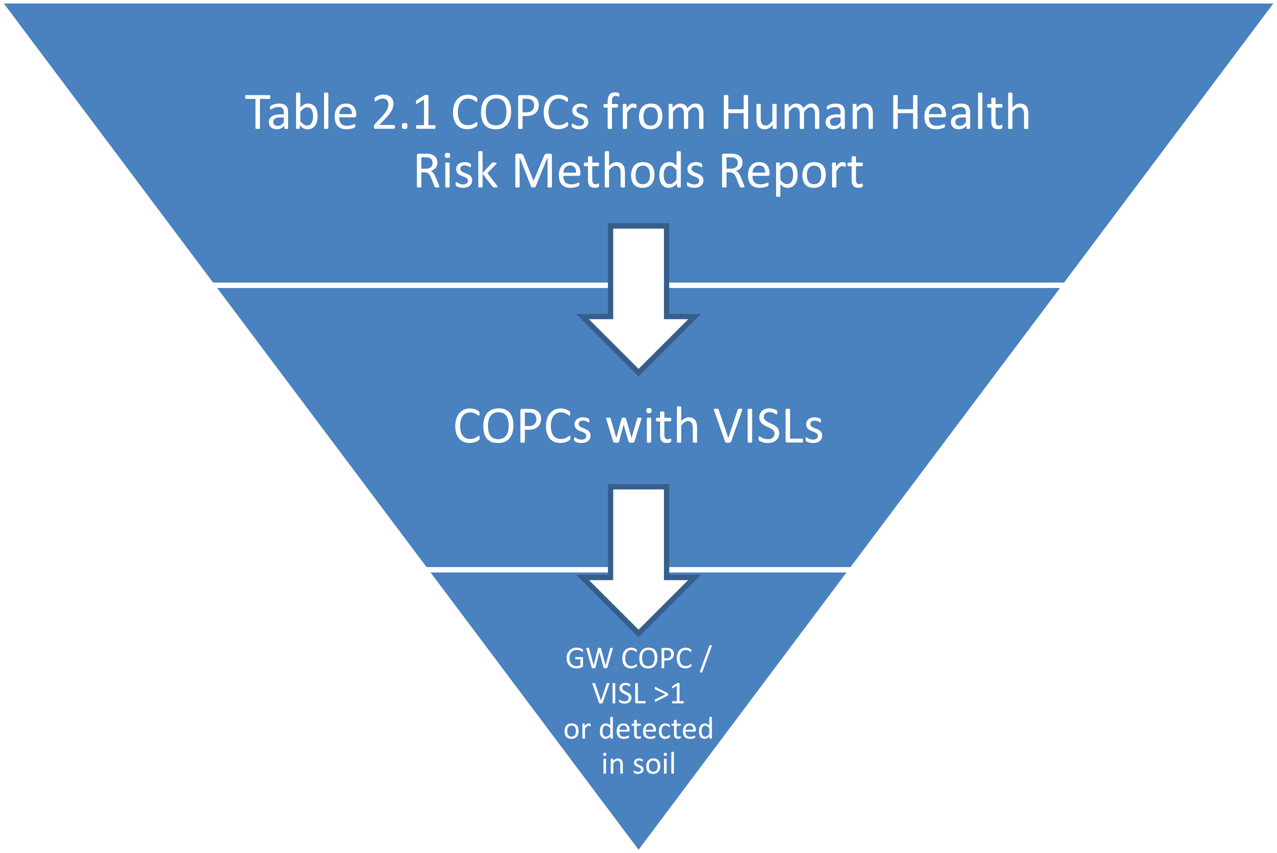

Table 2.1 COPCs from Human Health Risk Methods Report

COPCs with VISLs

GW COPC / VISL >1 or detected in soil

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[1] Radon outside of scope of this project

Paducah COPCs with VISLs

- CVOCs
  - 1,1,1-Trichloroethane (TCA)
  - 1,1-Dichloroethylene (1,1-DCE)
  - 1,1,2-TCA
  - 1,2-Dichloroethane (DCA)
  - Bromodichloromethane
  - Carbon Tetrachloride
  - Chloroform
  - Hexachlorobenzene
  - Tetrachloroethylene (PCE)
  - **Trichloroethylene (TCE) (primary COPC)**
  - Vinyl Chloride
- Petroleum Hydrocarbons
  - Benzene
  - Ethylbenzene
  - Xylenes
- PCBs
  - Aroclor 1016
  - Aroclor 1221
  - Aroclor 1232
  - Aroclor 1242
  - Aroclor 1248
  - Aroclor 1254
  - Aroclor 1260
  - PCB 81
  - PCB 105
  - PCB 114
  - PCB 118
  - PCB 123
  - PCB 126
  - PCB 156
  - PCB 157
  - PCB 167
  - PCB 169
  - PCB 189
- Other
  - 2,3,7,8-TCDD (dioxin)
  - Mercury (metal)
  - Naphthalene (PAH)

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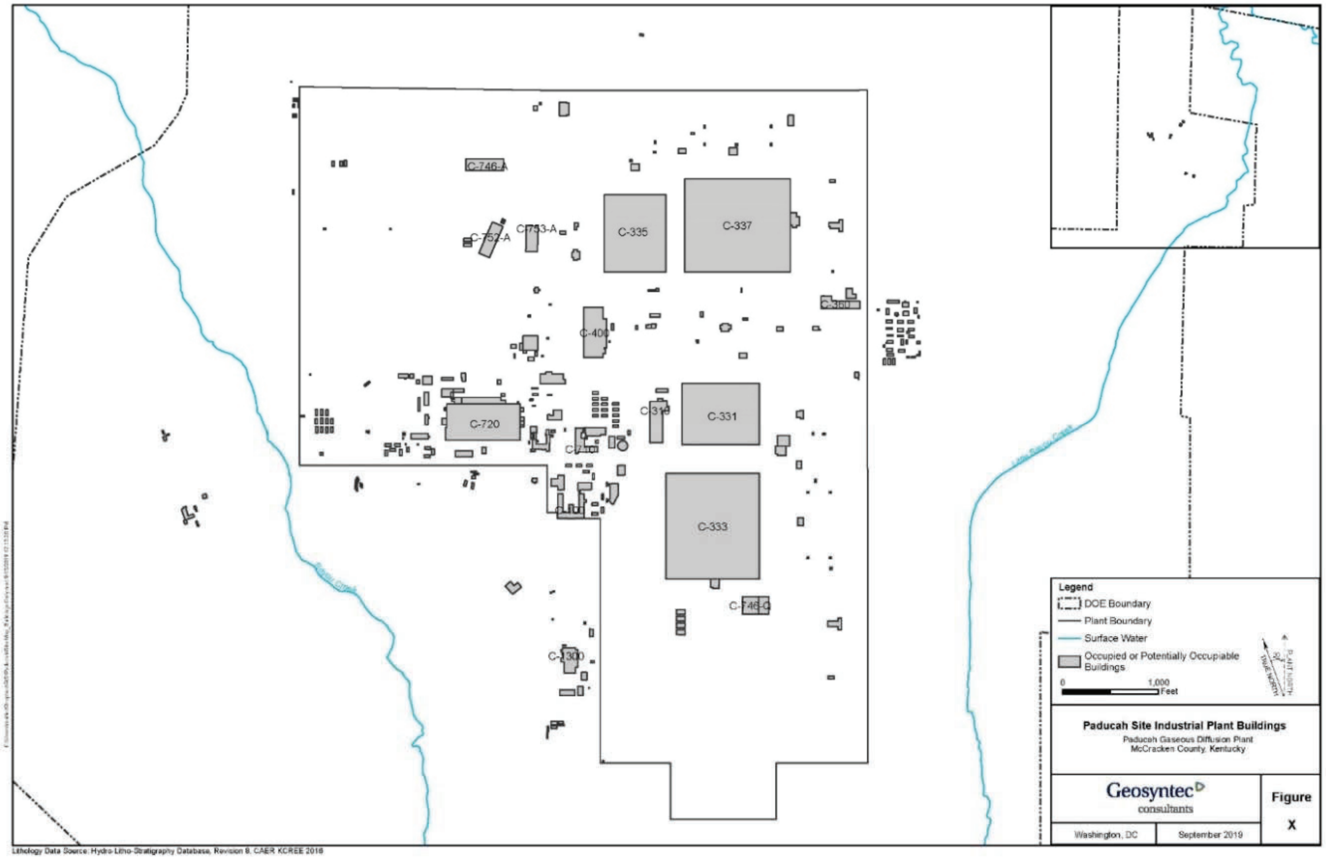
Action Items – Study Area

- Define study area
  - All facilities and tunnels within study area defined in SMP
  - New security office and firing range will be added



Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

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Action Items - Gore-Sorbers®
SWMU 4 Passive Soil Gas Sampling

- September 24 – October 9, 2012
- Gore-Sorber® survey - 65 soil gas samplers placed above and surrounding the clay cap
  - 5 of the 65 samplers had detections

- These passive samples will not be used to rank buildings and Gore-Sorbers® will not be included in the VI Investigation Work Plan

Screening, Ranking and Prioritization

- Screening:
  - Facilities to include or exclude from VI investigation

- Ranking:
  - Identify buildings more likely to have completed VI pathway
  - Transparent, defensible, repeatable, consistent with USEPA VI Guide (2015)
  - Not all buildings will be sampled

- Prioritization:
  - Which facilities to be sampled during first phase of field work?
  - Revise VI CSM to inform subsequent phases (if needed)

Screening Criteria

- Occupiable v. Non-occupiable
  - Identify all facilities that are potentially occupiable

- Screen out all facilities that are not occupiable

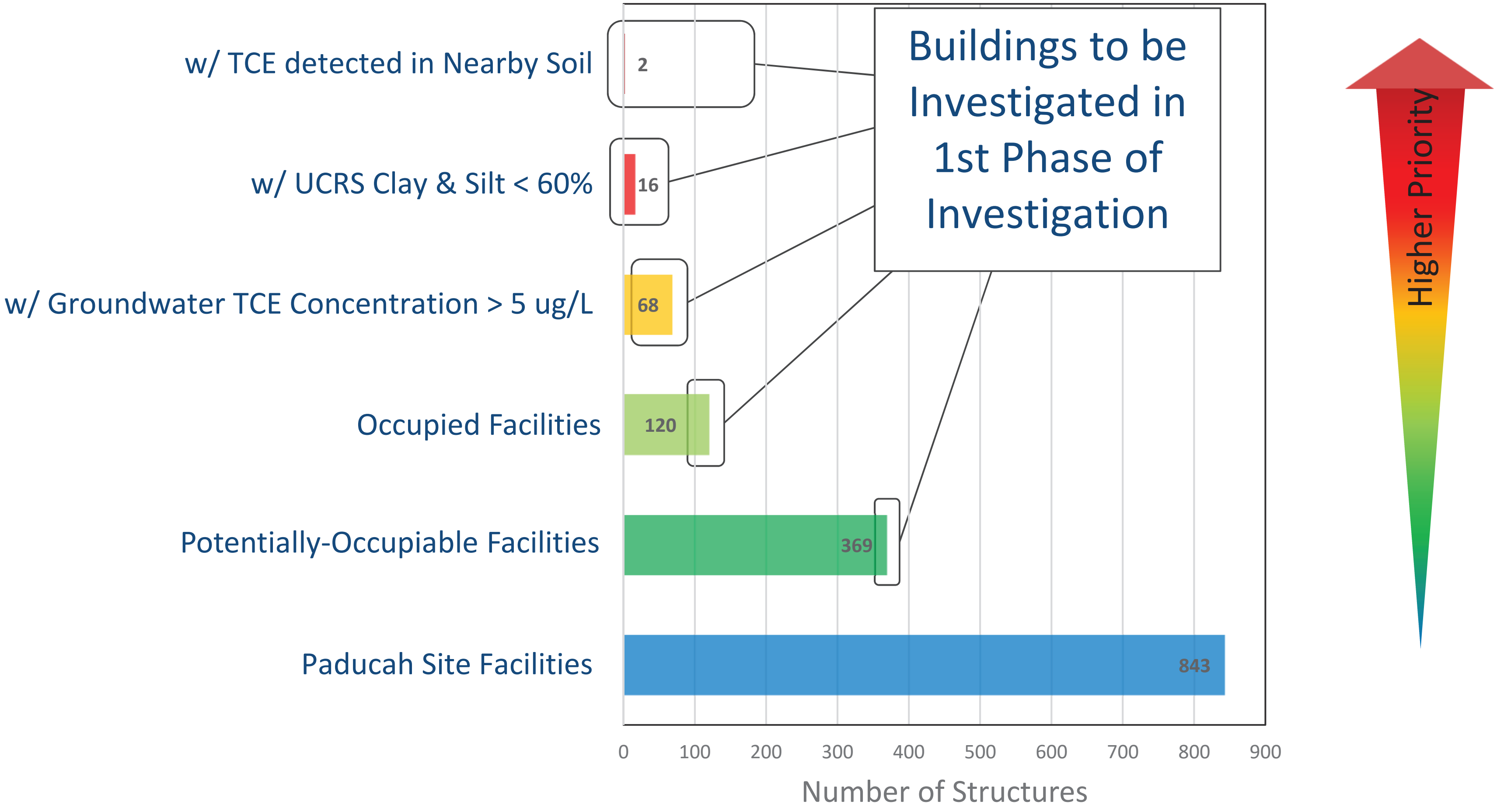
- Retain all potentially-occupiable facilities for ranking
  1. Occupied
  2. Planned for occupation
  3. Not occupied

Ranking Criteria (Summary List)

- Building characteristics
  - Occupancy
  - Building type, size
  - Foundation
  - Historical TCE use
  - Indoor air contamination (IH sampling)
- Subsurface source
  - Groundwater
  - Soil
- Vadose zone characteristics
  - High/low density utility corridors pathways
  - Soil type
  - Depth to groundwater

Example of Building Prioritization

Example: Occupied Buildings, UCRS Clay & Silt, and TCE in Groundwater and Soil



Ranking Criteria

<u>Occupancy</u>

- Method
  - Identify all facilities that are potentially occupiable (primarily buildings), including tunnels and bunkers
- Categorization
  1. Occupied
  2. Planned for occupancy
  3. Not occupied
- Ranking rationale
  - Higher priority to currently occupied buildings

Ranking Criteria, cont’d

Building Type

- Method
  - Categorize buildings based on building type, use, and age
- Categorization (qualitative)
  - Trailer
  - Process building/other
  - Size (large/medium/small)
  - Age
- Ranking rationale
  - Smaller and older buildings will rank higher
  - Note: because some facilities were built in groups of similar style and age, if there are buildings of particular styles and ages that rank high, those styles and ages will be considered for sampling during phase one regardless of an individual building’s rank

Ranking Criteria, cont'd

Building Foundation

- Method
    - Categorize buildings based on type and features of their foundation
- Categorization (qualitative)
    - Raised foundation
    - Slab-on-grade
    - Dirt
    - Basement
    - Presence/absence of pits, tunnels, sumps
- Ranking rationale
    - Higher priority to buildings with subgrade features like tunnels and buildings with basements

Ranking Criteria, cont'd

Historical TCE Use (used only for increase in rank)

- Method
  - Categorize buildings based on documented TCE use or disposal, identified in historical documentation and/or interviews
- Categorization (binary)
  - Documented TCE use
  - No documented TCE use
- Ranking rationale
  - Higher priority to buildings where TCE was used

Ranking Criteria, cont’d

<u>Indoor Air Contamination (used only for increase in ranking)</u>

- Method
  - Categorize buildings based on documented contamination in industrial hygiene (IH) samples
- Categorization (qualitative)
  - COCs detected in IH samples
  - No COCs detected in IH samples
  - Building not sampled
- Ranking rationale
  - Higher priority to buildings where COCs were detected in indoor air

Ranking Criteria, cont'd

RGA Groundwater Contamination

- Method
  - Categorize each facility according to underlying groundwater concentrations in relation to VISLs
  - For TCE (primary COPC): TCE Rank = TCE Concentration / TCE VISL
  - Group other chlorinated volatile organic compounds (CVOCs) : Cumulative Rank = $(COPC_1/VISL_1) + (COPC_2/VISL_2) + (COPC_3/VISL_3)$ + etc…
  - Group remaining (non-CVOC) COPCs: same as above
- Prioritization categorization (quantitative)
  - Higher > 100X VISL(s)
  - Med. = 1-10X VISL(s), 10-100X VISL(s)
  - Lower = <1X VISL(s)
- Ranking rationale
  - Higher priority to buildings overlying groundwater with greater TCE rank and non-TCE cumulative rank

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Ranking Criteria, cont'd

UCRS/Terrace Groundwater Contamination

- Method
  - Categorize each facility according to presence or absence of contamination in sampled underlying UCRS groundwater
- Categorization (qualitative)
  - Higher: UCRS groundwater sampled and contamination present
  - Lower: UCRS groundwater not sampled
  - Lowest: UCRS groundwater sampled and contamination not detected (with low RLs)
- Ranking rationale
  - Higher priority to buildings overlying UCRS groundwater with COC contamination
  - Lower priority to buildings overlying UCRS groundwater with no detected COCs (clean water lens)

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Ranking Criteria, cont'd

Soil Contamination

- Method
  - Categorize each facility according to available soil COPC contamination data
- Categorization (qualitative) (higher to lower)
  - COPC detected above RL
  - COPC ND with elevated RL
  - COPC not sampled/analyzed
  - COPC ND with low RL
- Ranking rationale
  - Higher priority to facilities near soils with detected COCs
  - Lower priority given to facilities without nearby soil sampling or with nearby soil where COCs were ND but had elevated RLs
  - Lowest priority given to facilities with ND soils with low RL

Ranking Criteria, cont'd

Potential Preferential Pathways (subsurface utilities)

- Method
    - Categorize buildings based on density of subsurface utility conduits surrounding the building
- Categorization (binary)
    - High density
    - Low density
- Ranking rationale
    - Higher priority to buildings near high density of subsurface utility conduits

Ranking Criteria, cont'd

Vadose Zone Lithology:
Percent Clay & Silt in UCRS and/or HU3 Clay & Silt Thickness

(applies only to groundwater contamination)

- Method
  - Categorize each facility according to percent clay and silt content of UCRS or clay and silt thickness in HU3, based on contouring of borehole data
- Categorization (semi-quantitative)
  - UCRS clay/silt: Higher to lower: <60%; 60-75%, > 75%
  - HUS clay/silt thickness: Higher to lower < 2ft, 2-10ft, > 10 ft
- Ranking rationale
  - Higher priority to buildings with lower percent or thickness of silt/clay in vadose zone between groundwater contamination and building foundation

Ranking Criteria, cont'd

Depth to Groundwater

- Applies to RGA, UCRS and Terrace (if data are available)
- Method
  - Categorize each facility according to shallowest depth to RGA groundwater documented over the past 5 years, or UCRS groundwater (if data are available)
  - Categorize each facility according to depth to terrace groundwater
- Categorization (quantitative)
  - High rank DTW = 0-10 feet
  - Medium rank DTW = 10-30 feet
  - Low rank DTW = 30-60 feet
- Ranking rationale
  - Higher priority to facilities with shallower DTW

Work Plan Development

- VI Study Work Plan:
  - Identify highest ranked buildings for sampling based on screening criteria
  - Develop a phased investigation plan, starting with the highest ranked buildings (as well as a subset of lower ranked buildings and buildings of each construction category to confirm CSM)
  - Describe data collection approaches and rationale:
    - Co-located indoor air and subslab/crawlspace samples
    - Cross-slab pressure differential data
    - Forensic tools, as needed
  - Describe preliminary risk assessment approach
  - Specify decision rules to determine "whether any additional actions are necessary to satisfy the question of potential threat to human health from vapor intrusion and/or to bring human exposure to vapor intrusion under control? [SMP; April, 2019]

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Paducah Site Industrial Area Vapor Intrusion Study Scoping – Presentation 4

November 22, 2019

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Agenda

- Recap of action items from 10/30 scoping meeting
  - DQO 3: Industrial Hygiene (IH) Data Summary
  - DQO 4: Study Area
  - DQO 5: Screening and Ranking Criteria (revised based on 10/30 meeting) from Revised CSM
- DQO Step 6 Background – Specify Performance or Acceptance Criteria
  - Decision Framework
- DQO Step 7 Background – Develop the Plan for Obtaining Data
  - Proposed Phased Sampling Approach
  - Proposed Field Sampling Methods
- Target schedule
- Next Scoping Meeting

Action Items
IH Data Summary

Table E.10 RMD (DOE 2019)
Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant Paducah, Kentucky Volume 1. Human Health, June 2019 (DOE/LX/07-0107&D2/R10/V1)

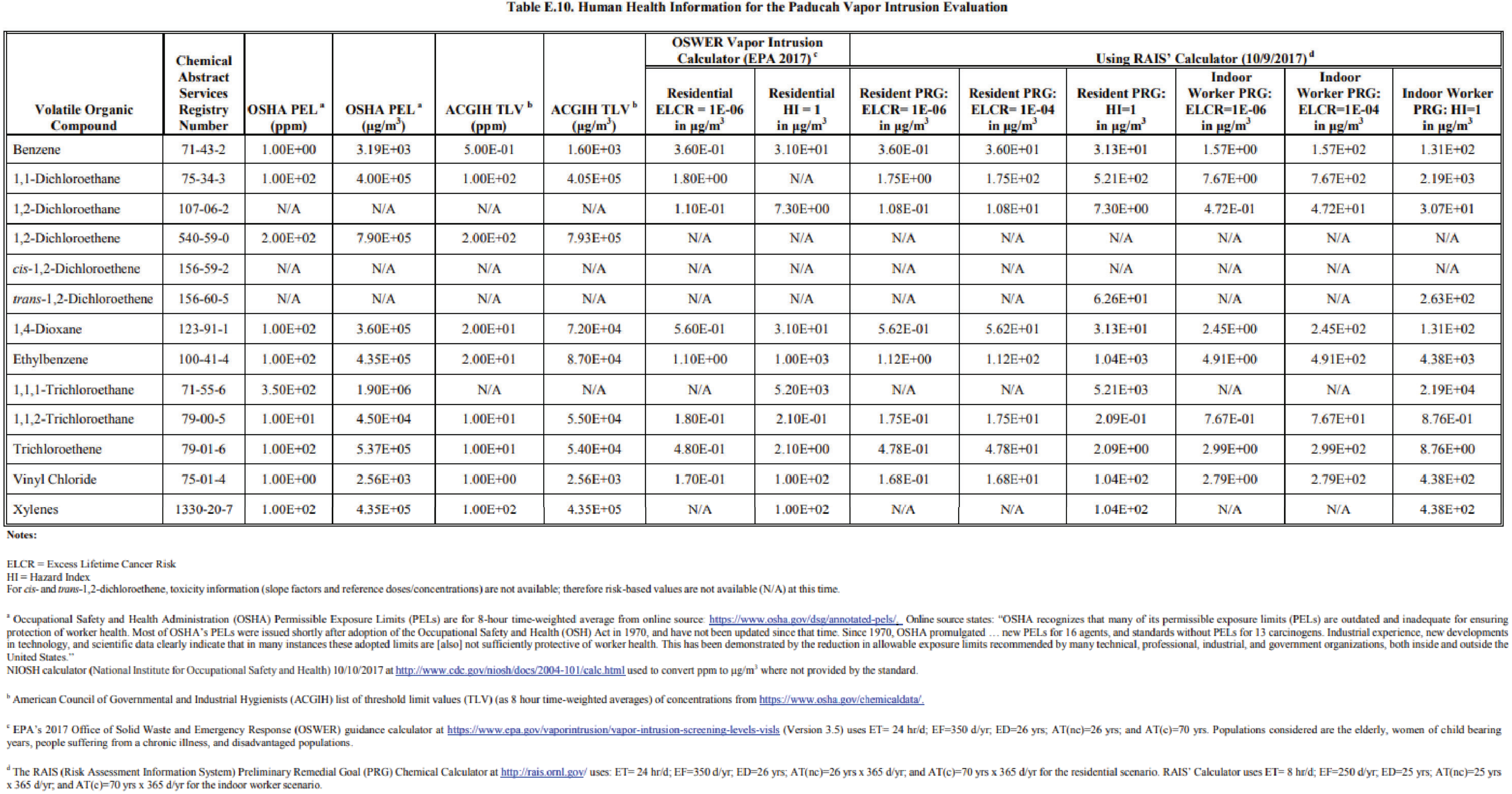

Table E.10. Human Health Information for the Paducah Vapor Intrusion Evaluation

Volatile Organic Compound	Chemical Abstract Services Registry Number	OSHA PEL [a] (ppm)	OSHA PEL [a] (μg/m³)	ACGIH TLV [b] (ppm)	ACGIH TLV [b] (μg/m³)	OSWER Vapor Intrusion Calculator (EPA 2017) [c]		Using RAIS' Calculator (10/9/2017) [d]					
						Residential ELCR = 1E-06 in μg/m³	Residential HI = 1 in μg/m³	Resident PRG: ELCR= 1E-06 in μg/m³	Resident PRG: ELCR= 1E-04 in μg/m³	Resident PRG: HI=1 in μg/m³	Indoor Worker PRG: ELCR=1E-06 in μg/m³	Indoor Worker PRG: ELCR=1E-04 in μg/m³	Indoor Worker PRG: HI=1 in μg/m³
Benzene	71-43-2	1.00E+00	3.19E+03	5.00E-01	1.60E+03	3.60E-01	3.10E+01	3.60E-01	3.60E+01	3.13E+01	1.57E+00	1.57E+02	1.31E+02
1,1-Dichloroethane	75-34-3	1.00E+02	4.00E+05	1.00E+02	4.05E+05	1.80E+00	N/A	1.75E+00	1.75E+02	5.21E+02	7.67E+00	7.67E+02	2.19E+03
1,2-Dichloroethane	107-06-2	N/A	N/A	N/A	N/A	1.10E-01	7.30E+00	1.08E-01	1.08E+01	7.30E+00	4.72E-01	4.72E+01	3.07E+01
1,2-Dichloroethene	540-59-0	2.00E+02	7.90E+05	2.00E+02	7.93E+05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,2-Dichloroethene	156-59-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
trans-1,2-Dichloroethene	156-60-5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.26E+01	N/A	N/A	2.63E+02
1,4-Dioxane	123-91-1	1.00E+02	3.60E+05	2.00E+01	7.20E+04	5.60E-01	3.10E+01	5.62E-01	5.62E+01	3.13E+01	2.45E+00	2.45E+02	1.31E+02
Ethylbenzene	100-41-4	1.00E+02	4.35E+05	2.00E+01	8.70E+04	1.10E+00	1.00E+03	1.12E+00	1.12E+02	1.04E+03	4.91E+00	4.91E+02	4.38E+03
1,1,1-Trichloroethane	71-55-6	3.50E+02	1.90E+06	N/A	N/A	N/A	5.20E+03	N/A	N/A	5.21E+03	N/A	N/A	2.19E+04
1,1,2-Trichloroethane	79-00-5	1.00E+01	4.50E+04	1.00E+01	5.50E+04	1.80E-01	2.10E-01	1.75E-01	1.75E+01	2.09E-01	7.67E-01	7.67E+01	8.76E-01
Trichloroethene	79-01-6	1.00E+02	5.37E+05	1.00E+01	5.40E+04	4.80E-01	2.10E+00	4.78E-01	4.78E+01	2.09E+00	2.99E+00	2.99E+02	8.76E+00
Vinyl Chloride	75-01-4	1.00E+00	2.56E+03	1.00E+00	2.56E+03	1.70E-01	1.00E+02	1.68E-01	1.68E+01	1.04E+02	2.79E+00	2.79E+02	4.38E+02
Xylenes	1330-20-7	1.00E+02	4.35E+05	1.00E+02	4.35E+05	N/A	1.00E+02	N/A	N/A	1.04E+02	N/A	N/A	4.38E+02

Notes:

ELCR = Excess Lifetime Cancer Risk
HI = Hazard Index
For *cis*- and *trans*-1,2-dichloroethene, toxicity information (slope factors and reference doses/concentrations) are not available; therefore risk-based values are not available (N/A) at this time.

[a] Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) are for 8-hour time-weighted average from online source: https://www.osha.gov/dsg/annotated-pels/. Online source states: "OSHA recognizes that many of its permissible exposure limits (PELs) are outdated and inadequate for ensuring protection of worker health. Most of OSHA's PELs were issued shortly after adoption of the Occupational Safety and Health (OSH) Act in 1970, and have not been updated since that time. Since 1970, OSHA promulgated … new PELs for 16 agents, and standards without PELs for 13 carcinogens. Industrial experience, new developments in technology, and scientific data clearly indicate that in many instances these adopted limits are [also] not sufficiently protective of worker health. This has been demonstrated by the reduction in allowable exposure limits recommended by many technical, professional, industrial, and government organizations, both inside and outside the United States."
NIOSH calculator (National Institute for Occupational Safety and Health) 10/10/2017 at http://www.cdc.gov/niosh/docs/2004-101/calc.html used to convert ppm to μg/m³ where not provided by the standard.

[b] American Council of Governmental and Industrial Hygienists (ACGIH) list of threshold limit values (TLV) (as 8 hour time-weighted averages) of concentrations from https://www.osha.gov/chemicaldata/.

[c] EPA's 2017 Office of Solid Waste and Emergency Response (OSWER) guidance calculator at https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-levels-visls (Version 3.5) uses ET= 24 hr/d; EF=350 d/yr; ED=26 yrs; AT(nc)=26 yrs; and AT(c)=70 yrs. Populations considered are the elderly, women of child bearing years, people suffering from a chronic illness, and disadvantaged populations.

[d] The RAIS (Risk Assessment Information System) Preliminary Remedial Goal (PRG) Chemical Calculator at http://rais.ornl.gov/ uses: ET= 24 hr/d; EF=350 d/yr; ED=26 yrs; AT(nc)=26 yrs x 365 d/yr; and AT(c)=70 yrs x 365 d/yr for the residential scenario. RAIS' Calculator uses ET= 8 hr/d; EF=250 d/yr; ED=25 yrs; AT(nc)=25 yrs x 365 d/yr; and AT(c)=70 yrs x 365 d/yr for the indoor worker scenario.

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Action Items
IH Data Summary, cont'd

- 2000: Enclosed Space Monitoring
- 2003: Six-Phase Heating Air Samples at C-400
- 2009-2018: IH Sampling

Action Items
IH Data Summary, cont'd

2000: Enclosed Space Monitoring

- Sampling at four locations
  - C-400 basement
  - Underground cable tunnel from C-337 to C-300
  - Underground cable tunnel from C-331 to C-531
  - Underground tunnel from C-333 to the approximate location of the old millwright shop
- Sampling at EW230 also performed
- VC not detected at any location (0.85 ppm or 2,172 µg/m^3)
- Detected compounds: 1,1,2-trichloro-1,2,2-trifluoroethane; TCE; acetone; m,p-xylene; 1,4-dichlorobenzene; dichlorodifluoromethane; 1,2-dichloro-1,1,2,2-tetrafluoroethane; 1,1,1-trichloroethane; toluene

Feasibility Study for the Groundwater Operable Unit at Paducah
Gaseous Diffusion Plant Paducah, Kentucky Volume 3. Appendix B
Baseline Human Health Risk Assessment, August 2001
(DOE/OR/07-1857&D2)

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Action Items
IH Data Summary, cont'd

2003: Six-Phase Heating Air Samples at C-400

Final Report Six-Phase Heating Treatability Study at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, March 2004 (DOE/OR/07-2113&D2)

- Sampling at four locations
  - C-400 basement (1)
  - Tunnel adjacent to Six-Phase Site (3)
  - TCE and vinyl chloride (VC)
- Gas indicator tube sampling
  - Daily during first 30 days and weekly after first 30 days
  - Detection limits of 2 ppm (10,748 µg/m^3) for TCE and 0.5 ppm (1,278 µg/m^3) VC
  - 227 samples - no detections for TCE or VC
- SUMMA canister samples
  - 24-hour Integrated samples
  - Weekly for 10 weeks then bi-weekly
  - Detection limit of 0.5 ppm (2,687 µg/m^3 for TCE and 1,278 µg/m^3 VC)
  - Two detections (2.8 ppm or 15,048 µg/m^3 TCE from C-400 basement and 0.5 ppm or 2,687 µg/m^3 TCE from the C-400 basement)
  - As a precaution, one summa tunnel location moved to the C-400 office area
  - A second detection (0.5 ppm or 2,687 µg/m^3 TCE from the C-400 basement)
  - No other detections during Six-Phase Heating

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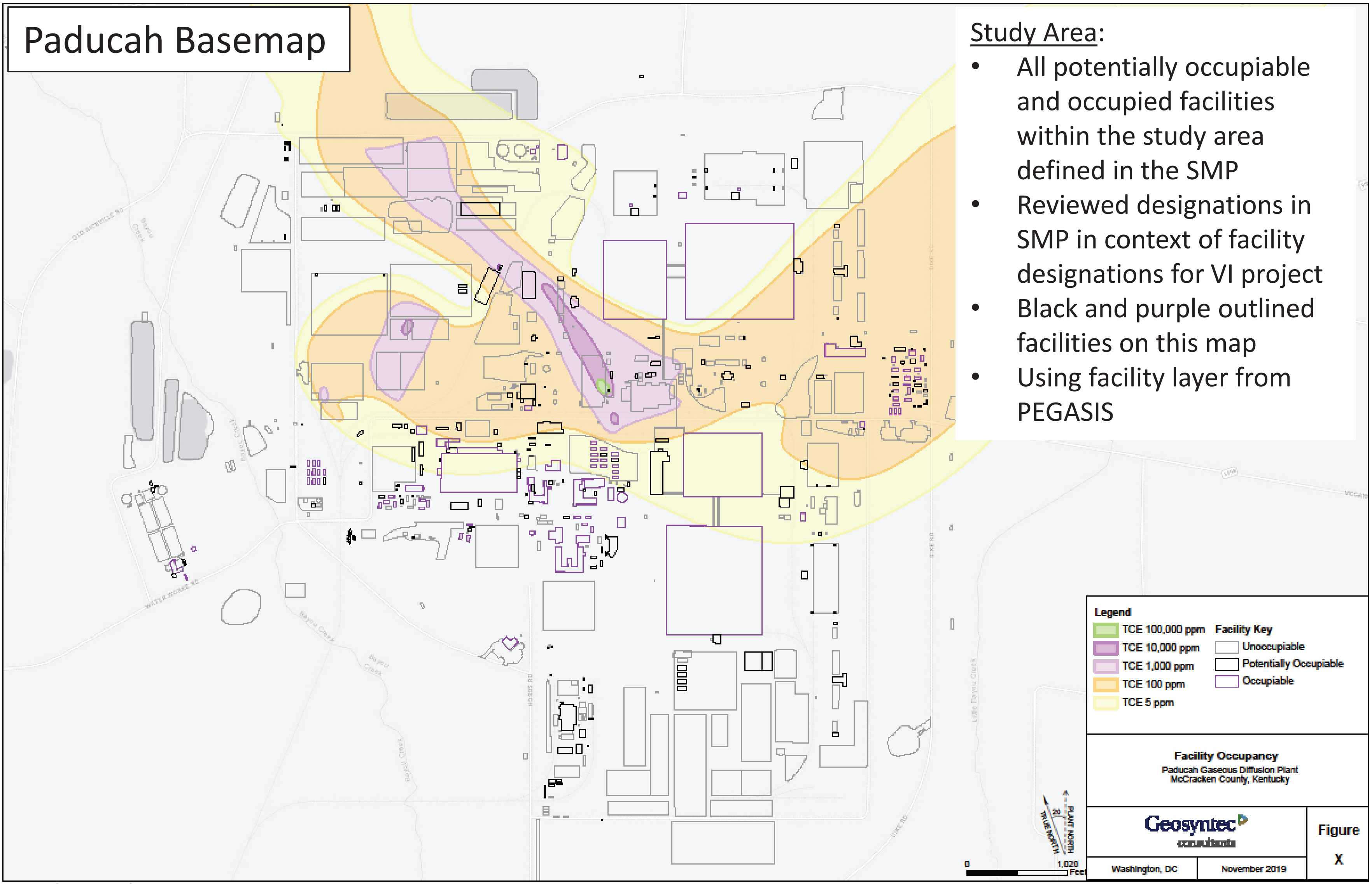
Action Items
IH Data Summary, cont'd

<u>2009-2018: IH Sampling</u>

- Mobile Office IH Samples (2018)
    - Eight TCE integrated area air samples at trailers in the C-412 Trailer Complex, C-755 Trailer Complex, and C-400 BCS Trailer with one detection of 0.09 ppm (484 µg/m^3)
        - TCE pipe cutting and removal activities were taking place on the detected sample day
- C-400 IH integrated and area samples
    - 2018: 3 VC samples; 2017: 6 1,2-DCE samples; 2015-2018: 29 TCE samples – all ND
- C-400 and C-720 SUMMA canister samples (Dec 2017 – Feb 2018)
    - 26 samples collected from C-400 Building with maximum of 0.003 ppm (16 µg/m^3) for TCE and no detections at 0.0002 ppm of VC (0.5 µg/m^3); 1,1-DCE (0.8 µg/m^3); or 1,2-DCE (0.8 µg/m^3)
    - 10 samples collected from C-720 Building with no detections (detection limit of 0.00015 ppm) of TCE (0.8 µg/m^3); VC (0.4 µg/m^3); 1,1-DCE (0.6 µg/m^3); or 1,2-DCE (0.6 µg/m^3)
- C-400 Groundwater Treatment System project (2009-2015)
    - 160 TCE samples with highest value of 1.3 ppm (6,987 µg/m^3) over workday
    - 213 VC samples with highest value of 0.015 ppm (38 µg/m^3) over workday
    - 188 1,2-DCE samples with no detections (detection limit of 0.01 ppm or 40 µg/m^3)

Action Items
Study Area

Paducah Basemap



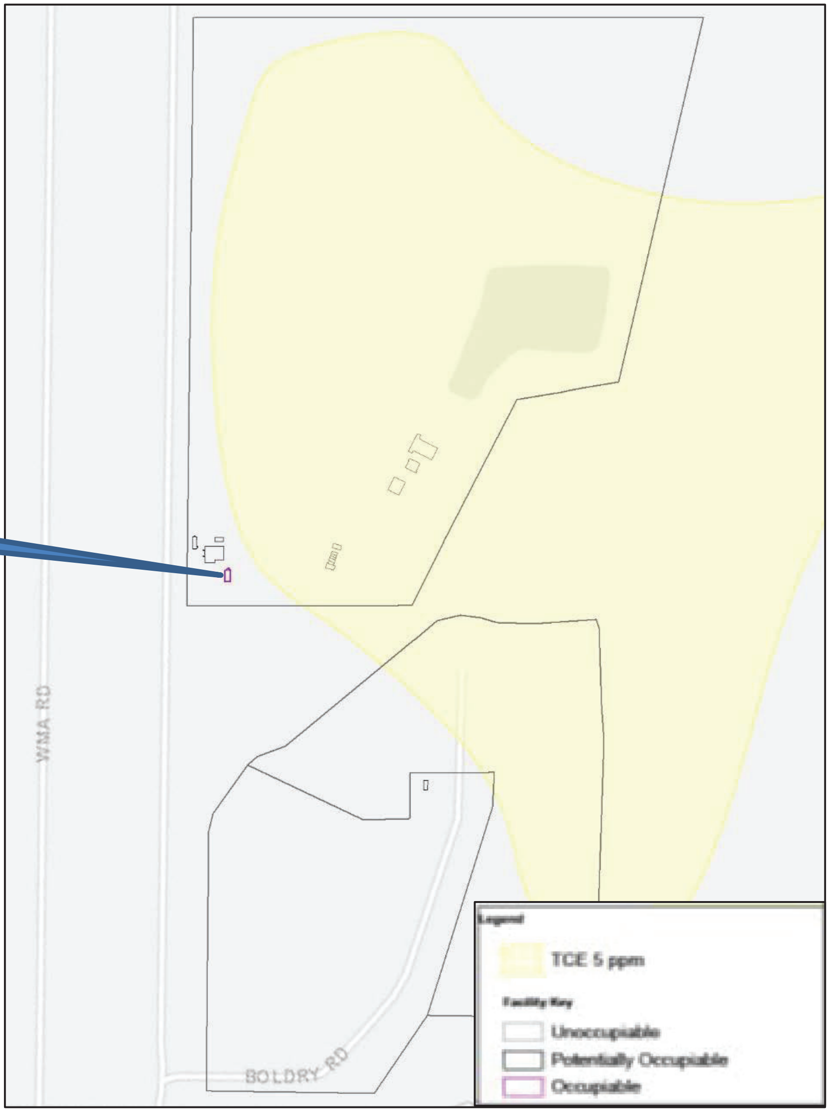
Lithology Data Source: Hydro-Litho-Stratigraphy Database, Revision 8, CAER KCREE 2016

Study Area:

- All potentially occupiable and occupied facilities within the study area defined in the SMP
- Reviewed designations in SMP in context of facility designations for VI project
- Black and purple outlined facilities on this map
- Using facility layer from PEGASIS

Action Items
Study Area, cont'd

- S/T/U landfill area
  - Plume boundary confirmed
  - Facilities confirmed based on current basemap
  - Will sample highlighted office building at landfill



Office Building

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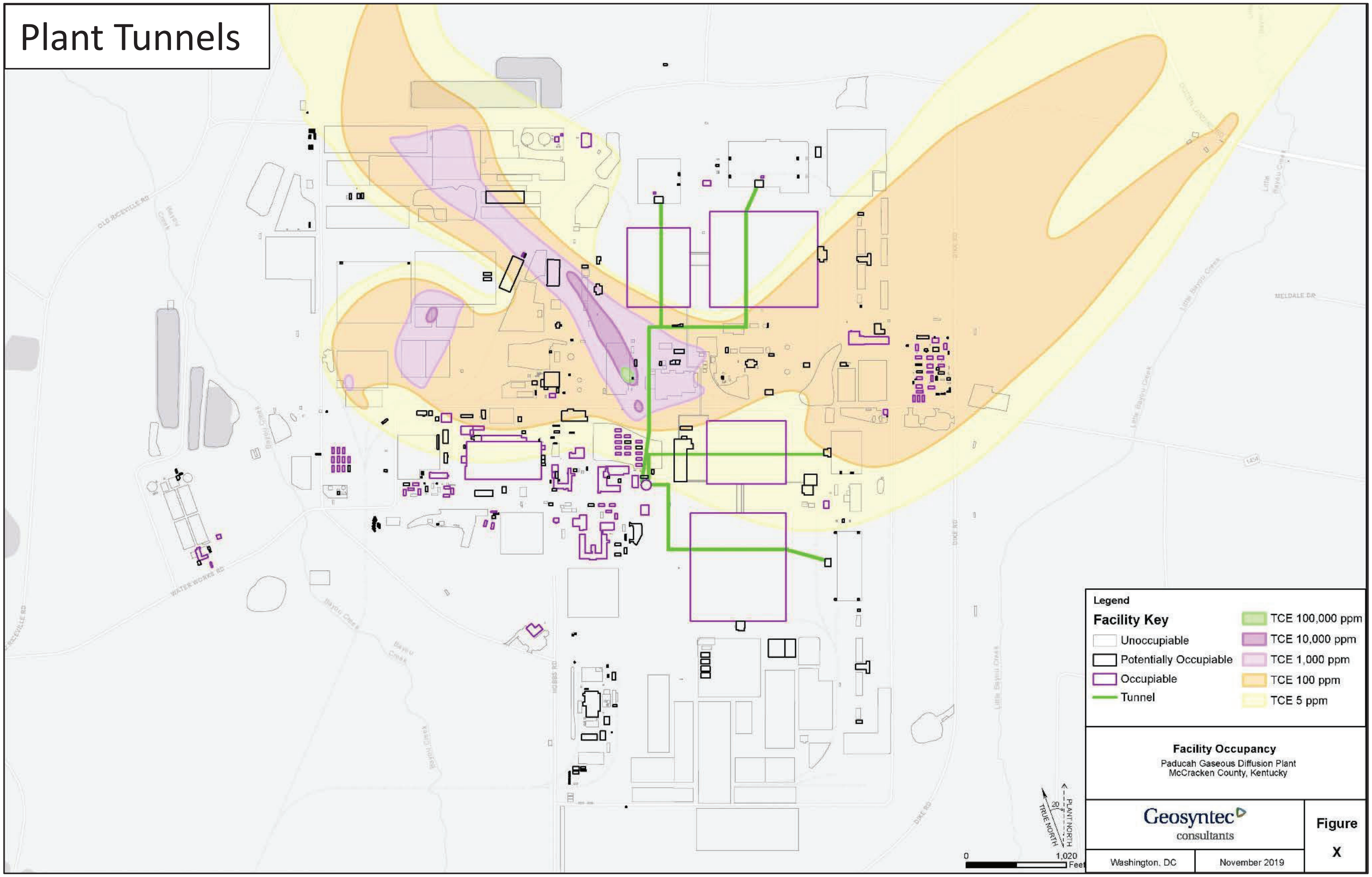
Action Items
Study Area, cont'd



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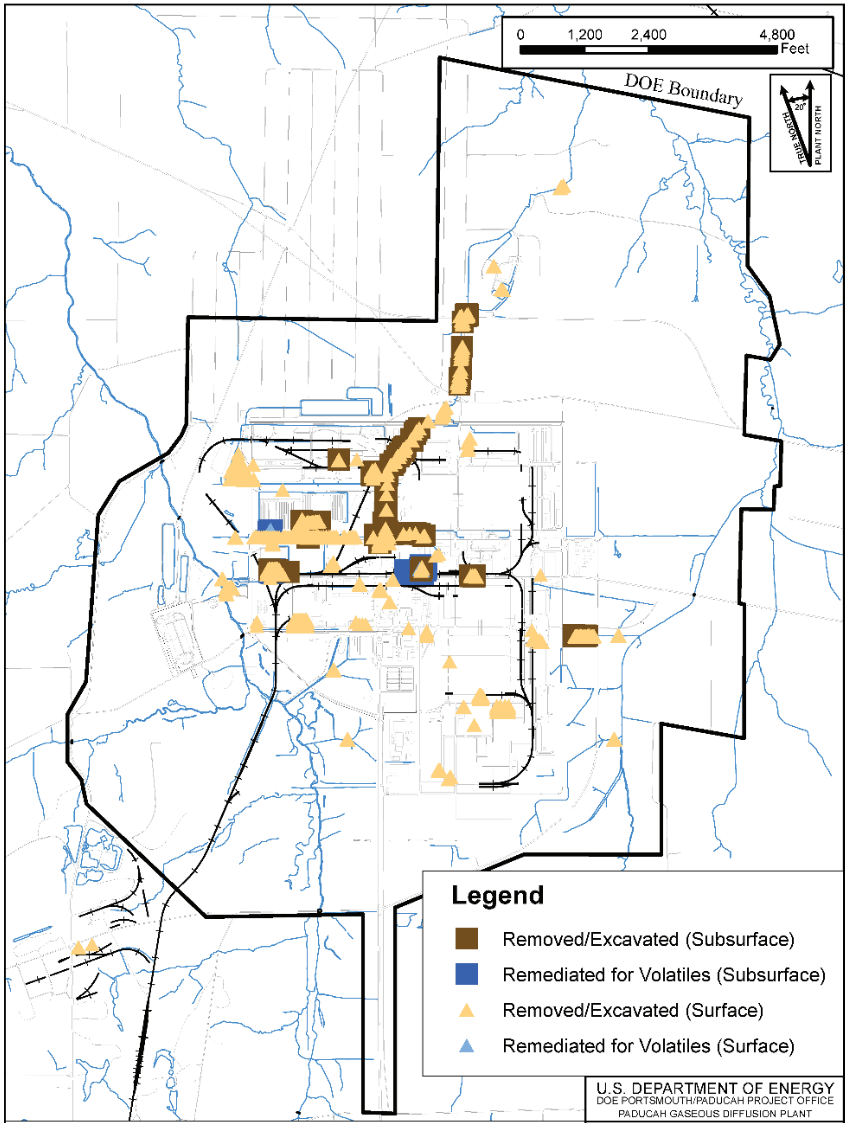
Action Items
Study Area, cont'd



- Discussion of remediation flags

Action Items
Screening and Ranking Criteria

Screening

- Definition of “occupiable”
  - For purposes of this Technical Guide and its recommendations for evaluating human health risk posed by vapor forming chemicals, **“building” refers to a structure that is intended for occupancy and use by humans**. This would include, for instance, homes, offices, stores, commercial and industrial buildings, etc., but would not normally include sheds, carports, pump houses, or other structures that are not intended for human occupancy. (OSWER Publication 9200.2-154 – Vapor Intrusion Technical Guide)

Ranking

- Normalized concentration values (concentration/VISL)
  - Will group all chemicals together for ranking (incl. TCE)
  - TCE will be available for ranking separately
- Clean water lens
  - If the CSM clearly shows clean UCRS groundwater above the RGA plume, it will be considered in ranking, as will contaminated UCRS groundwater

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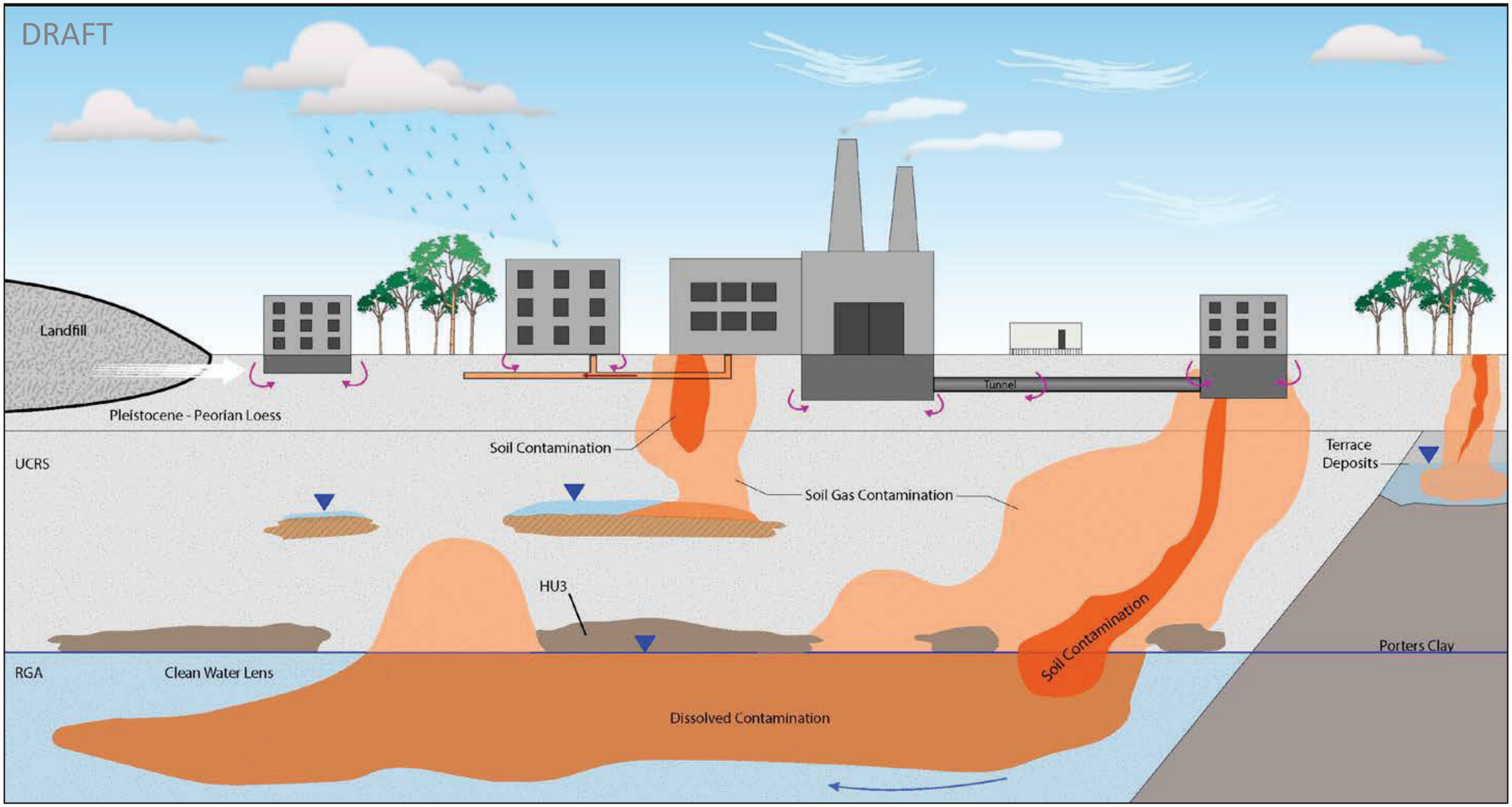
Action Items
Screening and Ranking Criteria

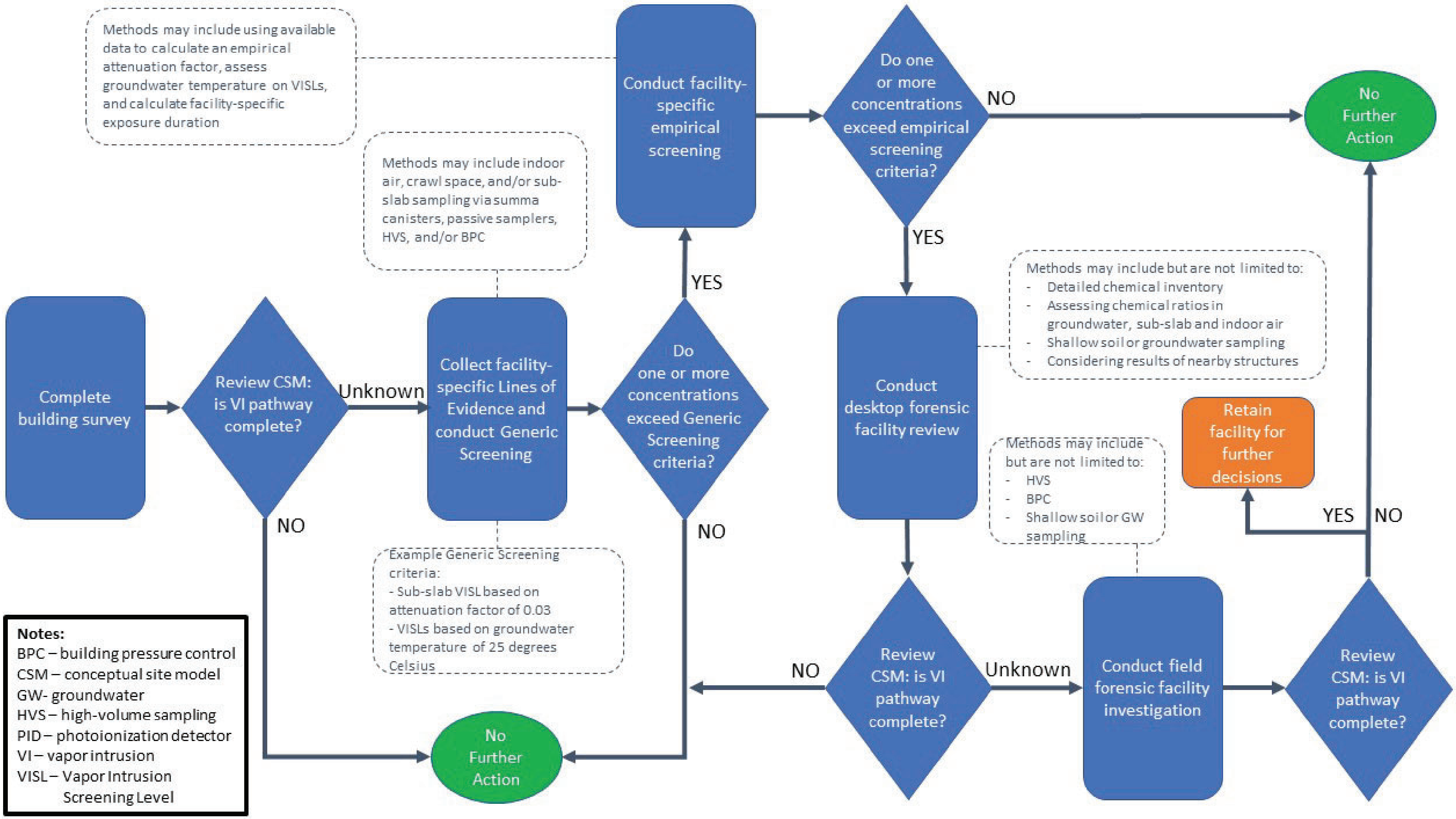
Ranking

- Utilities
  - Facilities connected to utility lines, including sewers, that cross through a soil source will be assigned a higher ranking
- TCE use in facilities
  - Process use of TCE will be used qualitatively to help identify potential source areas
  - During the field investigation, samples will be collected from areas suspected of having a complete VI pathway from subsurface sources
- Gravel thickness beneath facilities
  - Facilities overlying thick gravel fill, such as large process buildings, will be assigned a higher rank
- Analytical suite for prioritization and investigation
  - Analytes detected in groundwater with concentrations exceeding the VISL
  - Analytes detected in soil that have VISLs for soil gas and groundwater
  - Will also include cis-1,2-DCE and trans-1,2-DCE

Action Items
Revised CSM



DQO Step 6 Background Decision Rules Framework



Methods may include using available data to calculate an empirical attenuation factor, assess groundwater temperature on VISLs, and calculate facility-specific exposure duration

Methods may include indoor air, crawl space, and/or sub-slab sampling via summa canisters, passive samplers, HVS, and/or BPC

Example Generic Screening criteria:
- Sub-slab VISL based on attenuation factor of 0.03
- VISLs based on groundwater temperature of 25 degrees Celsius

Methods may include but are not limited to:
- Detailed chemical inventory
- Assessing chemical ratios in groundwater, sub-slab and indoor air
- Shallow soil or groundwater sampling
- Considering results of nearby structures

Methods may include but are not limited to:
- HVS
- BPC
- Shallow soil or GW sampling

Notes:
BPC – building pressure control
CSM – conceptual site model
GW- groundwater
HVS – high-volume sampling
PID – photoionization detector
VI – vapor intrusion
VISL – Vapor Intrusion Screening Level

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DQO Step 7 Background
Field Sampling Design

- Field Phase I Facility Set - Facilities will be selected for VI sampling based on the CSM via the ranking spreadsheet tool. Phase I will include:
  - Facilities with highest ranking
  - Some facilities with medium and low rankings to help validate/refine CSM and prioritization tool
  - Facilities with unique construction features/preliminary CSMs (the highest-ranked facility will be selected from each unique CSM group)
- Field Phase II Facility Set (if necessary) - Phase I results will be used to revise the CSM and re-rank the remaining facilities. Phase II will include:
  - Top ranked facilities from the remaining pool
  - A subset of facilities not yet sampled that abut facilities where Phase I data point to a complete VI pathway

DQO Step 7 Background
VI Pre-Sampling Procedure

Building Survey and Pre-Sampling Evaluation: Prior to sampling, the structures will undergo inspections which will include

- Identifying potential background sources
    - External Sources: tanks, emissions stacks, heavy vehicle traffic
    - Internal Sources: waste/fuel storage cans, paints, solvents, smoking etc.
    - Handheld field screening device (PID) may be used to aid in identifying sources
- Performing a visual assessment: examine facilities for condition and construction characteristics relevant to VI such as
    - Construction style (e.g., poured concrete, stone, etc.)
    - Leakiness (e.g., cracks or openings in the slab/walls)
    - HVAC systems, fume hoods etc.
- Locating potential sample locations

DQO Step 7 Background Sampling Methods

Conventional Vapor Intrusion Sampling Methods

- Crawl Space and Indoor Air
    - Sampling typically conducted with 6L SUMMA® canisters under timed exposures (8 hour+) for analysis by EPA Method TO-15
    - May use quantitative passive samplers such as Waterloo Membrane Samplers® or Radiello® samplers
- Sub-slab and Soil Gas
    - Discrete sampling (small volume) typically conducted with SUMMA® canisters or passive quantitative soil gas samplers for analysis by EPA Method TO-15 or TO-17
    - Large slabs may be tested by high volume sampling (HVS) (McAlary et al., GWMR 2010)

DQO Step 7 Background Desktop VI Forensic Methods

Forensic tools: Desktop and field forensic analyses may be performed to assess the relative contributions of subsurface and background sources if impacts from VI are indicated

- Detailed chemical inventory
  - Review product labels and safety data sheets for products used in the facility to determine potential background sources
- Chemical ratio analysis
  - Compare ratios of analytes in groundwater and soil gas to those in indoor air to determine whether analyte detections in indoor air are from a subsurface or indoor (background) source
  - Consistent with EPA Vapor Intrusion Guidance (EPA, 2015)
- Consider results from nearby structures
  - Results from similar, nearby structures may be used to validate initial facility field sampling results or to show inconsistencies or data gaps

DQO Step 7 Background Field VI Forensic Methods

- Building Pressure Control (BPC)
    - Manipulate indoor air pressure differentials using a blower or HVAC
    - Sustained pressure measurements using manometers and timed (30 minutes+) 6L SUMMA® canisters
    - Induce depressurized building conditions and sample to characterize VI impacts
    - Induce positive pressure building conditions and sample to characterize background source emissions
- High Volume Sampling (HVS)
    - Extract and screen 10,000 to 100,000 L of soil gas from subslab using shopvac
    - Grab samples collected in SUMMA® canisters
    - Field data give better understand source geometry
- Shallow Soil or Groundwater Sampling (future consideration only)
    - Additional subsurface sampling may be recommended in the report to constrain source geometry around certain facilities

Target Schedule

- Previous Scoping Meetings: 9/26/2019; 10/17/2019; 10/30/2019
  - Per MOA, work plan development will begin in FY2019
- Scoping Meeting: 10/17/2019 (Complete)
- Scoping Meeting: 10/30/2019 (Complete)
- Scoping Meeting: 11/22/2019 (Scheduled)
- Scoping Meeting: Week of 12/16/19 (Proposed)
- Scoping Meeting: Set up in January for DQO 7
- D1 Work Plan to EPA/KY: 6/2/2020
  - Per MOA, work plan development will be completed in FY2020
- Approval of Work Plan by EPA/KY: 10/15/20
- Procurement/Mobilization/Field Sampling/Data Review/Data Validation: October 2020 – April 2021
- D1 Report to EPA/KY: 9/30/2021
  - Per MOA, report will be issued by DOE in FY2021 (Scheduled)
- Approval of Report by EPA/KY: 1/28/2022

Next Scoping Meeting

Discuss decision rules (DQO Step 6) to answer the project study questions (DQO Step 2 – presented in October 17, 2019 Scoping Meeting):

- Does vapor intrusion from VOCs in soils and groundwater pose a potential threat to human health in buildings located over these areas at the Paducah Site?
- What are the appropriate criteria for identifying and prioritizing buildings needing investigation of the VI pathway?
- What data are needed to determine if the VI pathway is complete and poses a threat to human health in buildings?

U.S. DEPARTMENT OF
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OFFICE OF
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Paducah Site Industrial Area Vapor Intrusion Study Scoping – Presentation 5

December 18, 2019

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Agenda

- Discussion of Project Scope
- Vapor Intrusion Analyte List
    - Full Investigation Analyte List
    - Analyte detections
    - VISL Exceedances
    - Preliminary Investigation Analytes
- Decision Rules
- Preliminary Investigation Methods
- Revised Schedule
- Proposed Agenda for Final Scoping Meeting

Project Scope

- From MOA: "*DOE will develop a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Work Plan and Report to focus on PGDP buildings located over the groundwater plumes, consistent with EPA vapor intrusion guidance… Upon completion of the assessment, a Plant Industrial Area Vapor Intrusion Preliminary Risk Assessment Report will be issued by DOE (scheduled in FY 2021).”*

- *From OSWER VI Guidance: “To verify that the generic vapor intrusion model applies, there is a need for basic knowledge of the subsurface source of vapors (e.g., location, form, and extent of site-specific vapor-forming chemicals) and subsurface conditions (e.g., soil type in the vadose zone, depth to groundwater for groundwater sources), which are important elements of the CSM (see Section 5.4). When these subsurface data are not available, EPA recommends they be collected (i.e., initiate a vapor intrusion investigation; see Section 6.3.2, for example) before relying upon risk-based screening using pre-existing sampling data.”*

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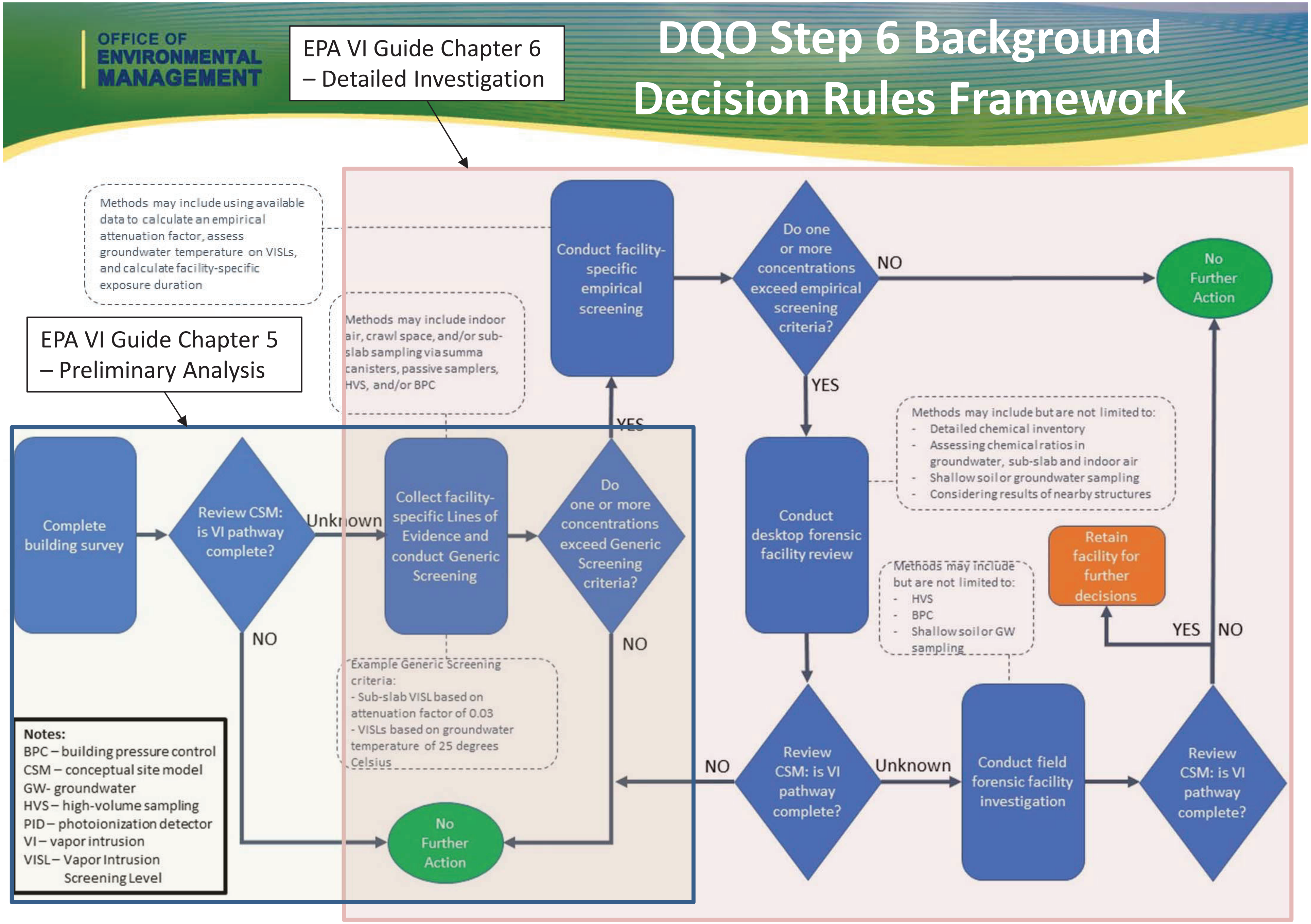
DQO Step 6 Background Decision Rules Framework



EPA VI Guide Chapter 6 – Detailed Investigation

EPA VI Guide Chapter 5 – Preliminary Analysis

Complete building survey

Review CSM: is VI pathway complete?

Unknown

NO

Collect facility-specific Lines of Evidence and conduct Generic Screening

Methods may include indoor air, crawl space, and/or sub-slab sampling via summa canisters, passive samplers, HVS, and/or BPC

Example Generic Screening criteria:
- Sub-slab VISL based on attenuation factor of 0.03
- VISLs based on groundwater temperature of 25 degrees Celsius

Do one or more concentrations exceed Generic Screening criteria?

YES

NO

No Further Action

Conduct facility-specific empirical screening

Methods may include using available data to calculate an empirical attenuation factor, assess groundwater temperature on VISLs, and calculate facility-specific exposure duration

Do one or more concentrations exceed empirical screening criteria?

NO

No Further Action

YES

Conduct desktop forensic facility review

Methods may include but are not limited to:
- Detailed chemical inventory
- Assessing chemical ratios in groundwater, sub-slab and indoor air
- Shallow soil or groundwater sampling
- Considering results of nearby structures

Review CSM: is VI pathway complete?

NO

Unknown

Conduct field forensic facility investigation

Methods may include but are not limited to:
- HVS
- BPC
- Shallow soil or GW sampling

Review CSM: is VI pathway complete?

YES

NO

Retain facility for further decisions

Notes:
BPC – building pressure control
CSM – conceptual site model
GW- groundwater
HVS – high-volume sampling
PID – photoionization detector
VI – vapor intrusion
VISL – Vapor Intrusion Screening Level

VI Investigation Analyte List – Full List Considered in Ranking

Table 1	Investigation Analyte List - Full List						
	Analyte	**Sample method**	**Analysis method**		**Analyte**	**Sample method**	**Analysis method**
Chlorinated Volatile Organic Compounds	1,1-Dichloroethylene (1,1-DCE)	Summa cannister	EPA Method TO15	Other	Acrylonitrile	PUF Cartridge	EPA Method TO15A
	1,1,1-Trichloroethane (TCA)	Summa cannister	EPA Method TO15	Aroclors	Aroclor 1016	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	1,1,2-Trichloroethane	Summa cannister	EPA Method TO15		Aroclor 1221	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	1,12-Trichloro-1,2,2-Trifluoroethane (Freon 113)	Summa cannister	EPA Method TO15		Aroclor 1232	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	1,2-Dichloro-1,1,2,2-Tetrafluoroethane (Freon 114)	Summa cannister	EPA Method TO15		Aroclor 1242	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	1,2-Dichloroethane (DCA)	Summa cannister	EPA Method TO15		Aroclor 1248	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	1,2-Dichloroethene (mixed)	Summa cannister	EPA Method TO15		Aroclor 1254	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	Acetone	Summa cannister	EPA Method TO15		Aroclor 1260	PUF Cartridge	EPA Method TO-4 8082 Aroclor
	Bromodichloromethane	Summa cannister	EPA Method TO15	Polychlorinated Biphenyls	PCB 81	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	cis-1,2-Dichloroethylene	Summa cannister	EPA Method TO15		PCB 105	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Carbon Tetrachloride	Summa cannister	EPA Method TO15		PCB 114	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Chloroform	Summa cannister	EPA Method TO15		PCB 118	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Dichlorodifluoromethane (Freon 12)	Summa cannister	EPA Method TO15		PCB 123	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Hexachlorobenzene	Summa cannister	EPA Method TO15		PCB 126	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Tetrachloroethylene (PCE)	Summa cannister	EPA Method TO15		PCB 156	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	trans-1,2-Dichloroethylene	Summa cannister	EPA Method TO15		PCB 157	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Trichloroethylene (TCE)	Summa cannister	EPA Method TO15		PCB 167	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Vinyl Chloride	Summa cannister	EPA Method TO15		PCB 169	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
Petroleum Hydrocarbons	Benzene	Summa cannister	EPA Method TO15		PCB 189	PUF Cartridge	EPA Method TO-4 1668A PCB Congener
	Ethylbenzene	Summa cannister	EPA Method TO15	SVOCs	1,4-Dichlorobenzene	PUF Cartridge	EPA Method TO-15
	Napthalene	Summa cannister	EPA Method TO15/13A		Acenaphthene	PUF Cartridge	EPA Method TO-13A
	Toluene	Summa cannister	EPA Method TO15		Acenaphthylene	PUF Cartridge	EPA Method TO-13A
	Xylenes	Summa cannister	EPA Method TO15		Anthracene	PUF Cartridge	EPA Method TO-13A
Dioxins	2,3,7,8-Tetrachlorodibenzo-P-dioxin	PUF Cartridge	EPA Method TO-9		Benz[a]anthracene	PUF Cartridge	EPA Method TO-13A
	1,2,3,4,6,7,8-Heptaclorodibenzofuran	PUF Cartridge	EPA Method TO-9		Fluorene	PUF Cartridge	EPA Method TO-13A
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	PUF Cartridge	EPA Method TO-9		Phenanthrene	PUF Cartridge	EPA Method TO-13A
	2,3,7,8-Tetrachlorodibenzofuran	PUF Cartridge	EPA Method TO-9		Pyrene	PUF Cartridge	EPA Method TO-13A
Metals	Mercury (metal)	PUF Cartridge	NIOSH Method 6009				

VI Investigation Analyte List
Approach to Atypical VI Compounds

Analytes requiring PUF Cartridge samples – dioxins, metals, aroclors, PCBs, PAHs

- Conduct field studies where highest concentrations measured in soil or groundwater to estimate maximum soil gas concentration of analyte on PGDP
- Evaluate results against VISLs where applicable
- Compounds without VISLs will require separate consideration

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VI Investigation Analyte List – Analyte Detections

Table 2	Analyte Detections in Soil and Groundwater						
	Analyte	Soil Detection	Groundwater Detection (1)		Analyte	Soil Detection	Groundwater Detection (1)
Chlorinated Volatile Organic Compounds	1,1-Dichloroethylene (1,1-DCE)	✓	✓	Other	Acrylonitrile		
	1,1,1-Trichloroethane (TCA)	✓	✓	Aroclors	Aroclor 1016	✓	
	1,1,2-Trichloroethane	✓	✓		Aroclor 1221		
	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	✓	✓		Aroclor 1232	✓	
	1,2-Dichloro-1,1,2,2-Tetrafluoroethane (Freon 114)				Aroclor 1242	✓	✓
	1,2-Dichloroethane (DCA)	✓	✓		Aroclor 1248	✓	✓
	1,2-Dichloroethene (mixed)	✓	✓		Aroclor 1254	✓	✓
	Acetone	✓	✓		Aroclor 1260	✓	✓
	Bromodichloromethane	✓		Polychlorinated Biphenyls (2)	PCB 81	Not Analyzed	Not Analyzed
	cis-1,2-Dichloroethylene	✓	✓		PCB 105	Not Analyzed	Not Analyzed
	Carbon Tetrachloride	✓	✓		PCB 114	Not Analyzed	Not Analyzed
	Chloroform	✓	✓		PCB 118	Not Analyzed	Not Analyzed
	Dichlorodifluoromethane (Freon 12)	✓			PCB 123	Not Analyzed	Not Analyzed
	Hexachlorobenzene				PCB 126	Not Analyzed	Not Analyzed
	Tetrachloroethylene (PCE)	✓	✓		PCB 156	Not Analyzed	Not Analyzed
	trans-1,2-Dichloroethylene	✓	✓		PCB 157	Not Analyzed	Not Analyzed
	Trichloroethylene (TCE)	✓	✓		PCB 167	Not Analyzed	Not Analyzed
	Vinyl Chloride	✓	✓		PCB 169	Not Analyzed	Not Analyzed
Petroleum Hydrocarbons	Benzene	✓	✓		PCB 189	Not Analyzed	Not Analyzed
	Ethylbenzene	✓	✓	SVOCs	1,4-Dichlorobenzene	✓	
	Napthalene	✓	✓		Acenaphthene	✓	
	Toluene	✓	✓		Acenaphthylene	✓	
	Xylenes	✓	✓		Anthracene	✓	
Dioxins	2,3,7,8-Tetrachlorodibenzo-P-dioxin	✓	Not Analyzed		Benz[a]anthracene	✓	✓
	1,2,3,4,6,7,8-Heptachlorodibenzofuran	✓	Not Analyzed		Fluorene	✓	
	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	✓	Not Analyzed		Phenanthrene	✓	✓
	2,3,7,8-Tetrachlorodibenzofuran	✓	Not Analyzed		Pyrene	✓	✓
Metals	Mercury (metal)	✓	✓				

1- Groundwater results from 2014-2019 at UCRS wells and sample depths

2- Total PCBs are reported in groundwater

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VI Investigation Analyte List – VISL Exceedances

Table 3	Number of Locations of Groundwater VISL Exceedances				
	Analyte	**Number of Locations of Exceedance** [1,2]		**Analyte**	**Number of Locations of Exceedance** [1,2]
Chlorinated Volatile Organic Compounds	1,1-Dichloroethylene (1,1-DCE)		Other	Acrylonitrile	
	1,1,1-Trichloroethane (TCA)		Aroclors	Aroclor 1016	
	1,1,2-Trichloroethane			Aroclor 1221	
	1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)			Aroclor 1232	
	1,2-Dichloro-1,1,2,2-Tetrafluoroethane (Freon 114)			Aroclor 1242	1
	1,2-Dichloroethane (DCA)			Aroclor 1248	3
	1,2-Dichloroethene (mixed)			Aroclor 1254	1
	Acetone			Aroclor 1260	1
	Bromodichloromethane		Polychlorinated Biphenyls	PCB 81	
	cis-1,2-Dichloroethylene	No VISL		PCB 105	
	Carbon Tetrachloride			PCB 114	
	Chloroform	2		PCB 118	
	Dichlorodifluoromethane (Freon 12)			PCB 123	
	Hexachlorobenzene			PCB 126	
	Tetrachloroethylene (PCE)			PCB 156	
	trans-1,2-Dichloroethylene	No VISL		PCB 157	
	Trichloroethylene (TCE)	50		PCB 167	
	Vinyl Chloride	15		PCB 169	
Petroleum Hydrocarbons	Benzene			PCB 189	
	Ethylbenzene		SVOCs	1,4-Dichlorobenzene	
	Napthalene			Acenaphthene	
	Toluene			Acenaphthylene	
	Xylenes			Anthracene	
Dioxins	2,3,7,8-TCDD			Benz[a]anthracene	
	2,3,7,8-HpCDD			Fluorene	
	2,3,7,8-HpCDF			Phenanthrene	
	2,3,7,8-TCDF			Pyrene	
Metals	Mercury (metal)	3			

1- EPA VISLs adjusted to Commercial setting with a target cancer risk level of one per million and a target hazard quotient of 0.1 for potential non-cancer effects.

2- Groundwater results from 2014-2019 at UCRS wells and sample depths.

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Preliminary VI Investigation Analyte List

Proposed Preliminary Investigation Analyte List		
Analyte	**Sample method**	**Analysis method**
Trichloroethylene (TCE)	Summa cannister	EPA Method TO-15
cis-1,2-Dichloroethylene	Summa cannister	EPA Method TO-15
trans-1,2-Dichloroethylene	Summa cannister	EPA Method TO-15
Vinyl Chloride	Summa cannister	EPA Method TO-15
Chloroform	Summa cannister	EPA Method TO-15

- **Analytes for preliminary Investigation are VOCs that had VISL exceedances, plus cis-DCE & trans-DCE (no VISLs)**

Preliminary Investigation Decision Rules Ranking & Walkdown

Preliminary Vapor Intrusion (VI) Investigation Decision Rules

- **IF** the building ranking process (based on conceptual site model) indicates a facility does not have a potentially complete VI pathway (no source, pathway, and/or potential receptors), **THEN** that facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Vapor Intrusion Investigation Report.
- **IF** the facility walkdown indicates a facility does not have a potentially complete VI pathway (no source, pathway, and/or potential receptors), **THEN** that facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Vapor Intrusion Investigation Report.

Preliminary Investigation Decision Rules
Subslab & Indoor Air

- **IF** subslab vapor concentrations for selected analytes in a facility are less than their respective VISL values, **THEN** the VI pathway is considered to be incomplete **AND** the facility will be excluded from further VI consideration, **ELSE** recommendations for further assessment will be included in the Vapor Intrusion Investigation Report.

- **IF** the subslab concentrations for selected analytes in a facility are greater than their respective VISL values and the indoor air concentrations for same selected analytes are less than their respective VISL values, **THEN** the pathway is considered to be incomplete and/or to not result in unacceptable concentrations under current conditions **AND** the facility will be excluded from further VI consideration.

- **IF** subslab vapor concentrations for selected analytes in a facility are greater than their respective VISL values **AND** the indoor air samples for the same selected analytes are greater than their respective VISL values, **THEN** the pathway is considered potentially complete and recommendations for further assessment will be included in the Vapor Intrusion Investigation Report.

Preliminary Investigation Decision Rules Background Sources & Recommendations

- **IF** outdoor air concentrations are comparable to those in indoor air samples in a facility, **THEN** the above conclusions will be reevaluated to determine the degree of certainty of the relative contributions of subslab, indoor, and outdoor sources.
- **IF** the above evaluation indicates that background sources are the cause of indoor air exceedances, **THEN** the VI pathway is considered to be incomplete **AND** the facility will be excluded from further VI consideration.
- **IF** a facility is retained from the previous seven steps, **THEN** recommendations for further desktop or field VI investigation will be included in the Vapor Intrusion Investigation Report.

Preliminary Investigation Methods
Facility Walkdown & Pre-Sampling Procedure

Prior to sampling, the structures will undergo walkdowns which will include:

- Identifying potential background sources
    - External sources: tanks, emissions stacks, heavy vehicle traffic, etc.
    - Internal sources: waste/fuel storage cans, paints, solvents, smoking, etc.
    - Handheld field screening device (e.g., PID) may be used to aid in identifying sources
- Performing a visual assessment: walkdown facilities for condition and construction characteristics relevant to VI such as
    - Construction style (e.g., poured concrete, stone, etc.)
    - Leakiness (e.g., cracks or openings in the slab/walls, etc.)
    - HVAC systems, fume hoods etc.
- Locating potential sample locations

Preliminary Investigation Methods Sampling & Analysis

- Subslab sampling
  - Sampled using 1L SUMMA® canisters and analyzed via EPA Method TO15.
  - May be sampled using High Volume Sampling (extract up to 100,000 L of soil gas from subslab to understand source chemistry and geometry).
- Indoor air sampling
  - Sampled using flow-regulated 6L SUMMA® canisters and analyzed via EPA Method TO15.
  - May be sampled in conjunction with Building Pressure Control (manipulates building pressurization and collects SUMMA canister samples to judge VI impacts and background source contributions to a facility.
- Passive collectors
  - May use quantitative passive samplers such as Waterloo Membrane Samplers® or Radiello® samplers to measure worker exposure.
- Forensic Tools
  - Building chemical inventory, chemical ratio analysis, and similar analyses may be used to characterize background and source influence.

Project Schedule

Activity	Date/Duration
DOE submit D1 Work Plan to EPA/KY	5/1/2020
EPA/KY review D1 Work Plan	90 days
EPA/KY submit comments on D1 Work Plan	7/30/20
DOE revision of D1 Work Plan and responses to comments	42 days
DOE submit D2 Work Plan to EPA/KY	9/10/20
EPA/KY review D1 Work Plan	30 days
EPA/KY approval of D2 Work Plan	10/10/20
Field Work (including procurement, mobilization, sampling, laboratory analysis, data receipt, data validation)	10/11/20 – 3/22/21
DOE submit D1 Report to EPA/KY	9/30/21

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Proposed Agenda for Scoping Meeting 6

- Present prioritized facility list for Preliminary Investigation
- Work Plan Outline
- Schedule

Paducah Site Industrial Area Vapor Intrusion Study Scoping – Presentation 6

January 14, 2020

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Agenda

- Recap of Project Scoping from 12/18/2019 Scoping Meeting
- Preliminary Investigation Facility Selection Process
- Prioritized Facility List for Preliminary Investigation (PI)
- Work Plan Outline
- Project Schedule

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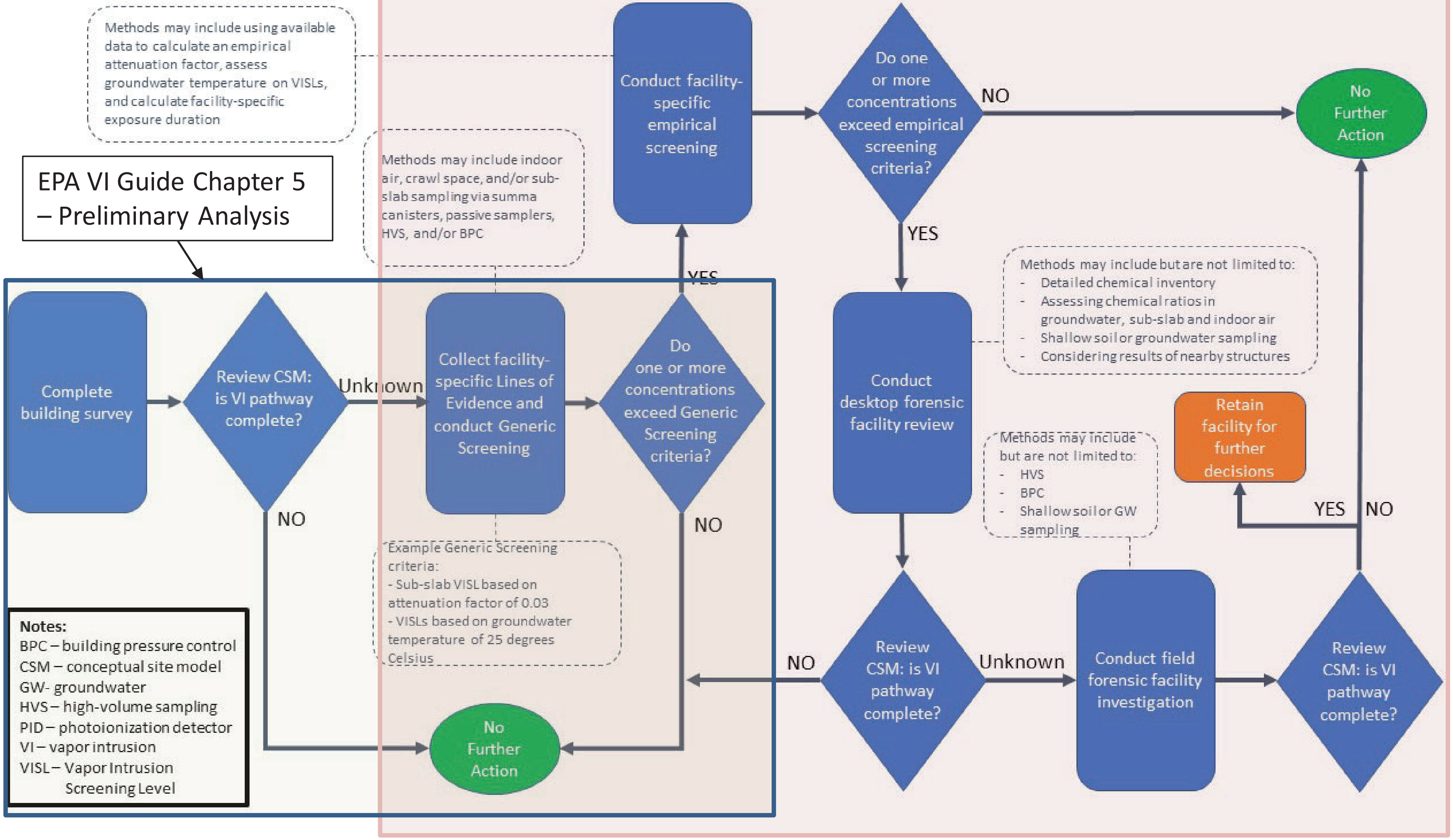
Recap of Project Scoping Decision Rules Framework

EPA VI Guide Chapter 6 – Detailed Investigation



EPA VI Guide Chapter 5 – Preliminary Analysis

Methods may include using available data to calculate an empirical attenuation factor, assess groundwater temperature on VISLs, and calculate facility-specific exposure duration

Complete building survey

Review CSM: is VI pathway complete?

Unknown

NO

Methods may include indoor air, crawl space, and/or sub-slab sampling via summa canisters, passive samplers, HVS, and/or BPC

Collect facility-specific Lines of Evidence and conduct Generic Screening

Example Generic Screening criteria:
- Sub-slab VISL based on attenuation factor of 0.03
- VISLs based on groundwater temperature of 25 degrees Celsius

Do one or more concentrations exceed Generic Screening criteria?

YES

NO

No Further Action

Conduct facility-specific empirical screening

Do one or more concentrations exceed empirical screening criteria?

NO

No Further Action

YES

Conduct desktop forensic facility review

Methods may include but are not limited to:
- Detailed chemical inventory
- Assessing chemical ratios in groundwater, sub-slab and indoor air
- Shallow soil or groundwater sampling
- Considering results of nearby structures

Review CSM: is VI pathway complete?

NO

Unknown

Methods may include but are not limited to:
- HVS
- BPC
- Shallow soil or GW sampling

Conduct field forensic facility investigation

Review CSM: is VI pathway complete?

YES

NO

Retain facility for further decisions

Notes:
BPC – building pressure control
CSM – conceptual site model
GW- groundwater
HVS – high-volume sampling
PID – photoionization detector
VI – vapor intrusion
VISL – Vapor Intrusion Screening Level

Recap of Project Scoping Clarifications from 12/18 Telecon

The Preliminary Investigation (PI) Scope

- Target the highest-ranked facilities
- Select next steps for these facilities
- Decision rules that do not apply to a particular facility will not be used (e.g., the decision rule to compare indoor air to background sources, but no background sources are detectable at the particular facility)
- More than one round of data *may* be collected
- Use PI findings to revise the VI-CSM in the report and decide whether future VI investigation should be expanded to:
  - Non-PI facilities and/or
  - Non-PI analytes

Recap of Project Scoping Clarifications from 12/18 Telecon, cont’d

The Preliminary Investigation (PI) Scope

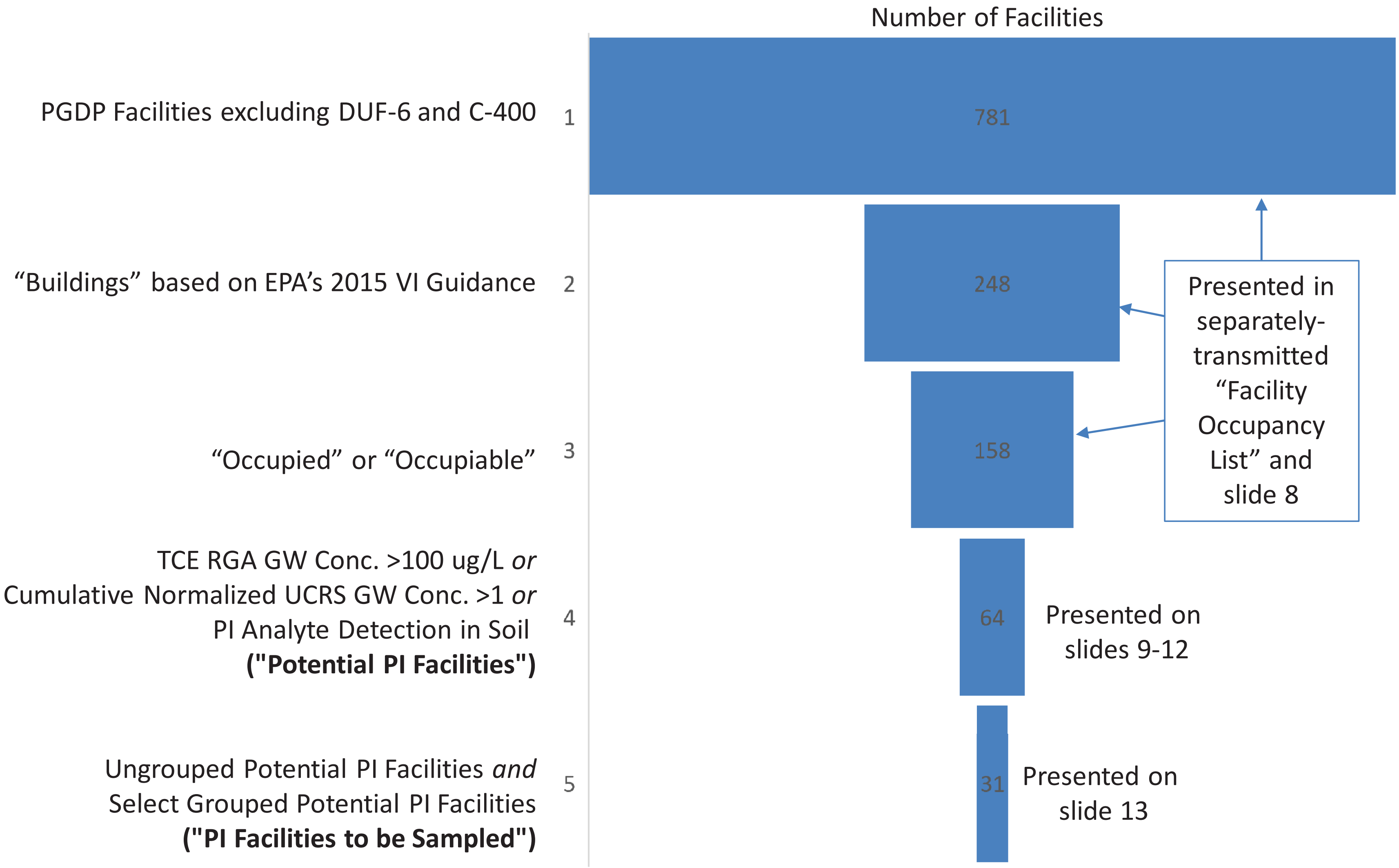
- A facility walkdown will be conducted at each PI facility in a mobilization separate from sampling
- Information collected during walkdown will inform sampling plan for each PI facility
- Media to be sampled may include subslab vapor, indoor air, or both, *but not necessarily always both*
- At those facilities where applicable, outdoor air samples will be collected when indoor air is sampled
- Differential pressure data will be collected during subslab and indoor air sampling when practicable

Recap of Project Scoping Clarifications from 12/18 Telecon, cont'd

PI Analyte*	Comment
TCE, vinyl chloride, chloroform	Had VISL exceedance in groundwater; TCE is likely the most important single driver for VI pathway evaluations
cis-1,2-DCE	Daughter product with no VISL, key to CSM
trans-1,2-DCE	Common background contaminant, no VISL
Mercury	Widely reported in soils analytical data
1,1,1-TCA	Listed waste to be considered where documented use in facility

*If there are volatile organic compounds outside of the PI analyte analyte list that are known to have been used at a facility, those analytes will be considered on a case-by-case basis.

PI Facility Selection Process
5 Steps



Presented in separately-transmitted “Facility Occupancy List” and slide 8

Presented on slides 9-12

Presented on slide 13

DRAFT FOR DISCUSSION ONLY

Potential PI Facilities
Steps 1-3

1. Exclude C-400 and DUF-6
2. Facilities considered to be “buildings”
   - For purposes of this Technical Guide and its recommendations for evaluating human health risk posed by vapor forming chemicals, **“building” refers to a structure that is intended for occupancy and use by humans**. This would include, for instance, homes, offices, stores, commercial and industrial buildings, etc., but would not normally include sheds, carports, pump houses, or other structures that are not intended for human occupancy. (OSWER Publication 9200.2-154 – Vapor Intrusion Technical Guide)
3. Facilities that are “occupied” or “occupiable”
   - Occupancy determination based on available facility information prior to facility walkdowns

Potential PI Facilities
Step 4 - Selection

4. Potential PI Facilities have one or more of the following:

TCE concentration in RGA groundwater >100 ug/L beneath the facility (based on 2018 plume map)

OR

Cumulative normalized UCRS groundwater concentration values from the past 5 years of sampling (for all analytes with VISLs) >1 within 100 feet of the facility

$$\sum ([analyte\ 1/VISL\ 1] + [analyte\ 2/VISL\ 2] + [analyte\ 3/VISL\ 3] + \ldots) \geq 1$$

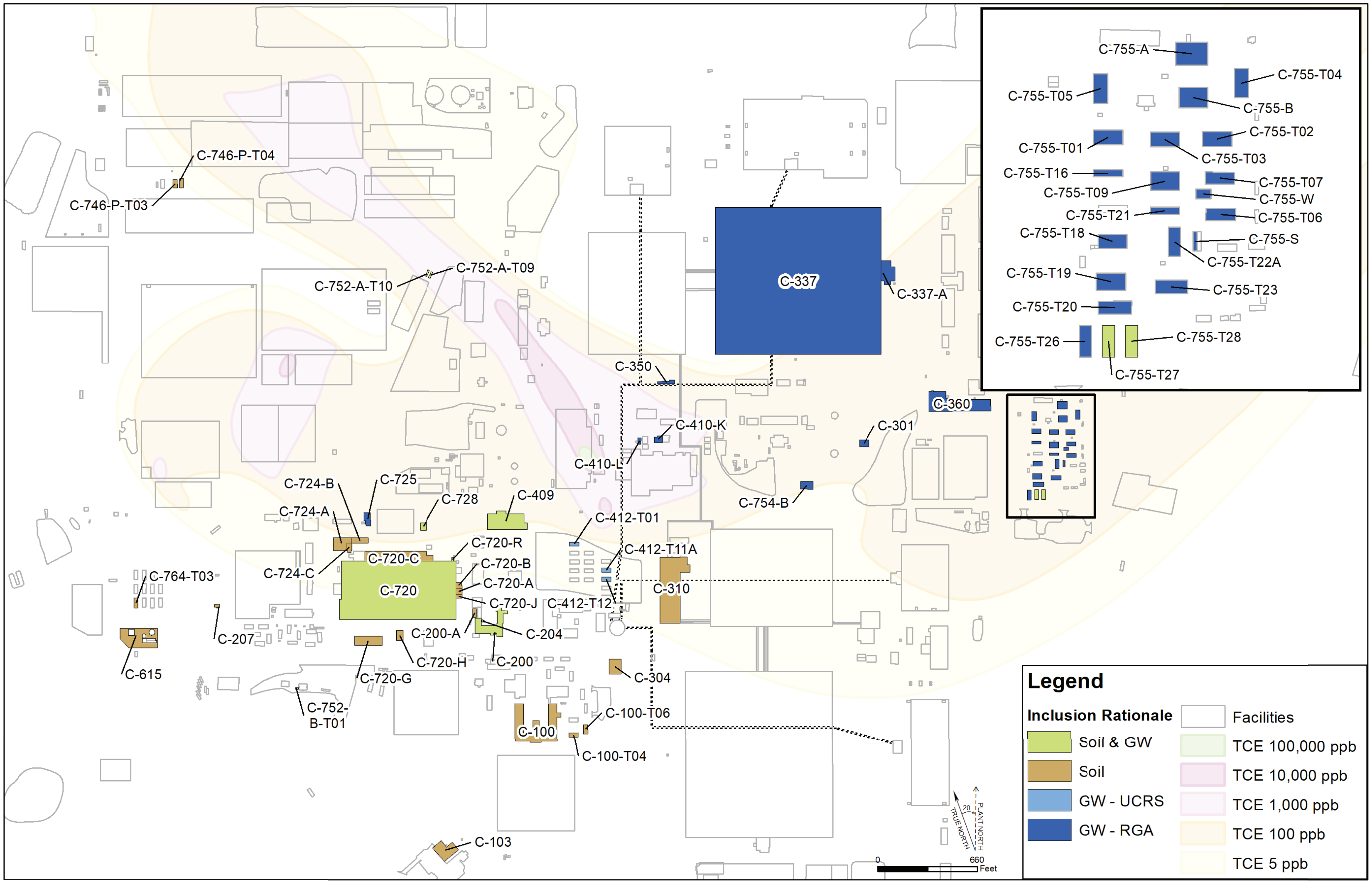
OR

A detection in soil from any sampling event of one or more of the PI analytes

- Tunnels were considered in this process. Occupiable buildings connected to tunnels that crossed through areas with detections of PI analytes in soil were considered as potential PI facilities

Potential PI Facilities
Step 4 – Map

- **64 Potential PI Facilities**



Facility basemap from PEGASIS

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Potential PI Facilities
Step 4 - List

Facility Number	Map Loc.	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (ug/L)	UCRS GW Conc (ug/L)	PI Soil Analytes Det? (Y/N)	Facility Size (sq ft)[1]
C-100	G-11	ADMINISTRATION BUILDING	Occupied	Soil	outside plume	n/a[2]	Yes	20000-50000
C-100-T04	G-11	OFFICE TRAILER	Occupiable	Soil	outside plume	n/a[2]	Yes	1000-5000
C-100-T06	G-11	OFFICE TRAILER	Occupiable	Soil	outside plume	n/a[2]	Yes	1000-5000
C-103	F-12	DOE SITE OFFICE & ANNEX	Occupied	Soil	outside plume	n/a[2]	Yes	5000-20000
C-200	G-10	GUARD & FIRE HEADQUARTERS	Occupied	UCRS GW and Soil	outside plume	1-10	Yes	5000-20000
C-200-A	G-10	C-200 ANNEX	Occupiable	Soil	outside plume	n/a[2]	Yes	1000-5000
C-204	G-10	DISINTEGRATOR BUILDING	Occupiable	UCRS GW	outside plume	1-10	No	<1000
C-207	E-10	FIRE TRAINING FACILITY	Occupiable	Soil	outside plume	n/a[2]	Yes	<1000
C-301	I-9	FIRE TRAINING BUILDING	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-304	H-10	TRAINING & CASCADE OFFICE BUILDING	Occupiable	Soil	outside plume	n/a[2]	Yes	5000-20000
C-310	H-10	PURGE & PRODUCT BUILDING	Occupiable	Soil	5-100	n/a[2]	Yes	>50000
C-337	I-8	PROCESS BUILDING	Occupied	RGA GW	100-1000	n/a[2]	No	>50000
C-337-A	I-8	FEED VAPORIZATION FACILITY	Occupiable	RGA GW	100-1000	n/a[2]	No	5000-20000
C-350	H-9	DRYING AGENT STORAGE BUILDING	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-360	J-9	TOLL TRANSFER & SAMPLING BUILDING	Occupiable	RGA GW	100-1000	n/a[2]	No	20000-50000
C-409	G-9	STABILIZATION BUILDING	Occupied	RGA/UCRS GW and Soil	100-1000	1-10	Yes	20000-50000
C-410-K	H-9	FLUORINE FACILITY BUILDING	Occupiable	RGA GW	1000-10000	n/a[2]	No	1000-5000
C-410-L	H-9	QUONSET HUT	Occupied	RGA GW	1000-10000	n/a[2]	No	<1000
C-412-T01	G-10	OFFICE TRAILER	Occupied	UCRS GW	5-100	1-10	No	1000-5000
C-412-T11A	G-10	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5-100	10-100	No	1000-5000
C-412-T12	G-10	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5-100	10-100	No	1000-5000
C-615	D-10	SEWAGE DISPOSAL PLANT	Occupiable	Soil	outside plume	n/a[2]	Yes	20000-50000
C-720	F-10	MAINTENANCE & STORES BUILDING	Occupiable	UCRS GW and Soil	5-100	10-100	Yes	>50000
C-720-A	F-10	COMPRESSOR SHOP	Occupiable	Soil	<5 (Inferred)	n/a[2]	Yes	1000-5000
C-720-B	F-10	MACHINE SHOP ADDITION	Occupied	Soil	5-100	n/a[2]	Yes	1000-5000
C-720-C	F-10	CONVERTOR SHOP ADDITION	Occupiable	Soil	5-100	n/a[2]	Yes	20000-50000
C-720-G	F-10	WAREHOUSE	Occupiable	Soil	outside plume	n/a[2]	Yes	5000-20000
C-720-H	F-10	WAREHOUSE	Occupiable	Soil	outside plume	n/a[2]	Yes	1000-5000
C-720-J	G-10	AIR LOCK	Occupiable	Soil	<5 (Inferred)	n/a[2]	Yes	<1000
C-720-R	F-10	MASS SPECTROMETER REPAIR TRAILER	Occupiable	UCRS GW and Soil	5-100	10-100	Yes	<1000
C-724-A	F-10	CARPENTER SHOP ANNEX	Occupiable	Soil	5-100	n/a[2]	Yes	5000-20000
C-724-B	F-10	CARPENTER SHOP	Occupiable	RGA GW and Soil	100-1000	n/a[2]	Yes	1000-5000
C-724-C	F-10	PAINT SHOP	Occupiable	Soil	5-100	n/a[2]	Yes	1000-5000

Potential PI Facilities
Step 4 – List, cont'd

Facility Number	Map Loc.	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (ug/L)	UCRS GW Conc (ug/L)	PI Soil Analytes Det? (Y/N)	Facility Size (sq ft)[1]
C-725	F-9	PAINT SHOP	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-728	F-9	MOTOR CLEANING FACILITY	Occupiable	RGA/UCRS GW and Soil	100-1000	10-100	Yes	1000-5000
C-746-P-T03	E-7	SCRAP METAL TRAILER (ABANDONED)	Occupiable	Soil	<5 (Inferred)	<1	Yes	1000-5000
C-746-P-T04	E-7	SCRAP METAL TRAILER	Occupiable	Soil	5-100	n/a[2]	Yes	1000-5000
C-752-A-T09	F-8	WASTE OPERATIONS OFFICE TRAILERS	Occupied	RGA GW and Soil	1000-10000	n/a[2]	Yes	<1000
C-752-A-T10	F-8	WASTE OPERATIONS OFFICE TRAILERS	Occupiable	RGA GW and Soil	1000-10000	n/a[2]	Yes	<1000
C-752-B-T01	E-11	FUELING STATION TRAILER	Occupiable	Soil	outside plume	n/a[2]	Yes	<1000
C-754-B	I-9	LOW LEVEL WASTE STORAGE	Occupied	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-A	J-9	MAINTENANCE SHOP	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-B	K-9	CHANGE HOUSE BUILDING	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-S	K-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	<1000
C-755-T01	J-9	OFFICE TRAILER	Occupied	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T02	K-9	OFFICE TRAILER	Occupied	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T03	J-9	OFFICE TRAILER	Occupied	RGA GW	100-1000	n/a[2]	No	1000-5000
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C-755-T09	J-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T16	J-9	RADCON TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	<1000
C-755-T18	J-9	FIELD OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T19	J-9	OFFICE BREAK TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T20	J-9	OFFICE BREAK TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T21	J-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	<1000
C-755-T22A	J-9	INSTRUMENT LAB TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T23	J-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T26	J-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	1000-5000
C-755-T27	J-9	OFFICE TRAILER	Occupiable	RGA GW and Soil	100-1000	n/a[2]	Yes	1000-5000
C-755-T28	J-9	OFFICE TRAILER	Occupiable	RGA GW and Soil	100-1000	n/a[2]	Yes	1000-5000
C-755-W	K-9	OFFICE TRAILER	Occupiable	RGA GW	100-1000	n/a[2]	No	<1000
C-764-T03	D-10	OFFICE TRAILER	Occupied	Soil	outside plume	n/a[2]	Yes	1000-5000

Notes: Information current as of 1/7/2020; All Preliminary Investigation Facilities were determined to be "buildings" based on the 2015 OSWER VI guidance;

1. Facility size not used in ranking or PI facility selection process;

2. Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are non-detect

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Select PI Facilities Proposed to be Sampled Step 5

- 23 potential PI facilities that are not grouped
- Plus: facilities selected from Groups A-G based on observed field conditions such as construction features and accessibility, and on the number of potential sources associated with a facility
  - Group A: 1 of the 2 facilities
  - Group B: 1 of the 2 facilities
  - Group C: 1 of the 3 facilities
  - Group D: 1 of the 8 facilities (likely a facility with both soil and groundwater sources)
  - Group E: 1 of the 2 facilities
  - Group F: 1 of the 2 facilities
  - Group G: 2 of the 22 facilities (likely one facility with both soil and groundwater sources and one facility that is occupied)
- **Total of 31 PI Facilities proposed for sampling**

Potential PI Facilities
Step 5 - List

Facility Number	Map Loc.	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (ug/L)	UCRS GW Conc (ug/L)	PI Soil Analytes Det? (Y/N)	Facility Size (sq ft)[1]	PI Facility Group[2]
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C-304	H-10	TRAINING & CASCADE OFFICE BUILDING	Occupiable	Soil	outside plume	n/a[3]	Yes	5000-20000	-
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C-720-C	F-10	CONVERTOR SHOP ADDITION	Occupiable	Soil	5-100	n/a[3]	Yes	20000-50000	-
C-720-G	F-10	WAREHOUSE	Occupiable	Soil	outside plume	n/a[3]	Yes	5000-20000	-
C-724-A	F-10	CARPENTER SHOP ANNEX	Occupiable	Soil	5-100	n/a[3]	Yes	5000-20000	-

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Potential PI Facilities
Step 5 - List, cont'd

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C-755-T27	J-9	OFFICE TRAILER	Occupiable	RGA GW and Soil	100-1000	n/a[3]	Yes	1000-5000	
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C-764-T03	D-10	OFFICE TRAILER	Occupied	Soil	outside plume	n/a[3]	Yes	1000-5000	-

Notes: All Preliminary Investigation Facilities were determined to be "buildings" based on the 2015 OSWER VI guidance; Information current as of 1/7/2020;

1. Facility size not used in ranking or PI facility selection process; 2. Facilities grouped based on similarities in spatial proximity, analyte source(s), and building size;

3. Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are non-detect

🟨 Highlighted facilities proposed for PI sampling; "-" for Facility Group indicates the facility is not grouped

DRAFT FOR DISCUSSION ONLY

Evaluating Non-PI Analytes from the Wide Analyte List Presented in December

Proposed process to evaluate whether Non-PI analytes (e.g., PCBs and PAHs) could require further evaluation:

- Install soil gas probes into soils or adjacent to groundwater where non-PI analytes were measured in respective medium at high concentrations in the site dataset
- Collect and analyze soil gas samples for applicable non-PI analytes to measure the highest site-specific concentrations for each
- Compare results against VISLs
- Compounds without VISLs will require separate consideration

Work Plan Outline

- Introduction
- Purpose
- Investigation Boundaries
- Site Background
- Desktop VI Analysis
- VI Conceptual Site Model and Facility Ranking Process
- Sampling Locations and Rationale
- Methods
- Results
- Discussion and Revised VI-CSM
- Investigation Decision Rules
- Quality Assurance
- Project Documentation

Project Schedule

Activity	Date/Duration
DOE submit D1 Work Plan to EPA/KY	5/1/2020
EPA/KY review D1 Work Plan	90 days
EPA/KY submit comments on D1 Work Plan	7/30/20
DOE revision of D1 Work Plan and responses to comments	42 days
DOE submit D2 Work Plan to EPA/KY	9/10/20
EPA/KY review D1 Work Plan	30 days
EPA/KY approval of D2 Work Plan	10/10/20
Field Work (including procurement, mobilization, sampling, laboratory analysis, data receipt, data validation)	10/11/20 – 3/22/21
DOE submit D1 Report to EPA/KY	9/30/21

APPENDIX B

PRELIMINARY INVESTIGATION DATASETS

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Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
Ambient Air Monitors	NA	AIR MONITORING STATIONS	N	Not Occupiable
C030285	NA	FENCE PERIMITER	N	Not Occupiable
C-100	G-11	ADMINISTRATION BUILDING	Y	Occupied
C-100-B	G-11	SECURITY-RECORDS MGT SEALANDS	N	Not Occupiable
C-100-T04	G-11	OFFICE TRAILER	Y	Occupiable
C-100-T05	G-11	OFFICE TRAILER	Y	Occupiable
C-100-T06	G-11	OFFICE TRAILER	Y	Occupiable
C-100-T08	G-11	FOCI OFFICE & CHANGE HOUSE	Y	Occupiable
C-101	G-11	FORMER CAFETERIA	Y	Occupiable
C-102	G-11	HOSPITAL	Y	Occupied
C-102-T01	G-10	OFFICE TRAILER	Y	Occupied
C-102-T02	G-10	OFFICE TRAILER	Y	Occupied
C-102-T03	G-10	OFFICE TRAILER	Y	Occupied
C-102-T04	G-10	OFFICE TRAILER	Y	Occupied
C-102-T05	G-10	OFFICE TRAILER	Y	Occupied
C-102-T06	G-10	OFFICE TRAILER	Y	No Longer Present
C-102-T07	G-11	OFFICE TRAILER	Y	No Longer Present
C-102-T08	G-11	OFFICE TRAILER	Y	No Longer Present
C-102-T09	G-11	OFFICE TRAILER	Y	No Longer Present
C-103	F-12	DOE SITE OFFICE & ANNEX	Y	Occupied
C-103-C	F-12	CONCRETE PAD & CANOPY	N	Not Occupiable
C-103-PL	F-12	DOE SITE OFFICE PARKING AREA	N	Not Occupiable
C-200	G-10	GUARD & FIRE HEADQUARTERS	Y	Occupied
C-200-A	G-10	C-200 ANNEX	Y	Occupiable
C-200-B	G-10	STORAGE TRAILER	N	Not Occupiable
C-200-UST	No Longer Present	UST	N	No Longer Present
C-201	G-10	EMERGENCY EQUIPMENT STORAGE BUILDING	Y	Occupiable
C-201-A	G-10	EMERGENCY EQUIPMENT STORAGE TRAILER	N	No Longer Present
C-201-B	G-10	EMERGENCY EQUIPMENT STORAGE TRAILER	N	No Longer Present
C-201-C	G-10	EMERGENCY EQUIPMENT STORAGE BUILDING	N	Not Occupiable
C-201-D	G-10	EMERGENCY EQUIPMENT STORAGE TRAILER	N	No Longer Present
C-202	G-10	GUARD TRAINING BUILDING	Y	Not Occupiable
C-203	G-10	EMERGENCY VEHICLE SHELTER	N	Not Occupiable
C-204	G-10	DISINTEGRATOR BUILDING	Y	Occupiable
C-205	G-10	RESPIRATOR ISSUE BUILDING	Y	Not Occupiable
C-206	E-10	PUMPER DRAFTING PIT	N	Not Occupiable
C-206-A	No Longer Present	Storage Trailer	Y	No Longer Present
C-206-B	E-10	SMOKE TRAINING FACILITY - CONDEMNED	Y	Not Occupiable
C-207	E-10	FIRE TRAINING FACILITY	Y	Occupiable
C-212	G-10	SLAB ONLY - former OFFICE BUILDING	N	Not Occupiable
C-212-A	G-10	SLAB ONLY - former OFFICE BUILDING	N	Not Occupiable
C-212-U	G-10	SLAB ONLY - former OFFICE BUILDING	N	Not Occupiable
C-214	G-16	POST 57 BUILDING	Y	No Longer Present
C-215	G-10	MAC PORTAL ACCESS	N	Not Occupiable
C-215-M	G-10	SECURITY IMAC PORTAL	N	Not Occupiable
C-216	J-8	FORMER GATE 47 (Building gone)	N	No Longer Present
C-217	H-6	FORMER POST 43 (Building gone)	N	No Longer Present
C-218	D-10	FIRING RANGE (Out of Service)	N	Not Occupiable
C-220-A	NA	Power Distribution System	N	Not Occupiable
C-220-D1	NA	Bell Telephone System	N	Not Occupiable
C-220-D2	NA	PAX Telephone System	N	Not Occupiable
C-223	G-13	POST 49 BUILDING	Y	Occupied
C-224	G-11	MAIN GUARD POST 15 BUILDING	Y	Occupied
C-225	J-9	POST 48 BUILDING	Y	Not Occupiable
C-225-A	J-9	GRAVEL PARKING AREA WEST OF C-755-P	N	Not Occupiable
C-226	H-10	GUARD SHACK (POST 91)	Y	Occupied
C-228	J-9	GUARD SHACK (POST 93)	Y	No Longer Present
C-229	F-10	GRAVEL AREA - former POST 229	N	No Longer Present
C-230-A	NA	Sanitary Water System	N	Not Occupiable
C-230-B	NA	Sanitary Water System	N	Not Occupiable
C-230-C	NA	Storm Sewer System	N	Not Occupiable
C-230-D	NA	Chilled Water System	N	Not Occupiable
C-230-E	NA	Plant (Process) Water System	N	Not Occupiable
C-230-F	NA	Process Waste Water System	N	Not Occupiable
C-230-G	NA	Recirculating Cooling Water System	N	Not Occupiable
C-230-H	NA	High Pressure Fire Water System	N	Not Occupiable
C-230-J	NA	Recirculating Heat Utilization System	N	Not Occupiable
C-232-A	NA	Nitrogen System	N	Not Occupiable
C-232-B	NA	Compressed Air System	N	Not Occupiable
C-232-C	NA	Acetylene/Oxygen System	N	Not Occupiable
C-232-D	NA	Steam Distribution System	N	Not Occupiable
C-232-E	No Longer Present	Natural Gas System	N	No Longer Present
C-233	D-10	POST 233 TRAILER	Y	Occupied
C-300	H-10	CENTRAL CONTROL BUILDING	Y	Not Occupiable
C-300-531	NA	Instrumentation Tunnel	N	Not Occupiable
C-300-533	NA	Instrumentation Tunnel	N	Not Occupiable
C-300-535	NA	Instrumentation Tunnels	N	Not Occupiable
C-300-537	NA	Instrumentation Tunnel	N	Not Occupiable
C-301	I-9	FIRE TRAINING BUILDING	Y	Occupiable
C-302	G-10	OPERATIONS DIV. DATA CENTER	Y	Not Occupiable
C-302-T01	G-10	TRAILER	Y	No Longer Present
C-302-T02	G-10	OFFICE TRAILER	Y	No Longer Present
C-303	H-10	SUPERVISORY CONTROL & DATA ACQUISITION SYSTEM	Y	Occupied
C-304	H-10	TRAINING & CASCADE OFFICE BUILDING	Y	Occupiable
C-310	H-10	PURGE & PRODUCT BUILDING	Y	Occupiable
C-310-331	H-9	TIE LINE	N	Not Occupiable
C-310-331-A	H-10	BRIDGE (ENCLOSED)	N	Not Occupiable
C-310-331-B	H-10	TIE LINE	N	Not Occupiable
C-310-A	H-10	PRODUCT WITHDRAWAL BUILDING	Y	Occupiable
C-315	I-10	SURGE & WASTE BUILDING	Y	Not Occupiable
C-315-331	I-10	TIE LINE	N	Not Occupiable
C-320	H-10	COMMUNICATION BUILDING	Y	Not Occupiable
C-320-A	H-10	TEMPORARY STORAGE TRAILER	N	No Longer Present
C-320-B	H-10	TEMPORARY STORAGE TRAILER	N	No Longer Present
C-331	I-10	PROCESS BUILDING	Y	Not Occupiable
C-331-333-A	H-10	BRIDGE (ENCLOSED-300 FT)	N	Not Occupiable
C-331-333-B	I-10	TIE LINE (WEST)	N	Not Occupiable
C-331-333-C	I-10	TIE LINE (EAST)	N	Not Occupiable
C-331-335	H-9	TIE LINE	N	Not Occupiable
C-331-410	H-9	TIE LINE (ABANDONED REMNANT)	N	Not Occupiable
C-331-A	I-9	CONTRACTOR STAGING YARD WEST	N	Not Occupiable
C-331-B	J-9	CONTRACTOR STAGING YARD EAST	N	Not Occupiable
C-331-C	I-9	PARKING LOT	N	Not Occupiable
C-331-T02	J-9	OFFICE / BREAKROOM	Y	No Longer Present
C-331-T03	J-9	OFFICE / BREAKROOM	Y	No Longer Present
C-331-T04	C-331	Office/Break Room Trailer	Y	Occupiable
C-331-T05	C-331	HP Office/Cool Shack (Metal bldg at col H-8 ground floor)	Y	Occupiable
C-331-T07	J-9	INSTRUMENT MECHANIC TRAILER	Y	No Longer Present
C-331-T08	C-331	IM Shop (Metal Building Col L-24)	Y	Occupiable
C-331-T09	C-331	IM Shop (Metal Building Col H-19)	Y	Occupiable
C-333	H-11	PROCESS BUILDING	Y	Occupiable
C-333-A	H-12	FEED VAPORIZATION FACILITY	Y	Not Occupiable
C-333-T06	H-11	HEALTH PHYSICS OFFICE TRAILER	N	No Longer Present

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-333-T07	H-12	FEED VAPORIZ. FACILITY TRAILER	N	No Longer Present
C-335	H-8	PROCESS BUILDING	Y	Not Occupiable
C-335-337-A	H-8	BRIDGE (ENCLOSED)	N	Not Occupiable
C-335-337-B	H-8	TIE LINE (NORTH)	N	Not Occupiable
C-335-337-C	H-8	TIE LINE (SOUTH)	N	Not Occupiable
C-335-T01	C-335	Trailer Inside Col. DD-9	Y	Occupiable
C-335-T02	C-335	Trailer Inside Col. CC-11	Y	Occupiable
C-335-T03	C-335	Metal Building Inside at Col CC-2	Y	Occupiable
C-335-T04	C-335	Office Inside Col. F-19	Y	Occupiable
C-335-T05	C-335	Office Inside Col. U-20	Y	Occupiable
C-337	I-8	PROCESS BUILDING	Y	Occupied
C-337-A	I-8	FEED VAPORIZATION FACILITY	Y	Occupiable
C-337-T01	I-8	HEALTH PHYSICS OFFICE TRAILER	N	No Longer Present
C-337-T02	I-8	HEALTH PHYSICS OFFICE TRAILER	N	No Longer Present
C-337-T03	C-335	Metal Building Inside at Col. Nb-8	Y	Occupiable
C-340	J-10	SLAB ONLY - former METALS PLANT	N	No Longer Present
C-340-B	J-10	SLAB ONLY - former METALS BLDG.	N	No Longer Present
C-340-C	J-10	SLAB ONLY - former SLAG BLDG.	N	No Longer Present
C-340-Complex	No Longer Present	C-340-Complex	N	No Longer Present
C-340-D	I-10	SLAB ONLY - former MAGNESIUM STORAGE BLDG.	N	No Longer Present
C-340-E	I-10	EMERGENCY POWER FOR CRITICAL ALARMS	N	No Longer Present
C-342	I-10	SLAB ONLY - former AMMONIA (NH3) DISSOCIATOR & STORAGE FACILIT	N	No Longer Present
C-342-A	I-10	SLAB ONLY - former AMMONIA (NH3) DISSOCIATOR ADDITION	N	No Longer Present
C-342-B	I-10	SLAB ONLY - former AMMONIA (NH3) DISSOCIATOR TANK SHELTER	N	No Longer Present
C-342-SLAB	No Longer Present	Slab Only - former Ammonia (NH3) Dissociator and Storage Facility	N	No Longer Present
C-350	H-9	DRYING AGENT STORAGE BUILDING	Y	Occupiable
C-360	J-9	TOLL TRANSFER & SAMPLING BUILDING	Y	Occupiable
C-360-A	J-9	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Y	Not Occupiable
C-360-T01	J-9	HEALTH PHYSICS OFFICE TRAILER	Y	No Longer Present
C-360-T02	J-9	CASCADE OPERATIONS STORAGE	N	No Longer Present
C-370-E	N-7	Historical Water Quality Monitoring Sampling Station - L10	N	No Longer Present
C-370-W	A-6	Historical Surface Water Monitoring Sampling Station - L5	N	No Longer Present
C-372	NA	Monitoring Wells	N	Not Occupiable
C-375-04	D-9	C-615 SECONDARY BASIN EFFL(KPDES OUTFALL 004)	N	Not Occupiable
C-375-06	C-8	C-611 No. 2 LAGOON(KPDES OUTFALL 006)	N	Not Occupiable
C-375-16	D-10	PLANT SURFACE RUNOFF FLUME(KPDES OUTFALL 016)	N	Not Occupiable
C-375-17	G-13	PLANT SURFACE RUNOFF FLUME(KPDES OUTFALL 017)	N	Not Occupiable
C-375-18	I-3	LANDFILL STORM WATER RUNOFF (KPDES OUTFALL 018)	N	No Longer Present
C-375-19	J-2	PLANT SURFACE RUNOFF(KPDES OUTFALL 019)	N	Not Occupiable
C-375-20	J-2	TREATED LEACHATE RUNOFF(KPDES OUTFALL 020)	N	Not Occupiable
C-375-E2	K-9	OIL CONTROL DAM(EAST DRAIN DITCH) (KPDES OUTFALL 002)	N	Not Occupiable
C-375-E3	K-10	OIL CONTROL DAM(EAST DRAIN DITCH) (KPDES OUTFALL 010)	N	Not Occupiable
C-375-E4	K-10	OIL CONTROL DAM(EAST DRAIN DITCH) (KPDES OUTFALL 011)	N	Not Occupiable
C-375-E5	K-11	OIL CONTROL DAM(EAST DRAIN DITCH) (KPDES OUTFALL 012)	N	Not Occupiable
C-375-E6	K-13	PLANT SURFACE RUNOFF(KPDES OUTFALL 013)	N	Not Occupiable
C-375-N1	H-5	MONITORING STATION (KPDES OUTFALL 003)	N	No Longer Present
C-375-S6	F-11	OIL CONTROL DAM(SOUTH DITCH) (KPDES OUTFALL 009)	N	Not Occupiable
C-375-W7	D-9	OIL CONTROL DAM(WEST DRAIN DITCH) (KPDES OUTFALL 008)	N	Not Occupiable
C-375-W8	D-9	OIL CONTROL DAM(KPDES OUTFALL 015)	N	Not Occupiable
C-375-W9	D-8	OIL CONTROL DAM(KPDES OUTFALL 001)	N	Not Occupiable
C-400-A	G-9	EMERGENCY POWER FOR CRITICAL ALARMS	N	Not Occupiable
C-400-C	G-9	TENT/CLAMSHELL	N	Not Occupiable
C-400-D (inside C-400)	G-9	LIME PRECIPITATION & ION EXCHANGE UNIT	N	No Longer Present
C-400-GTS	G-9	Groundwater Treatment System	N	Not Occupiable
C-400-L	G-8	STORM WATER LIFT STATION	N	Not Occupiable
C-400-T01	G-9	TRAILER	Y	Occupiable
C-400-T02	G-9	TRAILER	Y	Occupiable
C-400-WTS	G-9	C-400 Water Treatment System (NSDD)	N	Not Occupiable
C-401	G-9	NEUTRALIZING PIT	N	No Longer Present
C-402	G-9	SLAB ONLY - former LIME HOUSE	N	No Longer Present
C-402-SLAB	No Longer Present	Slab Only - former Lime House	N	No Longer Present
C-403	G-9	NEUTRALIZING PIT	N	Not Occupiable
C-404	F-8	LOW-LEVEL RADIOACTIVE WASTE BURIAL AREA	N	Not Occupiable
C-404-A	F-8	SUMP	N	Not Occupiable
C-405	G-9	SLAB ONLY - former CONTAMINATED ITEMS INCINERATOR	N	No Longer Present
C-405-SLAB	No Longer Present	Slab Only - former Contaminated Items Incinerator	N	No Longer Present
C-406	G-9	REMOVED - former TRICHLOROETHYLENE STORAGE TANK	N	No Longer Present
C-407	G-9	NITRIC ACID STORAGE TANK	N	Not Occupiable
C-408	G-9	REMOVED - former 50-Ton Truck Scale	N	No Longer Present
C-409	G-9	STABILIZATION BUILDING	Y	Occupied
C-410	H-9	SLAB ONLY - former FEED PLANT	N	No Longer Present
C-410/411/420 SLAB	NA	Gravel & Slabs left from D&D of Bldings	N	Not Occupiable
C-410-A	H-9	SLAB ONLY - former HYDROGEN HOLDER	N	No Longer Present
C-410-B	H-9	GRAVEL AREA - former SLUDGE LAGOON	N	No Longer Present
C-410-C	H-9	GRAVEL AREA - former HF NEUTRALIZATION BUILDING	N	No Longer Present
C-410-D	H-9	F2 STORAGE BUILDING	Y	Not Occupiable
C-410-E	H-9	ACID NEUTRALIZATION POND	N	No Longer Present
C-410-F	H-9	GRAVEL AREA - former HF STORAGE BUILDING (NORTH)	N	No Longer Present
C-410-G	H-9	GRAVEL AREA - former HF STORAGE BUILDING (CENTER)	N	No Longer Present
C-410-H	H-9	GRAVEL AREA - former HF STORAGE BUILDING (SOUTH)	N	No Longer Present
C-410-I	H-9	GRAVEL AREA - former ASH RECEIVER SHELTER	N	No Longer Present
C-410-J	H-9	GRAVEL AREA - former HF STORAGE BUILDING (EAST)	N	No Longer Present
C-410-K	H-9	FLUORINE FACILITY BUILDING	Y	Occupiable
C-410-L	H-9	QUONSET HUT	Y	Not Occupiable
C-411	H-9	SLAB ONLY - former CELL MAINTENANCE BUILDING	N	No Longer Present
C-411-A	H-9	STAGING AREA	N	Not Occupiable
C-412	G-10	TRAILER COMPLEX	N	Not Occupiable
C-412-ES	No Longer Present	C-412 Electrical System	N	No Longer Present
C-412-T01	G-10	OFFICE TRAILER	Y	Occupied
C-412-T02	G-10	OFFICE TRAILER	Y	Occupied
C-412-T03	G-10	OFFICE TRAILER	Y	Occupied
C-412-T04	G-10	OFFICE TRAILER	Y	Occupied
C-412-T05	G-10	OFFICE TRAILER	Y	Occupied
C-412-T06	G-10	OFFICE TRAILER	Y	Occupied
C-412-T07	G-10	SHOWER & CHANGE TRAILER	Y	Occupied
C-412-T08	G-10	OFFICE TRAILER	Y	Occupied
C-412-T09	G-10	OFFICE TRAILER	Y	Occupied
C-412-T10	G-10	OFFICE TRAILER	Y	Occupiable
C-412-T11A	G-10	SHOWER & CHANGE TRAILER	Y	Occupied
C-412-T11-A	G-10	SHOWER TRAILER	Y	Occupied
C-412-T12	G-10	SHOWER & CHANGE TRAILER	Y	Occupied
C-412-T13	G-10	OFFICE TRAILER	Y	Occupied
C-412-T14	G-10	OFFICE TRAILER	Y	Occupiable
C-412-WS	No Longer Present	C-412 Water Piping System	N	No Longer Present
C-415	H-9	FEED PLANT STORAGE BUILDING	Y	Not Occupiable
C-415-T01	H-9	Sealand	N	Not Occupiable
C-416	I-9	EQUIPMENT CLEANING PAD	N	Not Occupiable
C-416-T01	I-9	SEALAND TRAILER	N	Not Occupiable
C-417	I-9	EQUIPMENT CLEANING PAD /STAGING AREA	N	No Longer Present
C-420	H-9	SLAB ONLY - former GREENSALT PLANT	N	No Longer Present
C-531-1	J-10	SWITCH HOUSE	N	Not Occupiable
C-531-2	J-10	SWITCHYARD	N	Not Occupiable
C-531-3A	J-10	FIRE VALVE HOUSE NO. 1	N	Not Occupiable

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-531-3B	J-10	FIRE VALVE HOUSE NO. 2	N	Not Occupiable
C-532	I-10	RELAY HOUSE	N	Not Occupiable
C-533-1	J-11	SWITCH HOUSE	N	Not Occupiable
C-533-2	J-11	SWITCHYARD	N	Not Occupiable
C-533-3A	J-11	FIRE VALVE HOUSE NO. 1	N	Not Occupiable
C-533-3B	J-11	FIRE VALVE HOUSE NO. 2	N	Not Occupiable
C-533-3C	J-11	FIRE VALVE HOUSE NO. 3	N	Not Occupiable
C-533-3D	J-11	FIRE VALVE HOUSE NO. 4	N	Not Occupiable
C-535-1	H-7	SWITCH HOUSE	N	Not Occupiable
C-535-2	H-7	SWITCHYARD	N	Not Occupiable
C-535-3A	H-7	FIRE VALVE HOUSE NO. 1	N	Not Occupiable
C-535-3B	H-7	FIRE VALVE HOUSE NO. 2	N	Not Occupiable
C-535-4	H-7	TEST SHOP (MAINTENANCE OFFICE)	Y	Occupied
C-536	H-7	RELAY HOUSE	N	Not Occupiable
C-537-1	I-7	SWITCH HOUSE	N	Not Occupiable
C-537-2	I-7	SWITCHYARD	N	Not Occupiable
C-537-3A	H-7	FIRE VALVE HOUSE NO. 1	N	Not Occupiable
C-537-3B	H-7	FIRE VALVE HOUSE NO. 2	N	Not Occupiable
C-537-3C	I-7	FIRE VALVE HOUSE NO. 3	N	Not Occupiable
C-537-3D	I-7	FIRE VALVE HOUSE NO. 4	N	Not Occupiable
C-537-4	I-7	TEST SHOP	Y	Not Occupiable
C-540-A	J-11	OIL PUMP HOUSE	Y	Occupiable
C-540-A-SHED	No Longer Present	Wooden Shed	N	No Longer Present
C-540-B	I-11	OIL STORAGE TANK (NORTHWEST)	N	Not Occupiable
C-540-C	I-11	OIL STORAGE TANK (SOUTHWEST)	N	Not Occupiable
C-540-D	J-11	OIL STORAGE TANK (NORTHEAST)	N	Not Occupiable
C-540-E	J-11	OIL STORAGE TANK (SOUTHEAST)	N	Not Occupiable
C-541-A	H-7	OIL PUMP HOUSE	N	Not Occupiable
C-541-B	H-7	OIL STORAGE TANK (NORTHWEST)	N	Not Occupiable
C-541-C	H-7	OIL STORAGE TANK (SOUTHWEST)	N	Not Occupiable
C-541-D	H-7	OIL STORAGE TANK (NORTHEAST)	N	Not Occupiable
C-541-E	H-7	OIL STORAGE TANK (SOUTHEAST)	N	Not Occupiable
C-600	G-9	STEAM PLANT	N	Not Occupiable
C-600-1	G-9	NEW COOLING TOWER NEXT TO C-604	N	Not Occupiable
C-600-A	G-9	C-600 STEAM PKG BOILERS- PB-01 thru PB-05	N	Not Occupiable
C-600-A	G-9	C-600 STEAM PKG BOILERS- PB-01 thru PB-05	N	Not Occupiable
C-601	F-9	NITROGEN GENERATOR BUILDING ADDITION	Y	Not Occupiable
C-601-A	G-9	STEAM PLANT FUEL -STORAGE TANK (CENTER)	N	Not Occupiable
C-601-B	G-9	STEAM PLANT FUEL -STORAGE TANK (SOUTH)	N	Not Occupiable
C-601-C	G-9	STEAM PLANT FUEL OIL PUMP HOUSE	N	Not Occupiable
C-601-D	G-9	GRASSY AREA - former STEAM PLANT FUEL OIL STORAGE TANK (NORTH	N	No Longer Present
C-601-E	NA	Storage Building (Wood Shed)	N	Not Occupiable
C-602	F-9	COAL STORAGE YARD	N	Not Occupiable
C-603-A	G-9	SLAB ONLY - former NITROGEN MANIFOLD BUILDING	N	No Longer Present
C-603-B	F-9	SOIL AREA - former NITROGEN STORAGE TANK	N	No Longer Present
C-603-C	F-9	SOIL AREA - former NITROGEN RECEIVER (NORTH)	N	No Longer Present
C-603-D	F-9	SOIL AREA - former NITROGEN RECEIVER (SOUTH)	N	No Longer Present
C-603-E	F-9	NITROGEN STORAGE TANK (EAST)	N	Not Occupiable
C-603-F	F-9	NITROGEN STORAGE TANK (CENTER)	N	Not Occupiable
C-603-G	F-9	NITROGEN STORAGE TANK (WEST)	N	Not Occupiable
C-603-H	F-9	SLAB ONLY - former NITROGEN GENERATOR	N	No Longer Present
C-603-I	F-9	SLAB ONLY - former NITROGEN GENERATOR	N	No Longer Present
C-604	G-9	UTILITIES MAINTENANCE BUILDING	Y	Not Occupiable
C-604-A	G-9	UTILITIES STORAGE BUILDING	N	Not Occupiable
C-605	G-9	SUBSTATION BUILDING	Y	Not Occupiable
C-606	G-9	COAL CRUSHER BUILDING	Y	Not Occupiable
C-607	F-9	EMERGENCY AIR COMPRESSOR GENERATOR BUILDING	Y	Not Occupiable
C-611	Area	Water Treatment Plant Area	N	Not Occupiable
C-611-A	C-10	BUILDING & SHOP STORAGE	Y	Occupiable
C-611-A1	C-11	ACTIVATED CARBON STORAGE BUILDING	N	Not Occupiable
C-611-B	C-10	HEAD HOUSE	N	Not Occupiable
C-611-B1	C-10	POLYMER FEED SYSTEM ENCLOSURE	N	Not Occupiable
C-611-C	C-10	FLOCCULATOR BASIN	N	Not Occupiable
C-611-D	C-10	SETTLING BASIN (NORTHEAST)	N	Not Occupiable
C-611-E	C-10	SETTLING BASIN (NORTHWEST)	N	Not Occupiable
C-611-F	C-10	SETTLING BASIN (SOUTHEAST)	N	Not Occupiable
C-611-F1	C-11	SECONDARY COAGULATION BASIN	N	Not Occupiable
C-611-F2	C-11	CHEMICAL FEED FOR C-611-F1	N	Not Occupiable
C-611-F3	C-11	ACTIVATED CARBON FEED	N	Not Occupiable
C-611-G	C-11	SETTLING BASIN (SOUTHWEST)	N	Not Occupiable
C-611-H	C-11	FILTER BUILDING & PUMP STATION	N	Not Occupiable
C-611-I	C-11	CLEAR WELL	N	Not Occupiable
C-611-J	C-11	PUMP HOUSE (SETTLED WATER)	N	Not Occupiable
C-611-K	C-10	LAGOON No. 4	N	Not Occupiable
C-611-M (REMOVED)	No Longer Present	Storage Tank	N	No Longer Present
C-611-N (REMOVED)	No Longer Present	Sanitary Water Storage	N	No Longer Present
C-611-O	I-9	SANITARY WATER STORAGE TANK	N	Not Occupiable
C-611-P	G-9	PUMP HOUSE	N	Not Occupiable
C-611-Q	H-6	36 inch RAW WATER LINE BOOSTER STATION	N	Not Occupiable
C-611-R	I-9	WATER TANK-RCW FIRE WATER (HIGH PRESSURE)	N	Not Occupiable
C-611-S	C-11	CL2 STORAGE & FEED BUILDING	N	Not Occupiable
C-611-SB	Area	SETTLING BASINS 4 EA.	N	Not Occupiable
C-611-T	F-10	BOOSTER PUMP STATION(PLANT WATER)	N	Not Occupiable
C-611-T01	C-11	INSTRUMENT MAINTENANCE TRAILER	Y	Not Occupiable
C-611-U	C-10	SOFTENING FACILITY (WEST)	N	Not Occupiable
C-611-U-CaO	C-10	C-611-U-CaO	N	Not Occupiable
C-611-U-CO2	C-10	C-611-U-CO2	N	Not Occupiable
C-611-U-FF	C-10	C-611-U-FF	N	Not Occupiable
C-611-U-SA	C-10	C-611-U-SA	N	Not Occupiable
C-611-U-SBV	C10	C-611-U-Sludge Blowdown Vault	N	Not Occupiable
C-611-V	C-9	SLUDGE LAGOON	N	Not Occupiable
C-611-V1	C-9	SLUDGE LAGOON	N	Not Occupiable
C-611-W	C-10	SLUDGE LAGOON	N	Not Occupiable
C-611-X	C-10	SOFTENING FACILITY (EAST)	N	Not Occupiable
C-611-Y	C-9	RECYCLE LAGOON	N	Not Occupiable
C-611-Z	C-10	FLOCCULATOR BASIN	N	Not Occupiable
C-612	D-7	PILOT PUMP AND TREAT	N	Not Occupiable
C-612 -T05 - T08	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612 -T09 - T12	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-A	D-7	PUMP AND TREAT DECON PAD	N	Not Occupiable
C-612-A-PAD	NA	Storage Pad	N	Not Occupiable
C-612-B	D-7	STORM SHELTER	N	Not Occupiable
C-612-SSS	NA	C-612 Sanitary Sewage System	N	Not Occupiable
C-612-SYS	No Longer Present	Northwest Plume Treatment System	N	No Longer Present
C-612-T01	D-7	PUMP AND TREAT OFFICE	Y	Occupiable
C-612-T02	D-7	PUMP AND TREAT OFFICE	Y	Occupiable
C-612-T03	D-7	PUMP AND TREAT CHANGEHOUSE	Y	Not Occupiable
C-612-T04	D-7	WOODEN STORAGE BUILDING	N	Not Occupiable
C-612-T05	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T06	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T07	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T08	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T09	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-612-T10	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T11	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-612-T12	D-7	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-613	D-7	SCRAP YARD SEDIMENTATION BASIN	N	Not Occupiable
C-613-01	D-8	BASIN PUMP STATION	N	Not Occupiable
C-613-02	D-8	BASIN PUMP STATION	N	Not Occupiable
C-613-A	D-7	PROCESS AND OFFICE TRAILER	Y	Occupiable
C-613-B	D-7	SOIL BORROW STOCKPILE	N	Not Occupiable
C-613-DITCH	NA	Water Conveyance System to C-613	N	Not Occupiable
C-614	M-7	NORTHEAST PLUME TREATMENT SYSTEM	N	Not Occupiable
C-614-A	M-7	NORTHEAST PLUME PAD	N	Not Occupiable
C-614-B	M-7	NORTHEAST PLUME EXTRACTION WELL 331	N	Not Occupiable
C-614-C	M-7	NORTHEAST PLUME EXTRACTION WELL 332	N	Not Occupiable
C-614-FENCE	M-7	NORTHEAST PLUME FENCE	N	Not Occupiable
C-615	D-10	SEWAGE DISPOSAL PLANT	Y	Occupiable
C-615-A	D-10	PRIMARY SETTLING TANK	N	Not Occupiable
C-615-B	D-10	FINAL SETTLING TANK	N	Not Occupiable
C-615-C	D-10	OIL CONTROL BUILDING	Y	Not Occupiable
C-615-D	D-10	DIGESTER	N	Not Occupiable
C-615-E	D-10	TRICKLING FILTER	N	Not Occupiable
C-615-F	D-10	TRICKLING FILTER SLUDGE BEDS	N	Not Occupiable
C-615-G	G-10	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H	G-8	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H1	J-9	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H2	G-8	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H3	J-9	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H4	G-12	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H4A	F-12	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H5	J-9	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H6	E-7	SEWAGE LIFT STATION	N	Not Occupiable
C-615-H7	H-8	CHROMATE LIFT STATION (ABANDONED)	N	Not Occupiable
C-615-H8	J-9	OIL CONTROL MONITORING STATION	N	Not Occupiable
C-615-J	H-10	LIFT STATION (ABANDONED)	N	Not Occupiable
C-615-K	G-8	CHROMATE LIFT STATION (ABANDONED)	N	Not Occupiable
C-615-L	D-9	OIL CONTROL BUILDING	N	No Longer Present
C-615-M	D-9	OIL CONTROL STRUCTURE	N	Not Occupiable
C-615-N	D-9	OIL CONTAINMENT LAGOON	N	Not Occupiable
C-615-O	D-9	OIL CONTROL BUILDING	Y	Occupiable
C-616	F-7	LIQUID POLLUTION ABATEMENT FACILITY	N	Not Occupiable
C-616-A	G-7	CHEMICAL FEED BUILDING	Y	Occupied
C-616-B	G-7	CLARIFIER (EAST)	N	Not Occupiable
C-616-C	G-7	LIFT STATION	N	Not Occupiable
C-616-D	G-7	SLUDGE LAGOON & VALVE PIT	N	Not Occupiable
C-616-E	F-6	SLUDGE LAGOON	N	Not Occupiable
C-616-F	F-6	FULL FLOW LAGOON	N	Not Occupiable
C-616-G	G-7	SULPHURIC ACID TANKS (4) (DEMOLISHED)	N	No Longer Present
C-616-H1	G-7	FESO4 STORAGE TANK (EAST)	N	Not Occupiable
C-616-H2	G-7	FESO4 STORAGE TANK (WEST)	N	Not Occupiable
C-616-J	G-7	REDUCTION TANK (EAST)	N	Not Occupiable
C-616-K	G-7	CHEMICAL FEED STORAGE BUILDING	Y	Not Occupiable
C-616-L	G-9	EFFLUENT CONTROL VAULT	N	Not Occupiable
C-616-M	F-7	CLARIFIER (WEST)	N	Not Occupiable
C-616-N	F-7	REDUCTION TANK (WEST)	N	Not Occupiable
C-616-P	G-7	SLUDGE LAGOON & VALVE PIT	N	Not Occupiable
C-616-Q	G-9	FLYASH SETTLING LAGOON	N	Not Occupiable
C-616-Sump	G-7	SUMP	N	Not Occupiable
C-617-A	J-10	EFFLUENT CONTROL STATION	N	Not Occupiable
C-617-B	J-10	EFFLUENT CONTROL LAGOON	N	Not Occupiable
C-617-C	J-13	WETLAND & POND for OUTFALL 013	N	Not Occupiable
C-620	I-10	AIR COMPRESSOR ROOM	Y	Not Occupiable
C-631-1	I-9	PUMP HOUSE	N	Not Occupiable
C-631-10	No Longer Present	Asbestos Storage Shed	N	No Longer Present
C-631-12	No Longer Present	Asbestos Storage Shed	N	No Longer Present
C-631-13	I-9	RCW EQUIPMENT STORAGE SHED	N	No Longer Present
C-631-15	H-9	EQUIPMENT STORAGE SHED	N	No Longer Present
C-631-2	I-9	COOLING TOWER	N	Not Occupiable
C-631-3	I-9	PUMP HOUSE (FIREWATER)	N	Not Occupiable
C-631-4	H-9	BLENDING PUMP HOUSE	N	Not Occupiable
C-631-5	H-9	BLENDING COOLING TOWER (WEST)	N	Not Occupiable
C-631-6	I-9	BLENDING COOLING TOWER (EAST)	N	Not Occupiable
C-631-T08	H-9	ASBESTOS DECON TRAILER	Y	No Longer Present
C-631-T09	H-9	ASBESTOS CREW BREAKROOM TRAILER	Y	No Longer Present
C-631-T10	H-9	ASBESTOS CREW STORAGE TRAILER	N	Not Occupiable
C-631-T11	H-9	INSTRUMENT MAINTENANCE TRAILER	Y	No Longer Present
C-631-T12	H-9	ASBESTOS CREW STORAGE TRAILER	N	Not Occupiable
C-631-T14	I-9	RCW SUPERVISOR OFFICE TRAILER	Y	No Longer Present
C-631-T16	H-9	MAINTENANCE TRAILER	Y	No Longer Present
C-633-1	J-12	PUMP HOUSE	N	Not Occupiable
C-633-2A	J-12	COOLING TOWER (SOUTH)	N	Not Occupiable
C-633-2B	J-12	COOLING TOWER (NORTH)	N	Not Occupiable
C-633-3	J-13	BLENDING PUMP HOUSE	N	Not Occupiable
C-633-4	J-12	BLENDING COOLING TOWER (NORTH)	N	Not Occupiable
C-633-5	J-12	BLENDING COOLING TOWER (SOUTH)	N	Not Occupiable
C-633-6	J-11	SAND FILTER BUILDING	N	Not Occupiable
C-634-B	J-12	ACID STORAGE TANK (Demolished - Conc. Cradle & Dike Only)	N	No Longer Present
C-635-1	G-8	BLENDING PUMP HOUSE and PIPING	N	Not Occupiable
C-635-2	G-8	BLENDING COOLING TOWER (NORTH)	N	Not Occupiable
C-635-3	G-8	BLENDING PUMP HOUSE	N	Not Occupiable
C-635-4	G-8	BLENDING COOLING TOWER (NORTH)	N	Not Occupiable
C-635-5	G-8	BLENDING COOLING TOWER (SOUTH)	N	Not Occupiable
C-635-6	G-8	PROCESS WASTE HEAT UTILIZATION PUMP HOUSE	N	Not Occupiable
C-637-1	J-8	PUMP HOUSE	N	Not Occupiable
C-637-2A	J-8	COOLING TOWER (SOUTH)	N	Not Occupiable
C-637-2B	J-8	COOLING TOWER (NORTH)	N	Not Occupiable
C-637-3	J-7	BLENDING PUMP HOUSE	N	Not Occupiable
C-637-4	J-7	BLENDING COOLING TOWER (NORTH)	N	Not Occupiable
C-637-5	J-8	BLENDING COOLING TOWER (SOUTH)	N	Not Occupiable
C-637-6	J-8	SAND FILTER BUILDING	N	Not Occupiable
C-709	G-10	PLANT LABORATORY ANNEX	Y	Occupied
C-710	G-10	TECHNICAL SERVICES BUILDING	Y	Not Occupiable
C-710-A	G-10	GAS CYLINDER STORAGE BUILDING	N	Not Occupiable
C-710-B	G-10	STORAGE SHED	N	No Longer Present
C-711	G-10	GAS MANIFOLD	N	Not Occupiable
C-712	G-10	ACID NEUTRALIZATION PIT	N	Not Occupiable
C-720	F-10	MAINTENANCE & STORES BUILDING	Y	Occupiable
C-720-A	F-10	COMPRESSOR SHOP	Y	Occupiable
C-720-B	F-10	MACHINE SHOP ADDITION	Y	Occupied
C-720-C	F-10	CONVERTOR SHOP ADDITION	Y	Occupiable
C-720-C1	F-10	PAINT SHOP	Y	Not Occupiable
C-720-D	F-10	TRANSFORMER BUILDING	Y	Not Occupiable
C-720-E	F-10	CHANGE HOUSE ADDITION	Y	Occupiable
C-720-G	F-10	WAREHOUSE	Y	Occupiable
C-720-H	F-10	WAREHOUSE	Y	Occupiable

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-720-J	G-10	AIR LOCK	Y	Occupiable
C-720-K	G-10	INSTRUMENT SHOP ADDITION	Y	Not Occupiable
C-720-L	G-10	OXYGEN FACILITY (TANK)	N	Not Occupiable
C-720-M	G-10	COMPUTER MAINTENANCE TRAILER	Y	Occupiable
C-720-M T01	G-10	IT STORAGE TRAILER	Y	Occupiable
C-720-M T02	G-10	IT STORAGE TRAILER	Y	Occupiable
C-720-M-T01	G-10	COMPUTER MAINTENANCE TRAILER	Y	Occupiable
C-720-M-T02	G-10	COMPUTER MAINTENANCE TRAILER	Y	Occupiable
C-720-N1	B-18	RAILROAD CLASSIFICATION YARD	N	Not Occupiable
C-720-R	F-10	MASS SPECTROMETER REPAIR TRAILER	Y	Occupiable
C-720-S	G-10	INSTRUMENT MAINTENANCE TRAILER	Y	Not Occupiable
C-720-T	F-10	ELECTRICAL MAINTENANCE TRAILER	Y	No Longer Present
C-720-T08	F-10	Mobile Office	Y	Occupiable
C-720-U	G-10	TRAILER	N	Not Occupiable
C-721	F-10	GAS MANIFOLD STORAGE	Y	Not Occupiable
C-722	F-10	ACID NEUTRALIZATION PIT	N	Not Occupiable
C-724-A	F-10	CARPENTER SHOP ANNEX	Y	Occupiable
C-724-B	F-10	CARPENTER SHOP	Y	Occupiable
C-724-C	F-10	PAINT SHOP	Y	Occupiable
C-724-D	F-9	LUMBER STORAGE BUILDING	Y	Not Occupiable
C-724-T01	F-9	CHANGE HOUSE TRAILER/ABANDONED	Y	No Longer Present
C-725	F-9	PAINT SHOP	Y	Occupiable
C-726	G-9	SANDBLAST BUILDING	Y	Not Occupiable
C-727	H-10	LOW LEVEL WASTE STORAGE	Y	Not Occupiable
C-728	F-9	MOTOR CLEANING FACILITY	Y	Occupiable
C-729	G-10	ACETYLENE BUILDING	Y	Not Occupiable
C-730	F-10	MAINTENANCE SERVICES	Y	Not Occupiable
C-730-A	F-11	STORM SHELTER	N	Not Occupiable
C-730-C	F-11	GRAVEL PARKING AREA (EAST)	N	Not Occupiable
C-730-D	E-11	GRAVEL PARKING AREA (WEST)	N	Not Occupiable
C-730-T01	F-10	OFFICE TRAILER	Y	Occupiable
C-730-T02	F-10	OFFICE TRAILER	Y	Occupied
C-730-T05	F-11	OFFICE TRAILER	Y	Occupied
C-730-T06	F-11	OFFICE TRAILER	Y	Occupiable
C-731	E-9	RAILROAD REPAIR EQUIPMENT STORAGE BUILDING	Y	Not Occupiable
C-732	E-9	MAINTENANCE MATERIALSSTORAGE BUILDING (SALT)	Y	Not Occupiable
C-732-1	E-9	MAINTENANCE MATERIALS STORAGE BUILDING (SALT)	N	Not Occupiable
C-733	E-9	WASTE OIL & CHEMICAL STORAGE FACILITY	Y	Occupiable
C-740	E-10	MATERIAL YARD	N	Not Occupiable
C-740-A	E-10	SEMI-TRAILER UNLOADING FACILITY	N	Not Occupiable
C-740-B	E-10	OIL DRUM STORAGE SHELTER	N	Not Occupiable
C-741	F-10	MOBILE EQUIPMENT SHED	N	Not Occupiable
C-742	F-10	CYLINDER STORAGE BUILDING	Y	Not Occupiable
C-742-B	D-8	Cl F3 CYLINDER STORAGE	Y	Not Occupiable
C-743	E-10	OFFICE BUILDING	Y	Not Occupiable
C-743 COMP	Area	Environmental Trailer Complex	N	Not Occupiable
C-743-A	E-10	HEALTH PHYSICS STORAGE	N	Not Occupiable
C-743-A1	E-10	STORAGE SHED	N	Not Occupiable
C-743-A2	E-10	STORAGE SHED	N	Not Occupiable
C-743-B	E-10	STORM SHELTER	N	Not Occupiable
C-743-C	E-10	STORM SHELTER	N	Not Occupiable
C-743-D	E-10	WOODEN STORAGE BLDG.	N	Not Occupiable
C-743-T01	F-10	OFFICE TRAILER	Y	Occupiable
C-743-T02	F-10	OFFICE TRAILER	Y	Occupiable
C-743-T03	E-10	OFFICE TRAILER	Y	No Longer Present
C-743-T04	E-10	CHANGE HOUSE / SHOWER TRAILER	Y	No Longer Present
C-743-T07	E-10	OFFICE TRAILER	Y	No Longer Present
C-743-T09	F-10	OFFICE TRAILER	Y	Occupiable
C-743-T11	E-10	OFFICE TRAILER	Y	No Longer Present
C-743-T12	E-10	OFFICE TRAILER	Y	Occupied
C-743-T13	E-10	OFFICE TRAILER	Y	Occupiable
C-743-T14	E-10	OFFICE TRAILER	Y	Occupied
C-743-T15	E-10	OFFICE TRAILER	Y	Occupied
C-743-T16	E-10	MATERIAL HANDLING TRAILER	Y	Occupiable
C-743-T17	E-10	FIELD SUPPORT LAB TRAILER	Y	Occupiable
C-743-T17-A	E-10	FIELD SUPPORT & LAB SHELTER	Y	Occupiable
C-743-T18	E-10	SHED	N	Not Occupiable
C-744	F-9	LUBRICATION BUILDING	Y	Not Occupiable
C-745-A	E-9	CYLINDER STORAGE	N	Not Occupiable
C-745-A1	D-9	FLUORINE STORAGE YARD	N	Not Occupiable
C-745-A-SW	D-9	CYLINDER STORAGE	N	Not Occupiable
C-745-B	E-8	CYLINDER STORAGE	N	Not Occupiable
C-745-B1	E-8	CYLINDER STORAGE YARD OFFICE	Y	Not Occupiable
C-745-C	F-8	CYLINDER STORAGE	N	Not Occupiable
C-745-C-T03	F-8	OFFICE TRAILER	Y	Occupiable
C-745-C-T04	F-8	OFFICE TRAILER	Y	Not Occupiable
C-745-D	I-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-E	J-9	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-F	H-12	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-G	H-12	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-G1	H-12	BASIN LIFT STATION	N	Not Occupiable
C-745-G6	No Longer Present	Cylinder Painting Trailer	N	No Longer Present
C-745-G-T01	H-12	REMOVED - CYLINDER PAINT FACILITY TRAILER	N	No Longer Present
C-745-H	J-7	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-J	J-7	RADIOACTIVE MATERIAL STORAGE YARD	N	Not Occupiable
C-745-K	H-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-L	H-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-M	H-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-N	I-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-P	I-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-Q	I-12	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-R	I-12	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-R1	I-13	CYLINDER CHANGEOUT BUILDING	Y	Not Occupiable
C-745-S	H-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-T	I-14	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-U	I-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-V	J-13	CYLINDER STORAGE YARD	N	Not Occupiable
C-745-W	I-13	CYLINDER YARD HIGH ACTIVITY R.R. PAD	N	Not Occupiable
C-745-X	I-12	EQUIPMENT STORAGE YARD	N	Not Occupiable
C-745-Y	J-8	EQUIPMENT STORAGE YARD	N	Not Occupiable
C-745-Z	J-8	EQUIPMENT STORAGE YARD	N	Not Occupiable
C-745-Z1	J-7	CONSTRUCTION SPOILS AREA	N	Not Occupiable
C-746-U4 to -U9	I-3	Sealand	N	Not Occupiable
C-746-A	F-7	NORTH WAREHOUSE (METAL FURNACE & SCRAP RECOVERY)	Y	Not Occupiable
C-746-A SLABS	NA	Slabs from D&D east/west ends (H3 & V)	N	Not Occupiable
C-746-A1	No Longer Present	UST	N	No Longer Present
C-746-A2	No Longer Present	UST	N	No Longer Present
C-746-A-H3	F-7	SLAB ONLY	N	No Longer Present
C-746-A-V	F-7	SLAB ONLY	N	No Longer Present
C-746-B	F-7	SLAB ONLY - former SOUTH WAREHOUSE	N	No Longer Present
C-746-B SLAB	No Longer Present	Slab Only - former South Warehouse	N	No Longer Present
C-746-B1	F-7	STAGING AREA	N	Not Occupiable
C-746-B-T01	F-7	OFFICE TRAILER	Y	No Longer Present

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-746-C	F-7	CLEAN SCRAP YARD (NORTH)	N	Not Occupiable
C-746-C1	F-7	CLEAN SCRAP YARD (SOUTH)	N	Not Occupiable
C-746-D	J-9	CLASSIFIED SCRAP YARD	N	Not Occupiable
C-746-E	F-7	CONTAMINATED SCRAP YARD (NORTH)	N	Not Occupiable
C-746-E1	F-7	CONTAMINATED SCRAP YARD (SOUTH)	N	Not Occupiable
C-746-F	E-7	CLASSIFIED SCRAP BURIAL YARD	N	Not Occupiable
C-746-G	J-9	ELECTRICAL EQUIPMENT STORAGE	N	Not Occupiable
C-746-G-T01	J-9	TRAILER	Y	Not Occupiable
C-746-G-T02	J-9	TRAILER	Y	No Longer Present
C-746-H1	F-9	PEM STORAGE SLAB	N	Not Occupiable
C-746-H2	F-9	PEM STORAGE SLAB	N	Not Occupiable
C-746-H3	F-9	PEM STORAGE SLAB	N	Not Occupiable
C-746-H4	F-7	NICKEL INGOT STORAGE PAD	N	Not Occupiable
C-746-K	D-11	SANITARY LANDFILL	N	Not Occupiable
C-746-L	I-3	TRACTOR STORAGE SHED	N	No Longer Present
C-746-M	F-9	SLAB ONLY - former WASTE ASKAREL STORAGE FACILITY	N	No Longer Present
C-746-M SLAB	No Longer Present	Slab Only - former Waste Askarel Storage Facility	N	No Longer Present
C-746-N	F-7	PAD	N	Not Occupiable
C-746-P	E-7	SCRAP METAL YARD (EAST)	N	Not Occupiable
C-746-P COMP-E	NA	C-746-P Complex Electrical	N	Not Occupiable
C-746-P COMP-S	NA	C-746-P Complex Sewer	N	Not Occupiable
C-746-P COMP-W	NA	C-746-P Complex Water	N	Not Occupiable
C-746-P1	E-7	SCRAP METAL YARD (WEST)	N	Not Occupiable
C-746-P-T01	E-7	SCRAP METAL TRAILER	Y	Occupiable
C-746-P-T03	E-7	SCRAP METAL TRAILER (ABANDONED)	Y	Occupiable
C-746-P-T04	E-7	SCRAP METAL TRAILER	Y	Occupiable
C-746-P-T04-A	E-7	SCRAP METAL TRAILER	Y	Not Occupiable
C-746-P-T05	F-7	SCRAP METAL TRAILER	Y	No Longer Present
C-746-Q	I-12	HAZARDOUS & LLW STORAGE FACILITY	Y	Occupiable
C-746-Q1	I-12	HIGH ASSAY WASTE STORAGE BUILDING	Y	Not Occupiable
C-746-R	H-12	ORGANIC WASTE STORAGE AREA	N	Not Occupiable
C-746-S	I-4	NEW SANITARY LANDFILL AREA	N	Not Occupiable
C-746-S1	I-3	LANDFILL SERVICE BUILDING	Y	No Longer Present
C-746-S2	I-3	SHED	N	No Longer Present
C-746-S3	I-3	SHED	N	No Longer Present
C-746-S4	I-3	SHED	N	No Longer Present
C-746-S-T01	I-3	Trailer	Y	Occupiable
C-746-T	I-4	INDUSTRIAL LANDFILL	N	Not Occupiable
C-746-T14	H-3	TRAILER	Y	Occupiable
C-746-U	I&J-1&2	LANDFILL I&J-1&2	N	Not Occupiable
C-746-U1	H-3	LEACHATE OFFICE BUILDING	Y	Not Occupiable
C-746-U10	I-3	STORAGE BUILDING	N	Not Occupiable
C-746-U11	I-3	STORAGE BUILDING	N	Not Occupiable
C-746-U12	H-3	STORAGE BUILDING	N	Not Occupiable
C-746-U13	I-2	STORM SHELTER	N	Not Occupiable
C-746-U15	I-2	LEACHATE TREATMENT FACILITY	Y	Not Occupiable
C-746-U16	I-2	LEACHATE STORAGE FACILITY	Y	Occupiable
C-746-U2	H-3	LANDFILL EQUIPMENT BUILDING	Y	Occupiable
C-746-U3	I-2	LEACHATE FACILITY	Y	Occupiable
C-746-U3/C-746-U03	I-2	LEACHATE FACILITY	N	Not Occupiable
C-746-U4	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U4	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U5	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U6	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U7	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U8	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U9	I-3	SEALAND STORAGE CONTAINERS	N	Not Occupiable
C-746-U-Fence	NA	C-746-U Landfill Fence	N	Not Occupiable
C-746-U-Pond	I&J-2	Landfill Holding Pond	N	Not Occupiable
C-746-U-S	H-3	TRUCK SCALE	N	Not Occupiable
C-746-U-T14	H-3	TRAILER SHOWER	Y	Occupiable
C-746-V	F-8	WASTE STAGING PAD	N	Not Occupiable
C-746-X	I-7	ELECTRICAL EQUIPMENT STORAGE BUILDNG	N	Not Occupiable
C-747	E-9	BURIAL AREA (INACTIVE)	N	Not Occupiable
C-747-A	E-7	BURIAL AREA (INACTIVE)	N	Not Occupiable
C-747-A-T01	E-7	HP ACCESS TRAILER	Y	No Longer Present
C-747-B	E-7	BURIAL AREA (INACTIVE)	N	Not Occupiable
C-747-C	E-9	OIL LANDFARM AREA	N	Not Occupiable
C-747-D	F-9	PAD	N	Not Occupiable
C-747-E	F-9	PAD	N	Not Occupiable
C-747-F	F-9	TRAILER	Y	Not Occupiable
C-747-FENCE	NA	C-747 Fence	N	Not Occupiable
C-747-T07		Trailer, H3 Pad Office	Y	Occupiable
C-748-A	D-11	KOW DISPOSAL AREA (INACTIVE)	N	Not Occupiable
C-748-B	E-9	BURIAL AREA (INACTIVE)	N	Not Occupiable
C-749	E-8	URANIUM SCRAP BURIAL YARD (INACTIVE)	N	Not Occupiable
C-750	G-10	GARAGE BUILDING	Y	Occupiable
C-751	F-10	GRAVEL AREA - former FUEL DISPENSING FACILITY	N	No Longer Present
C-752	G-8	WASTE HOLDING PAD	N	Not Occupiable
C-752-A	F-8	STORAGE FACILITY	Y	Not Occupiable
C-752-A-ENC	F-8	WASTE CONTAINMENT ENCLOSURE	N	Not Occupiable
C-752-A-T09	F-8	WASTE OPERATIONS OFFICE TRAILERS	Y	Occupied
C-752-A-T10	F-8	WASTE OPERATIONS OFFICE TRAILERS	Y	Occupiable
C-752-B	E-11	FUELING STATION	N	Not Occupiable
C-752-B-T01	E-11	FUELING STATION TRAILER	Y	Occupiable
C-752-C	E-11	OFFSITE DECONTAMINATION FACILITY	Y	Not Occupiable
C-752-C-T01	E-11	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-752-C-T01 through T08	E-11	SEALAND STORAGE TRAILERS	N	Not Occupiable
C-752-D	E-11	PARKING AREA (EAST + WEST)	N	Not Occupiable
C-752-D	E-11	PARKING AREA (EAST + WEST)	N	Not Occupiable
C-753-A	G-8	TSCA STORAGE FACILITY	Y	Not Occupiable
C-754	H-9	LOW LEVEL WASTE STORAGE	N	Not Occupiable
C-754-A	H-9	WASTE MANAGEMENT STAGING AREA	N	Not Occupiable
C-754-B	I-9	LOW LEVEL WASTE STORAGE	Y	Occupied
C-755	J-9	C-755 TRAILER COMPLEX	N	Not Occupiable
C-755-A	J-9	MAINTENANCE SHOP	Y	Occupiable
C-755-A1	J-9	STORAGE SHED	N	Not Occupiable
C-755-B	K-9	CHANGE HOUSE BUILDING	Y	Occupiable
C-755-C	J-9	STORAGE SHED	N	Not Occupiable
C-755-D	K-9	GUARD SHACK	Y	Not Occupiable
C-755-E	J-9	UNDERGROUND STORM SHELTER	N	Not Occupiable
C-755-ES	NA	C-755 Electrical Distribution System	N	Not Occupiable
C-755-F	J-9	UNDERGROUND STORM SHELTER	N	Not Occupiable
C-755-FENCE	NA	C-755 Fence	N	Not Occupiable
C-755-G	K-9	UNDERGROUND STORM SHELTER	N	Not Occupiable
C-755-H	J-9	UNDERGROUND STORM SHELTER	N	Not Occupiable
C-755-J	J&K-9	Sealand Storage Trailer	N	Not Occupiable
C-755-K	J&K-9	Sealand Storage Trailer	N	Not Occupiable
C-755-L	J&K-9	Sealand Storage Trailer	N	Not Occupiable
C-755-M	K-9	STORAGE BUILDING	N	Not Occupiable
C-755-M1	J-9	STORAGE BUILDING	N	Not Occupiable
C-755-M2	J-9	STORAGE BUILDING	N	Not Occupiable
C-755-M3	J-9	STORAGE BUILDING	N	Not Occupiable

Table B.1. Facility Occupancy List

Facility Number	Map Location	Facility Description	Building?	Status?
C-755-M4	K-9	STORAGE SHED	N	Not Occupiable
C-755-N	K-9	EAST EXTENDED PARKING LOT	N	Not Occupiable
C-755-P	J-9	GRAVEL PARKING LOT	N	Not Occupiable
C-755-Q	J&K-9	Sealand Storage Trailer	N	Not Occupiable
C-755-R	K-9	SEALAND STORAGE	N	Not Occupiable
C-755-S	K-9	OFFICE TRAILER	Y	Occupiable
C-755-T	K-9	STORAGE SHED	N	Not Occupiable
C-755-T01	J-9	OFFICE TRAILER	Y	Occupied
C-755-T02	K-9	OFFICE TRAILER	Y	Occupied
C-755-T03	J-9	OFFICE TRAILER	Y	Occupied
C-755-T04	K-9	OFFICE TRAILER	Y	Occupiable
C-755-T05	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T06	K-9	OFFICE TRAILER	Y	Occupied
C-755-T07	K-9	OFFICE TRAILER	Y	Occupiable
C-755-T08B	K-9	SHOWER & CHANGE TRAILER	Y	Occupied
C-755-T09	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T10	K-9	STORAGE TRAILER	N	Not Occupiable
C-755-T11	K-9	STORAGE TRAILER	N	No Longer Present
C-755-T12	K-9	STORAGE TRAILER	N	No Longer Present
C-755-T13	J-9	SEALAND STORAGE	N	Not Occupiable
C-755-T14	J-9	SEALAND STORAGE	N	Not Occupiable
C-755-T15	J-9	SEALAND STORAGE	N	No Longer Present
C-755-T16	J-9	RADCON TRAILER	Y	Occupiable
C-755-T17	J-9	CHANGEHOUSE / SHOWER TRAILER	Y	No Longer Present
C-755-T17A	J-9	SHOWER TRAILER	Y	Occupiable
C-755-T18	J-9	FIELD OFFICE TRAILER	Y	Occupiable
C-755-T19	J-9	OFFICE BREAK TRAILER	Y	Occupiable
C-755-T20	J-9	OFFICE BREAK TRAILER	Y	Occupiable
C-755-T21	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T22A	J-9	INSTRUMENT LAB TRAILER	Y	Occupiable
C-755-T23	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T24	K-9	SEALAND STORAGE	N	Not Occupiable
C-755-T25	K-9	SEALAND STORAGE	N	No Longer Present
C-755-T26	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T27	J-9	OFFICE TRAILER	Y	Occupiable
C-755-T28	J-9	OFFICE TRAILER	Y	Occupiable
C-755-U	J-9	EQUIPMENT SHEDS (8)	N	Not Occupiable
C-755-V	K-9	SALT STORAGE	N	Not Occupiable
C-755-W	K-9	OFFICE TRAILER	Y	Occupiable
C-755-X	K-9	STORAGE SHED	N	Not Occupiable
C-755-Y	J&K-9	Sealand Storage Trailer	N	Not Occupiable
C-755-Z	K-9	STORAGE TRAILER	N	Not Occupiable
C-757	G-7	SOLID & LL WASTE PROCESS FACILITY	N	Not Occupiable
C-757-T01	G-7	HEALTH PHYSICS OFFICE TRAILER	Y	No Longer Present
C-759	F-8	SCRAP METAL STAGING AREA	N	Not Occupiable
C-759-A	F-8	ISOCS - In Situ Object Counting System	N	Not Occupiable
C-759-B	J&K-9	Staging Area - Gravel Pad	N	Not Occupiable
C-760	G-7	North-South Diversion Ditch (NSDD) LAYDOWN GRAVEL PAD	N	Not Occupiable
C-760-A	G-7	NSDD SURGE BASIN	N	Not Occupiable
C-761	G-14	WASTE DISPOSITION STAGING	N	Not Occupiable
C-762	J-6	EQUIPMENT STAGING PAD	N	Not Occupiable
C-764	Area	Construction Trailer Complex	N	Not Occupiable
C-764 SS	D&E-10	Storm Shelters (12)	N	Not Occupiable
C-764-A	D-10	PARKING AREA	N	Not Occupiable
C-764-B	E-10	SANITARY WATER VAULT	N	Not Occupiable
C-764-C	No Longer Present	Sanitary Water Vault	N	No Longer Present
C-764-T01	D-10	OFFICE TRAILER	Y	Occupied
C-764-T02	D-10	OFFICE TRAILER	Y	Occupied
C-764-T03	D-10	OFFICE TRAILER	Y	Occupied
C-764-T04	D-10	OFFICE TRAILER	Y	Occupied
C-764-T05	D-10	OFFICE TRAILER	Y	Occupied
C-764-T06	D-10	OFFICE TRAILER	Y	Occupied
C-764-T07	D-10	OFFICE TRAILER	Y	Occupied
C-764-T08	D-10	OFFICE TRAILER	Y	Occupied
C-764-T09	D-10	OFFICE TRAILER	Y	Occupied
C-764-T10	E-10	OFFICE TRAILER	Y	Occupiable
C-764-T11	E-10	CHANGE HOUSE TRAILER	Y	Occupiable
C-765	K-8	NE PLUME ALT. TREATMENT SYSTEM	N	Not Occupiable
C-765-A	J-9	NEW NE PLUME CONTAINMENT SYSTEM	N	Not Occupiable
C-770	D-8	STAGING AREA - former VORTEC DEMONSTRATION PLANT	N	Not Occupiable
C-800	G-11	MOTORCYLCE PARKING SHELTER	N	Not Occupiable
C-801	G-10	SLAB ONLY - former BUS SHELTER	N	No Longer Present
C-802	G-12	METEOROLOGICAL TOWER	N	Not Occupiable
C-802-A	G-12	RADIO COMMUNICATION BUILDING	Y	Not Occupiable
C-802-B	G-12	METEOROLOGICAL EQUIPMENT BUILDING	Y	Not Occupiable
C-810	G-11	PARKING AREA (C-100)	N	Not Occupiable
C-811	F-11	PARKING AREA (C-720)	N	Not Occupiable
C900057 (BRIDGE 1)	E&F-16	South Acid Road Bridge	N	Not Occupiable
C900057 (BRIDGE 2)	C-7	Transport Road Bridge	N	Not Occupiable
C-AREA	NA	Railroads (inside CAA)	N	Not Occupiable
C-RR	NA	Railroad Tracks 1&2 Outside CAA	N	Not Occupiable
C-RR-T	E-12	Railroad Trestle Outside CAA	N	Not Occupiable
CY-Fence	NA	Cylinder Yard Fence	N	Not Occupiable
Low Water Crossing	A-12	Rice Springs Low Water Crossing	N	Not Occupiable
NEPCS-2	M-7	NEPCS Alternate System at C-637-2A	N	Not Occupiable
PCB-310	C-310	PCB Troughing in C-310	N	Not Occupiable
PCB-315	C-315	PCB Troughing in C-315	N	Not Occupiable
PCB-331	C-331	PCB Troughing in C-331	N	Not Occupiable
PCB-333	C-333	PCB Troughing in C-333	N	Not Occupiable
PCB-335	C-335	PCB Troughing in C-335	N	Not Occupiable
PCB-337	C-337	PCB Troughing in C-337	N	Not Occupiable
Post 92 (former C-227)	No Longer Present	Post 92 (guard shack removed)	N	No Longer Present
Raw Water Supply Line	NA	Raw Water Supply Lines from TVA	N	Not Occupiable
Roads "Gravel"	NA	Roads Gravel	N	Not Occupiable
Roads Paved	NA	Asphalt/Concrete	N	Not Occupiable
Water Works Bridge	D-10	Water Works Bridge	N	Not Occupiable
C-208	F-12	FIRING RANGE	Y	Not Occupiable
C-310-335	H-9	TIE LINE	N	Not Occupiable
C-104	G-16	ACCESS CONTROL FACILITY	Y	Occupied
C-213	G-16	HOBBS ROAD ACCESS POINT	N	Not Occupiable
A1-A2	B-17	Public Warning System Sirens	N	Not Occupiable
B1-B2	M-12	Public Warning System Sirens	N	Not Occupiable
C1-C2	K-4	Public Warning System Sirens	N	Not Occupiable
D1-D2	C-5	Public Warning System Sirens	N	Not Occupiable
C-340-A	J-10	Slab Only - former Metals Plant	N	No Longer Present
C-410-T01	H-9	TRAILER	N	No Longer Present
C-750-A,B,C,D	G-10	UST or Storage Tanks (Removed)	N	No Longer Present
C-751-E	F-10	UST (Removed)	N	No Longer Present
C-751-W	F-10	UST (Removed)	N	No Longer Present
C-755-T08A	K-9	Office Trailer (Gone)	N	No Longer Present
C-746	E-8	Abandoned General Electric (GE) Betz Tank	N	Not Occupiable

Note:
Information checked and revised as of 2/14/2020.

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Appendix B Preliminary Investigation Datasets (CD)

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APPENDIX C

FACILITY WALKDOWN INFORMATION

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ACRONYMS

AST	aboveground storage tank
EQP	equipment
GW	groundwater
RCRA	Resource Conservation and Recovery Act
RGA	Regional Gravel Aquifer
UCRS	Upper Continental Recharge System

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Table C.1. Summary of Walkdown Information

Facility Number	Facility Description	Occupancy Status	PI Inclusion Rationale	Max RGA GW TCE Conc (based on 2018 plume) beneath Facility (μg/L)	Max Cumulative Normalized UCRS GW Conc within 100 ft of Facility (μg/L)	PI Soil Analytes Detected within 100 ft of Facility? (Y/N)	Facility Size (square ft)[1]	Walkdown Notes	Plan to Sample?	Sampling Rationale if Not Planned to Sample	Building Type	Office Staff	Non-Office Staff	Does the Facility Have a Basement?
C-100	ADMINISTRATION BUILDING	Occupied	Soil	outside plume	N/A[3]	Yes	20000-50000	Offices with Basement	Yes	-	Building with Basement	Yes	No	Yes
C-103	DOE SITE OFFICE & ANNEX	Occupied	Soil	outside plume	N/A[3]	Yes	5000-20000	Site Offices	Yes	-	Slab on Grade Structure	Yes	No	No
C-200	GUARD & FIRE HEADQUARTERS	Occupied	UCRS GW and Soil	outside plume	1-10	Yes	5000-20000	Police/Fire	Yes	-	Building with Basement	Yes	No	Yes
C-204	DISINTEGRATOR BUILDING	Not Occupiable	UCRS GW	outside plume	1-10	No	<1000	Incinerator	No	Holes in walls; not occupiable. Not part of building group.	Slab on Grade Structure	No	No	No
C-207	FIRE TRAINING FACILITY	Not Occupiable	Soil	outside plume	N/A[3]	Yes	<1000	Fire Training	No	Holes in walls; not occupiable. Not part of building group.	Slab on Grade Structure	No	No	No
C-301	FIRE TRAINING BUILDING	Not Occupiable	RGA GW	100-1000	N/A[3]	No	1000-5000	No Roof	No	No roof	Slab on Grade Structure	No	No	No
C-304	TRAINING & CASCADE OFFICE BUILDINC	Occupiable	Soil	outside plume	N/A[3]	Yes	5000-20000	Offices	Yes	-	Slab on Grade Structure	Yes	No	No
C-310	PURGE & PRODUCT BUILDING	Occupiable	Soil	5-100	N/A[3]	Yes	>50000	Former Process Building	Yes	-	Building with Basement	No	Yes	Yes
C-337	PROCESS BUILDING	Occupied	RGA GW	100-1000	N/A[3]	No	>50000	Process Building	Yes	-	Building with Basement	Yes	Yes	Yes
C-337-A	FEED VAPORIZATION FACILITY	Occupiable	RGA GW	100-1000	N/A[3]	No	5000-20000	Office/Bath	Yes	-	Slab on Grade Structure	No	No	No
C-350	DRYING AGENT STORAGE BUILDING	Not Occupiable	RGA GW	100-1000	N/A[3]	No	1000-5000	$\mathrm{CIF_3}$ Tanks	No	Not occupiable tank buildings. Not part of building group.	Slab on Grade Structure	No	No	No
C-360	TOLL TRANSFER & SAMPLING BUILDINC	Not Occupiable	RGA GW	100-1000	N/A[3]	No	20000-50000	Deactivated	No	Building deactivated	Building with Basement	No	No	Yes
C-360A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Occupiable	RGA GW	100-1000	N/A[3]	No	5000-20000	Vehicle and heavy equipment maintenance	Yes	-	Slab on Grade Structure	Yes	Yes	No
C-409	STABILIZATION BUILDING	Occupied	RGA/UCRS GW and Soil	100-1000	1-10	Yes	20000-50000	Big Ovens/Lab	Yes	-	Slab on Grade Structure	No	No	No
C-410-K	FLUORENE FACILITY BUILDING	Occupiable	RGA GW and Soil	1000-10000	N/A[3]	Yes	1000-5000	F2 Process	Yes	-	Slab on Grade Structure	No	No	No
C-410-L[4]	QUONSET HUT	Not Occupiable	RGA GW	1000-10000	N/A[3]	No	<1000	Spill Quonset	No	Not occupiable spill response. Part of building group; include C-410K instead	Slab on Grade Structure	No	No	No
C-412-T11A	SHOWER & CHANGE TRAILER	Occupied	UCRS GW	5-100	10-100	No	1000-5000	Female and Male Change Trailer	Yes	-	Trailer (Skirted)	No	Yes	No
C-615	SEWAGE DISPOSAL PLANT	Occupiable	Soil	outside plume	N/A[3]	Yes	20000-50000	Sewage Plant	Yes	-	Building with Basement	No	Yes	Yes
C-720	MAINTENANCE & STORES BUILDING	Occupiable	UCRS GW and Soil	5-100	10-100	Yes	>50000	Stores; Maintenance Shops. C-720 and C-720C are connected; will be assessed together.	Yes	-	Slab on Grade Structure	Yes	Yes	No
C-724-B	CARPENTER SHOP	Occupiable	RGA GW and Soil	100-1000	N/A[3]	Yes	1000-5000	Carpenter Shop. C-724A and C-724B are connected; will be assessed together.	Yes	-	Slab on Grade Structure	No	Yes	No
C-720-C	CONVERTOR SHOP ADDITION	Occupiable	Soil	5-100	N/A[3]	Yes	20000-50000	Stores; Maintenance Shops. C-720 and C-720C are connected; will be assessed together.	Yes	-	Slab on Grade Structure	Yes	Yes	No
C-720-G	WAREHOUSE	Occupiable	Soil	outside plume	N/A[3]	Yes	5000-20000	Future Occupied	Yes	-	Slab on Grade Structure	Yes	Yes	No
C-724-A	CARPENTER SHOP ANNEX	Occupiable	Soil	5-100	N/A[3]	Yes	5000-20000	Carpenter Shop. C-724A and C-724B are connected; will be assessed together.	Yes	-	Slab on Grade Structure	No	Yes	No
C-725	PAINT SHOP	Occupiable	RGA GW	100-1000	N/A[3]	No	1000-5000	Paint Shop/Storage; Occupied	Yes	-	Slab on Grade Structure	No	No	No
C-728	MOTOR CLEANING FACILITY	Not Occupiable	RGA/UCRS GW and Soil	100-1000	10-100	Yes	1000-5000	Holes in Walls; Abandoned	No	Not occupiable; holes in walls; abandoned	Slab on Grade Structure	No	No	No
C-746-U1	LEACHATE OFFICE BUILDING	Occupiable	Unique CSM[2]	outside plume	N/A[3]	No	<1000	Landfill Leachate Office	Yes	-	Trailer (No Skirt)	Yes	Yes	No
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	Occupied	RGA GW and Soil	1000-10000	N/A[3]	Yes	<1000	Breakroom	Yes	-	Trailer (Skirted)	Yes	Yes	No
C-752-B-T01	FUELING STATION TRAILER	Occupiable	Soil	outside plume	N/A[3]	Yes	<1000	AST Trailer	Yes	-	Trailer (Skirted)	No	No	No
C-754-B	LOW LEVEL WASTE STORAGE	Occupied	RGA GW	100-1000	N/A[3]	Yes	1000-5000	Police Training; No Floor Slab	Yes	-	No Slab	No	Yes	No
C-755-T16	RADCON TRAILER	Occupiable	RGA GW	100-1000	N/A[3]	No	<1000	Change/Shower Trailer	Yes	-	Trailer (Skirted)	No	Yes	No
C-755-T27	OFFICE TRAILER	Occupiable	RGA GW and Soil	100-1000	N/A[3]	Yes	1000-5000	Operations & Maintenance Office	Yes	-	Trailer (Skirted)	Yes		No
C-764-T03	OFFICE TRAILER	Occupied	Soil	outside plume	N/A[3]	Yes	1000-5000	Offices	Yes	-	Trailer (Skirted)	Yes	No	No

Notes: Information checked and revised as of 2/14/2020; all Preliminary Investigation facilities were determined to be "buildings" based on the 2015 OSWER VI guidance.

[1] Facility size not used in ranking or PI facility selection process.

[2] Facility included for sampling because it is loacted near a landfill.

[3] Facility is not located within 100 ft of a UCRS monitoring well or all concentrations of analytes in the well are non-detect.

[4] Replaced with C-410-K during walkdowns February 11-14, 2020.

Table C.1. Summary of Walkdown Information

Facility Number	Facility Description	If Yes, Is Basement Occupied?	Above Grade Construction	Basement Type	Basement Floor	Basement Floor (2)	Concrete Floor	Foundation Walls	Foundation Walls (2)	The Basement Is	Does the Basement Feel Drafty	Sump Present	Water In Sump?	Basement depth below grade?	Potential Soil Vapor Entry Points	Type of Ground Cover around Outside of Building	Is the Building Insulated?	How Air Tight?	Age of Building	Describe location of any Tunnels
C-100	ADMINISTRATION BUILDING	Seldom	Concrete	Full	Concrete	Uncovered	Unsealed	Poured	Unsealed	Dry	No	Yes	Yes	15		Grass/concrete/asphalt	Yes	Tight	54	N/A
C-103	DOE SITE OFFICE & ANNEX	N/A	Concrete	N/A	N/A	N/A	Unsealed	Poured	Unsealed	N/A	N/A	N/A	N/A	N/A	Utility Pen and Floor Drains	Grass/concrete/asphalt	Yes	Tight	25	N/A
C-200	GUARD & FIRE HEADQUARTERS	Almost Never	Block Concrete	Full	Concrete	Damaged from Flooding	Unsealed	block	Sealed with Paint	Wet	No	Yes	Yes	10	Yes	Concrete/Grass	No	Tight	1950's	N/A
C-204	DISINTEGRATOR BUILDING	N/A	Steel	N/A	N/A	N/A	unsealed	N/A	N/A	N/A	N/A	No	N/A	N/A	NA	Asphalt/Concrete	No	Not Tight		N/A
C-207	FIRE TRAINING FACILITY	N/A	Steel	N/A	N/A	N/A	Unsealed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	Concrete	No	Not Tight		N/A
C-301	FIRE TRAINING BUILDING	N/A	Steel	N/A	N/A	N/A	Unsealed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	Concrete	No	Not Tight		N/A
C-304	TRAINING & CASCADE OFFICE BUILDING	N/A	Brick	N/A	N/A	N/A	Unsealed	Poured	Unsealed	NA	NA	N/A	N/A	N/A	Floor Drains	Grass/concrete/asphalt	No	Tight		N/A
C-310	PURGE & PRODUCT BUILDING	Almost Never			Concrete	Uncovered		Poured	Unsealed	Dry	No	Yes	Unknown	15	Sump, Floor Drain	Asphalt/Gravel	No	Average	1940's	Tunnel to300 and 331
C-337	PROCESS BUILDING	Seldom	Corrugated Steel	Full	Concrete	Uncovered	Unsealed	Poured	Unsealed	Dry	No	Yes	Yes	12	Sealed Drain	Grass/Concrete	No	Average	1950's	From Basement to N & S
C-337-A	FEED VAPORIZATION FACILITY	N/A	Block Concrete	N/A	N/A	N/A	Flooring	block	Sealed with Paint	N/A	N/A	No	N/A	N/A	N/A	Concrete	No	Average		N/A
C-350	DRYING AGENT STORAGE BUILDING	N/A	Block Concrete	N/A	N/A	N/A	Unsealed	N/A	N/A	N/A	N/A	No	N/A	N/A		Grass	No	Average		N/A
C-360	TOLL TRANSFER & SAMPLING BUILDING	N/A	Concrete/Steel	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not described	Asphalt				N/A
C-360A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	N/A	Steel	N/A	N/A	N/A	Unsealed	Poured	Unsealed	N/A	N/A	N/A	N/A	N/A	Cracks in slab	Concrete	Yes	Not Tight		N/A
C-409	STABILIZATION BUILDING	N/A	Steel	N/A	N/A	N/A	Sealed with Paint	N/A	N/A	N/A	N/A	No	N/A	N/A	Expansion Joints, Utility Trench, Lube oil pits, Trenching under Ovens	Grass/Concrete/Asphalt	Yes	Average	1970's	N/A
C-410-K	FLUORENE FACILITY BUILDING	N/A	Steel	N/A	N/A	N/A	Unsealed	Poured	N/A	N/A	N/A	N/A	N/A	N/A	Floor drain, perimeter joint in comcrete floor	Grass/Concrete	Yes	Average	1991	N/A
C-410-L[4]	QUONSET HUT	N/A	Steel	N/A	N/A	N/A	Unsealed	N/A	N/A	N/A	N/A	No	N/A	N/A	No	Gravel	No	Average	Newer	N/A
C-412-T11A	SHOWER & CHANGE TRAILER	N/A	Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Floor Drains	Grass/Gravel	Yes	Tight		None
C-615	SEWAGE DISPOSAL PLANT	Occasionally	Concrete	Full	Concrete	Uncovered	Unsealed	Poured	Unsealed	Dry	No	Yes	Yes	8	Utility Pen and Floor Drains	Grass/concrete	No	Average	50-60 y/0	NA
C-720	MAINTENANCE & STORES BUILDING	N/A	Concrete	N/A	N/A	N/A	Sealed with Paint	Steel/Poured and block concrete	Sealed with Paint	N/A	N/A	N/A	N/A	N/A	Expansion Joints and Drains	Grass/concrete/asphalt	No	Average	1953	N/A
C-724-B	CARPENTER SHOP	N/A	Steel	N/A	N/A	N/A	unsealed	block	Unsealed	N/A	N/A	N/A	N/A	N/A	Floor Drains, expansion Joints	Grass/concrete	No	Varies	1953	N/A
C-720-C	CONVERTOR SHOP ADDITION	N/A	Concrete	N/A	N/A	N/A	Sealed with Paint	Steel/Poured and block concrete	Sealed with Paint	N/A	N/A	N/A	N/A	N/A	Expansion Joints and Drains	Grass/concrete/asphalt	No	Average	1953	N/A
C-720-G	WAREHOUSE	N/A	Steel	N/A	N/A	N/A	Unsealed	N/A	NA	N/A	N/A	N/A	N/A	N/A	Expansion Joints	Concrete/asphalt	No	Average	1953	N/A
C-724-A	CARPENTER SHOP ANNEX	N/A	Steel	N/A	N/A	N/A	unsealed	block	Unsealed	N/A	N/A	N/A	N/A	N/A	Floor Drains, expansion Joints	Grass/concrete	No	Varies	1953	N/A
C-725	PAINT SHOP	N/A	Steel	N/A	N/A	N/A	Unsealed	NA	NA	N/A	N/A	N/A	N/A	N/A	Sealed Expansion Joint, Cut in concrete, Hole in floor	Grass/concrete	No	Not Tight		N/A
C-728	MOTOR CLEANING FACILITY	N/A	Steel	N/A	N/A	N/A	unsealed	block	Unsealed	N/A	N/A	N/A	N/A	N/A	Floor Joint	Grass/Concrete	No	Not Tight	1957	N/A
C-746-U1	LEACHATE OFFICE BUILDING	N/A	Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Floor Drains	Concrete	No	Average		N/A
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	N/A	Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	NA	Gravel	No	Average		N/A
C-752-B-T01	FUELING STATION TRAILER	N/A	Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	gravel	No	Average		N/A
C-754-B	LOW LEVEL WASTE STORAGE	N/A	Steel	N/A	N/A	N/A	unsealed	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	grass	No	Not Tight		N/A
C-755-T16	RADCON TRAILER	N/A	Steel/Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Utility Pen and Floor Drains	Gravel	No	Average		N/A
C-755-T27	OFFICE TRAILER	N/A	Wood frame Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	Gravel	No	Average		N/A
C-764-T03	OFFICE TRAILER	N/A	Wood frame Trailer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	Gravel		Tight		N/A

Table C.1. Summary of Walkdown Information

Facility Number	Facility Description	Describe Location of Internal Load-bearing Walls	Does a Gap Exist between Footings and the Floor Slab	Describe Location of Roof Support Columns or Isolation Piers Nothing Joints where the Floor Meets Piers or Columns	Type of Heating System	Primary Fuel	Hot Water Tank Fueled by	Boiler/Furnace Location	Air Conditioning	Are There Air Distribution Ducts Present?	Describe Supply and Cold Air Return Ductwork	Building Ventilation	Note Bathroom Exhaust Fans/Fume Hoods, Other Venting Systems	Loading Dock Doors Left Open	Additional Building Vents	Stationary Sources Nearby
C-100	ADMINISTRATION BUILDING	Throughout	N/A	NA	Hot Air Circulation	Natural Gas, Electric	Electric	Outdoors	Central Air	Yes	Each room has own air duct	N/A	N/A	N/A	N/A	N/A
C-103	DOE SITE OFFICE & ANNEX	N/A	N/A	NA	Hot Air Circulation	Natural Gas, Electric	Electric	Outdoors	Central Air	Yes	Throughout Offices	N/A	N/A	N/A	N/A	N/A
C-200	GUARD & FIRE HEADQUARTERS		Not observable	NA	Hot Air Circulation				Central Air	Yes	Good where visible	Yes	Vent for diesel generator in basement	No	Diesel Generator	N/A
C-204	DISINTEGRATOR BUILDING	N/A	No	N/A	None	None	None	None	Window Units	No	N/A	N/A	N/A	N/A	N/A	N/A
C-207	FIRE TRAINING FACILITY	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	None
C-301	FIRE TRAINING BUILDING	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C-304	TRAINING & CASCADE OFFICE BUILDING	N/A	No	N/A	Hot Air Circulation	Electric	Electric		Central Air	Yes	Throughout Facility			N/A	None	None
C-310	PURGE & PRODUCT BUILDING	All, Poured Concrete	No	N/A	Space Heaters	Electric	Electric	N/A	None	No	N/A		Only in one part of building	No		One stack assoc. with building - Not in operation
C-337	PROCESS BUILDING	N/A	Yes, all are caulked	See Photos	Hot Air Circulation, Space Heaters		N/A		Central Air	Yes	Not Visible		Only in Office Area	No	Entire Length E to W	None
C-337-A	FEED VAPORIZATION FACILITY	West wall behind kitchen/office	Not observable	N/A	Space Heaters	Electric			Window Units	No			Could not Access	1 in unused maintenance room	None	None
C-350	DRYING AGENT STORAGE BUILDING	None	Yes, small gap	None	None	NA			Window Units	No	N/A	None but venting system on enclosed cylinder loading space	None	None	AAC	None
C-360	TOLL TRANSFER & SAMPLING BUILDING	Not Observed		Not Observed	None	None	None	None	None	None	None	None	None	None	None	None
C-360A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	N/A	No	Can see soil around pier in NW & SW Corners	None	None	None	None	None	None	None	None	None	Closed during Inspection	None	None
C-409	STABILIZATION BUILDING	North Line, E-W oriented	Yes	At load-bearing walls	Hot Air Circulation	Electric		Each Office/lab		RCRA Lab only	RCRA lab and office area only	None	Flume hoods on east end. RCRA Lab	No	None	None
C-410-K	FLUORENE FACILITY BUILDING	N/A	No	None	Space Heaters	Electric			None	No	N/A		N/A	No	None	None
C-410-L[4]	QUONSET HUT	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	No	N/A	N/A	N/A	2	None	C-400 to the west
C-412-T11A	SHOWER & CHANGE TRAILER	N/A	N/A	N/A	Hot Air Circulation	Electric			Central Air	Yes	Not Visible		Vent fans	N/A	None	None
C-615	SEWAGE DISPOSAL PLANT	N/A	No	N/A	Space Heaters	Electric	Electric	N/A	Window Units	No	N/A	Vent Fans	Exhaust Fans	N/A	Vent from basement	None
C-720	MAINTENANCE & STORES BUILDING	Along truck alleys	Expansion Joints	Columns throughout building	Hot air	Natural gas, fuel oil	Electric or Steam	Outdoors	Central Air	Yes	Good condition		None observed	Opened only for entry/exit	N/A	None
C-724-B	CARPENTER SHOP	N/A	No	Sealed Expansion Joints	steam radiation, radiant floor	Electric	electric	Outdoors	Central Air	Yes		Leaky Eastern Side		None open	N/A	None
C-720-C	CONVERTOR SHOP ADDITION	Along truck alleys	Expansion Joints	Columns throughout building	Hot air	Natural gas, fuel oil	Electric or Steam	Outdoors	Central Air	Yes	Good condition		None observed	Opened only for entry/exit	N/A	None
C-720-G	WAREHOUSE	N/A	No	No	N/A	N/A	Electric	N/A	N/A	N/A	N/A	Gaps in door frame, Vent to outide	None	Not Open	Some vents to outside	None
C-724-A	CARPENTER SHOP ANNEX	N/A	No	Sealed Expansion Joints	steam radiation, radiant floor	Electric	electric	Outdoors	Central Air	Yes		Leaky Eastern Side		None open	N/A	None
C-725	PAINT SHOP	N/A	No	N/A	Space Heaters	N/A	N/A	N/A	N/A	N/A	N/A	Very Leaky	N/A	Door Closed	None	None
C-728	MOTOR CLEANING FACILITY	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Very Leaky	N/A	N/A	Nonie	None
C-746-U1	LEACHATE OFFICE BUILDING	N/A	N/A	N/A	Heat pump, space heaters	Electric	Electric	Outdoors	Central Air	Yes	Throughout Trailer		Bathroom fans	N/A	N/A	None
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	N/A	N/A	N/A	Hot air circulation	Electric	N/A		Central Air	Yes	Throughout Trailer	One window, not sealed		N/A	None	None
C-752-B-T01	FUELING STATION TRAILER	N/A	N/A	N/A	Window Unit	Electric	N/A		Window Units	No	N/A		N/A	N/A	None	Gasoline, ASTs
C-754-B	LOW LEVEL WASTE STORAGE	N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	None	None
C-755-T16	RADCON TRAILER	N/A	N/A	N/A	Hot Air Circulation	Electric	Electric		Central Air	Yes	Throughout Trailer		Bathroom fans	N/A	None	None
C-755-T27	OFFICE TRAILER	N/A	N/A	N/A	Hot Air Circulation	Electric	Electric		Central Air	Yes	Throughout Trailer		Bathroom fans	N/A	None	None
C-764-T03	OFFICE TRAILER	N/A	N/A	N/A	Hot Air Circulation	Electric	Electric		Central Air	Yes	Throughout Trailer		Bathroom fans	N/A	N/A	None

Table C.1. Summary of Walkdown Information

Facility Number	Facility Description	Heavy Vehicular Traffic Nearby	Identify Potential Sources in the Building	Were any Readings of Indoor Air Taken Using a PID?	Describe Location of Designated Smoking Areas	Describe Odors in the Building	Any Known Spills of a Chemical Immediately Outside the Building?	Are Vehicles or Heavy Machinery Used within the Building	Has the Building Ever had a Fire?
C-100	ADMINISTRATION BUILDING	None	Janitor Closet	Yes	Between 101 & 102, in front of canopy	None	No	No	No
C-103	DOE SITE OFFICE & ANNEX	None	janitor Closet	Yes	West Side of facility	Main Conference Room - Carpet smell	No	No	No
C-200	GUARD & FIRE HEADQUARTERS	Light	Former Armory	Yes	Southside and center of Northside	Cleaners in janitor closet	No	No	Unknown
C-204	DISINTEGRATOR BUILDING	Emergency Vehicles	None	No	Unknown	None	No	No	Unknown
C-207	FIRE TRAINING FACILITY	None	None	Yes	None	None	No	No	No
C-301	FIRE TRAINING BUILDING	NA	NA	No	None	N/A	No	YES	No
C-304	TRAINING & CASCADE OFFICE BUILDING	Heavy Construction Equipment	Cleaning Supplies	Yes	SW corner of facility	None	No	No	No
C-310	PURGE & PRODUCT BUILDING		Janitor Closet	Yes	None	None	No	Yes, limited	Yes, 1950's
C-337	PROCESS BUILDING	Some	Multiple. Lube oil release, PCB Areas	Yes	Outside, 20 Ft. North of access	None	No	yes	No
C-337-A	FEED VAPORIZATION FACILITY	To east	None	No	None	None	No	No	No
C-350	DRYING AGENT STORAGE BUILDING	None	None	No	None	None	No	No	Unknown
C-360	TOLL TRANSFER & SAMPLING BUILDING		NA	No	None	None	No	No	No
C-360A	TOLL TRANSFER & SAMPLING BUILDING ANNEX	Vehicle Traffic & EGP maintenance - Higher than average	Flammables Cabinet	Yes	None	Petroleum Odor	No	Yes	No
C-409	STABILIZATION BUILDING	Light	None	Yes	None	None	No	No	Unknown
C-410-K	FLUORENE FACILITY BUILDING	Light	None	Yes	None	None	No	No	No
C-410-L[4]	QUONSET HUT	Light	Gas Generator	Yes	None	None	No	No	No
C-412-T11A	SHOWER & CHANGE TRAILER	Light	Cleaning Supplies	Yes	None	Air Fresheners	No	No	No
C-615	SEWAGE DISPOSAL PLANT	None	Pesticides	Yes	None	None	None	No	No
C-720	MAINTENANCE & STORES BUILDING	None	Chemical Storage	Yes	Front of building > 25'	Tox 2 Chemical odor	Yes	Yes	No
C-724-B	CARPENTER SHOP	None	Oil draining area, fire cabinet	Yes	none	petroleum odor near oil storage area	Yes	yes	No
C-720-C	CONVERTOR SHOP ADDITION	None	Chemical Storage	Yes	Front of building > 25'	Tox 2 Chemical odor	Yes	Yes	No
C-720-G	WAREHOUSE	None	Fire Cabinets, Diesel Use	Yes	No	General Odor	No	Yes	No
C-724-A	CARPENTER SHOP ANNEX	None	Oil draining area, fire cabinet	Yes	none	petroleum odor near oil storage area	Yes	yes	No
C-725	PAINT SHOP	None	Gas powered equipment	Yes	South end of Facility	Fuel and Rubber	No	None	no
C-728	MOTOR CLEANING FACILITY	None	Fire Cabinet	Yes	None	None	No	No	No
C-746-U1	LEACHATE OFFICE BUILDING	Heavy Construction Equipment	Cleaning Supplies	Yes	N of trailer	None	No	No	No
C-752-A-T10	WASTE OPERATIONS OFFICE TRAILERS	None	General chemicals	Yes	None	Fruity	No	No	No
C-752-B-T01	FUELING STATION TRAILER	Refueling	Cleaning Supplies	Yes	None	None	No	No	No
C-754-B	LOW LEVEL WASTE STORAGE	None	Fire Cabinet	yes	None	None	No	No	No
C-755-T16	RADCON TRAILER	None	None	yes	None	None	No	No	No
C-755-T27	OFFICE TRAILER	None	General cleaning supplies	Yes	SW corner of facility	None	No	No	No
C-764-T03	OFFICE TRAILER	None	General cleaning supplies	Yes	In front of Trailer	None	No	No	No

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-100

Date: 2/12/2020 7:22 AM

Direction: East end of basement.

Comments: Utility penetration in basement mechanical room in C-100.

C-100

Date: 2/12/2020 7:23 AM

Direction: East end of basement.

Comments: Floor penetration in basement mechanical room in C-100.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-100

Date: 2/12/2020 7:29 AM

Direction: Central portion of basement.

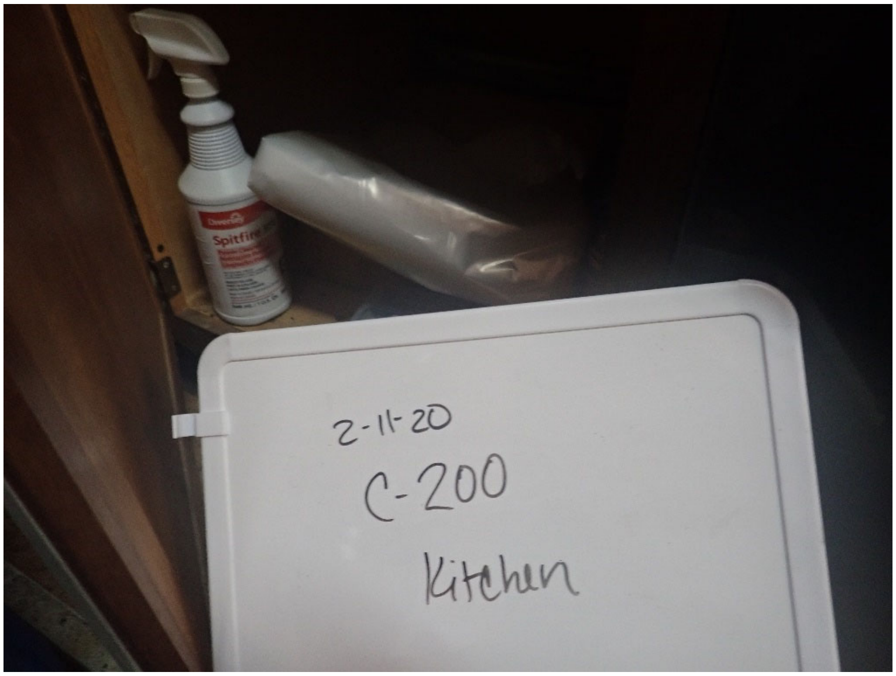
Comments: Sump in basement central equipment room in C-100.

C-200

Date: 2/11/2020 3:21 PM

Direction: Western portion of building.

Comments: Cleaning supplies in kitchen in the west (police) wing of C-200.



Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-200

Date: 2/11/2020 3:21 PM

Direction: Western portion of building.

Comments: Janitorial supplies in in the west (police) wing of C-200.

C-200

Date: 2/11/2020 3:22 PM

Direction: Western portion of building.

Comments: Janitorial supplies in in the west (police) wing of C-200.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-207

Date: 2/11/2020 1:32 PM

Direction: North

Comments: Holes in walls of C-207.

C-207

Date: 2/11/2020 1:32 PM

Direction: West

Comments: Holes in walls of C-207.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-207

Date: 2/11/2020 1:32 PM

Direction: West

Comments: Gaps in walls of C-207.

C-207

Date: 2/11/2020 1:32 PM

Direction: West side of building.

Comments: Holes in walls of C-207.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-207

Date: 2/11/2020 1:33 PM

Direction: North

Comments: Holes in walls of C-207.

C-301

Date: 2/12/2020 7:33 AM

Direction: South

Comments: Gaps in walls of C-301.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-301

Date: 2/12/2020 7:34 AM

Direction: West

Comments: Roof not present in C-301.

C-310

Date: 2/13/2020 9:05 AM

Direction: Northwestern portion of building.

Comments: Floor drain in ground floor of C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:07 AM

Direction: Northwestern portion of building.

Comments: Sink, hot water heater, and floor penetrations in the ground floor of C-310.

C-310

Date: 2/13/2020 9:10 AM

Direction: Northwestern portion of building.

Comments: Stained concrete in ground floor of C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310	
Date: 2/13/2020 9:10 AM	
Direction: Northwestern portion of building.	
Comments: Floor penetrations in ground floor of C-310.	

C-310	
Date: 2/13/2020 9:11 AM	
Direction: Northwestern portion of building.	
Comments: Floor drain in ground floor of C-310.	

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310	
Date: 2/13/2020 9:11 AM	
Direction: North	
Comments: First floor interior of C-310.	

C-310	
Date: 2/13/2020 9:12 AM	
Direction: Northern portion of building.	
Comments: Cracked concrete on the first floor of C-310.	

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:13 AM

Direction: Northern portion of building.

Comments: Utility vault on the first floor of C-310.

C-310

Date: 2/13/2020 9:16 AM

Direction: Northern portion of building.

Comments: Utility vault on the first floor of C-310.

C-310

Date: 2/13/2020 9:17 AM

Direction: Northern portion of building.

Comments: Small interior room in C-310.

C-310

Date: 2/13/2020 9:18 AM

Direction: Northern portion of building.

Comments: Floor joint in C-310.

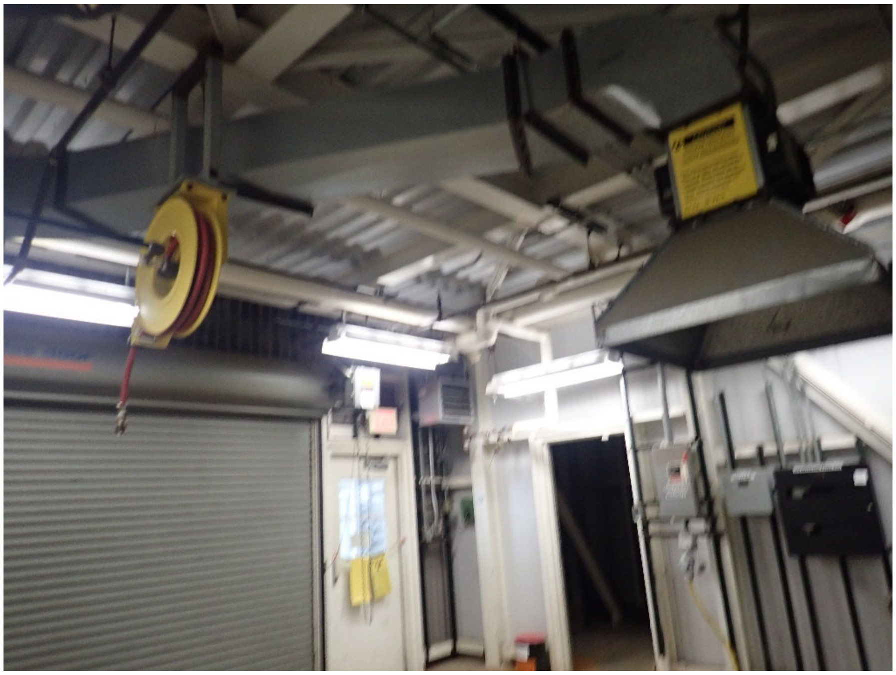
Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:19 AM

Direction: Northern portion of building.

Comments: Duct work in C-310.



C-310

Date: 2/13/2020 9:22 AM

Direction: Northern portion of building.

Comments: Emergency exit in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:23 AM

Direction: Eastern portion of building.

Comments: Floor penetration in battery room of C-310.

C-310

Date: 2/13/2020 9:24 AM

Direction: Eastern portion of building.

Comments: Floor penetrations in battery room of C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:24 AM

Direction: East side of building.

Comments: Machinery and lubricant in C-310.

C-310

Date: 2/13/2020 9:25 AM

Direction: East side of building.

Comments: Floor drain in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:25 AM

Direction: East side of building.

Comments: Floor drain in C-310.

C-310

Date: 2/13/2020 9:26 AM

Direction: East side of building.

Comments: Floor drain and floor penetration in C-310.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:26 AM

Direction: East side of building.

Comments: Expansion joint in C-310.

C-310

Date: 2/13/2020 9:28 AM

Direction: East side of building.

Comments: Openings to outdoor air in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:32 AM

Direction: Southern portion of building.

Comments: Floor penetration in C-310.

C-310

Date: 2/13/2020 9:33 AM

Direction: Southern portion of building.

Comments: Floor drain and floor penetrations in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:36 AM

Direction: West side of building.

Comments: Floor drain in C-310, south of lube oil tank.

C-310

Date: 2/13/2020 9:36 AM

Direction: West side of building.

Comments: Floor drain in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:37 AM

Direction: West side of building.

Comments: Floor penetration in C-310.

C-310

Date: 2/13/2020 9:38 AM

Direction: West side of building.

Comments: Floor penetration in the lube oil containment berm in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:40 AM

Direction: West side of building.

Comments: Open floor drain in C-310, east of lube oil berm.

C-310

Date: 2/13/2020 9:42 AM

Direction: West side of building.

Comments: Outside filer room in C-310 near Control Room.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:43 AM

Direction: West side of building.

Comments: Foundation footers in Filter Room 2 in C-310.

C-310

Date: 2/13/2020 9:43 AM

Direction: West side of building.

Comments: Interior of Filter Room 2 in C-310.

C-310

Date: 2/13/2020 9:43 AM

Direction: West side of building.

Comments: Exterior of filter room with concrete and floor drain in C-310 near Control Room.

C-310

Date: 2/13/2020 9:44 AM

Direction: West side of building.

Comments: Large floor drain in C-310.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-310

Date: 2/13/2020 9:46 AM

Direction: West side of building.

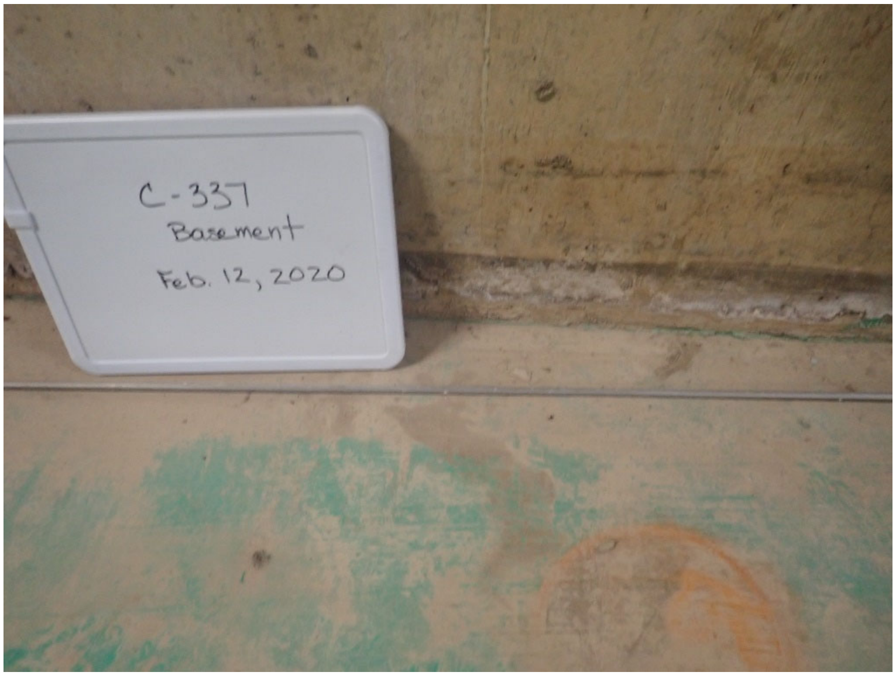
Comments: Expansion joints around Column D12/C12 in C-310.

C-337

Date: 2/12/2020 9:27 AM

Direction: Central portion of building.

Comments: Concrete floor and walls in the basement of C-337.



GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-337

Date: 2/12/2020 9:31 AM

Direction: Central portion of building.

Comments: Sump in basement of C-337.

C-337

Date: 2/12/2020 9:39 AM

Direction: South

Comments: Tunnel in basement of C-337.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

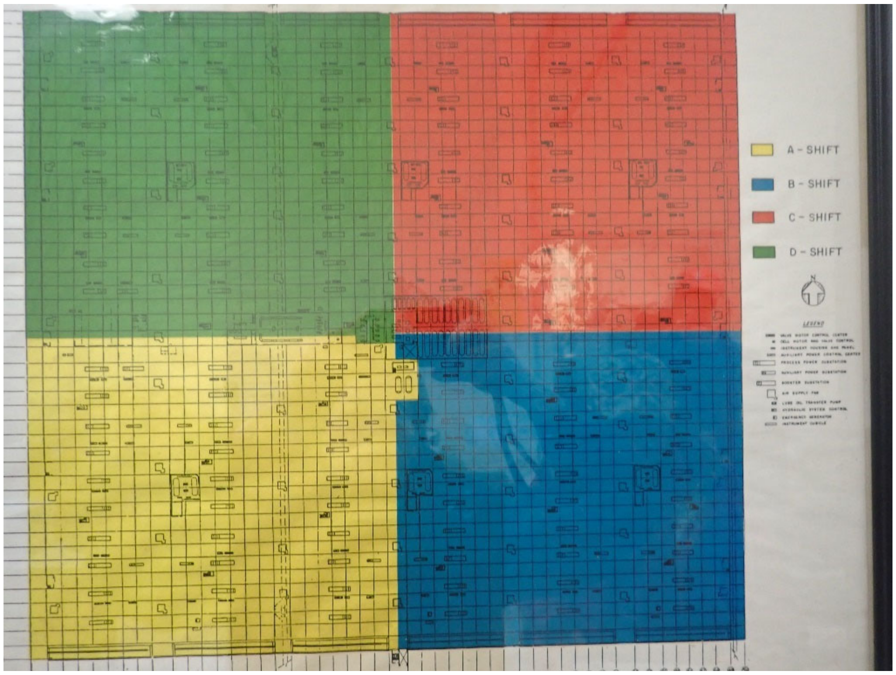
Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-337

Date: 2/12/2020 9:49 AM

Direction: N/A

Comments: Drawing of C-337 floor plan and ventilation pattern.

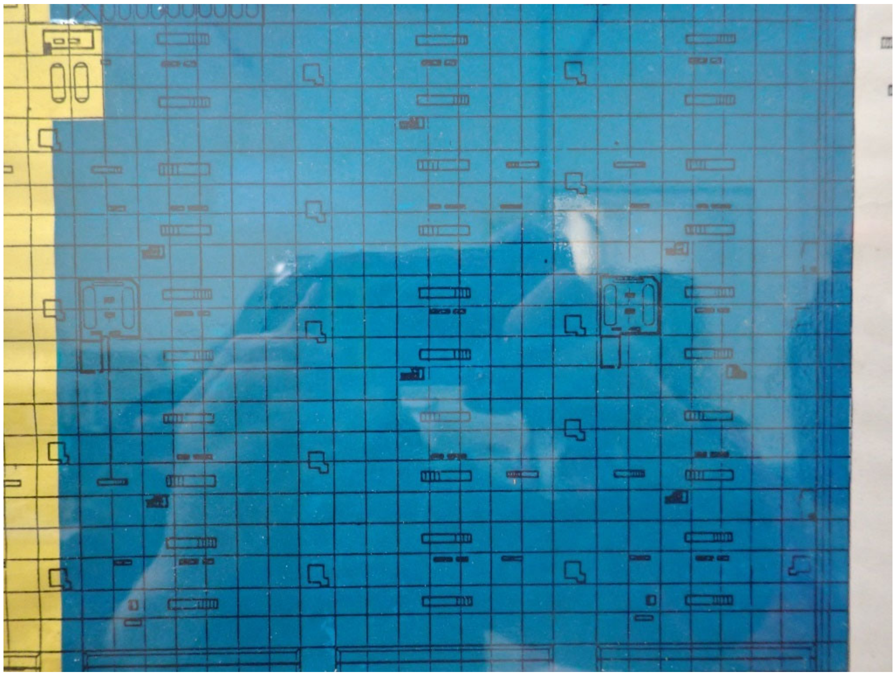


C-337

Date: 2/12/2020 9:49 AM

Direction: N/A

Comments: Drawing of southeast quadrant of C-337 (zoom in of "B Shift").



GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-337

Date: 2/12/2020 9:54 AM

Direction: Central portion of building.

Comments: Freon pit in the southeastern portion of the ground floor of C-337 (confined space entry only).

C-337

Date: 2/12/2020 9:55 AM

Direction: Central portion of building.

Comments: Same as above.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-337

Date: 2/12/2020 9:58 AM

Direction: Southeastern portion of building.

Comments: Polychlorinated biphenyl (PCB) spill area on ground floor of C-337.

C-337

Date: 2/12/2020 10:02 AM

Direction: Southeastern portion of building.

Comments: PCB spill area on ground floor of C-337.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-337

Date: 2/12/2020 10:09 AM

Direction: Southeastern portion of building.

Comments: Column and floor joints outside of filter room on ground floor of C-337.

C-337

Date: 2/12/2020 10:20 AM

Direction: Southeastern portion of building.

Comments: Open air to filter room in C-337.

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-337-A

Date: 2/12/2020 1:14 PM

Direction: North

Comments: Radiological area with process equipment in C-337-A.

C-337-A

Date: 2/12/2020 1:14 PM

Direction: Northwest

Comments: Cylinders in C-337-A.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-337-A

Date: 2/12/2020 1:15 PM

Direction: North

Comments: Floor vaults in C-337-A.

C-337-A

Date: 2/12/2020 1:15 PM

Direction: North

Comments: Process area in C-337-A.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-337-A

Date: 2/12/2020 1:15 PM

Direction: West

Comments: Metal siding in C-337-A.

C-360-A

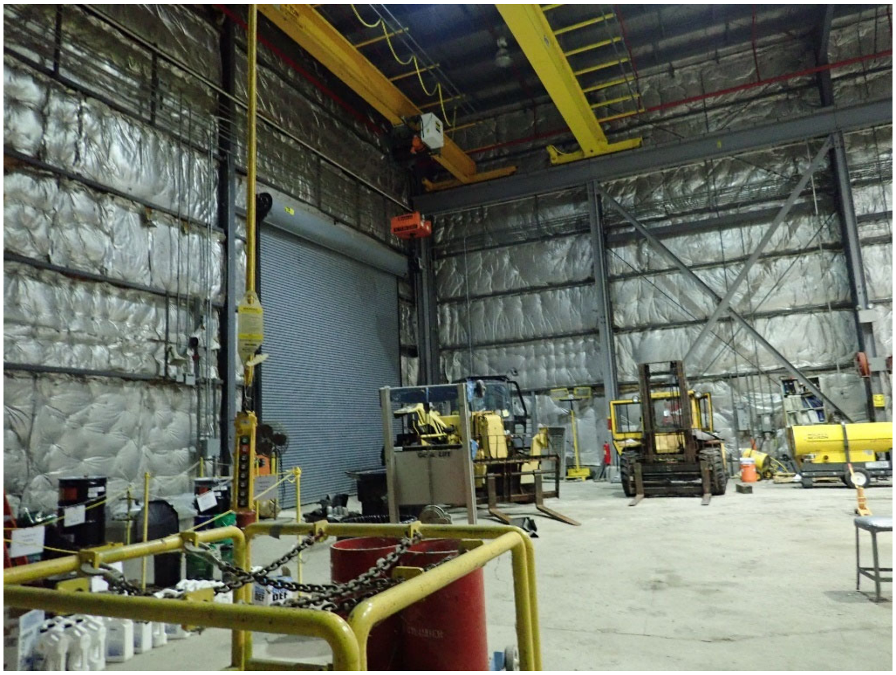
Date: 2/13/2020 9:48 AM

Direction:

Comments: Same as above.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A	
Date: 2/13/2020 11:04 AM	
Direction: Northwest	
Comments: Insulated interior of C-360A.	

C-360-A	
Date: 2/13/2020 11:05 AM	
Direction: Southwest	
Comments: Bay door and forklifts in C-360A.	

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:05 AM

Direction: Southeast

Comments: Columns and un-insulated wall in C-360A.

C-360-A

Date: 2/13/2020 11:06 AM

Direction: South

Comments: Floor stain and gap beneath door in C-360A.

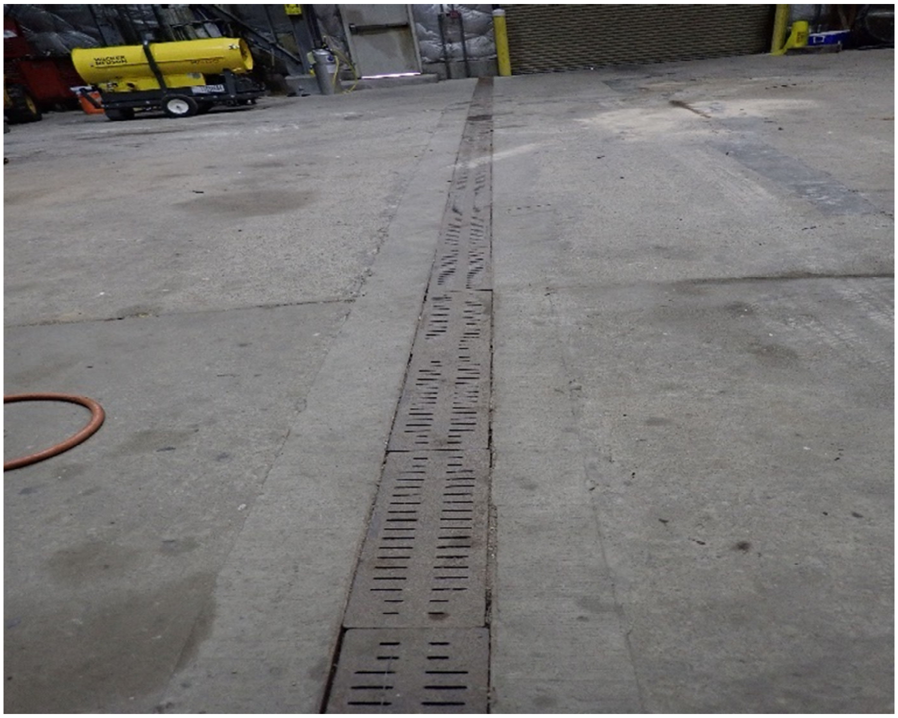
Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:07 AM

Direction: West

Comments: Floor drain in C-360A.



C-360-A

Date: 2/13/2020 11:07 AM

Direction: Western portion of building.

Comments: Cracked concrete in C-360-A.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:08 AM

Direction: East

Comments: Office space in C-360-A.

C-360-A

Date: 2/13/2020 11:14 AM

Direction: West

Comments: Maintenance table with chemicals in C-360-A.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A **Date: 2/13/2020 11:14 AM** **Direction: West** **Comments: Lubricant sprays in C-360A.**	
C-360-A **Date: 2/13/2020 11:15 AM** **Direction: North side of building.** **Comments: Gap around column in C-360-A.**	

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:15 AM

Direction: North side of building.

Comments: Gap around column in C-360-A.

C-360-A

Date: 2/13/2020 11:17 AM

Direction: North side of building.

Comments: Marking paint in C-360-A.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: Four Rivers Nuclear Partnership **Project Number: KX7002**

Site Name: Paducah Gaseous Diffusion Plant **Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:18 AM

Direction: North side of building.

Comments: Insecticide in C-360-A.

C-360-A

Date: 2/13/2020 11:19 AM

Direction: North side of building.

Comments: Fire cabinet with chemical storage in C-360-A.

Client: Four Rivers Nuclear Partnership	**Project Number: KX7002**
Site Name: Paducah Gaseous Diffusion Plant	**Site Location: Paducah, KY**

C-360-A

Date: 2/13/2020 11:19 AM

Direction: North side of building.

Comments: Fire cabinet with chemical storage in C-360-A.

C-360-A

Date: 2/13/2020 11:21 AM

Direction: North side of building.

Comments: Unsealed floor joint in C-360-A.

Paducah Site Industrial Area
Vapor Intrusion Study
Field Documentation and
Paducah Gaseous Diffusion Plant
Vapor Intrusion Project Facility Walkdown Checklist

GENERAL

Field documentation will be maintained throughout the project in various types of documents and formats, including field logbooks, field forms, sample labels, chain-of-custody forms, and sample data forms. Documentation will be conducted in accordance with U.S. Department of Energy Prime Contractor procedures.

The primary purpose of the logbook or daily form is to document each day's field activities; the personnel on each field team; and administrative occurrences, conditions, or activities that may have affected the fieldwork or data quality of environmental samples. The level of detail of the information recorded in the field logbook or daily form should be such that a reconstruction of the field events can be created from the logbook/form.

Field team personnel may use bound field logbooks or field forms with sequentially numbered pages for the maintenance of field records and for documenting any information pertinent to field activities. A designated field team member will record field activities and pertinent information.

Field logbooks, field forms, chain-of-custody forms, data packages with associated quality assurance/quality control information, and sample data forms are maintained according to the requirements defined in procedure CP3-RD-0010, *Records Management Process*. Duplicates of field records are maintained until the completion of the project. Logbooks and field documentation are copied periodically. The originals are forwarded to Records Management, and copies are maintained in the field office.

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN CHECKLIST

Attached is the checklist to be completed for selected facilities at Paducah Gaseous Diffusion Plant as part of the Vapor Intrusion Project. The expectation is that this checklist will be completed during the facility walkdown, and that this activity (e.g., facility identification and date and time of walkdown) will be recorded appropriately in the field logbook/form.

All parts of the checklist must be completed and any corrections must be initialed.

Facility checklists will be included in the project work plan and may be included, as appropriate, in the project report.

PGDP Vapor Intrusion Project Facility Walkdown Checklist

Geosyntec
consultants

Facility ID: ~~C-724~~ TG C-100

Date: ~~2/11/2020~~ TG 2|12|2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG | TO

Date: 2| 12|2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-100

Facility Location: ____________________

General Facility Use: office

____

Building Contact/Facility Representative: Jason Lawrance

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y] / N

Non-office Staff? (circle one) Y / [✓ N]

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Office space

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, [✓ Seldom,] Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement storm shelter; IT infrastructure; janitorial

1st Floor Offices

2nd Floor Offices

3rd Floor

Additional Floors

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, [✓ concrete], stone, brick, [✓ steel]

b. Basement type: [✓ full], crawlspace, slab, other __________

c. Basement floor: [✓ concrete], dirt, stone, other __________

d. Basement floor: [✓ uncovered], covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

f. Foundation walls: [✓ poured], block, stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

h. The basement is: wet, damp, [✓ dry], moldy, other __________

i. Does the basement feel drafty? Y / [✓ N]

j. Sump present? [✓ Y] / N

k. Water in sump? [✓ Y] / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ~15 (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

No expansion joints

no major cracks in concrete

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / [✓ asphalt] / other ____________

Is the building insulated? (circle one) Y/[✓ N] How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available): ~1953 - 54

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: None

Describe location(s) of internal load-bearing walls:

Throughout

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

None

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

[✓ Natural Gas], Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

primary

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, [✓ Outdoors], Main Floor, Other package boilers

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None chilled water unit (external)

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Each room has own duct

Building Ventilation: __________

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): None

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Janitor Closet	See p. 8

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Juniter closet	HP Glema Glass cleaner	(4) 19 oz			
	Spartan HTU handi spray	(2) 1 qt			
	Virex Tb	(3) 1 qt			
	Wasp spray	1			
	Spartan dust spray	3			
	Spartan restroom cleaner	1			
	Bleach	4 gal			

Initials TG

Geosyntec
consultants

Facility ID: C-100

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

Janitor closet 1st Fl E end

IA - 0.0

Floor drain 0.0

Pipe pen 0.0

- others noted on drawing

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): Between 101 + 102 and in front of canopy.

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y [✓ N]

If yes, describe:

Has the building ever had a fire? Y [✓ N]

If yes, describe:

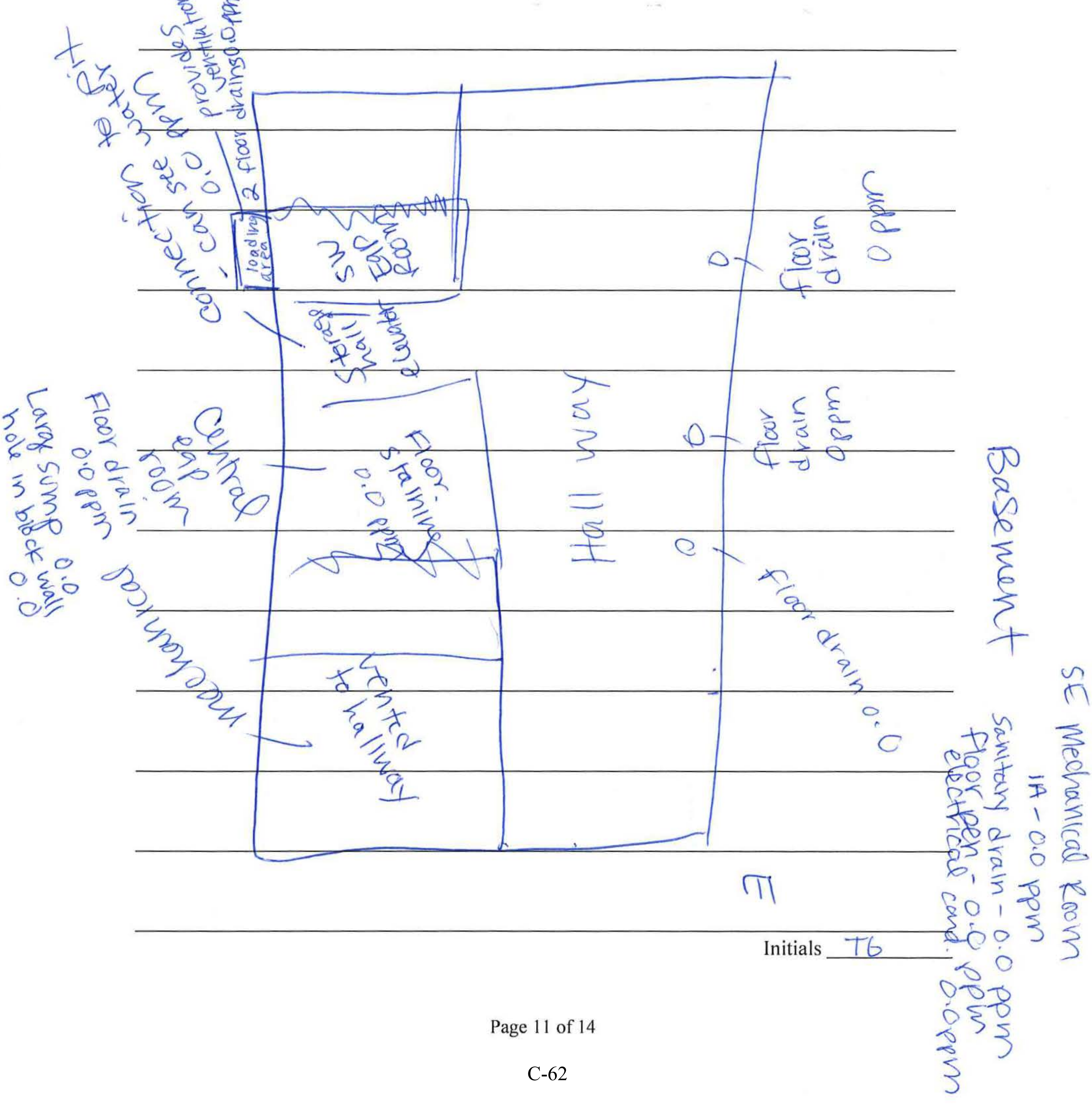
Initials TG

Geosyntec
consultants

Facility ID: C-100

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



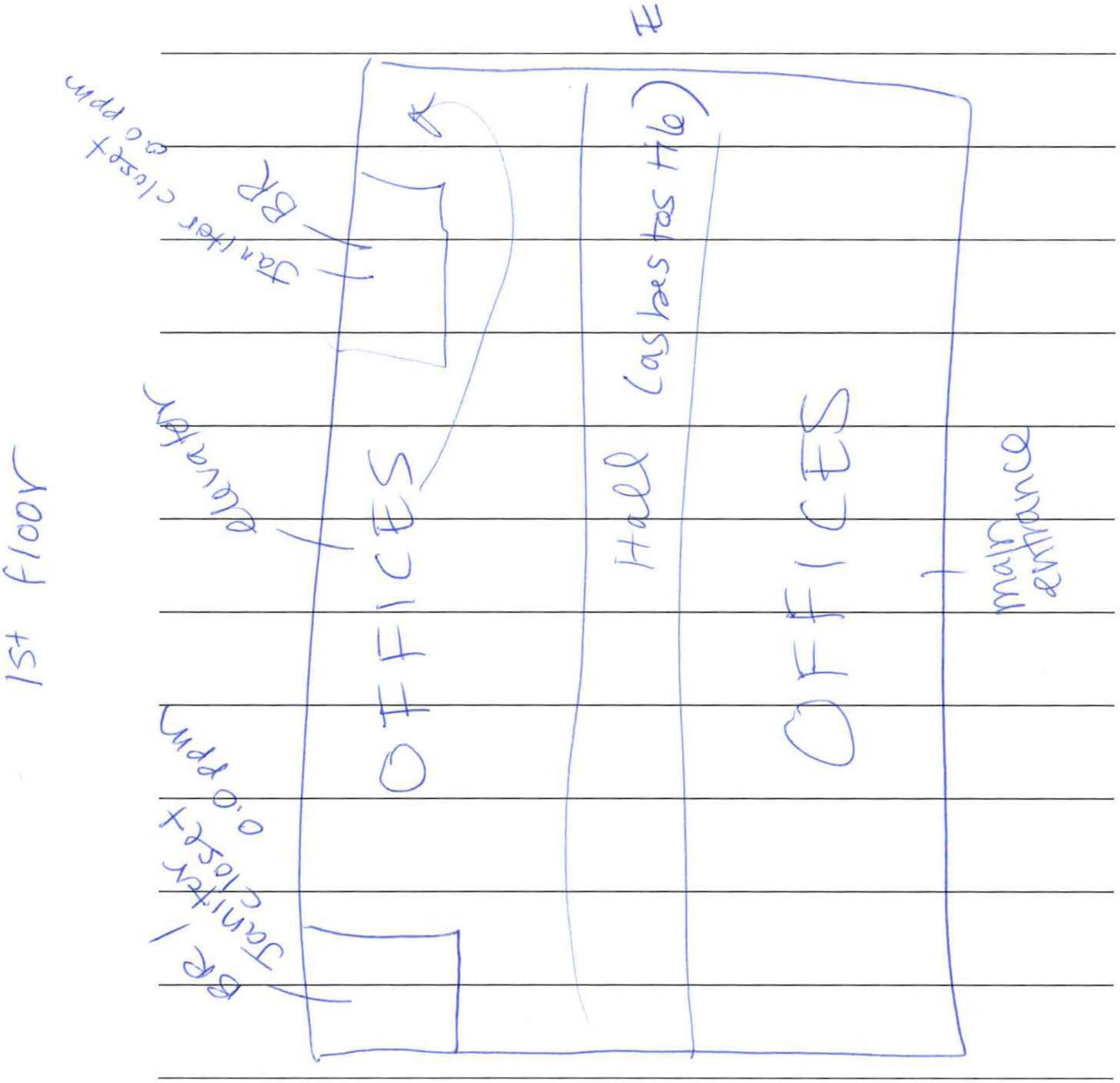
Initials TG

Geosyntec
consultants

Facility ID: C-100

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd



Initials TG

Facility ID: C-100

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

C-100 vault, pathway from basement
to second floor air - cubicles in
room on second floor.

Indoor air 0.0 ppm

- room past elevator

- some offices carpet ; fabric chairs, etc.

- asbestos tiles

Initials TG

Facility ID: C-100

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Gabe Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-103

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T.G. / T.O.

Date: 2/12/2020

Weather: 30's, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-103 DOE SITE OFFICE & ANNEX

Facility Location: F-12

General Facility Use: ADMINISTRATIVE OFFICES

Building Contact/Facility Representative: DOE

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) Y/[✓ N]

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Offices

Does facility have a basement? (circle one) Y [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

TG
~~Full-time,~~ Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Offices

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, [✓ concrete], stone, brick, steel

N/A

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: [✓ unsealed], sealed, sealed with carpet or tile

f. Foundation walls: [✓ poured], block, stone, other ________

g. Foundation walls: [✓ unsealed], sealed, sealed with ________

N/A

h. The basement is: wet, damp, dry, moldy, other ________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ______ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

Utility pen – 0 ppm

floor drain – 0 ppm

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / [✓ asphalt] / other ______________________

Is the building insulated? (circle one) Y/N How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available): 1995

Age of separate additions or expansion (if information available): ______________

____

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

____

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation,] Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other_________

What is the primary type of fuel used is: (circle all that apply – note primary)

[✓ Natural Gas], Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: Electric

Boiler/furnace located in (circle one): Basement, [✓ Outdoors], Main Floor, Other_________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

throughout offices

Building Ventilation: __________

Note bathroom exhaust fans, fume hoods or other venting systems: __________

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): No

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
See attached map	

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location See attached map	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Same as C-100	→ General cleaning supplies				

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Ambient air - 0.0

(concrete floor)
Mechanical room floor pen - 0.0

Others on attached map

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): WEST SIDE OF FACILITY

Describe odors in the building: Main Conference room (off of main entrance - new carpet smell)

Any known spills of a chemical immediately outside or inside the building? Y [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y [✓ N]

If yes, describe:

Has the building ever had a fire? Y [✓ N]

If yes, describe:

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

TG

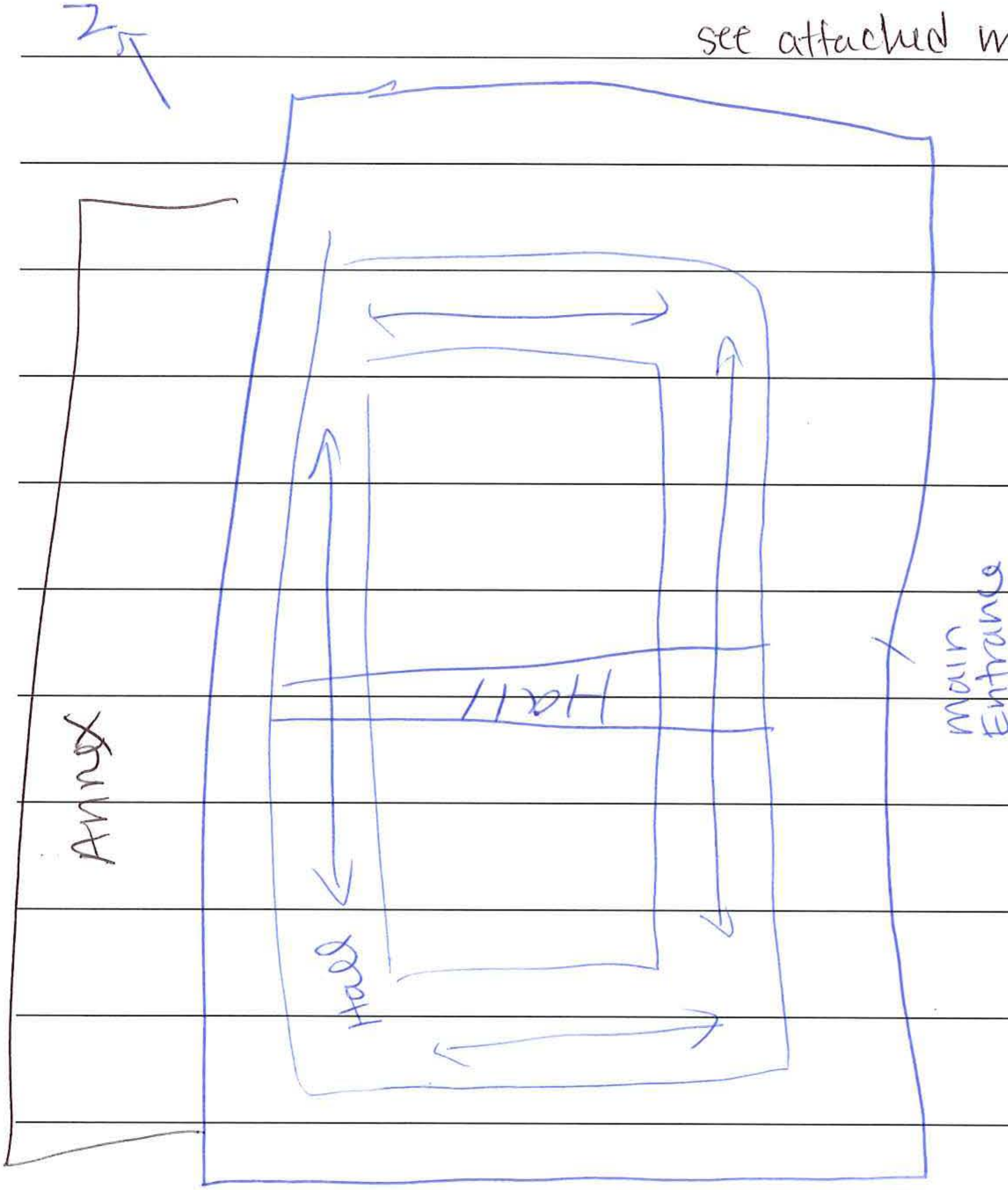
Initials TG

Facility ID: C-103

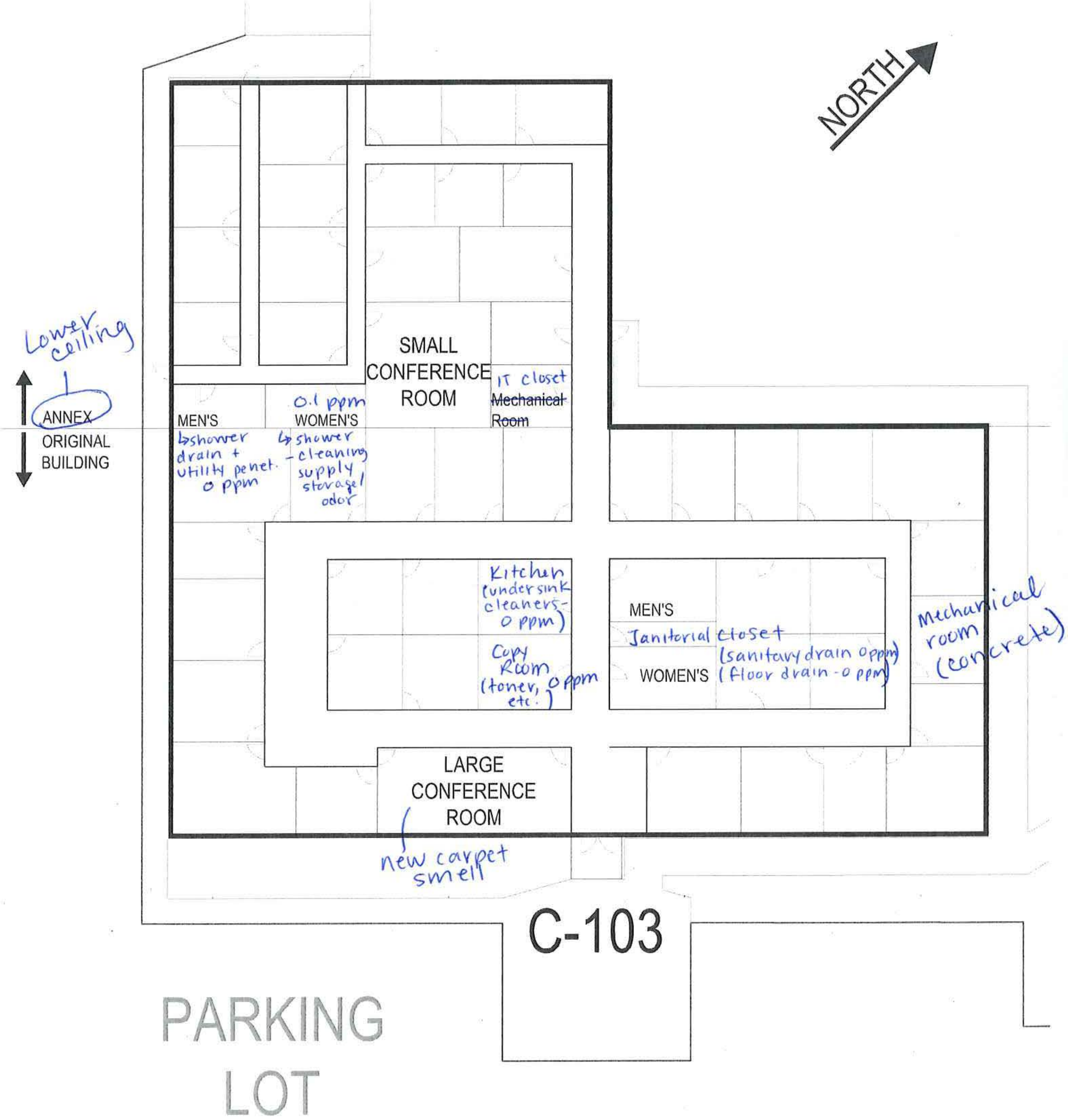
Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

see attached map



Initials TG


NORTH
Lower ceiling
ANNEX
ORIGINAL BUILDING
SMALL CONFERENCE ROOM
IT closet
~~Mechanical Room~~
MEN'S
↳shower drain + utility penet. 0 ppm
0.1 ppm
WOMEN'S
↳ shower - cleaning supply storage/ odor
Kitchen (under sink cleaners- 0 ppm)
Copy Room (toner, etc.) 0 ppm
MEN'S
Janitorial closet
WOMEN'S
(sanitary drain 0 ppm)
(floor drain - 0 ppm)
Mechanical room (concrete)
LARGE CONFERENCE ROOM
new carpet smell
C-103
PARKING LOT

Facility ID: C-103

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-103

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Gahr Date 2/12/2020

Reviewer Signature Date

Geosyntec
consultants

Facility ID: C-200

Date: Feb 11, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Hickey

Date: Feb 11, 2020

Weather: 43 F, breeze, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-200 / Security / Fire HQ

Facility Location:

General Facility Use: Police & Fire personnel

Building Contact/Facility Representative: Gilbert McNichols

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N

- Basement requires authorization for entry
- contact G. McNichols 5649 or Pro Force Lieutenant for access

~~#3~~4 ss/IA pairs
2 - fire
1 - police
1 * basement SS/IA pair

Facility ID: C-200

Date: Feb 11, 2020

Part II: Building Characteristics and Occupancy

Facility Description: single story + small basement
police & fire ops

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, [✓ Almost Never]

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement: not used any longer, little storage

1st Floor: offices

2nd Floor: none

3rd Floor: —

Additional Floors: —

Initials

Geosyntec consultants

Facility ID: C-200

Date: Feb 11, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, [✓ block concrete], stone, brick, steel

b. Basement type: [✓ full], crawlspace, slab, other smaller footprint than bldg

c. Basement floor: [✓ concrete], dirt, stone, other some exposed conc. floor

d. Basement floor: uncovered, covered, [✓ covered with damaged flooring from flooding]

e. Concrete floor: [✓ unsealed], sealed, sealed with in back sump room

f. Foundation walls: poured, [✓ block], stone, other

g. Foundation walls: unsealed, [✓ sealed], sealed with paint

h. The basement is: [✓ wet], damp, dry, moldy, other

i. Does the basement feel drafty? Y / [✓ N]

j. Sump present? [✓ Y] / N

k. Water in sump? [✓ Y] / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately 10' (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

See PID screening list

Initials

Facility ID: C-200

Date: Feb 11, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ some concrete] / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available): 1950's

Age of separate additions or expansion (if information available):

Describe location of any tunnels: None

Describe location(s) of internal load-bearing walls:

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No not observable if present hidden behind flooring / moldings

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

none

Initials

Facility ID: C-200

Date: Feb 11, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

good where visible (exercise area)

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: yes, present including vent for diesel generator (emergency) in basement

Loading dock doors left open: no

Size:____________________ Frequency:____________________

Initials MC

Facility ID: C-200

Date: Feb 11, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: diesel generator in basement

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): light

Initials

Facility ID: C-200

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
former armory in basement	before floods incl. gun cleaner
used to contain TCE-con	taining materials in
drum for separated dis	posal
no longer storing or using	gun cleaner in bldg.
now armory moved to	new bldg outside fence

Initials

Facility ID: C-200

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials TAC

Facility ID: C-200

Date: Feb 4, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

indoor air 0.0 ppm exercise area/kitchen

under sink/cabinet 0.0 ppm

janitor's closet w/wing 3.0 ppm

floor cover in west wing hallway 0.0 ppm

steel trap door Fire side 0.0

Basement

walls, several holes in block wall 0.0

large sump 0.0 with water

old bathroom floor drain 0.0

pipe outside bathroom 0.0

floor drain 0.0

utility trench in floor full of water 0.0

Initials AAC

Facility ID: C-200

Date: Feb 11, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): South side and center of north side

Describe odors in the building: cleaners in janitor closet

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / N unknown

If yes, describe:

Initials MC

Facility ID: C-200

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

none

Initials

Facility ID: C-200

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

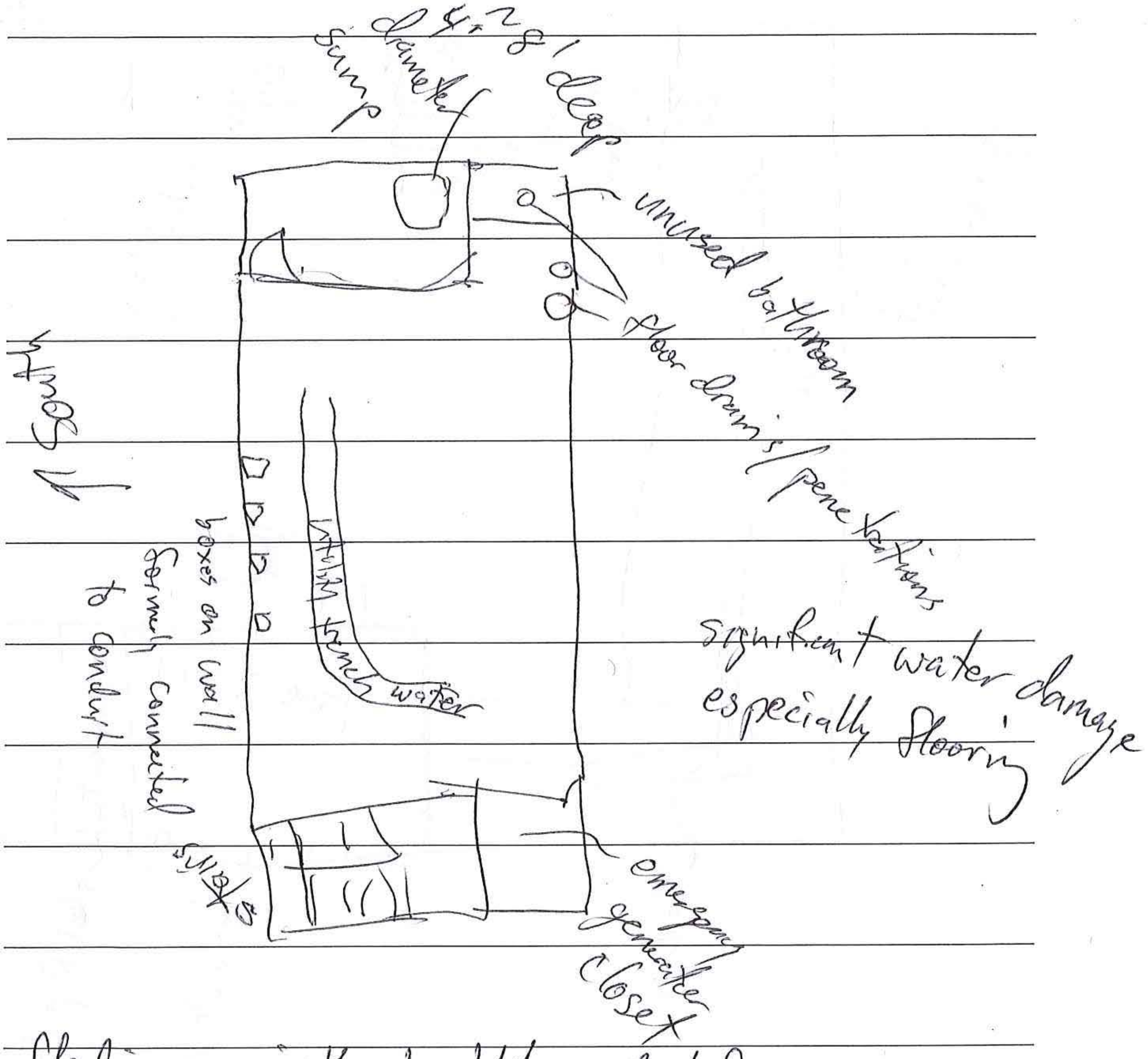
Initials TdC.

Facility ID: C-200

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

Basement map approx 40x20'



flooding came in through utility conduits from the south

Conduits now abandoned

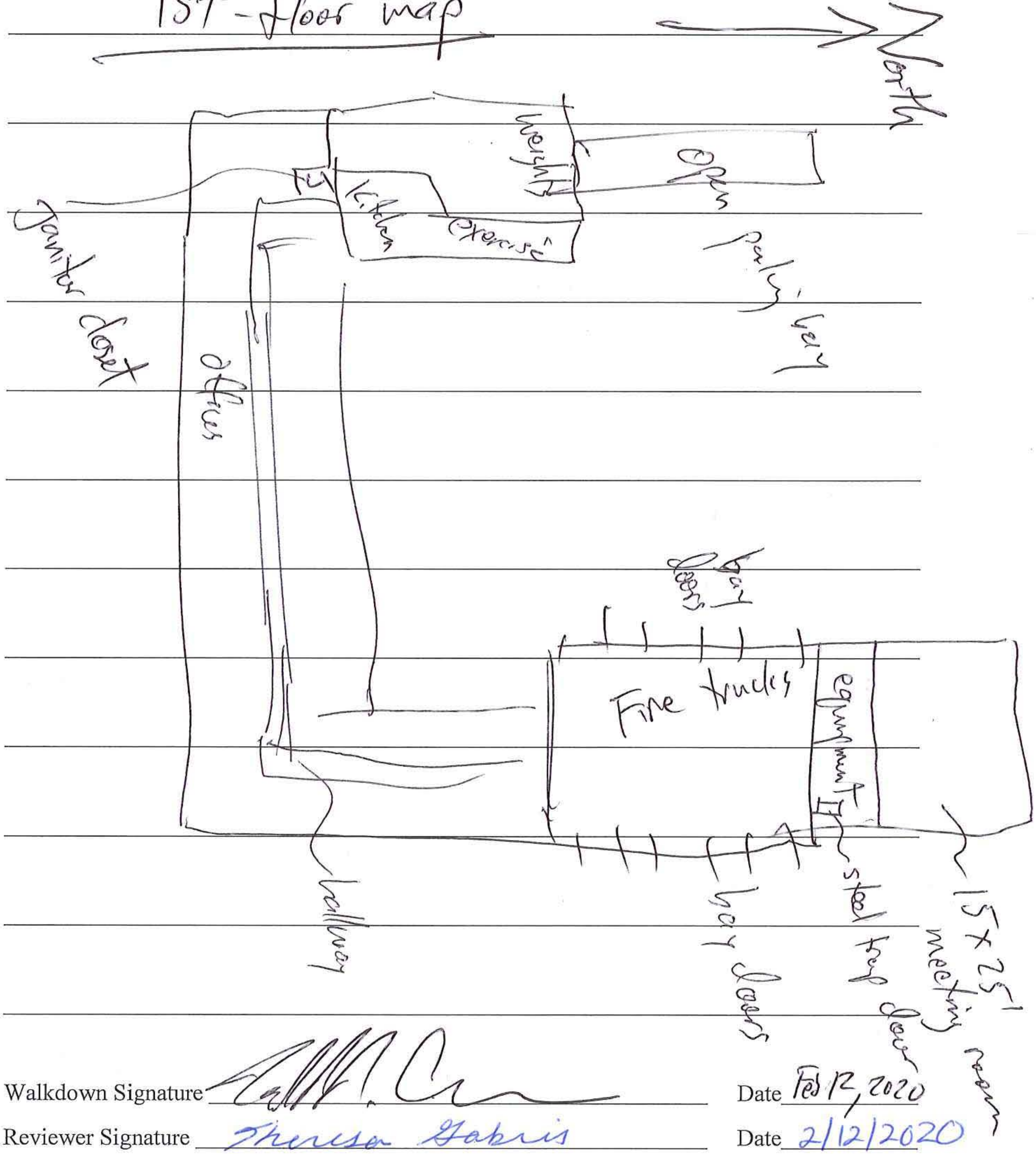
Initials MC

Facility ID: C-200

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

1st-floor map



Walkdown Signature

Date Feb 12, 2020

Reviewer Signature Theresa Gabris

Date 2/12/2020

Geosyntec
consultants

Facility ID: C-204
Date: Feb 11, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Holley

Date: Feb 11, 2020

Weather: 43°F light wind, overcast, bright

Part I: Facility Identification and Building Information

Facility ID/Name: C-204

Facility Location: inside Limited Area adjacent to C-200

General Facility Use: not occupiable, signed & locked from outside former document ~~insp~~ incinerator, 1-room

Building Contact/Facility Representative: Brian ~~Loranze~~ Lowrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) Y / [✓ N]

Initials

Facility ID: C-204

Date: Feb 11, 2020

Part II: Building Characteristics and Occupancy

Facility Description: former document incinerator room
1 room, steel walls, holes in walls & rotted open @ floor
~ 15' x 15' 1 story

Does facility have a basement? (circle one) Y/ [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost [✓ Never]

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement —

1st Floor none

2nd Floor —

3rd Floor —

Additional Floors —

Initials T.G.C.

Facility ID: C-204

Date: Feb 11, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

none

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

N/A

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / [✓ N]

k. Water in sump? Y / N / [✓ Not Applicable]

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

____

____

____

Initials M.C.

Facility ID: C-204

Date: Feb 11, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete / asphalt] / other ____________________

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / [✓ Not Tight]

Age of building (if information available): ____________________

Age of separate additions or expansion (if information available): ____________________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials A.A.C.

Facility ID: C-204

Date: Feb 11, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary) NONE

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

N/A

Air conditioning (circle one): Central Air, [✓ Window units], Open Windows, None very old not used

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

N/A

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials A.A.C.

Facility ID: C-204

Date: Feb 11, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): N/A

Heavy vehicular traffic nearby (or other mobile sources): police & fire vehicles

Initials F.C.

Facility ID: C-204
Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
none	

Initials TA C.

Facility ID: C.204

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials MC.

Facility ID: C-204

Date: Feb 4, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / [✓ N]

If yes, describe locations, covering used (if any), and readings below:

Initials U.C.

Facility ID: C-204

Date: Feb 11, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): Unknown

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / N

If yes, describe: Unknown

Initials M.C.

Facility ID: C-204

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Initials MC

Facility ID: ______________

Date: ________________

Part IX: Additional Notes from Walkdown, cont'd

Initials ___________

Facility ID: ______________

Date: ______________

Part IX: Additional Notes from Walkdown, cont'd

Initials ___________

Facility ID: C-204

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

Walkdown Signature

Date Feb 11, 2020

Reviewer Signature Theresa

Date 2/11/2020

Facility ID: C-207

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/11/2020

Weather: 30/40s, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-207/ Fire training facility

Facility Location:

General Facility Use: Abandoned, some general storage, very ventilated through gaps in walls/around doors

Building Contact/Facility Representative:

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials TG

Not occupiable

Facility ID: C-207

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: Extremely high air exchange
Building walls and doors have many
openings (see photos); not occupiable

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Vacant

2nd Floor vacant

3rd Floor

Additional Floors

Initials TG

Geosyntec
consultants

Facility ID: C-207

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other _________

c. Basement floor: concrete, dirt, stone, other _________

d. Basement floor: uncovered, covered, covered with _________

e. Concrete floor: [✓ unsealed], sealed, sealed with _________

N/A

f. Foundation walls: poured, block, stone, other _________

g. Foundation walls: unsealed, sealed, sealed with _________

h. The basement is: wet, damp, dry, moldy, other _________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately _______ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

None

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / asphalt / other ____________

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / [✓ Not Tight] Extremely well ventilated

Age of building (if information available): ____________

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Geosyntec
consultants

Facility ID: C-207

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

N/A

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ______________________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ______________________________

Note bathroom exhaust fans, fume hoods or other venting systems: ______________________________

Loading dock doors left open: ______________________________

Size:__________ Frequency:__________

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): No

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
None	

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
None					

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Indoor air - 0 ppm

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Building has many gaps in walls and door frames - not suitable for VI.

- Not occupiable

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-207

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature ______________________ Date 2/11/2020

Reviewer Signature ______________________ Date Feb 12, 2020

Facility ID: C-301

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T Creamer, E. Hickey

Date: Feb 12, 2020

Weather: 40F rain, calm

Part I: Facility Identification and Building Information

Facility ID/Name: C-301 / Storage Pad

Facility Location: open area just south of C337

General Facility Use: Storage - not used

Building Contact/Facility Representative: Jeff Bennett

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) Y / [✓ N]

Initials TAC.

Facility ID: C-301

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: 2-story-high, rusted corrugated steel skin building on slab on grade - no roof, just trusses

facility not occupiable

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement none

1st Floor not used

2nd Floor

3rd Floor none

Additional Floors

Initials

Geosyntec
consultants

Facility ID: C-301

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

b. Basement type: full, crawlspace, slab, other ____

c. Basement floor: concrete, dirt, stone, other ____

d. Basement floor: uncovered, covered, covered with ____

N/A

e. Concrete floor: [✓ unsealed], sealed, sealed with ____

f. Foundation walls: poured, block, stone, other ~~steel~~ none

g. Foundation walls: unsealed, sealed, sealed with ____

h. The basement is: wet, damp, dry, moldy, other ____

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

N/A

Basement/Lowest Level Depth below Grade: approximately ____ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

none

Initials TAC.

Facility ID: C-301

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available): none

Describe location of any tunnels: none

Describe location(s) of internal load-bearing walls:

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials M. C

Facility ID: C-301

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ______________________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

N/A

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ______________________________

Note bathroom exhaust fans, fume hoods or other venting systems: ______________________________

Loading dock doors left open: ______________________________

Size:__________ Frequency:__________

Initials MC.

Facility ID: C-301

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: ____

Stationary sources nearby (emission stacks, etc.): ____

N/A

Heavy vehicular traffic nearby (or other mobile sources): ____

Initials TLC

Facility ID: C-701

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description

Initials AC

Facility ID: C-301
Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

N/A

Initials

Facility ID: C-301

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / [✓ N]

If yes, describe locations, covering used (if any), and readings below:

N/A

Initials

Facility ID: C-301

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: N/A

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe: Forklifts

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TC.

Facility ID: C-301

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

none

Initials AC.

Facility ID: C-301

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Initials TAL.

Facility ID: C-301

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

None

Initials

Facility ID: C-301

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Walkdown Signature ______ Date Feb 12, 2020

Reviewer Signature Theresa Gab Date 2/12/2020

Facility ID: C-304

Date: 2|12|2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG|TO

Date: 2|12|2020

Weather: 30's, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-304 Training and Cascade office Bldg.

Facility Location: H-10

General Facility Use: Administrative office Bldg.

Building Contact/Facility Representative: Dale Danahoo

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) Y/[✓ N]

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Administrative offices

Does facility have a basement? (circle one) Y [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor office space, Kitchen, BR

2nd Floor

3rd Floor

Additional Floors

Initials TL

Facility ID: C-304

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, [✓ brick], steel

N/A

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: [✓ unsealed], sealed, sealed with ________

f. Foundation walls: [✓ poured], block, stone, other ________

N/A

g. Foundation walls: [✓ unsealed], sealed, sealed with ________

h. The basement is: wet, damp, dry, moldy, other ________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

Floor drains - 0.0 ppm

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / [✓ asphalt] / other ______________

Is the building insulated? (circle one) Y / [✓ N] How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available): ______________

Age of separate additions or expansion (if information available): ______________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, [✓ Other] Geothermal

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Throughout facility

Building Ventilation: __________

Note bathroom exhaust fans, fume hoods or other venting systems: __________

Loading dock doors left open: N/A

Size: __________ Frequency: __________

Initials TG

Facility ID: C-304

Date: 2-12-2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): Heavy construction equipment (excavators)

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
See page 9	

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Bathroom + Kitchen cleaning supplies					
- same as C-100					

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

tile < Room 139 - Kitchen - under sink - 0.0 ppm
140 Women's RR - floor drain - 0.0 ppm

concrete 141 - odor (cleaning supplies) - AA - 0.0, sink 0.0
hole between wall / floor 0.0

mech. room 109 - floor drain - 0.0 ppm
concrete

some cracking Concrete
comm. room 108 - floor pen. 0.0 ppm
classroom #1 104 sink - 0.0 ppm under cabinet w/ cleaning supplies

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): Southwest corner of facility

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y [✓ N]

If yes, describe:

Has the building ever had a fire? Y [✓ N]

If yes, describe:

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

TG

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

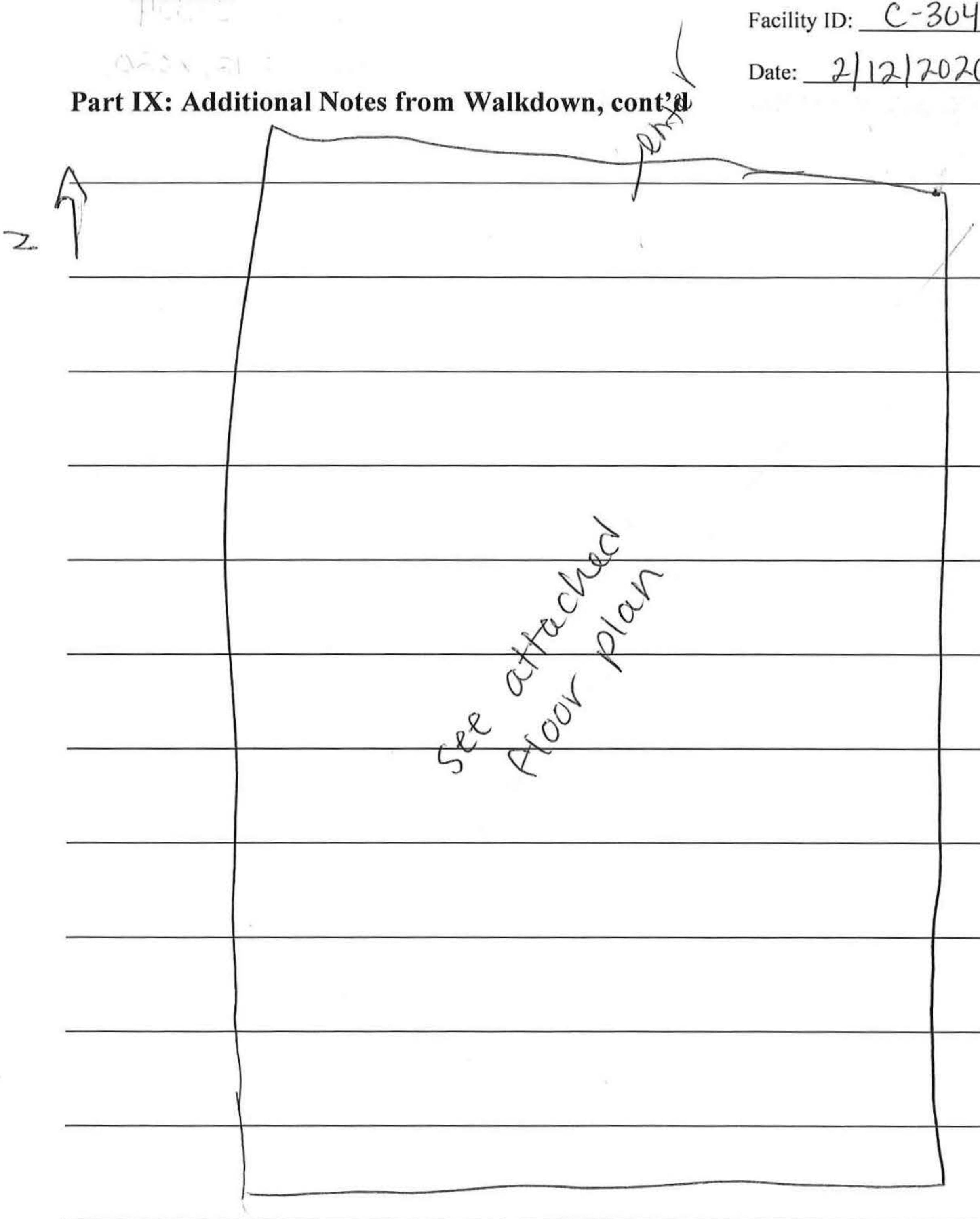
TG

Initials TG

Facility ID: C-304

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd



See attached Floor plan

Initials TG

Facility ID: C-304

Date: 2/12/2020

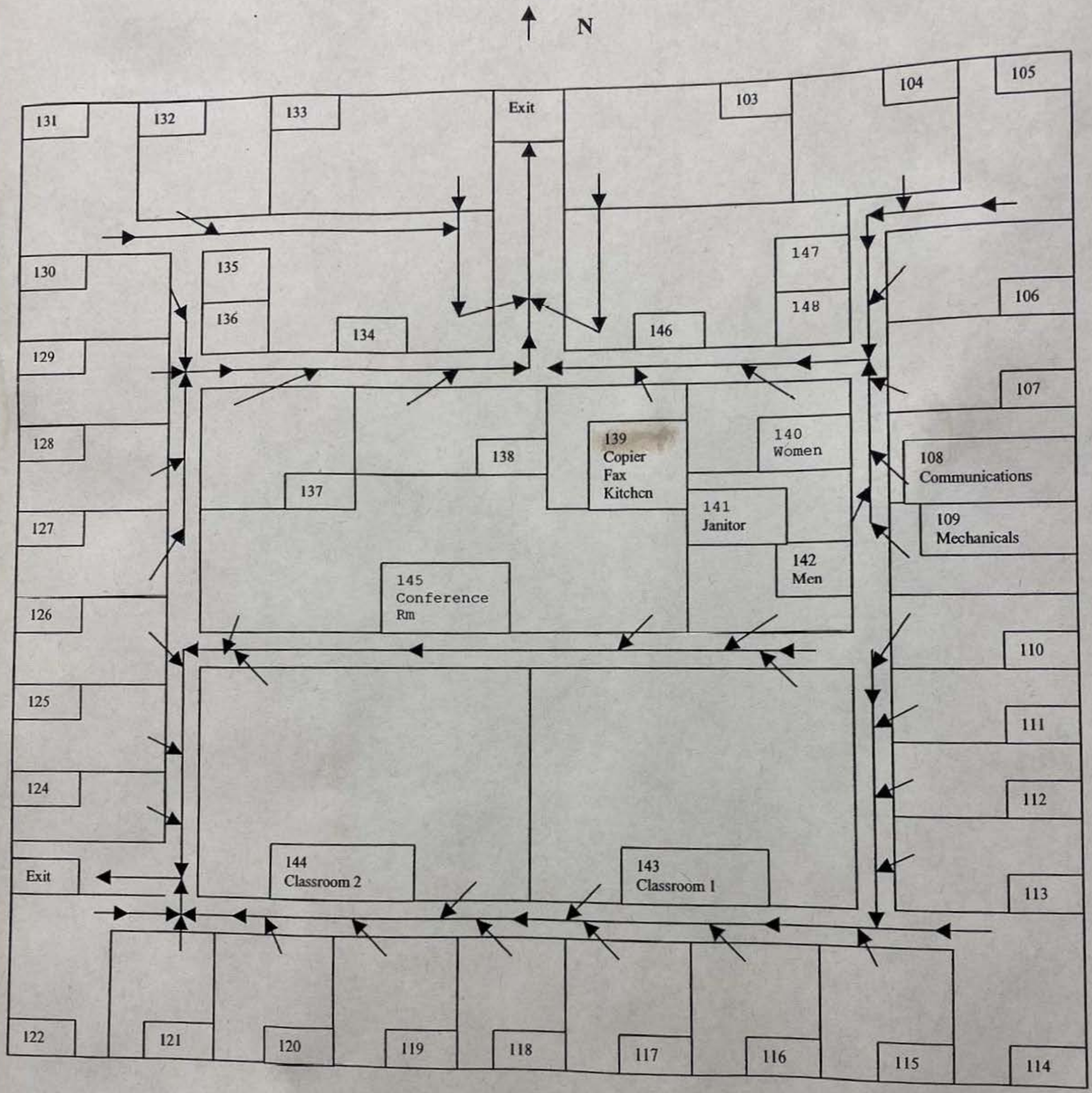
Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Gah Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

APPENDIX I (Continued)
C304 Building Emergency Exit Routes



Facility ID: C-310

Date: 2-13-2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Overby

Date: 2-13-2020

Weather: cloudy, 37°

Part I: Facility Identification and Building Information

Facility ID/Name: C-310 / Purge & Product Bldg

Facility Location: ~~SE~~ NE of C-400

General Facility Use: used to perform final stages of enrichment & pull product. Currently shutdown

Building Contact/Facility Representative: Bill Steffen

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) [✓ Y] N only for routine rounds.

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part II: Building Characteristics and Occupancy

Facility Description: former process bldg like C-337 but smaller w/ fewer units

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, [✓ Almost Never]

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement controls

1st Floor office / storage / process

2nd Floor

3rd Floor

Additional Floors

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, steel

b. Basement type: full, crawlspace, slab, other ________ 30x 70ft

c. Basement floor: [✓ concrete], dirt, stone, other ________

d. Basement floor: [✓ uncovered], covered, covered with ________

e. Concrete floor: unsealed, sealed, sealed with ________

f. Foundation walls: [✓ poured] block, stone, other ________ 0.0 ppm

g. Foundation walls: [✓ unsealed], sealed, sealed with ________

h. The basement is: wet, damp, [✓ dry], moldy, other ________

i. Does the basement feel drafty? Y / [✓ N]

j. Sump present? [✓ Y] / N 0.0 ppm

k. Water in sump? Y / N / Not Applicable not visible

Basement/Lowest Level Depth below Grade: approximately 15 (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

sump, 1 floor drain

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / [✓ asphalt] / other gravel

Is the building insulated? (circle one) Y/ [✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): 40's

Age of separate additions or expansion (if information available): N/A

Describe location of any tunnels: tunnel to 300 & 331 south end of Basement

Describe location(s) of internal load-bearing walls:

All, poured concrete

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary) N/A TO

Hot air circulation, Heat pump, Hot water baseboard, [✓ Space Heaters], Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other_________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric] Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other N/A

Air conditioning (circle one): Central Air, Window units, Open Windows, [✓ None]

Are there air distribution ducts present? Y [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ______________________________

Note bathroom exhaust fans, fume hoods or other venting systems: ________________

only in on part of bldg - pic taken

Loading dock doors left open: NO

Size:__________________ Frequency:__________________

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents:

Stationary sources nearby (emission stacks, etc.): one stack associated w/ bldg. not in operation.

Heavy vehicular traffic nearby (or other mobile sources):

Initials TC

Geosyntec
consultants

Facility ID: C-310

Date: 2-13-2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
upstairs by ACR, metal cab	janitorial supplies
C-6	S-150 '' & sigma lubricants

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials TO

Geosyntec
consultants

Facility ID: C-310

Date: 2-13-2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

Fume hoods in maintenance areas.

Hot water heater
Northwest corner - sink 0.0ppm

Floor drain
-C-4 0.0 (west)

-north end maintenance confined space - 2 garage doors 0.0ppm (east) 0.0ppm

this area has covering on concrete (sealcoat)

Basement around walls 0.0ppm

Basement floor drain - 0.0ppm

Basement sump - 0.0ppm

Crack in Basement floor near stairs - 0.0ppm

Basement tunnels 0.0ppm

Floor penetration/drain 0.0ppm C-7

C-7/D-7 Expansion joint 0.0ppm

pipe 0.0ppm
D-4 - north emergency shower drain 0.0

Initials TO

Facility ID: C-310

Date: 2-13-2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): NONE

Describe odors in the building: NONE

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe: very limited

Has the building ever had a fire? [✓ Y] / N

If yes, describe: 1950s - most of cell caught fire

Initials TO

Geosyntec
consultants

Facility ID: C-310

Date: 2-13-2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Filter room #3- crack in floor 0.0ppm (north end)

stains on floor near Filter Room 0.0ppm

Emergency exit in floor 0.0ppm

Battery room - emer. eyewash drain 0.0ppm - pipe 0.0ppm

E 11 - E12

Floor drain 0.0ppm small floor penetration 0.0 E12 exp. joint 0.0 ppm

E-13 floor stain 0.0ppm

NaF pellets — Heat from large tube

D-18 penetration 0.0ppm

B-17 floor drain 0.0ppm

C-18 RCW drain 0.0ppm

2 others by eg. 0.0ppm

A-17/A16 - drain 0.0ppm

B 15
B 14 Floor drain
Filter Room #1 0.0ppm

small floor penetration 0.0ppm

B14 North end of FR#1 small floor penetration 0.0ppm

B13 large Floor grate in 2nd containment 0.0ppm
large lube oil AST

B12 Floor drain 0.0ppm

Filter room #2 floor penetrations
Pipe 0.0ppm
↓ 0.0ppm

B9
B8 Floor drain 0.0ppm
small pentration 0.0ppm

D12/C12 expansion joint 0.0ppm

D-18 cleaning supplies/janitorial

Initials

Facility ID: ____________

Date: ________________

Part IX: Additional Notes from Walkdown, cont'd

Initials __________

Facility ID: ____________

Date: ________________

Part IX: Additional Notes from Walkdown, cont'd

Initials __________

X360 A

Geosyntec consultants

Facility ID: C-310

Date: Feb ~~19~~ 13 2020

Part IX: Additional Notes from Walkdown, cont'd

- equivalent former enriching process as C-337 which had 4 "units". C-310 had 1 unit.

same fans & air rooms (filter)

- Only office space in NW corner

- stack ~~off~~ SW corner

- only accessible (for us) from NW corner onto a short green painted walkway hugging the offices

Walkdown Signature ____________ Date 2-13-2020

Reviewer Signature ____________ Date ____________

Facility ID: C-337

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Hickey

Date: Feb 12, 2020

Weather: 40F rain, calm

Part I: Facility Identification and Building Information

Facility ID/Name: C-337/ Process Building

Facility Location:

General Facility Use: Used to perform enriching operations.
Currently in shutdown condition.

Building Contact/Facility Representative: William Steffen

Building Occupants (if information readily available): operators, supervisors/managers, maintenance personnel

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N

Initials TC.

Facility ID: C-337

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: Giant process building

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, [✓ Seldom], Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement utilities & tunnel connections

1st Floor former process, some storage now

2nd Floor former process

3rd Floor N/A

Additional Floors

Initials AC

Facility ID: C-337

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel] corrugated skin

b. Basement type: [✓ full], crawlspace, slab, other __________

c. Basement floor: [✓ concrete], dirt, stone, other __________

d. Basement floor: [✓ uncovered], covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

f. Foundation walls: [✓ poured], block, stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

h. The basement is: wet, damp, [✓ dry], moldy, other __________

i. Does the basement feel drafty? Y [✓ N] but slight air input noted from North tunnel

j. Sump present? [✓ Y] / N

k. Water in sump? [✓ Y] / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately 12 (feet)

Describe potential soil vapor entry points (e.g., cracks, [✓ expansion joints], [✓ utility penetrations], drains):

sealed drains

Initials Ad.C.

Facility ID: C-337

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other ______

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): 1950's

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: from basement to N & S - see drawing

Describe location(s) of internal load-bearing walls:

none, all on steel & columns

Does a gap exist between footings and the floor slab (describe if yes)? [✓ Yes] / No

all are caulked

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

see photos of map / floor plan

Initials AC.

Facility ID: C-337

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, [✓ Space Heaters], Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: N/A

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None just for bathrooms, control room in center

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

not visible

Building Ventilation:

Note bathroom exhaust fans, fume hoods or other venting systems: only in office area

Loading dock doors left open: no

Size: Frequency:

Initials

Facility ID: C-337

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: entire length E-to-W of both N & S walls have air intakes (now covered) and vents (now covered) above intakes

Stationary sources nearby (emission stacks, etc.):

Heavy vehicular traffic nearby (or other mobile sources): some

Initials TLC

Facility ID: C-337

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
- Lube oil release containment areas & storage	
- PCB release/abatement/encapsulation areas	
↳ ~~to~~ decommissioned transformers	
draining PCB oils	
- PCB "troughs" running overhead 1st floor	
connected to drains w/ sight-glass on columns	
- various small spots of oil staining on floor	

Initials

Facility ID: C-387

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials

Facility ID: C-337

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] N

If yes, describe locations, covering used (if any), and readings below:

screen entire perimeter of where floor meets
walls 0.0 ppm

screen base of 5 central columns 0.0 ppm

air flow observable as coder air moving into basement
from North, Direction of 537 tunnel.

air flow not observable @ entrance to South tunnel

no doors on either tunnel.

Initials

Facility ID: C-337

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): Outside in west truck alley, 20 feet north of access door.

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials AC.

Facility ID: C-337

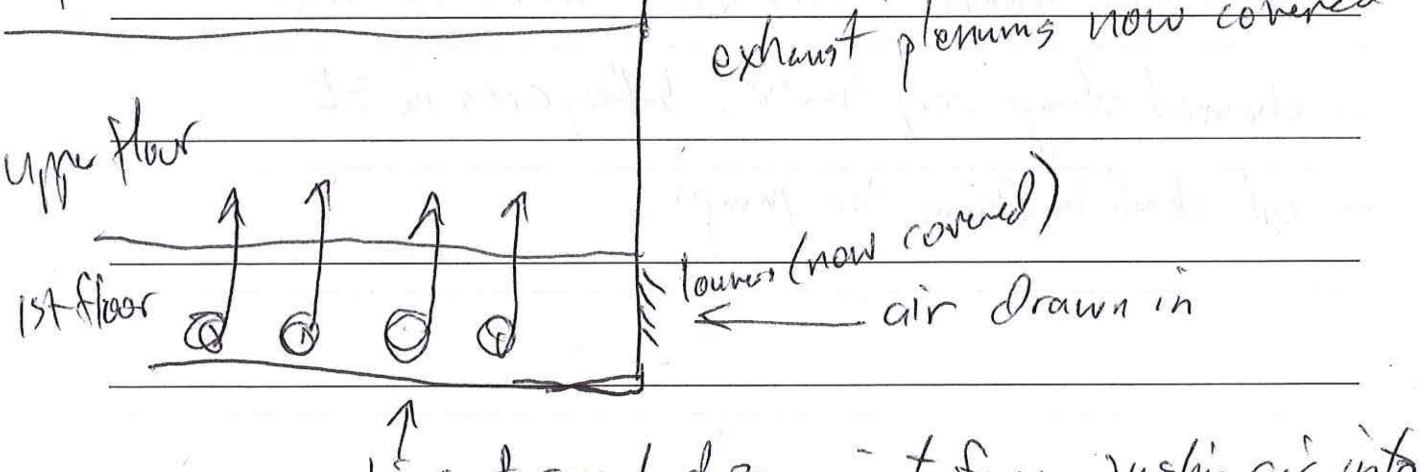
Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

PID screening numerous joints in floor 0.0 ppm
sealed drains 0.0ppm

filter rooms floors recessed approx 1 foot sloping down from main floor.

Profile - historical air flow



lines of several dozen giant fans pushing air into second floor. 2nd floor pressurized, 1st floor under vaccuum

in winter to avoid sprinkler system freezing, some fans operated to blow warmer air from upper level down through filter rooms & out across 1st floor.

Initials

Facility ID: C-337

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

- lube oil station @ H44 with small, 2x2' sump only for containment area & sprinkler water

PID 0.0 ppm   40'x40' lube oil area

all columns 20' on center

- identical lube oil station & sump @ S44
- N side much cooler air from N wind
- chemical storage very limited, battery area in SE
- oil stored in drums for pumps

Initials

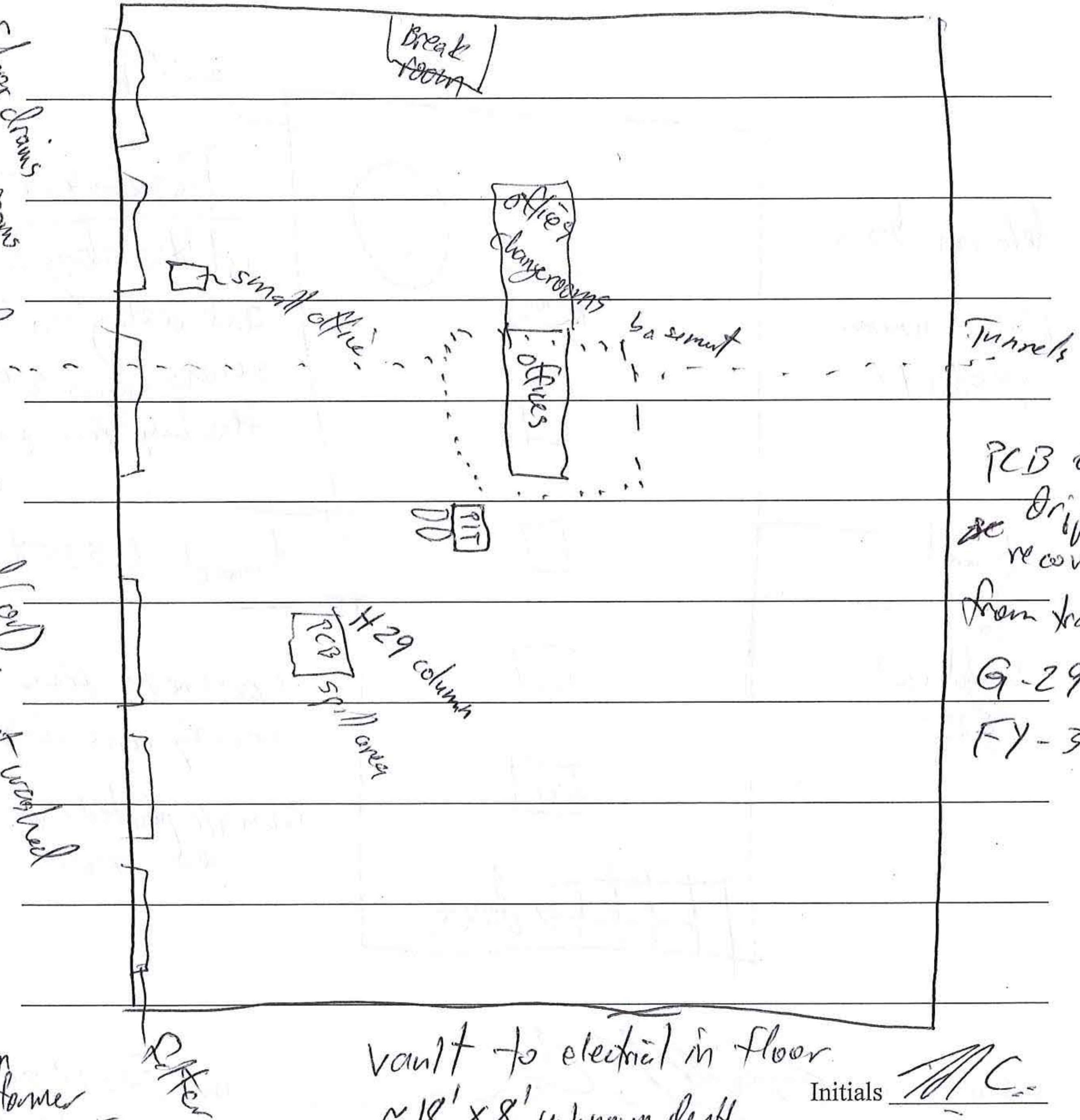
Facility ID: C-337

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

1st floor

Lube oil containment / tanks
H28 - H26 } columns
H28 - GA28 }



floor drains in filter rooms now abandoned & filled

PCBs used (oil) on filters which got washed into floor drains

PCB oil ~~sc~~ drip recovery from transformer
G-29
FY-30

filter rooms

blown transformer had been @ E30 now sitting @ D27

vault to electrical in floor
~18' x 8' unknown depth
Fy 29 - FY28 - G28 - G29
0.0ppm @ manhole

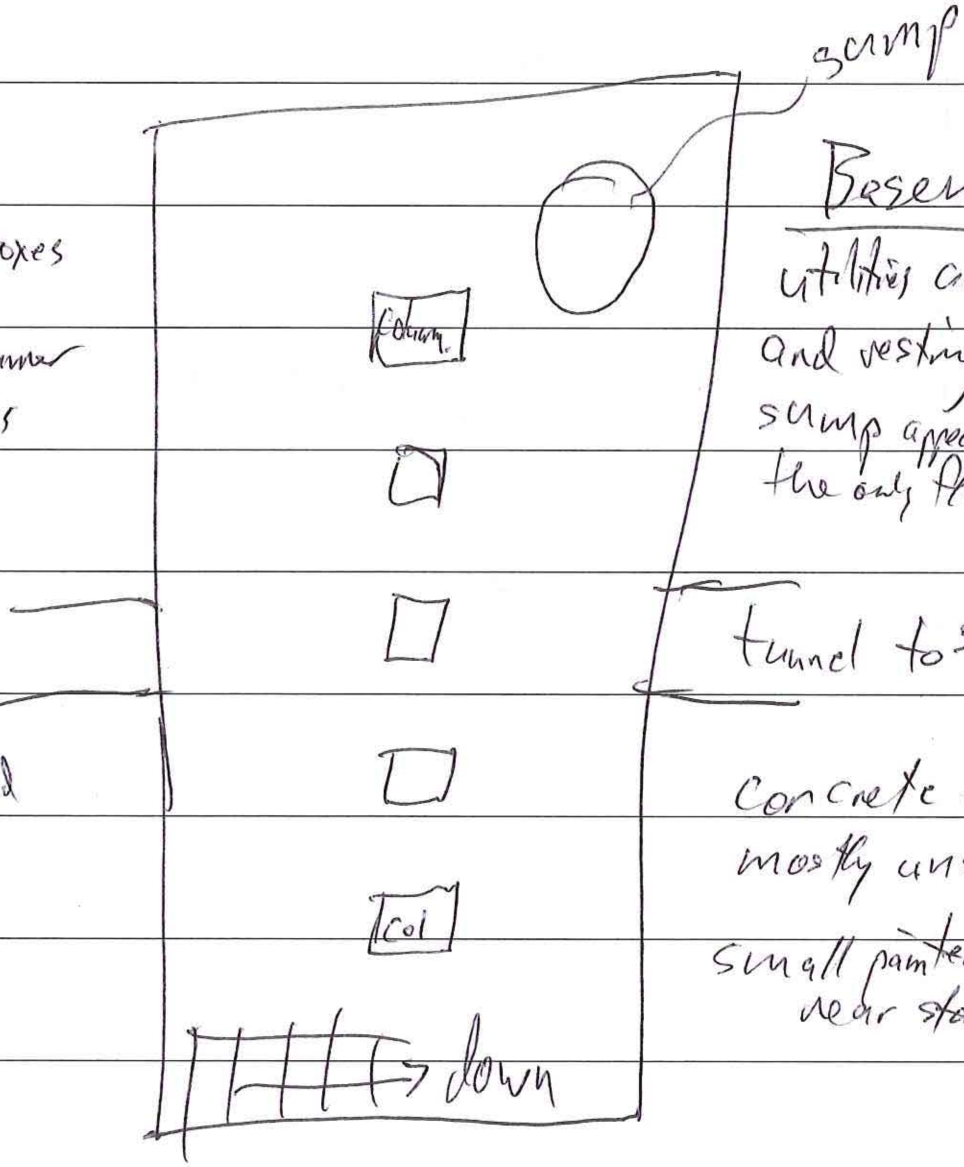
Initials MC

Geosyntec
consultants

Facility ID: C-337

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd



Basement

telecom boxes

NO consumer products

utilities along walls and resting on floor

sump appears to be the only floor penetration

tunnel to switch yard 537

tunnel to 335 & 300

Concrete floor mostly unsealed

small painted area near stairs

Walkdown Signature

Date Feb 12, 2020

Reviewer Signature Therese Gah

Date 2/12/2020

Facility ID: C-337A

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Hickey

Date: Feb 12, 2020

Weather: 37 F, rain, breeze

Part I: Facility Identification and Building Information

Facility ID/Name: C-337A / Feed Facility

Facility Location: E side of C-337

General Facility Use: used to heat feed cylinders for introduction into the enrichment process. Currently in shutdown condition.

Building Contact/Facility Representative: William Steffen

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N] - only for routine rounds

Initials TC

Facility ID: C-337A

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: offices & bathrooms supporting C-337 ops
currently not used
water is valved-off, dusty, 2 desks
has not been used for years

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement NP

1st Floor former offices, bathrooms

2nd Floor

3rd Floor

Additional Floors

Initials

Facility ID: C-337A

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, block [✓ concrete], stone, brick, steel

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________ N/A

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: unsealed, sealed, sealed with flooring

f. Foundation walls: poured, [✓ block], stone, other ________

g. Foundation walls: unsealed, [✓ sealed], sealed with paint

h. The basement is: wet, damp, dry, moldy, other N/A

i. Does the basement feel drafty? Y / N N/A

j. Sump present? Y / [✓ N] not observed

k. Water in sump? Y / N / [✓ Not Applicable]

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

____

____

____

Initials MC.

Facility ID: C-337A

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

west wall behind kitchen / office

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

not visible, tile floor with molding all around

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials

Geosyntec
consultants

Facility ID: C-337A

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, [✓ Space Heaters] on wall in SE corner office, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, [✓ Window units], Open Windows, None

present in hole in wall, unplugged large air gap around

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: could not access

Loading dock doors left open: none except 1 in unused maintenance room

Size:__________ Frequency:__________

Initials TdC.

Facility ID: C-337A

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: none observed

Stationary sources nearby (emission stacks, etc.): none

Heavy vehicular traffic nearby (or other mobile sources): to east

Initials MC.

Facility ID: C-337A

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
none	

Initials

Facility ID: C-337A

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials TLC.

Facility ID: C-337A

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y [✓ N]

If yes, describe locations, covering used (if any), and readings below:

Initials TVC.

Facility ID: C-337A

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None.

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

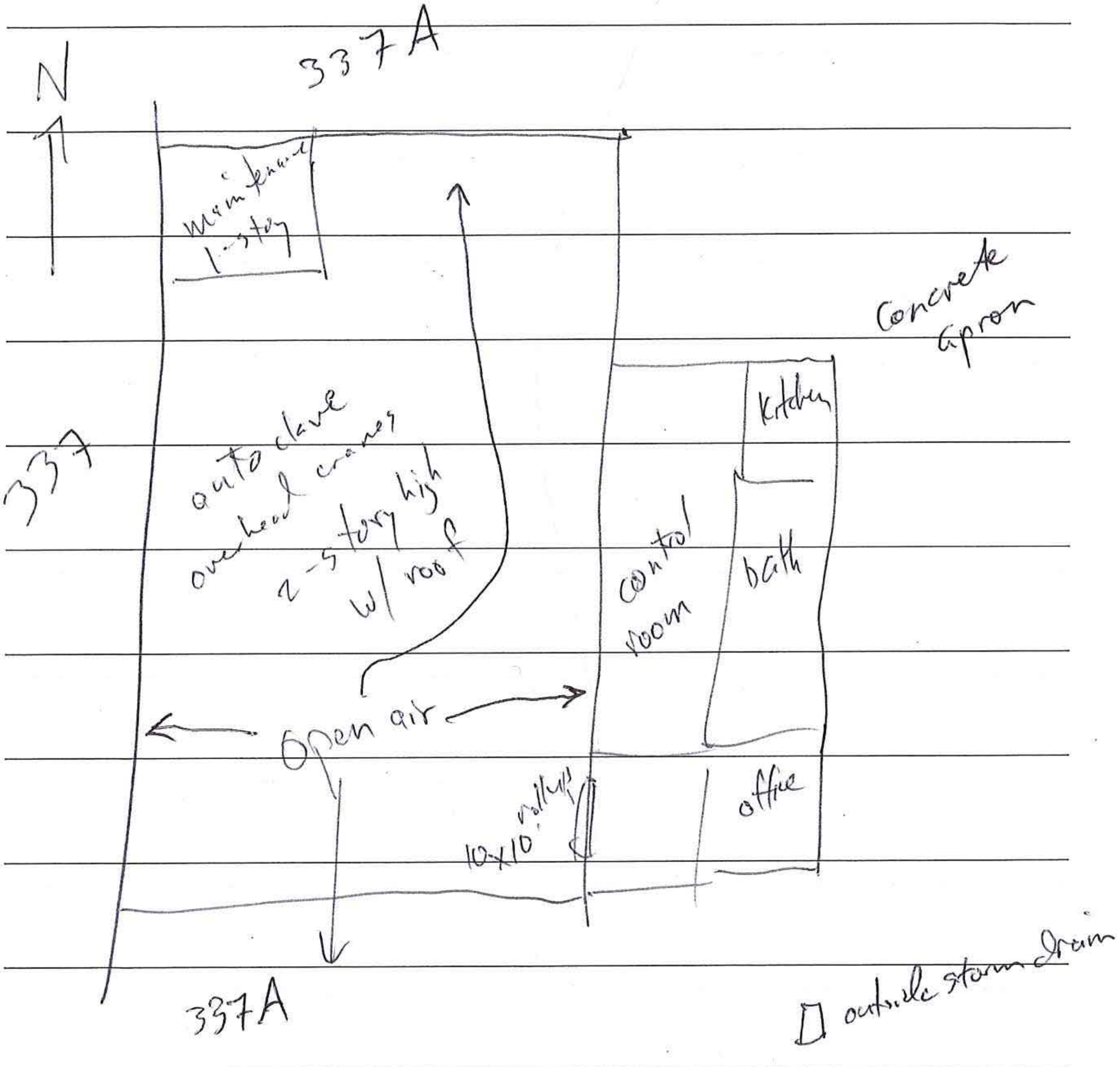
If yes, describe:

Initials RC

Facility ID: O-337A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TJC

Facility ID: C-337A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

None

Initials

Facility ID: C-337A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Initials

Facility ID: C-337A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Walkdown Signature ______ Date Feb 12, 2020

Reviewer Signature Theresa Gabris Date 2/12/2020

Geosyntec
consultants

Facility ID: C-350

Date: Feb 11, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T Creamer, Emma Hickey

Date: Feb 11, 2020

Weather: 41F light overcast, humid

Part I: Facility Identification and Building Information

Facility ID/Name: C-350

Facility Location: inside Limited Area SW of C-337

General Facility Use: former chemical storage ClF_3, F_2
2 small buildings

Building Contact/Facility Representative: Brian Lowrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) Y / [✓ N]

Initials TC

Facility ID: C-300

Date: Feb 11, 2020

Part II: Building Characteristics and Occupancy

Facility Description: comprises 2 small buildings built around large tanks formerly of ClF_3 one has small room on N side w/ equip for filling gas cylinders no longer in operation – building not ~~occupa~~ for occupation

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement N/A

1st Floor noted above

2nd Floor

3rd Floor N/A

Additional Floors

Initials Td C.

Facility ID: C-350
Date: Feb 11, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, steel concrete block Concrete roof

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________ N/A

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: [✓ unsealed], sealed, sealed with ________

f. Foundation walls: poured, block, stone, other ________

g. Foundation walls: unsealed, sealed, sealed with ________ N/A

h. The basement is: wet, damp, dry, moldy, other ________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / [✓ N]

k. Water in sump? Y / N / [✓ Not Applicable]

Basement/Lowest Level Depth below Grade: approximately N/A (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

N

Initials TAC.

Facility ID: C-360

Date: Feb 11, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / concrete / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

none

Does a gap exist between footings and the floor slab (describe if yes)? [✓ Yes] / No

small gap

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

None

Initials

Facility ID: C-350

Date: Feb 1, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary) None

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal N/A

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, [✓ Window units] one, Open Windows, None

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

N/A

Building Ventilation: none but venting system on enclosed cylinder loading space w/scale in floor

Note bathroom exhaust fans, fume hoods or other venting systems: none

Loading dock doors left open: none

Size:__________ Frequency:__________

Initials MC

Facility ID: C-350

Date: Feb 4, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

TLC.

Additional Building Vents: ~~none~~ Venting on cylinder fill station

Stationary sources nearby (emission stacks, etc.): none

Heavy vehicular traffic nearby (or other mobile sources): none

Initials TLC

Facility ID: C-350
Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
none	

Initials TAC.

Facility ID: C-350

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
		None			

Initials TC

Facility ID: C-350

Date: Feb 11, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / [✓ N]

If yes, describe locations, covering used (if any), and readings below:

Initials TLC.

Facility ID: C-350

Date: Feb 11, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / N

If yes, describe: unknown

Initials

Facility ID: C-360

Date: ____________

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

None

See drawing p14

Initials ____________

Facility ID: C-350

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

see drawing p14

Initials

Facility ID: C-350

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

None see Drawing p14

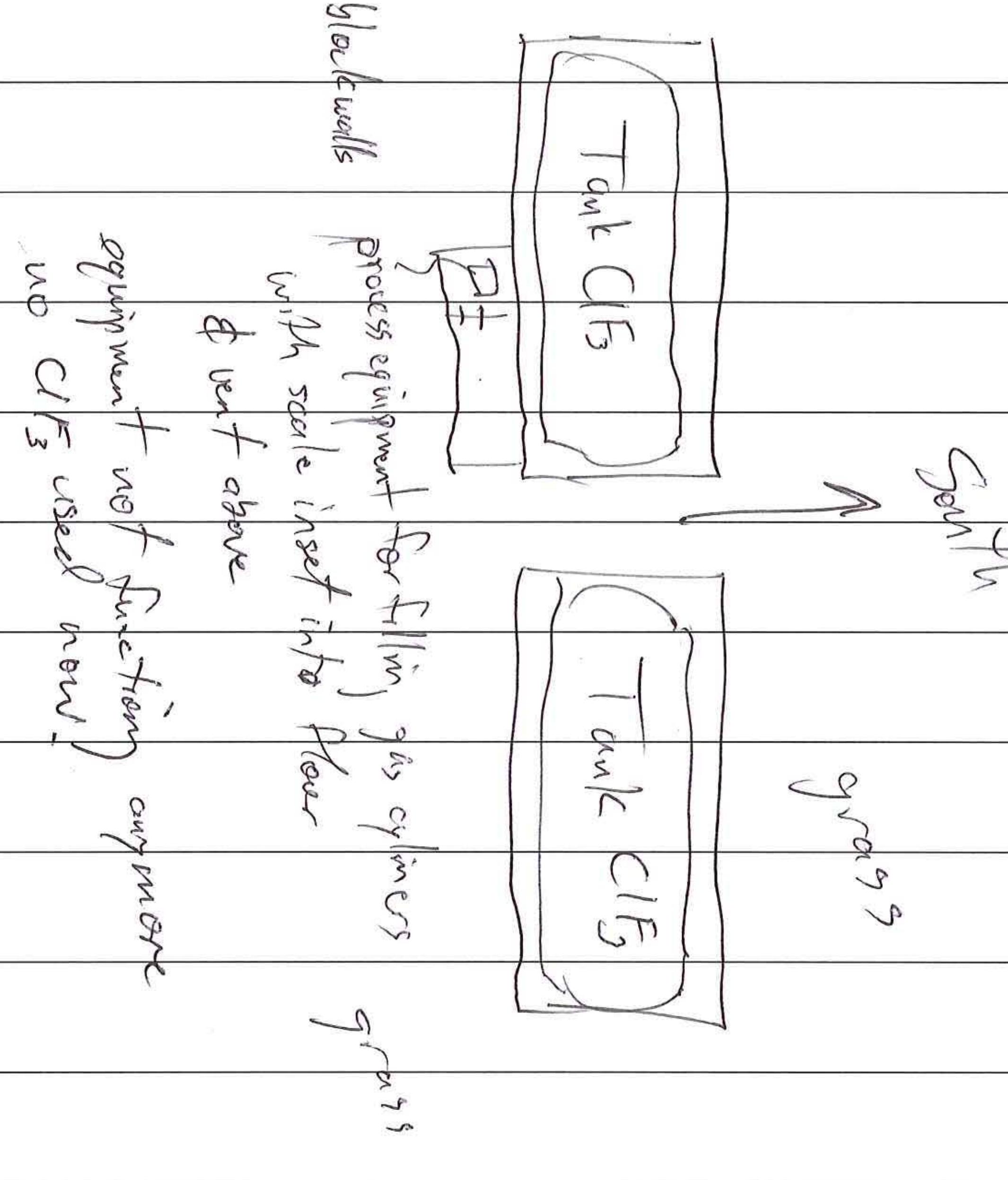
Initials

Geosyntec consultants

Facility ID: C-350

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd



process equipment for filling gas cylinders with scale inset into floor & vent above

equipment not functioning anymore

no ClF_3 used now.

Walkdown Signature

Date Feb 11, 2020

Reviewer Signature Therese Gah

Date 2/12/2020

Geosyntec
consultants

Facility ID: C-360

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Haley

Date: Feb 12, 2020

Weather: Rain, 37F breeze

Part I: Facility Identification and Building Information

Facility ID/Name: C-360/ Transfer and Sampling Building

Facility Location:

General Facility Use: Formerly Used to perform sampling of product and feed cylinders and transfer of product cylinders into customer shipping cylinders.
*Currently in shutdown condition, cleaned out, and demo ready.

Building Contact/Facility Representative: William Steffen

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials T.C.

bldg access will require RADCON support and RAD 2 training for walkers
will not be completed today (Feb 12)

Facility ID: C-360

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: offices & control rooms on NW corner, process to S. in larger space. Walked into hallway w/ offices and learned facility is deactivated. Much of space is not accessible without further training etc.

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement not accessed

1st Floor only accessed as noted above (offices)

2nd Floor not accessed

3rd Floor —

Additional Floors

Initials TAC

Facility ID: C-360

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, [✓ concrete], stone, brick, [✓ steel]

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: unsealed, sealed, sealed with ________

f. Foundation walls: poured, block, stone, other ________

g. Foundation walls: unsealed, sealed, sealed with ________

h. The basement is: wet, damp, dry, moldy, other ________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

unknown

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

not described

Initials

Facility ID: C-3600

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / [✓ asphalt] / other ______

Is the building insulated? (circle one) Y/N How air tight? Tight / Average / Not Tight

Age of building (if information available): ______

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

Not observed

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

not observed

Initials MAC

Facility ID: C-360

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary) None deactivated

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: ____________________

Loading dock doors left open: ____________________

Size:__________ Frequency:__________

Initials AC

Facility ID: C-360

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: __________

Stationary sources nearby (emission stacks, etc.): N/A building deactivated

Heavy vehicular traffic nearby (or other mobile sources): __________

Initials __________

Facility ID: C-360

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
N/A	

Initials

Facility ID: C-360

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials JAC

Geosyntec
consultants

Facility ID: C-360

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / [✓ N]

If yes, describe locations, covering used (if any), and readings below:

Initials

Facility ID: C-360

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials AC

Facility ID: C-360

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

deactivated - building ready for demolition

temporary power for lights & sump

all other utilities cut

not used.

C-360A
remains in use

Initials AAC.

Facility ID: C-360

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Initials JMC

Facility ID: C-360

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Initials

Facility ID: C-3600

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Walkdown Signature Date Feb 12, 2020

Reviewer Signature Theresa Gabi Date 2/12/2020

Geosyntec
consultants

Facility ID: C-360A

Date: 2/13/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO/EH

Date: 2/13/2020

Weather: 30s, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-360A / Toll Transfer + Sampling Building Annex

Facility Location:

General Facility Use: Vehicle/ heavy equipment maintenance

Building Contact/Facility Representative: Jason Lawrence

Building Occupants (if information readily available): potential (some office space)

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N intermittent

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part II: Building Characteristics and Occupancy

Facility Description: small/med slab on grade, single
story maintenance garage.
Storage, oil change, maintenance,
office space
Generally leaky building; can see daylight under doors

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor storage, maintenance, office

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

f. Foundation walls: [✓ poured], block, stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

N/A

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

Cracks in slab (0ppm), large floor drain (0 ppm)

Initials TG

Geosyntec
consultants

Facility ID: C-360A

Date: 2/13/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / asphalt / other ______

Is the building insulated? (circle one) [✓ Y] / ~~N~~ TG How air tight? Tight / Average / [✓ Not Tight]

Age of building (if information available): ______

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

~~N/A~~ TG Can see down to soil around pier in NW + SW corners.

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

None

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ________

Note bathroom exhaust fans, fume hoods or other venting systems: ________

Loading dock doors left open: closed during inspection

Size:________ Frequency:________

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): Vehicle + eqp maintenance - expect above average traffic around garage.

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Flammables cabinet (N wall)	0.6 ppm
oil storage area	0.0 ppm

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

See photos

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Fire cabinet and around garage	zep brake cleaner	few cans			
	Blaster chain +cable lub	Few cans			
	oil				
	diesel				
	waspspray				
	antifreeze				
	electrical cleaner				

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Ambient IA - 0.0 ppm

Flame cabinet - 0.6 ppm

Gap around NE/NW piers - 0.0 ppm

Pipe floor penetrations - 0.0 ppm (loading area)

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: Petroleum odor

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location: Staining throughout garage

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe: Fork lifts, lifts, likely other vehicles/machinery intermittently

Has the building ever had a fire? Y / [✓ N]

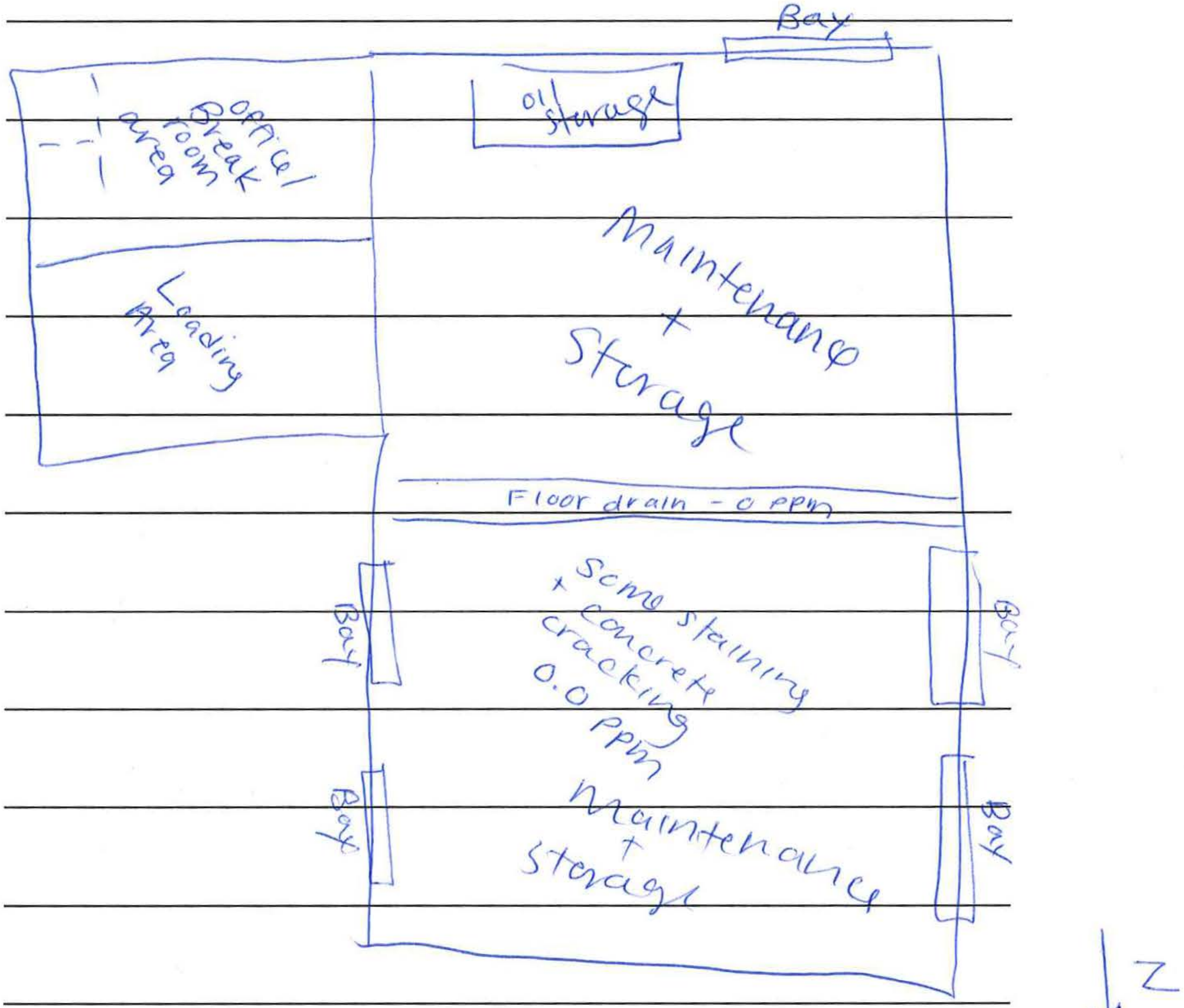
If yes, describe:

Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-360A

Date: 2/13/2020

Part IX: Additional Notes from Walkdown, cont'd

oil sheen on door knob

Initials TG

Facility ID: C-360 A

Date: 2/13/2020

Part IX: Additional Notes from Walkdown, cont'd

Initials TG

Geosyntec
consultants

Facility ID: C-360A

Date: 2/13/2020

Part IX: Additional Notes from Walkdown, cont'd

Walkdown Signature Theresa Goh Date 2/13/2020

Reviewer Signature Teresa Date 2/13/2020

Facility ID: C-409

Date: Feb 11, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, Emma Hrclay

Date: Feb 11, 2020

Weather: 43 F, breeze, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-409

Facility Location: SW of C-400

General Facility Use: equipment drying & cleaning, ovens & sorting/cleaning stations, no solvent use (all historical use)

Building Contact/Facility Representative: Brian Lowrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials

Facility ID: C-409

Date: Feb 11, 2020

Part II: Building Characteristics and Occupancy

Facility Description: former equipment cleaning including cylinders bldg not used anymore except equipment storage

built 1970s

Does facility have a basement? (circle one) Y [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement N/A

1st Floor building not in use

2nd Floor mezzanine only - former lab & some equip

3rd Floor N/A

Additional Floors N/A

Initials

Geosyntec
consultants

Facility ID: C-409

Date: Feb 11, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/a

b. Basement type: full, crawlspace, slab, other ____

c. Basement floor: concrete, dirt, stone, other ____

d. Basement floor: uncovered, covered, covered with ____

e. Concrete floor: unsealed, [✓ sealed], sealed with paint

f. Foundation walls: poured, block, stone, other none

g. Foundation walls: unsealed, sealed, sealed with N/A

h. The basement is: wet, damp, dry, moldy, other ____ N/A

N/A

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ____ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

expansion joints, utility trench, lube oil pits (2)
trenches under ovens

Initials ____

Facility ID: C-409

Date: Feb 11, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / [✓ asphalt] / other varies, all grass on S. side

Is the building insulated? (circle one) [✓ Y] / N How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): 1970's

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: none

Describe location(s) of internal load-bearing walls:

north line — A, B, C lines of columns E-W oriented
south line

Does a gap exist between footings and the floor slab (describe if yes)? [✓ Yes] / No

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

See above

Initials AC

Geosyntec consultants

Facility ID: C-409

Date: Feb 11, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

see note below

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other each office/lab

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N RCRA lab only

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Only HVAC in RCRA lab, mezzanine, office area, bathrooms & not in most of facility

Building Ventilation: none

Note bathroom exhaust fans, fume hoods or other venting systems: 2 fume hoods on east end RCRA lab

Loading dock doors left open: No

Size: ~10 x 10 Frequency: __________

2 on N side

Initials __________

Facility ID: C-409

Date: Feb 11, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: none

Stationary sources nearby (emission stacks, etc.): none

Heavy vehicular traffic nearby (or other mobile sources): light

Initials MC.

Geosyntec
consultants

Facility ID: C-409

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
none observed	
2 empty fire cabinets on	mezzanine

Initials TdC

Facility ID: C-409

Date: Feb 11, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials AAC

Facility ID: C-409

Date: Feb 11, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] N

If yes, describe locations, covering used (if any), and readings below:

West end utility trench & floor joints 0.0 ppm

indoor air 0.0 ppm

6th oven steel floor over trench - joint 0.0 ppm

2 vertical pipes from floor inside "RCRA Lab" 0.0 ppm

men's bath floor drain 0.0 ppm

shower drain 0.0 ppm

hole in wall 0.0 ppm

Women's bath floor drain 0.0 ppm

shower drain 1 0.0 ppm

shower drain 2 0.0 ppm

Initials

Facility ID: C-409

Date: Feb 11, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): none

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / N

Describe with location: NO

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / N

If yes, describe: unknown

Initials AMC

Facility ID: C-409

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Initials AC

Geosyntec
consultants

Facility ID: C-409

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

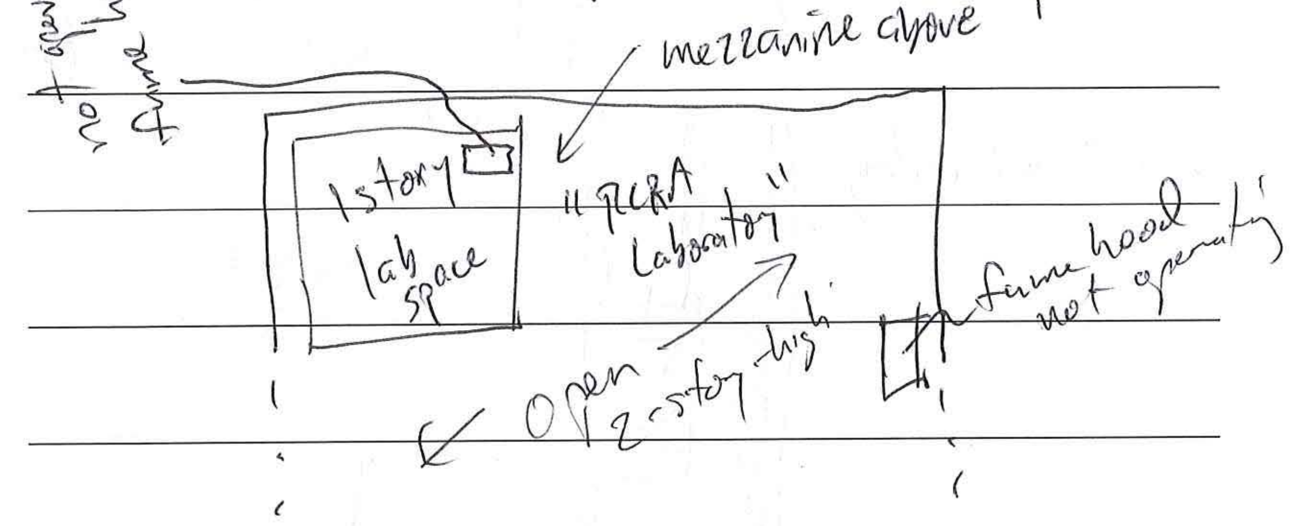
Initials LAC

Facility ID: C-409

Date: Feb 4, 2020

Part IX: Additional Notes from Walkdown, cont'd

E end of bldg continued from p14



decon here was alkali, acid or formula 409

no solvents

Initials

building continues see p13

Geosyntec
consultants

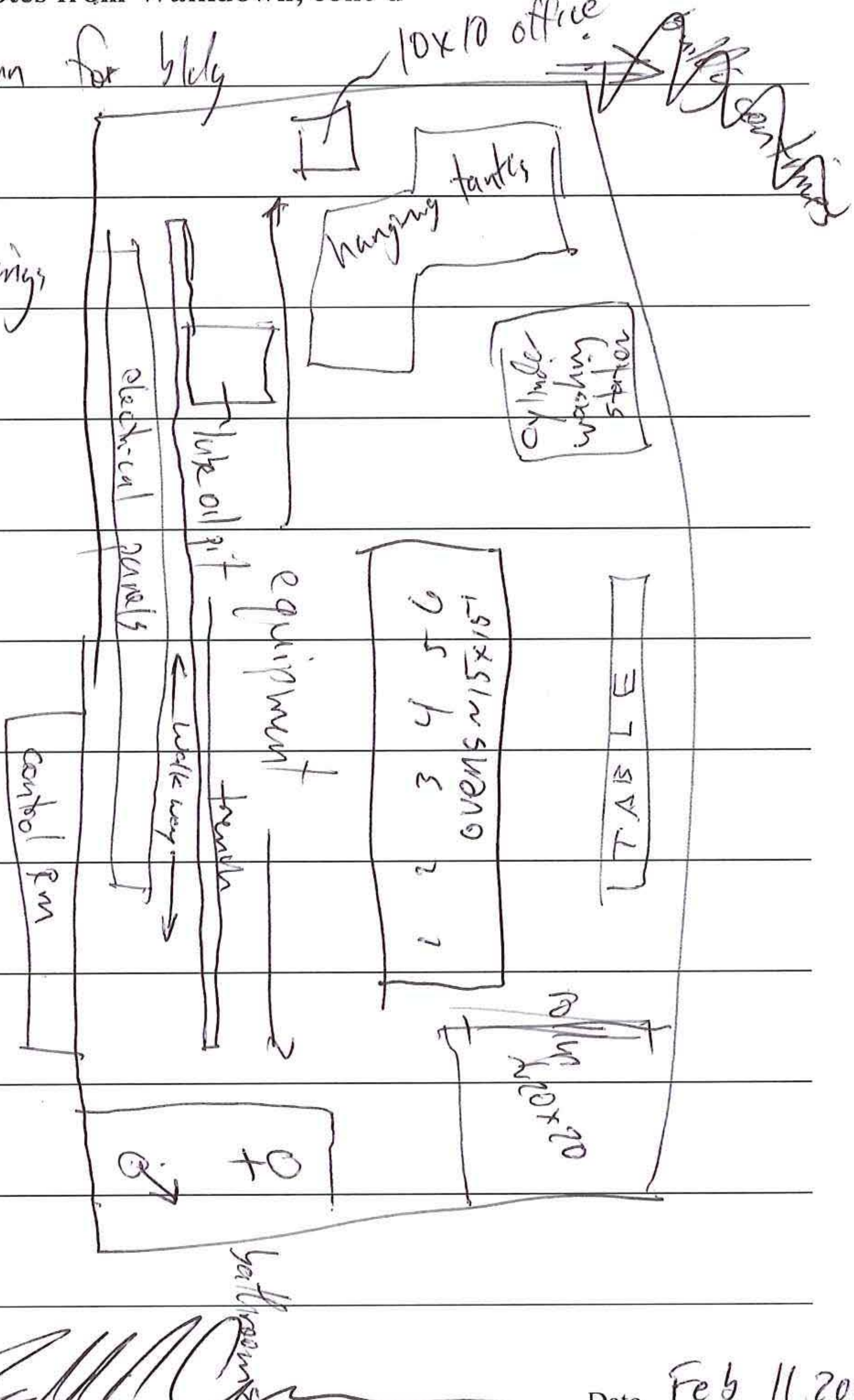
Facility ID: C-409

Date: Feb 11, 2020

Part IX: Additional Notes from Walkdown, cont'd

no current plan for bldg

~ 30+ foot ceilings



Walkdown Signature
Date Feb 11, 2020

Reviewer Signature Theresa Gabin
Date 2/12/2020

Geosyntec
consultants

Facility ID: C-410 K&D

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Hickey

Date: Feb 12, 2020

Weather: Rain, 37F breeze

Part I: Facility Identification and Building Information

Facility ID/Name: C-410 K & D

Facility Location:

General Facility Use: emptying F_2 gas & cylinders into 3 large tanks

Building Contact/Facility Representative: Brian Lowrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials TC

K- built 1991
D- built ~1952

Facility ID: C-410 K&D

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: 2 small structures, 5 feet apart
K has an enclosed room with an awning-covered
outdoor area connected by roll-up door
D has 3, 1000 cubic foot Yellow tanks for F_2 gas
piping connects buildings

Does facility have a basement? (circle one) Y [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement —

1st Floor F_2 gas transfer & storage

2nd Floor —

3rd Floor —

Additional Floors —

Initials

Facility ID: C-410 K & D

Date: Feb 12, 2020

Part III: Construction Characteristics

K – built with 1/2 ft footer wall around perimeter & steel on top.

D – poured concrete walls up ~ 6-8 ft steel on top

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

b. Basement type: full, crawlspace, slab, other N/A

c. Basement floor: concrete, dirt, stone, other N/A

d. Basement floor: uncovered, covered, covered with N/A

e. Concrete floor: [✓ unsealed], sealed, sealed with ____________

f. Foundation walls: [✓ poured], block, stone, other ~ 1/2 foot w/ steel on top

g. Foundation walls: [✓ unsealed], sealed, sealed with ____________

h. The basement is: wet, damp, dry, moldy, other N/A

i. Does the basement feel drafty? Y / N N/A

j. Sump present? Y / [✓ N]

k. Water in sump? Y / N / [✓ Not Applicable]

Basement/Lowest Level Depth below Grade: approximately N/A (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

floor drain in K

perimeter joint in concrete floor

Initials AC.

Facility ID: C-410-K&D

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other ____________

Is the building insulated? (circle one) K [✓ Y] / D [✓ N] How air tight? Tight / K & D [✓ Average] / Not Tight

Age of building (if information available): K-1991 D-1952

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: None

Describe location(s) of internal load-bearing walls:

None

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

None

Initials ____________

Facility ID: C-410 K&D

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary) in K hung from roof

Hot air circulation, Heat pump, Hot water baseboard, [✓ Space Heaters], Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, [✓ None]

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

N/A

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: no

Size: 10 X 10 Frequency:__________

Initials TdC.

Facility ID: C-410 K&D

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: none

Stationary sources nearby (emission stacks, etc.): none

Heavy vehicular traffic nearby (or other mobile sources): light

Initials

Facility ID: C-410 K&D

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
none	

Initials MC.

Facility ID: C-410 K&D

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
none - no cabinets					

Initials MC.

Geosyntec
consultants

Facility ID: C-410 K & D

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

0.0 ppm indoor air in K

Initials

Facility ID: C-410 K4D

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): none

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials

Facility ID: Q-410K&D

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

None

Initials AAC.

Facility ID: C-410K&D

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

NONE

Initials TAC.

Facility ID: C-410K&D

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

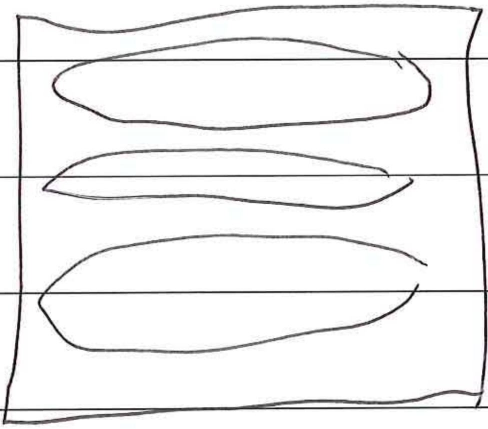
Initials JC

Facility ID: C-410K & D

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

- 3 Flourine tanks filling whole space
- poured concrete walls with steel on top



D

each tank 1000 cf

yellow tanks & lines

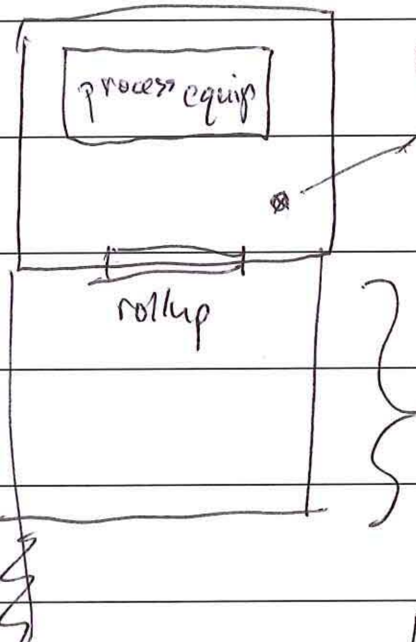
floor drain 0.0 ppm

K

enclosed

steel I-beams
steel skin
insulated
~30 x 25'

for ~~filling~~ emptying cylinders with Flourine gas into tanks next door in C-410-D



canopy

grass surrounded by concrete apron

hung heaters on ceiling

Walkdown Signature

Date Feb 12 2020

Reviewer Signature Theresa Gob

Date 2/12/2020

Geosyntec
consultants

Facility ID: C-410L

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer, E. Hickey

Date: Feb 12, 2020

Weather: Rain 40F calm

Part I: Facility Identification and Building Information

Facility ID/Name: C-410 L

Facility Location: due east of C-400

General Facility Use: storage for trailer - spill response equipment

Building Contact/Facility Representative: Brian Lowrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials

Facility ID: C-410L

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: qonset hut

spill response equip. storage

Does facility have a basement? (circle one) Y [✓ N]

~~If Yes, Is basement/lowest level occupied? (circle one)~~

~~Full-time, Occasionally, Seldom,~~ Almost Never TMC N/A

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement NP

1st Floor storage

2nd Floor NP

3rd Floor NP

Additional Floors —

Initials TMC

Facility ID: C-410L

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel] Qonset on slab

b. Basement type: full, crawlspace, slab, other ________ N/A

c. Basement floor: concrete, dirt, stone, other ________ N/A

d. Basement floor: uncovered, covered, covered with ________ N/A

e. Concrete floor: [✓ unsealed], sealed, sealed with ________

f. Foundation walls: poured, block, stone, other ________ N/A

g. Foundation walls: unsealed, sealed, sealed with ________ N/A

h. The basement is: wet, damp, dry, moldy, other ________ N/A

i. Does the basement feel drafty? Y / N N/A

j. Sump present? Y / [✓ N]

k. Water in sump? Y / N / [✓ Not Applicable]

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

clean, uncracked slab, excellent condition

Initials MC

Facility ID: C-410L

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / other gravel

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): newer

Age of separate additions or expansion (if information available): N/A

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

Qonset hut on slab

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TMC.

Facility ID: C-4/0L

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

NoNe

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ______________________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: ______________________________

Note bathroom exhaust fans, fume hoods or other venting systems: ______________________________

Loading dock doors left open: 1 rollup, 1 back man door

Size: 10x10' Frequency:__________________

Initials MC.

double sliding barn doors

Facility ID: C-410L

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: none

Stationary sources nearby (emission stacks, etc.): C-400 to West

Heavy vehicular traffic nearby (or other mobile sources): light

Initials

Facility ID: C-410L

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
gasoline-powered generator	

Initials

Facility ID: C-410L

Date: Feb 12, 2010

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading

Initials TAC

Geosyntec
consultants

Facility ID: C-410L

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

0.0 indoor - 1 open space

no separate rooms

Initials TdC.

Facility ID: C-410L

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): none

Describe odors in the building: none

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials MC

Facility ID: C-410L

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Initials

Facility ID: C-410L

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

Initials AAC

Facility ID: C-410L

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

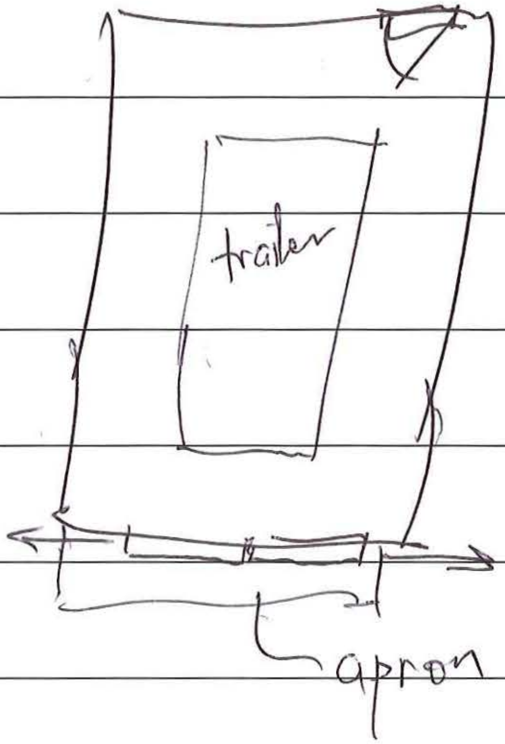
Initials TAC

Facility ID: C-410L

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

several small areas in walls, under door and pipe penetrations connect OA to indoors.



Walkdown Signature

Date Feb 12, 2020

Reviewer Signature

Date 2/12/2020

Facility ID: C-412-T11A

Date: Feb 12, 2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Creamer E. Hickey

Date: Feb 12, 2020

Weather: 40F rain calm

Part I: Facility Identification and Building Information

Facility ID/Name: C-412-T11A/ Change House and Shower Trailer

Facility Location:

General Facility Use: Used for FRNP employees to change out and shower.

Building Contact/Facility Representative: Jeff Bennett

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) [✓ Y] /N
Field crews

Initials

Facility ID: C-4/2-T11A

Date: Feb 12, 2020

Part II: Building Characteristics and Occupancy

Facility Description: men's & women's shower/bath/changing 2-sided trailer

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement NP

1st Floor shower/bathroom

2nd Floor NP

3rd Floor NP

Additional Floors —

Initials JC.

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, steel trailer

b. Basement type: full, crawlspace, slab, other ______

c. Basement floor: concrete, dirt, stone, other ______

d. Basement floor: uncovered, covered, covered with ______

e. Concrete floor: unsealed, sealed, sealed with ______

f. Foundation walls: poured, block, stone, other ______

g. Foundation walls: unsealed, sealed, sealed with ______

h. The basement is: wet, damp, dry, moldy, other ______

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

not applicable trailer

Basement/Lowest Level Depth below Grade: approximately ______ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

Floor drains

Initials TMC

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / concrete / asphalt / other gravel

Is the building insulated? (circle one) [✓ Y]/N How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available): none

Describe location of any tunnels: none

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: ______________________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

not visible

1 unit on outside of each side men/women

Building Ventilation: ______________________________

Note bathroom exhaust fans, fume hoods or other venting systems: vent fans both sides on switches

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials MC

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): none

Heavy vehicular traffic nearby (or other mobile sources): light

Initials TAC

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
See next	page

Initials

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
men's	Virex TB	Ready	to use	disinfecting	cleaner
photo	of products	on	both men's	&	women's

Initials TMC

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

0.0 ppm men's side

0.0 ppm women's side

0.0 ppm in hole (small) in trailer skirt

Initials TdC

Facility ID: T-412-T11A

Date: Feb 12, 2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: air fresheners

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials

Facility ID: T-412-T11A

Date: ______

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

men's side floor drain 0.0 ppm

Initials MC

Geosyntec
consultants

Facility ID: C-412-T11A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

Initials

Facility ID: C-412-TTCA

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd

none

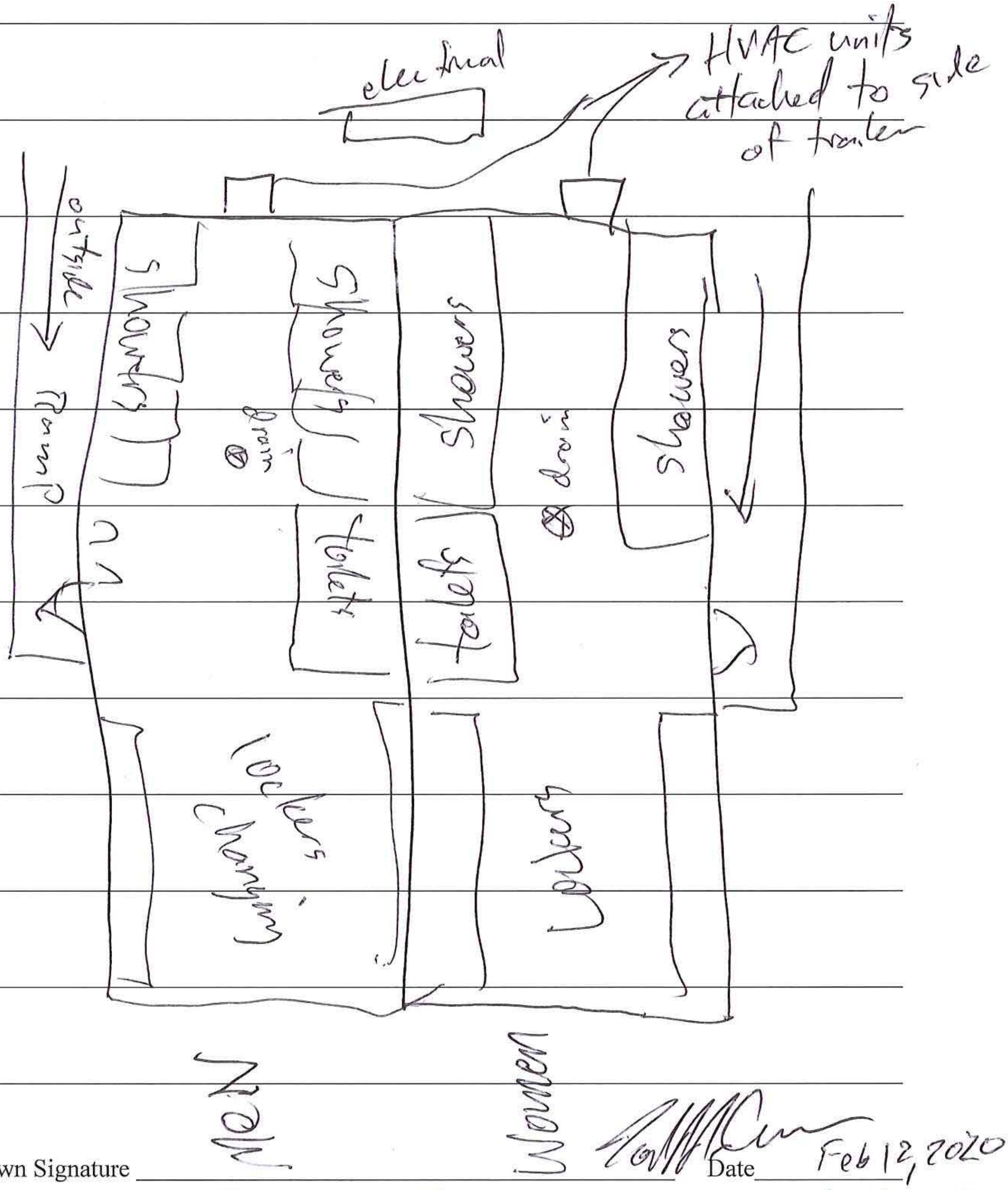
Initials

Geosyntec
consultants

Facility ID: C-4/2-T1/A

Date: Feb 12, 2020

Part IX: Additional Notes from Walkdown, cont'd



Walkdown Signature ______ Date Feb 12, 2020

Reviewer Signature Theresa Gabri Date 2/12/2020

Facility ID: C-615

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/11/2020

Weather: 30/40s; overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-615 - Sewage Treatment Facility

Facility Location: D-10

General Facility Use: wastewater treatment

Building Contact/Facility Representative: Dale Donohoo / Brad McGreggor

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) [✓ Y] /N (see below)

No permanent occupants - utility operators make rounds every 4 hours.

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: wastewater treatment facility with large open basement - occupied daily by operators

Does facility have a basement? (circle one) [✓ Y]/N

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, [✓ Occasionally,] Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement Occupied every day -ops - pump sludge

1st Floor occupied

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, [✓ concrete], stone, brick, steel

b. Basement type: [✓ full], crawlspace, slab, other __________

c. Basement floor: [✓ concrete], dirt, stone, other __________

d. Basement floor: [✓ uncovered], covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

f. Foundation walls: [✓ poured], block, stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

h. The basement is: wet, damp, [✓ dry], moldy, other __________

i. Does the basement feel drafty? Y / [✓ N]

j. Sump present? [✓ Y] / N 0 ppm

k. Water in sump? [✓ Y] / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately 8 (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, [✓ utility penetrations], [✓ drains]):

____

____

____

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): ~50-60 y/o

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

NO

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

NO

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, [✓ Space Heaters], Stream radiation, Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other N/A

Air conditioning (circle one): Central Air, [✓ Window units], Open Windows, None

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

N/A

Building Ventilation: vent fans

Note [✓ bathroom exhaust fans], fume hoods or other venting systems:

Loading dock doors left open: N/A

Size: Frequency:

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: vent from basement to outdoor air

Stationary sources nearby (emission stacks, etc.): NO

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C-615

Date: 7/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
~~Chlorine~~ TG	

Initials TG

Geosyntec
consultants

Facility ID: C-615

Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
1st floor	Wasp spray	16 oz			
1st floor bathroom	Kano Kroil	8 oz			
	Chlorine				

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

See drawings

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None.

Describe odors in the building: NO

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location: None.

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

TG

Initials TG

Geosyntec
consultants

Facility ID: C-615

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

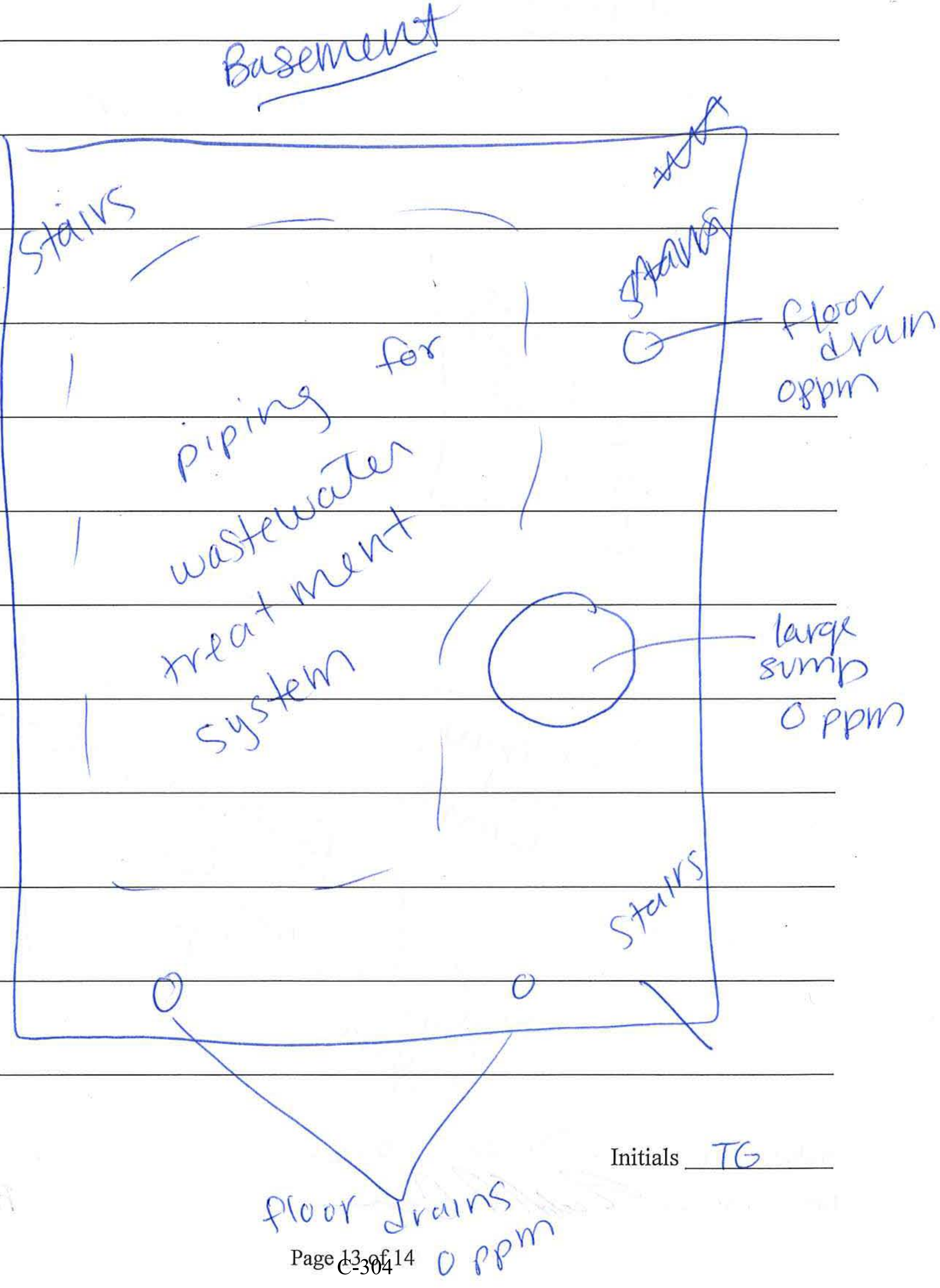
TG

Initials TG

Facility ID: C-615

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd



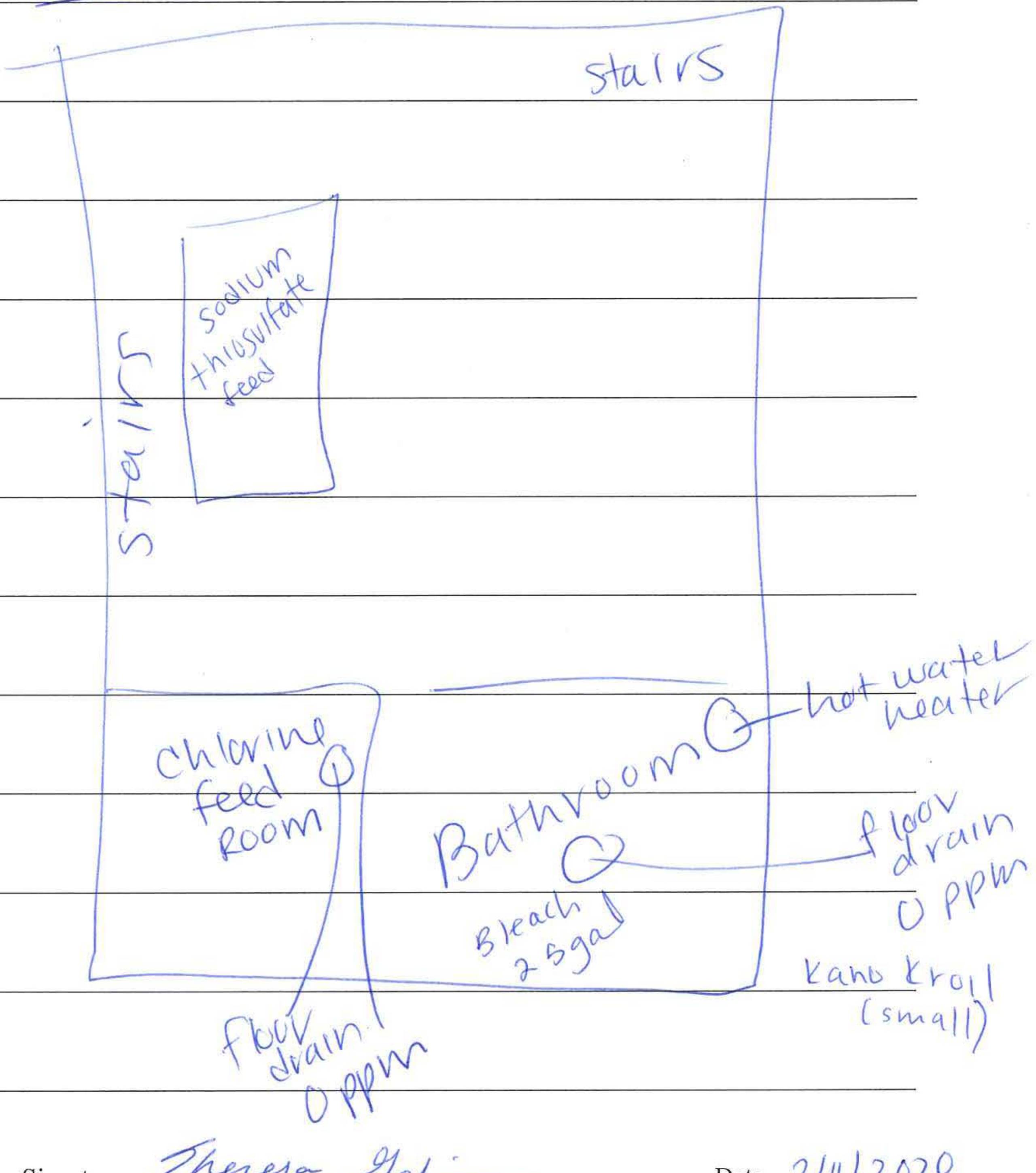
Initials TG

Facility ID: C-615

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

1st floor



Walkdown Signature Theresa Gab Date 2/11/2020

Reviewer Signature Date Feb 11, 2020

Facility ID: C-720/C-720C

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: T. Gabris, T. Creamer, T. Overby, E. Hickey

Date: 2/11/2020

Weather: 40s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-720/C-720C

Facility Location:

General Facility Use: Stores, machine shops

Building Contact/Facility Representative: Jason Lawrance

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N

Initials TG

Facility ID: C-720/C-720C

Date: Feb 11, 2020

Part II: Building Characteristics and Occupancy

Facility Description: Large open space
-roof drains penetrate floor (ex column H-11)
- C-720C is the most recent addition on N side of building
interiors are connected via huge open ways

Does facility have a basement? (circle one) Y [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement N/A

1st Floor Store room, machine shops, historic teardown

2nd Floor Mezzanine, offices (~7 people)

3rd Floor

Additional Floors

Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

poured & block

a. Above grade construction: wood frame, [✓ concrete], stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: unsealed, sealed, sealed with painted

f. Foundation walls: [✓ poured], [✓ block], stone, [✓ other] structural steel w/ asbestos

└ load bearing internal → exterior and truck alleys (up to ~8ft)

g. Foundation walls: unsealed, sealed, sealed with painted

N/A

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, [✓ expansion joints], utility penetrations, [✓ drains]):

Initials tb

Geosyntec
consultants

Facility ID: C720/720C

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / [✓ asphalt] / other

Is the building insulated? (circle one) Y/[✓ N] – limited (on piping) transite paneling How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): ~~limited~~ 1953/54

Age of separate additions or expansion (if information available): C-720C Addition

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

along truck alleys

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

expansion joints

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

columns throughout building

Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

RCW [✓ Hot air circulation,] Heat pump, ~~Hot water~~ baseboard, Space Heaters, [✓ Stream radiation,]

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

[✓ Natural Gas,] [✓ Fuel Oil,] Kerosene, Electric, Propane, Solar, Wood, Coal
– backup

Hot water tank fueled by: electric or steam
L primary

Boiler/furnace located in (circle one): Basement, [✓ Outdoors,] Main Floor, Other package boilers Nat. gas.. fuel oil backup

Air conditioning (circle one): [✓ Central Air,] Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

good condition

Building Ventilation: __________

Note bathroom exhaust fans, fume hoods or other venting systems: none observed

Loading dock doors left open: Opened only for entry/exit

Size:__________ Frequency:__________

Initials TG

Facility ID: C720/720 C

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): NO

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
SE 1st floor chemical storage area #1	0.1 ppm ; see photos
SE " " #2	0.9 ppm ; odor
~~wood filled floor joints C-720C~~ 50'	~~0 ppm~~ TG

Initials TG

Geosyntec
consultants

Facility ID: C720/720C

Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
SW store room chem storage	See photos and chemical inventory				
SW chem storage 2	Kano / Kroil	1 gal	poor	pet-distillate	No hit 0ppm
metallurgy shop	cleaners - see photos				0 ppm
zep non-chlorinated break cleaner	↔ C720C E end	14 oz	good		0 ppm
Cloumn 13K fire cabinet	See photos				

Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Storage room condensate drain - 0ppm
Storage room perimeter joint - 0ppm
Storage room floor drain (likely plugged) - 0ppm
Drain in chemical storage room - 0ppm - eye wash drain
Chemical storage area #1 in store room (SW) - 0.1 ppm
" " #2 - 0.9 ppm
S of struck alley - Metallurgy shop - IA - 0ppm; ~~Floor~~ anchor 0 ppm
C720C - NW - open floor drain - 0 ppm
C720C - wood filled floor joint 50' - 0 ppm
Changehouse 2 janitor closet drain - 0 ppm
Between J8 + J9 columns - haz waste storage - 0ppm
Fire cabinet near column 13K (photos)
Instrument shop (NE) utility corridor - 0 ppm

Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): front of bldg >25'

Describe odors in the building: Tox 2 chemical odor

Any known spills of a chemical immediately outside or inside the building? [✓ Y] / N

Describe with location:

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe: forklifts, skidsteers, pickup trucks (3)
3-axel full-size for roll-off containers - Diesel truck

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TG

Facility ID: C720|720C

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

- Expansion joints contaminated
- Building flooded several times - drains plugged
- floor joints epoxied shut
- truck alleys sealed and painted

- 4-8" slab
- can drill through slab with utility clearance
- lots of rebar

Initials TG

Facility ID: C720 | 720C

Date: 2|11|2020

Part IX: Additional Notes from Walkdown, cont'd

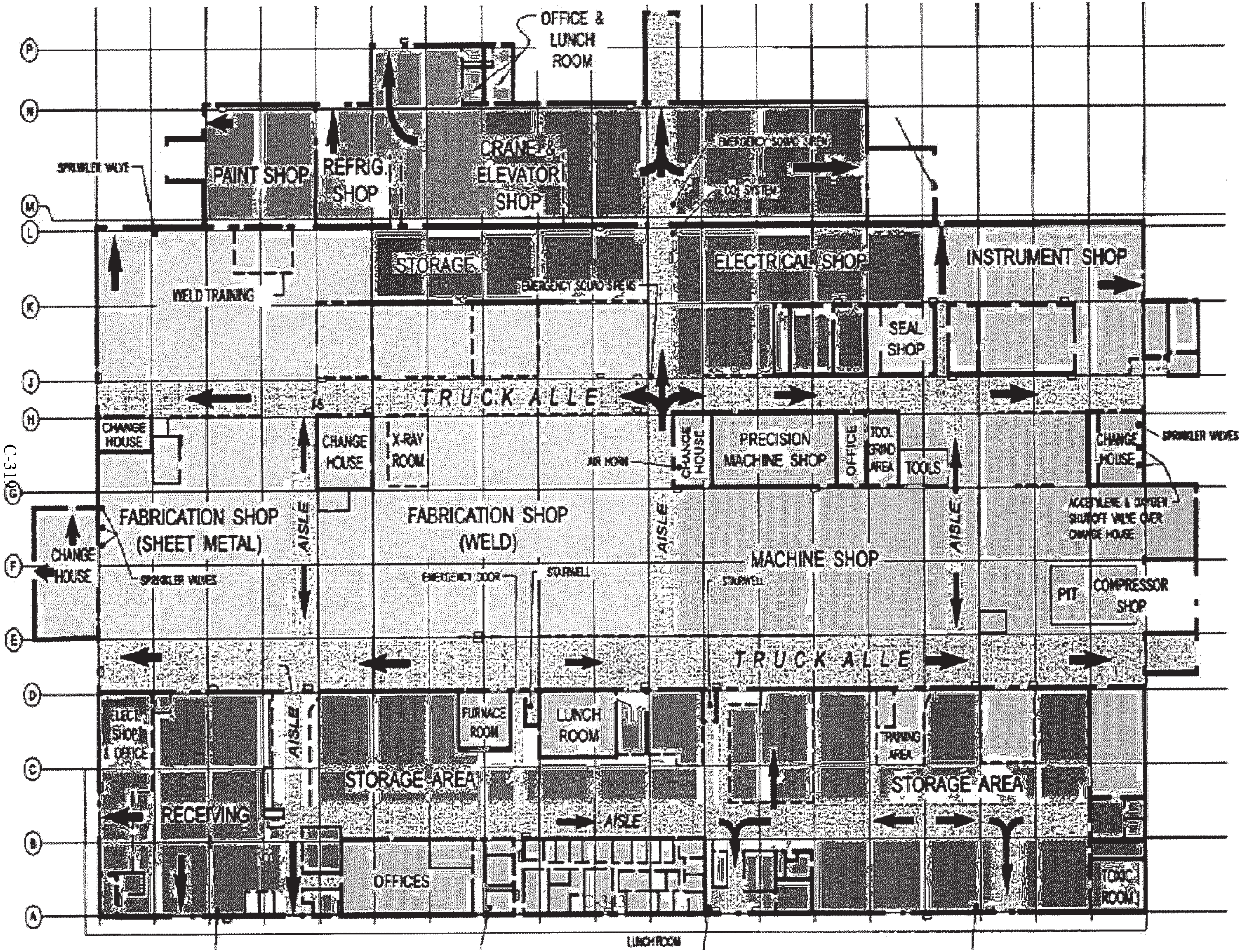
Initials TG

Facility ID: C720/720C

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

Initials TG


OFFICE & LUNCH ROOM
PAINT SHOP
REFRIG. SHOP
CRANE & ELEVATOR SHOP
EMERGENCY SOUND SIREN
CO2 SYSTEM
SPRINKLER VALVE
STORAGE
EMERGENCY SOUND SIRENS
ELECTRICAL SHOP
INSTRUMENT SHOP
WELD TRAINING
SEAL SHOP
TRUCK ALLE
CHANGE HOUSE
CHANGE HOUSE
X-RAY ROOM
AIR HORN
CHANGE HOUSE
PRECISION MACHINE SHOP
OFFICE
TOOL GRIND AREA
TOOLS
CHANGE HOUSE
SPRINKLER VALVES
ACCETYLENE & OXYGEN SHUTOFF VALVE OVER CHANGE HOUSE
FABRICATION SHOP (SHEET METAL)
AISLE
FABRICATION SHOP (WELD)
AISLE
MACHINE SHOP
AISLE
CHANGE HOUSE
SPRINKLER VALVES
EMERGENCY DOOR
STAIRWELL
STAIRWELL
PIT
COMPRESSOR SHOP
TRUCK ALLE
ELECT. SHOP & OFFICE
AISLE
FURNACE ROOM
LUNCH ROOM
TRAINING AREA
STORAGE AREA
STORAGE AREA
RECEIVING
AISLE
OFFICES
TOXIC ROOM
LUNCH ROOM
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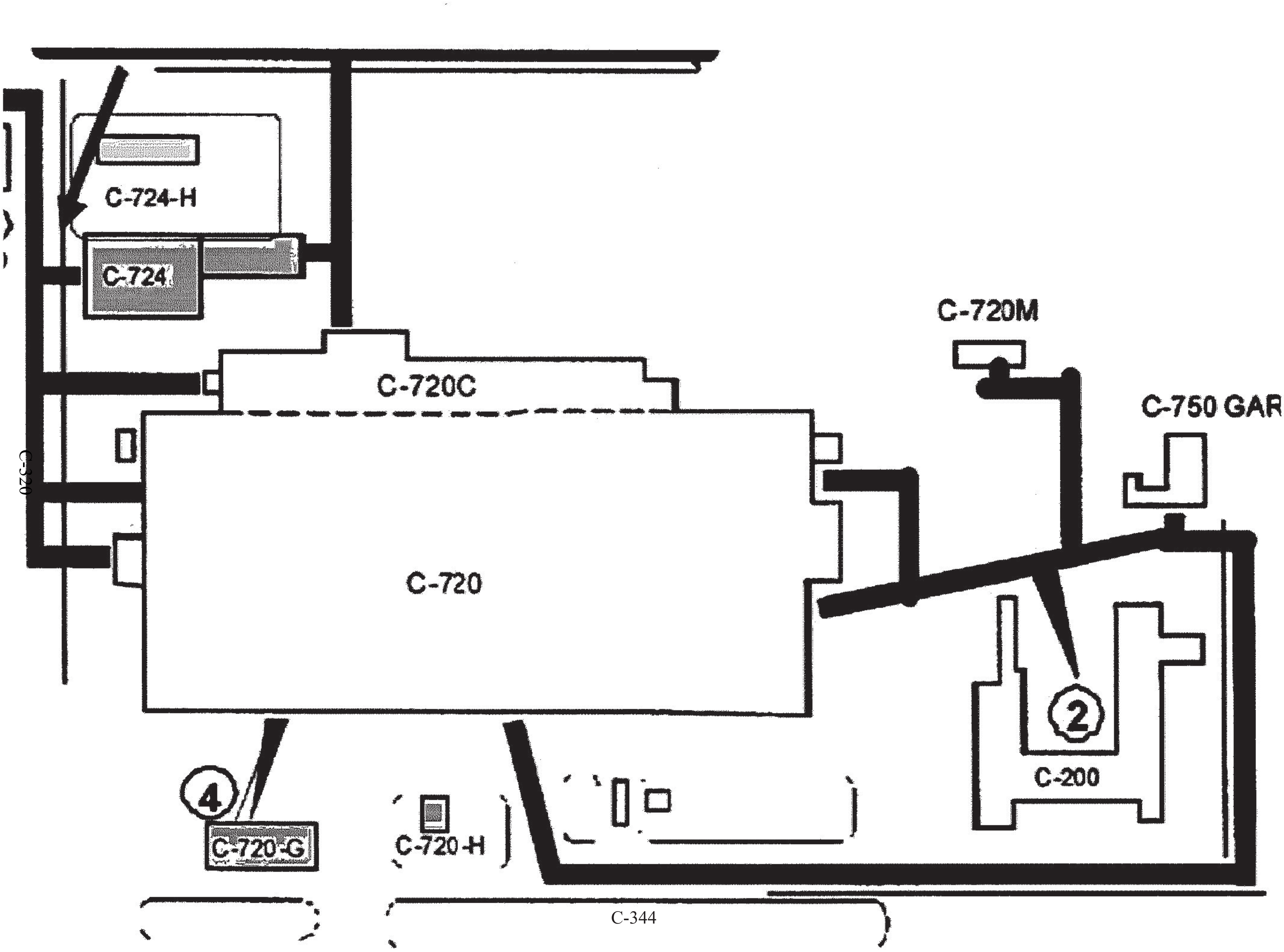

C-724-H
C-724
C-720M
C-720C
C-750 GAR
C-320
C-720
②
C-200
④
C-720-G
C-720-H
C-344

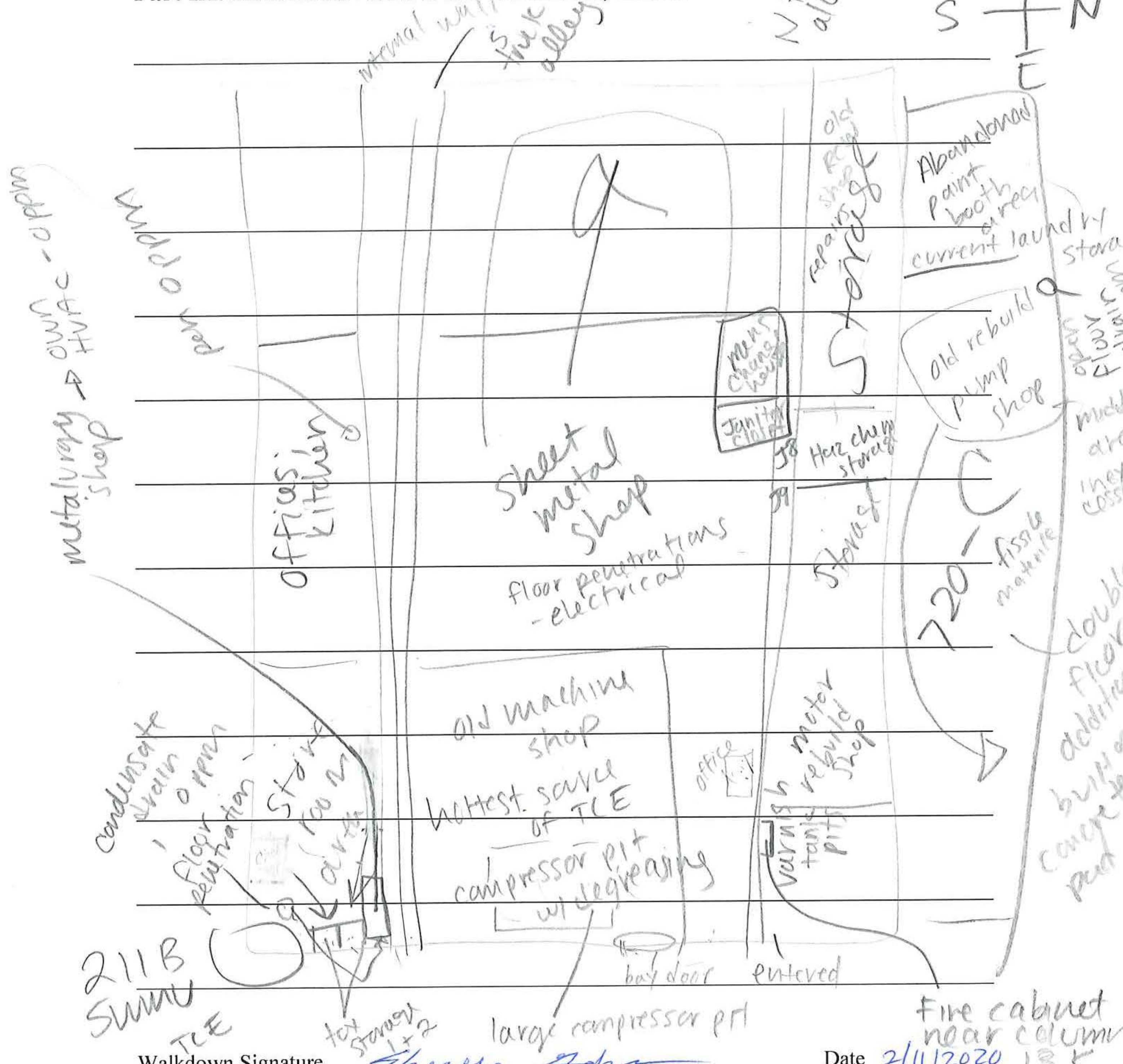
Geosyntec consultants

SEE ATTACHED FLOOR PLAN

Facility ID: C720/720C

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd



Walkdown Signature

Date 2/11/2020

Reviewer Signature

Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-720 G

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/11/2020

Weather: 30-40's, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-720 G/warehouse

Facility Location:

General Facility Use: Storage - will be full-time occupied soon

Building Contact/Facility Representative: Jason Lawrance

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N

Initials TG

Facility ID: C720G

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: Storage

Mid-sized single story storage building.

-single open space

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Stores

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C720G

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

N/A

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

expansion joints

Initials TG

Facility ID: C-720G

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / [✓ asphalt] / other ____________

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): ~1953

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-720 G

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

N/A - no HVAC

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Building Ventilation: Gaps in door frame; vents to outside

Note bathroom exhaust fans, fume hoods or other venting systems: None

Loading dock doors left open: Not open

Size:__________ Frequency:__________

Initials TG

Facility ID: C-720 G

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: some vents to outside

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): No

Initials TG

Facility ID: C-720 G

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
will be fire cabinets moved in	(future use)
potential diesel use	

Initials TG

Facility ID: C-720 G

Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
None					

Initials TG

Facility ID: C-720 6

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

Ambient indoor air - 0.2 ppm
Expansion joint - 0.1 ppm
sanitary sewer manhole - 0.1 ppm
pipe run between restrooms - 0.3 ppm

Initials T6

Facility ID: C-7206

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): NO

Describe odors in the building: General odor

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? [✓ Y] / N

If yes, describe: forklift ; battery-operated lift

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TG

Facility ID: C-720 G

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

some deterioration of slab along joints

Initials TG

Facility ID: C-7206

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

Initials TG

Facility ID: C-720G

Date: 2/11/2020

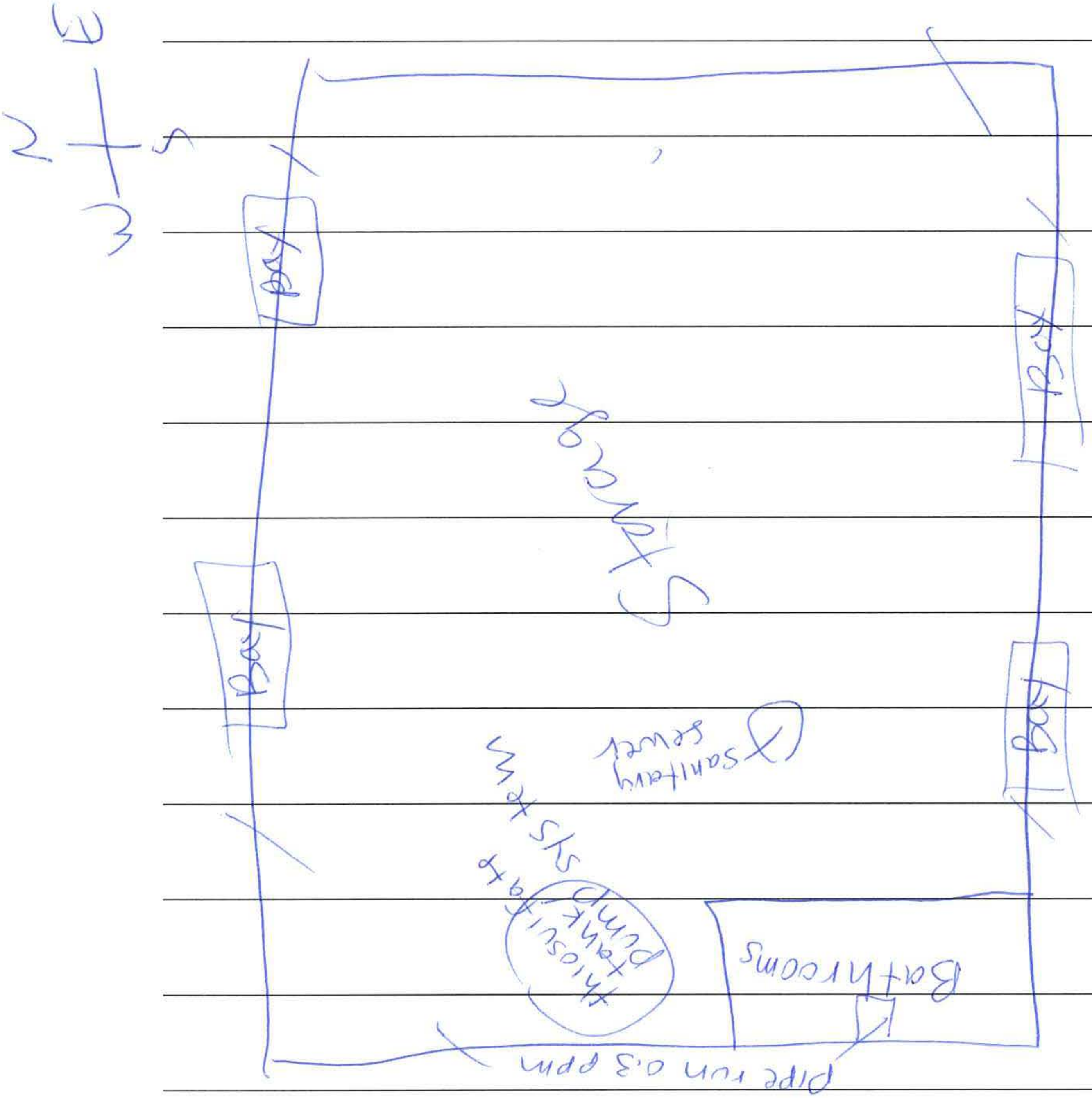
Part IX: Additional Notes from Walkdown, cont'd

Initials TG

Facility ID: C-7206

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd



Walkdown Signature Theresa Gabris Date 2/11/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-724 A/B

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/11/2020

Weather: 30-40's, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-724 A/B - carpenter shop/annex

Facility Location:

General Facility Use: Maintenance; storage

Building Contact/Facility Representative: Jason Lawrance

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) [✓ Y] / N

Initials TG

Geosyntec
consultants

Facility ID: C-724A/B

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: Storage, maintenance, locksmith

Small storage/maintenance, single-story facility.

C-724 A and B are a single space.

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor occupied, ~~office~~ TG storage, maintenance

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

f. Foundation walls: poured, [✓ block], stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

N/A

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

floor drains (0 ppm)

expansion joints filled (0 ppm)

Initials TG

Facility ID: C-724A/B

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other ____________

Is the building insulated? (circle one) Y/[✓ N] little How air tight? Tight / [✓ Average] west / [✓ Not Tight] East

Age of building (if information available): ~1953

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: NA

Describe location(s) of internal load-bearing walls:

NA

Does a gap exist between footings and the floor slab (describe if yes)? Yes/[✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

sealed expansion joints

Initials TG

Facility ID: C-724A/B

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, [✓ Stream radiation],

[✓ Radiant floor], Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, [✓ Outdoors], Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: Leaky eastern side

Note bathroom exhaust fans, fume hoods or other venting systems: __________________

Loading dock doors left open: None open

Size:__________________ Frequency:__________________

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Oil draining area	odor; 0.1 ppm
fire cabinet	chemical storage (see pic)

Initials TG

Facility ID: C-724 A|B

Date: 2|11|2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
office	CRC ice-off	12 oz	used		0.0
	oils + degreasers	see pics			0.1
waste oil ↔	oil draining area				0.1
fire cabinet		see pics			

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

Break room floor penetration (SW corner) 0.0 ppm

oil draining area 0.1 ppm

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): No

Describe odors in the building: Petroleum odor near oil storage area

Any known spills of a chemical immediately outside or inside the building? [✓ Y] / N

Describe with location: Mainly oils, acetone, paint thinner, etc.

Are vehicles or heavy machinery used within the building? Y / N

If yes, describe: golf carts, fork lifts, gators, trucks

Has the building ever had a fire? Y / [✓ N]

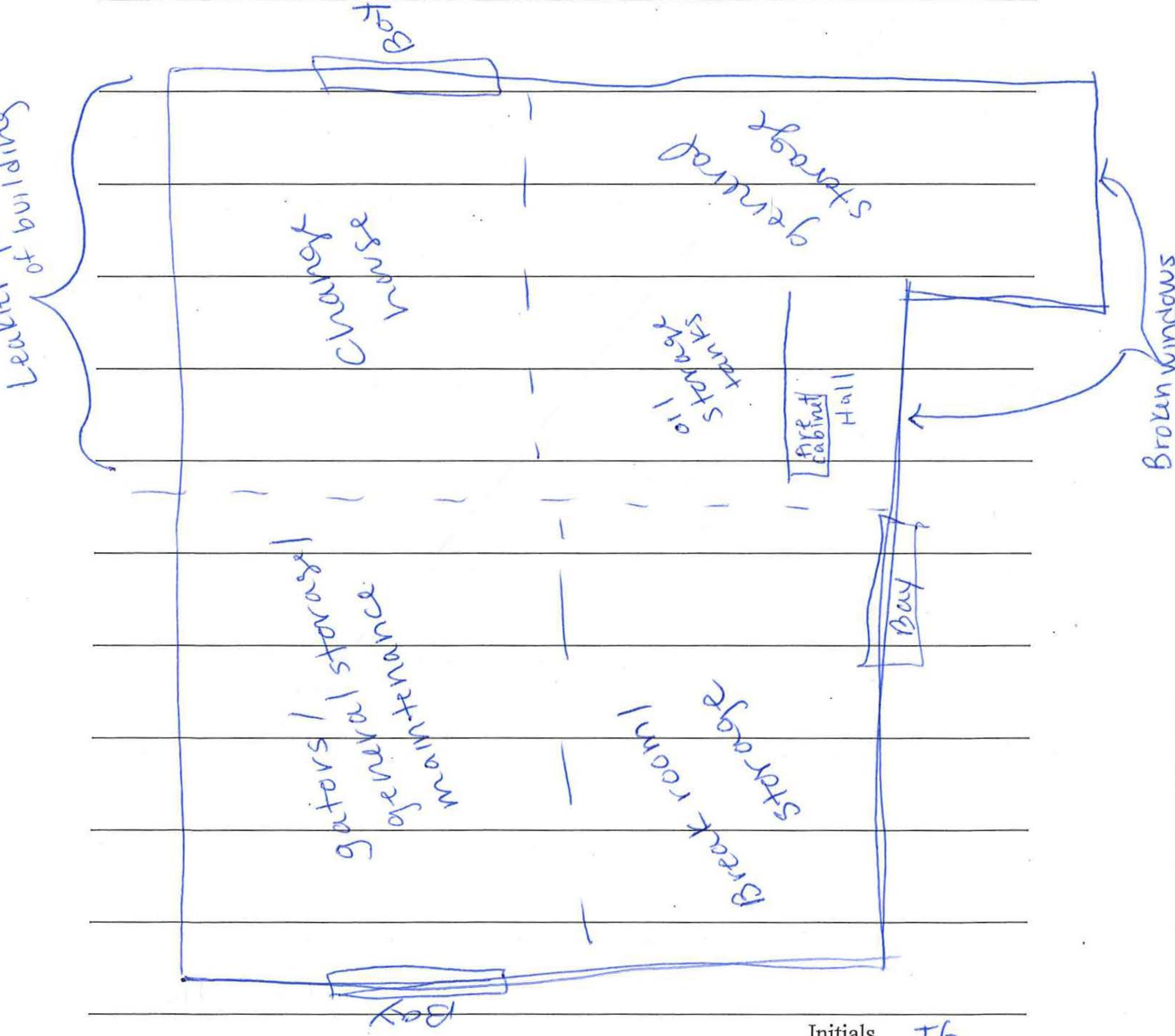
If yes, describe:

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

Initials TG

Facility ID: C-724 A/B

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

Initials T6

Facility ID: C-724 A|B

Date: 2|11|2020

Part IX: Additional Notes from Walkdown, cont'd

Walkdown Signature Theresa Date 2/11/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-725

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG / TO

Date: 2/11/2020

Weather: 30/40s, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-725 Paint Shop

Facility Location: F-9

General Facility Use: SST O & M storage

Building Contact/Facility Representative: SST (Kyle Gore)

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) Y / [✓ N]

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: Large front loader parked in center

- general storage

- small slab on grade storage facility

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement ______

1st Floor O+M storage

2nd Floor ______

3rd Floor ______

Additional Floors ______

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with __________

N/A

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

Sealed expansion joint (E-W) - 0 ppm

cut in concrete (filled) - 0 ppm

hole in floor along SW wall - 0ppm

western wall expansion joint - 0ppm

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other ____________

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / [✓ Not Tight]

Age of building (if information available): ____________

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Geosyntec consultants

Facility ID: C-725

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available) N/A

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, [✓ Space Heaters], Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

N/A

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: very leaky

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: Door closed

Size:__________ Frequency:__________

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Front loader	
fuel-powered landscaping/m	aintenance tools

Initials TG

Facility ID: C-725
Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
southern wall	pesticides	photos			
southern wall	herbicides	photos			

Initials tG

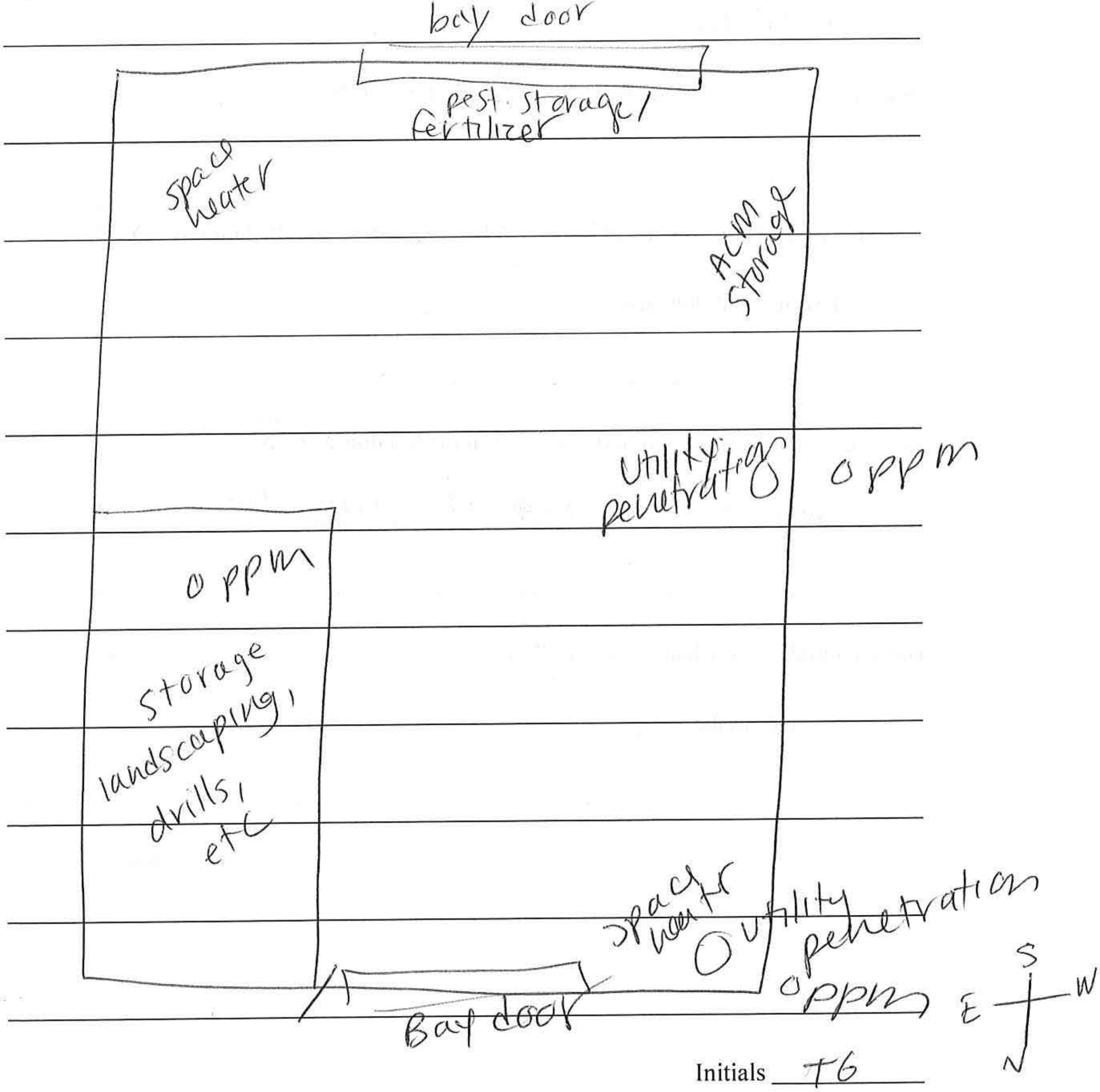
Facility ID: C-725

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:



Initials TG

Facility ID: C-725

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): South end of facility

Describe odors in the building: fuel / rubber

Any known spills of a chemical immediately outside or inside the building? Y [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y [✓ N]

If yes, describe: storage of front loader

Has the building ever had a fire? Y [✓ N]

If yes, describe:

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

staining on concrete floors - 0 ppm

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-725

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

T6

Walkdown Signature ____ Date 2/11/2020

Reviewer Signature ____ Date Feb 12 2020

Facility ID: C-728

Date: 2/11/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG / TO

Date: 2/11/2020

Weather: 30/40s, overcast

Part I: Facility Identification and Building Information

Facility ID/Name: C-728 / Motor cleaning facility

Facility Location:

General Facility Use: Former motor cleaning - dip in mineral spirits then steam

Building Contact/Facility Representative: Barry Kinsall

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part II: Building Characteristics and Occupancy

Facility Description: Vacant ; some chemical storage (to be removed); abandoned in place mixing vat and ASTs (see pic); many holes in building walls/ beneath doors
-Currently equipment storage and decon ops.

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Former engine cleaning

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: [✓ unsealed], sealed, sealed with painted

f. Foundation walls: poured, [✓ block], stone, other __________

g. Foundation walls: [✓ unsealed], sealed, sealed with __________

N/A

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

floor joint (0 ppm)

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / [✓ concrete] / asphalt / other ______

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / [✓ Not Tight]

Age of building (if information available): ~1957

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / [✓ No]

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N|A

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available) N/A

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________ TG

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

____

____

Building Ventilation: very leaky

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: N/A

Size:__________________ Frequency:__________________

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): No

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Fire cabinet - see photos	to be removed

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Fire cabinet	see photo				

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Penetration near NW corner (0 ppm) -pic

Holes in block wall (W) - 0 ppm

EW floor joint - 0 ppm

IA - 0ppm

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

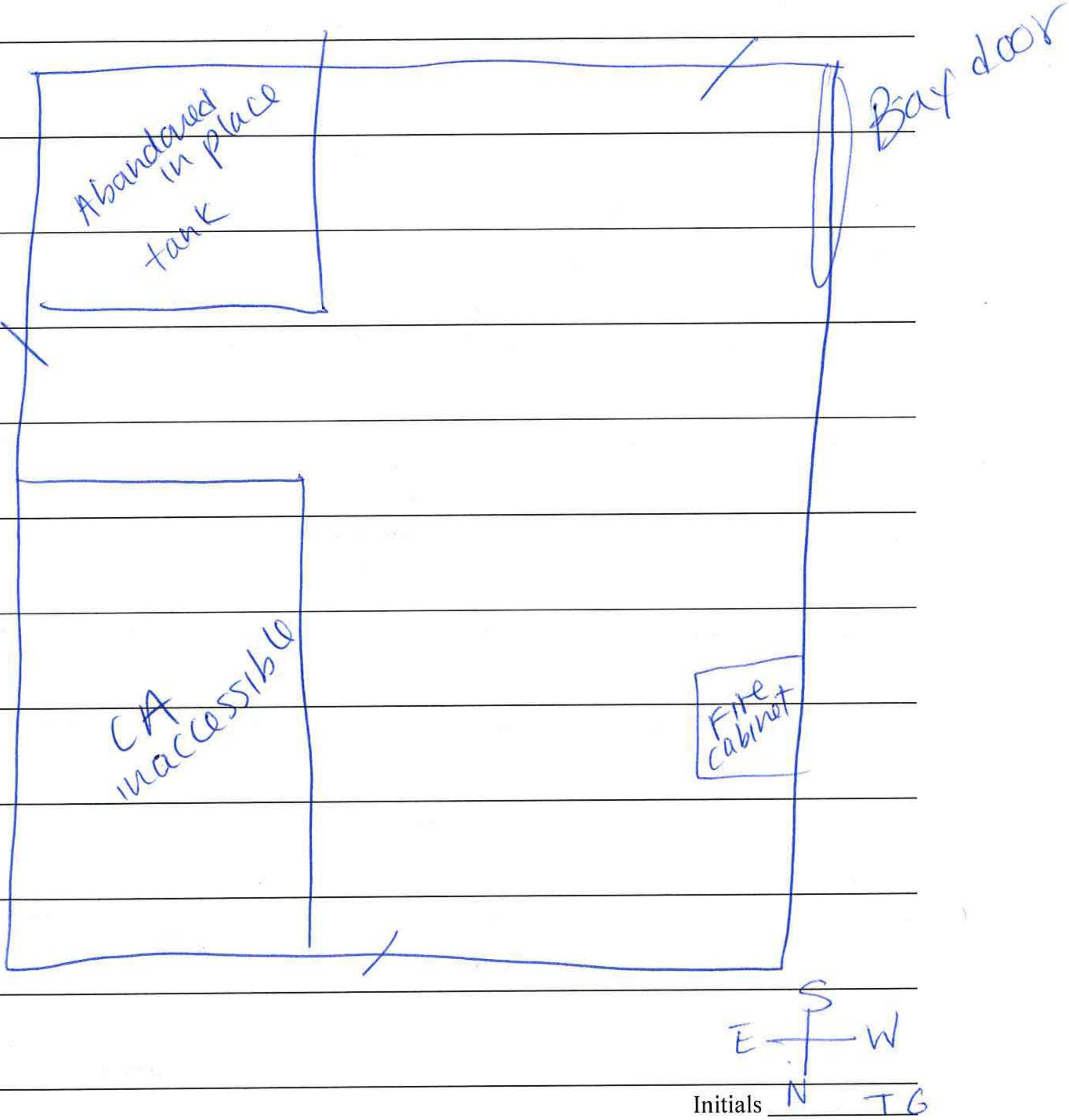
If yes, describe:

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-728

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-728

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

T6

Initials T6

Facility ID: C-728

Date: 2/11/2020

Part IX: Additional Notes from Walkdown, cont'd

T6

Walkdown Signature Theresa Gol Date 2/11/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: ~~C-615~~ TG C-746-U1

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-746-U1 / Leachate office Building

Facility Location:

General Facility Use: Office trailer

Building Contact/Facility Representative: ~~Brad McGreggor~~ TG Gary Hines

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y] / N

Non-office Staff? (circle one) [✓ Y] / N

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Office trailer

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Office / Kitchen / BR

2nd Floor

3rd Floor

Additional Floors

Initials TG

Geosyntec
consultants

Facility ID: C-746-U1

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply) Trailer sitting directly on slab

a. Above grade construction: [✓ wood frame], concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: unsealed, sealed, sealed with __________

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

BR, utility room

Floor drains – 0ppm

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / [✓ concrete] / asphalt / other

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Geosyntec consultants

Facility ID: C-746-U1

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, [✓ Heat pump], Hot water baseboard, [✓ Space Heaters], Stream radiation,

TG Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: Electric

Boiler/furnace located in (circle one): Basement, [✓ Outdoors], Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Throughout trailer

Building Ventilation: ______________________________

Note [✓ bathroom exhaust fans], fume hoods or other venting systems: ______________________________

Loading dock doors left open: N/A

Size:__________________ Frequency:__________________

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): Heavy construction vehicles

Initials TG

Geosyntec
consultants

Facility ID: C-746-U1

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Beneath kitchen sink	cleaning supplied all 0 ppm
utility closet	
Bathroom	

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
under sink	general cleaning supplies				
utility closet					
BR					

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Beneath kitchen sink - 0ppm

Utility closet floor drain - 0ppm

Bathroom shower + floor drain - 0ppm

General IA - 0ppm

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): N of trailer

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

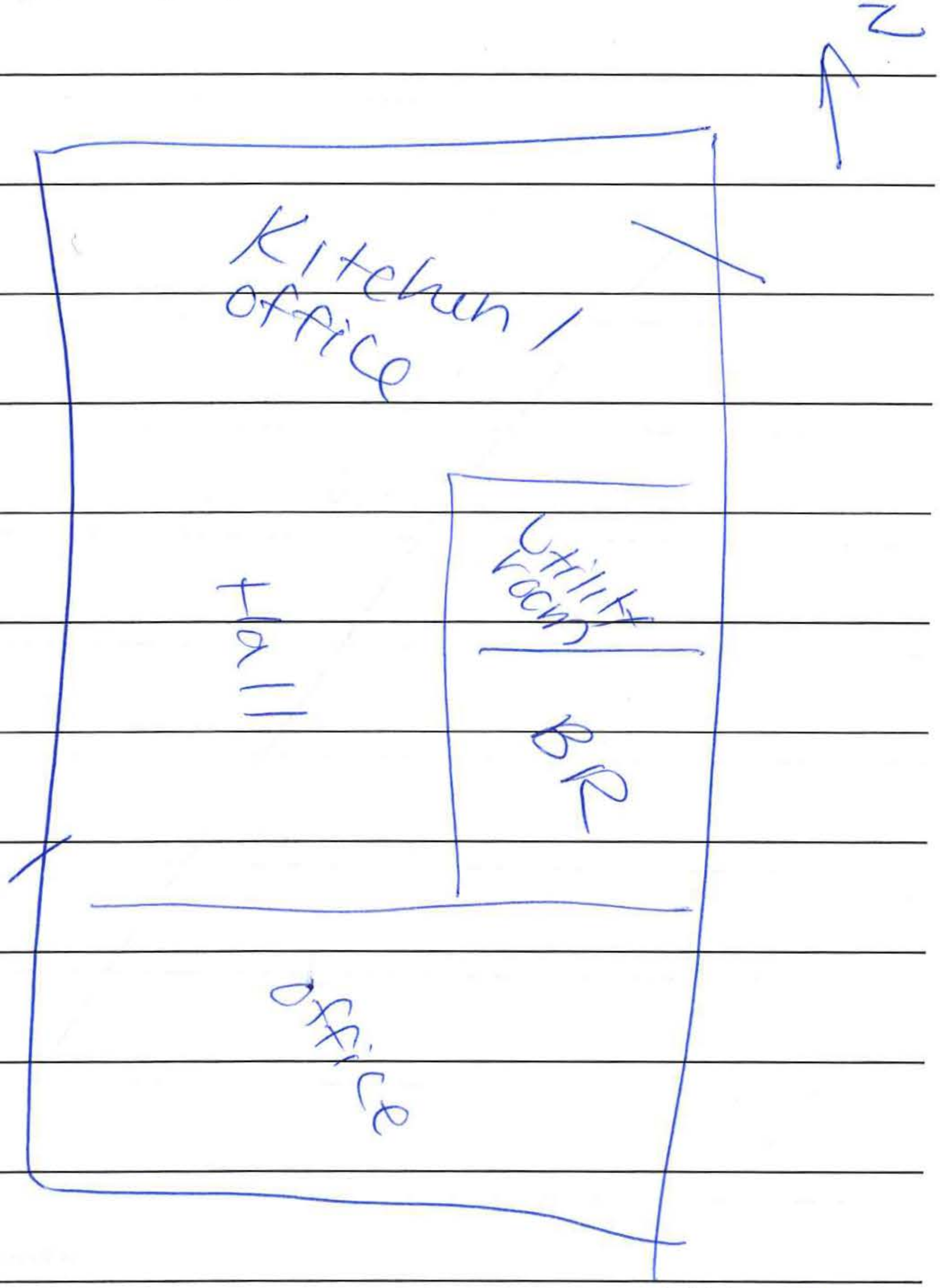
Initials TG

Geosyntec consultants

Facility ID: C-746-U7

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-746-U1

Date: 12/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Geosyntec
consultants

Facility ID: C-746-U1

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-746-U1

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature

Date 2/12/2020

Reviewer Signature

Date Feb 12, 2020

C-752A-T10

Facility ID: ~~C-615~~ TG ~~C-746-U1~~

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-752A-T10 – Office/Breakroom Trailer

Facility Location:

General Facility Use: Break room

Building Contact/Facility Representative: ~~Brad MC Greggor~~ TG ~~Dominic D~~ Dhomynic Lightfoot

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y]/N

Non-office Staff? (circle one) [✓ Y]/N

intermittent

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Break trailer

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Break room

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other _________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: unsealed, sealed, sealed with _____________

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with ___________

h. The basement is: wet, damp, dry, moldy, other ____________________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately _______ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

N/A

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / [✓ other] gravel

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): ______

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: N/A

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Thrughout

Building Ventilation: one window not sealed

Note bathroom exhaust fans, fume hoods or other venting systems: __________

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Geosyntec
consultants

Facility ID: C-752A-T10

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
See pg. 8	

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
Deicer					
lock spray					
epoxy maintenance coating					
(rust-oleum) 15 cans					
pesticide					
spray paint					
general cleaning					
de-icer					
Kwik foam sealant					
WD-40					

0.1 ppm

Initials TG

Facility ID: C-752A7-T10

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Ambient IA 0.0-0.1 ppm

Initials T6

Facility ID: C-752A-710

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: Fruity (lotion)

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

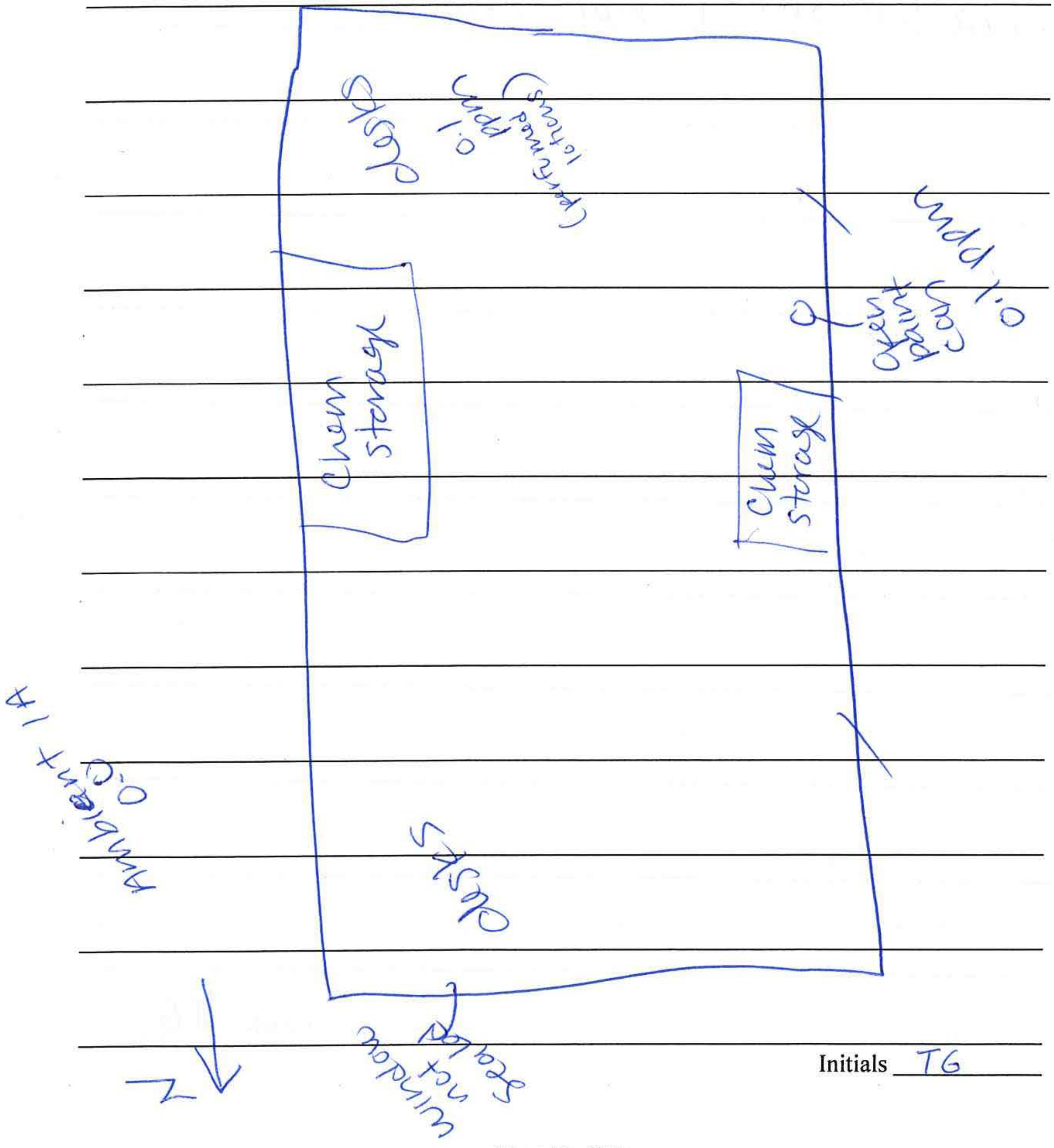
If yes, describe:

Initials TG

Facility ID: C-752A-TTO

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

Trailer skirt not intact

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-752A-T10

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Gar Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-752-B-T01

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-752-B-T01 FUELING STATION

Facility Location: E-11

General Facility Use: AST office trailer

Building Contact/Facility Representative: SST (BARRY KINSALL)

Building Occupants (if information readily available):

Office Staff? (circle one) Y [✓ N]

Non-office Staff? (circle one) Y [✓ N]

intermittent (computer setup)

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: AST monitoring/maintenance office trailer

Does facility have a basement? (circle one) Y/ [✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement ______

1st Floor office

2nd Floor ______

3rd Floor ______

Additional Floors ______

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply) Mounted on steel slide over gravel -mostly skirted; small openings in back

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other ________

c. Basement floor: concrete, dirt, stone, other ________

d. Basement floor: uncovered, covered, covered with ________

e. Concrete floor: unsealed, sealed, sealed with ________

f. Foundation walls: poured, block, stone, other ________

g. Foundation walls: unsealed, sealed, sealed with ________

h. The basement is: wet, damp, dry, moldy, other ________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

None

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / other gravel

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available): ____________

Age of separate additions or expansion (if information available): ____________

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, [✓ Other] Window unit

window unit
heat/AC

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: N/A

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, [✓ Window units,] Open Windows, None

Are there air distribution ducts present? Y / [✓ N]

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

N/A

Building Ventilation: __________

Note bathroom exhaust fans, fume hoods or other venting systems: N/A

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): Gasoline ASTs

Heavy vehicular traffic nearby (or other mobile sources): Refueling

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Few 1 L cleaners	0 ppm

Initials TG

Geosyntec
consultants

Facility ID: C-752-B-T01

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
	Houdini Lock lubricant				

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] N

If yes, describe locations, covering used (if any), and readings below:

1A - 0ppm

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): NONE

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

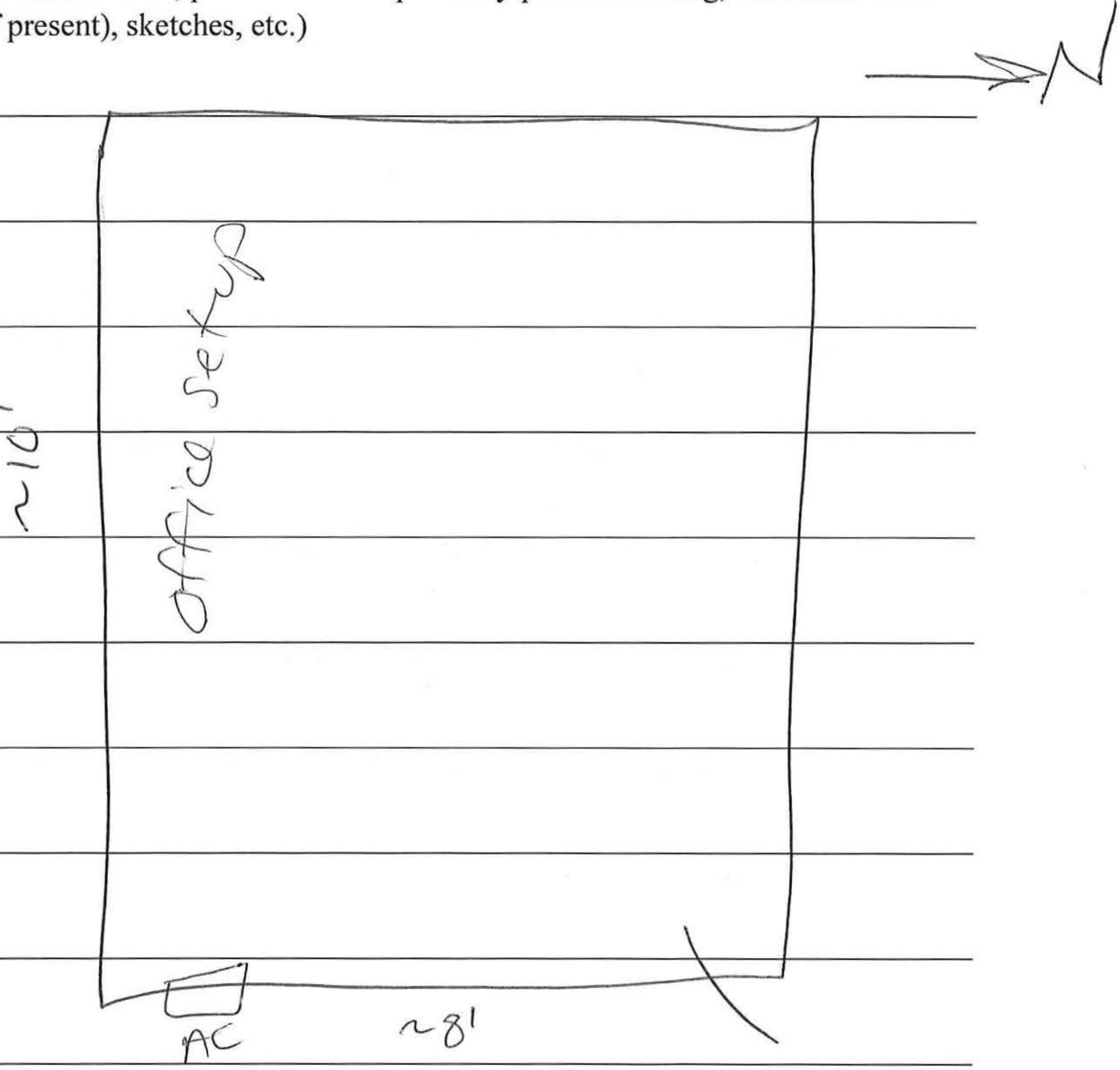
If yes, describe:

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-752-B-T01

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Gabris Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

C-754 B
Facility ID: ~~C-615~~TG ~~C-746-U1~~

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-754 B / Low-level waste storage(?) -former

Facility Location:

General Facility Use: Police training

Building Contact/Facility Representative: Gilbert McNichols TG ~~Brad McGreggor~~

Building Occupants (if information readily available):

Office Staff? (circle one) Y /N

Non-office Staff? (circle one) [✓ Y]/N -intermittent

Initials tb

Facility ID: C-754B

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Domed quonset hut.
Gravel ~~layer over slab.~~
base w/ concrete footer - No floor slab

Large open space w/ fire cabinet near entrance.

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Training (obstacle course)

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

N/A e. Concrete floor: [✓ unsealed], sealed, sealed with __________ — concrete footer only

N/A

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

None

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

[✓ grass] / concrete / asphalt / other ______

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / Average / [✓ Not Tight]

Age of building (if information available): ______

Age of separate additions or expansion (if information available): ______

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available) None

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation, Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, Electric, Propane, Solar, Wood, Coal

Hot water tank fueled by: ____________________

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): Central Air, Window units, Open Windows, None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

TG

____

Building Ventilation: ____________________

Note bathroom exhaust fans, fume hoods or other venting systems: ____________________

Loading dock doors left open: ____________________

Size:__________ Frequency:__________

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
Fire cabinet	See p.8

Initials T6

Facility ID: C754B

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
3 cans Diesel		Fire Cabinet			0.2 ppm
50 cans Green Gas					

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Fire Cabinet – 0.2 ppm

Ambient IA – 0.0 ppm

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

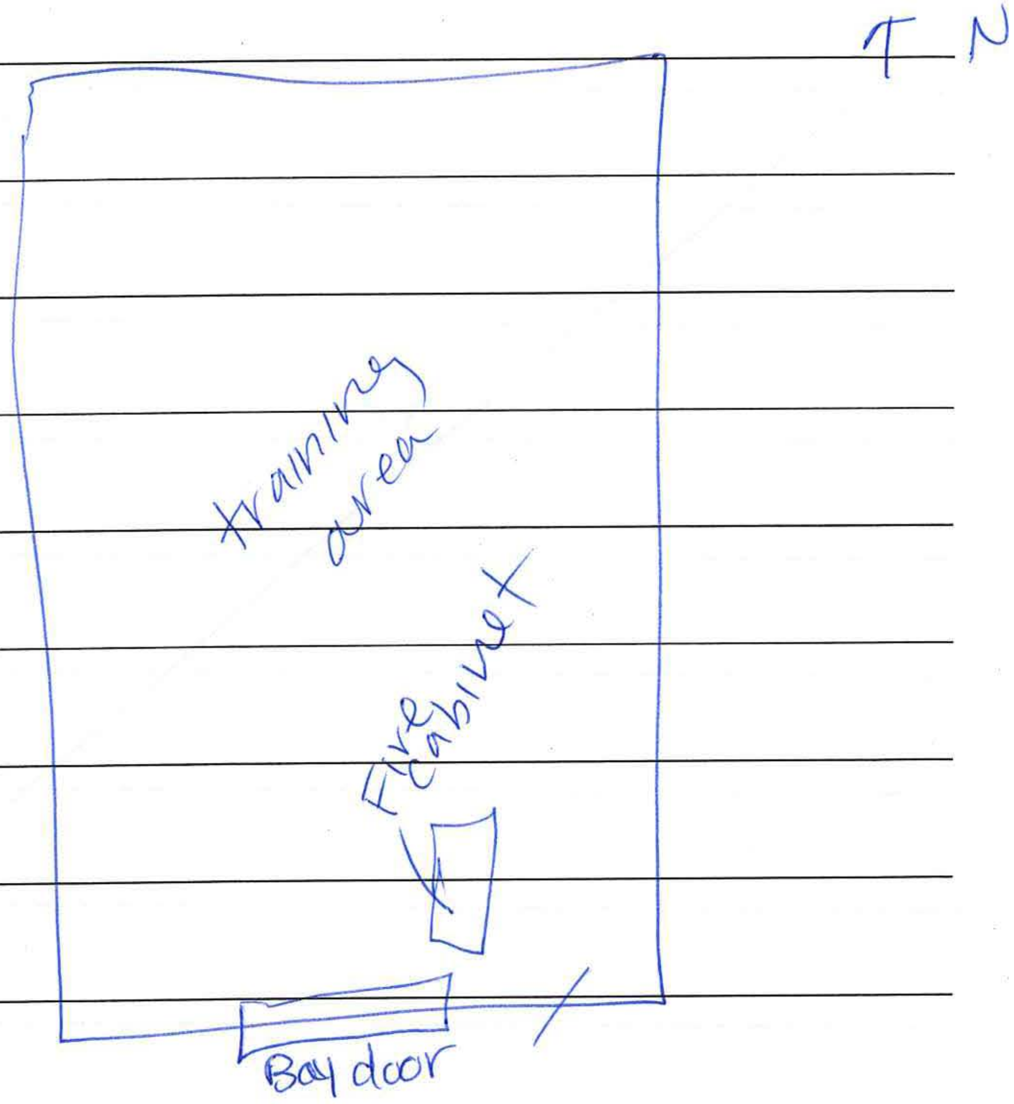
If yes, describe:

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C754B

Date: 2/12/2020.

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C754 B

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C754B

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa G Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

Geosyntec
consultants

Facility ID: C-755-T16

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-755-T16 / Change House and Shower Trailer

Facility Location:

General Facility Use: Used for FRNP and VNS employees to change out and shower.

Building Contact/Facility Representative: Jeff Bennett

Building Occupants (if information readily available):

Office Staff? (circle one) Y / [✓ N]

Non-office Staff? (circle one) [✓ Y] / N Field Crews

Initials TG

Facility ID: C755 T16

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Men's change house

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Bathrooms, locker rooms, showers

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C755T16

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: wood frame, concrete, stone, brick, [✓ steel]

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: unsealed, sealed, sealed with __________

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

utility penetrations and floor drains - 0ppm

Initials TG

Facility ID: C755T16

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / [✓ other] gravel

Is the building insulated? (circle one) Y/[✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Geosyntec
consultants

Facility ID: C755 T16

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Throughout

Building Ventilation: ____________________

Note [✓ bathroom exhaust fans], fume hoods or other venting systems: ____________________

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C 755 T16

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C755T16

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
None	

Initials T6

Facility ID: C755 716

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
None					

Initials TG

Facility ID: C755 T16

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] N

If yes, describe locations, covering used (if any), and readings below:

Ambient IA - 0 ppm

All shower drains - 0 ppm

All floor drains - 0 ppm

Utility conduits in closets - 0 ppm

Initials T6

Facility ID: C755T16

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): None

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

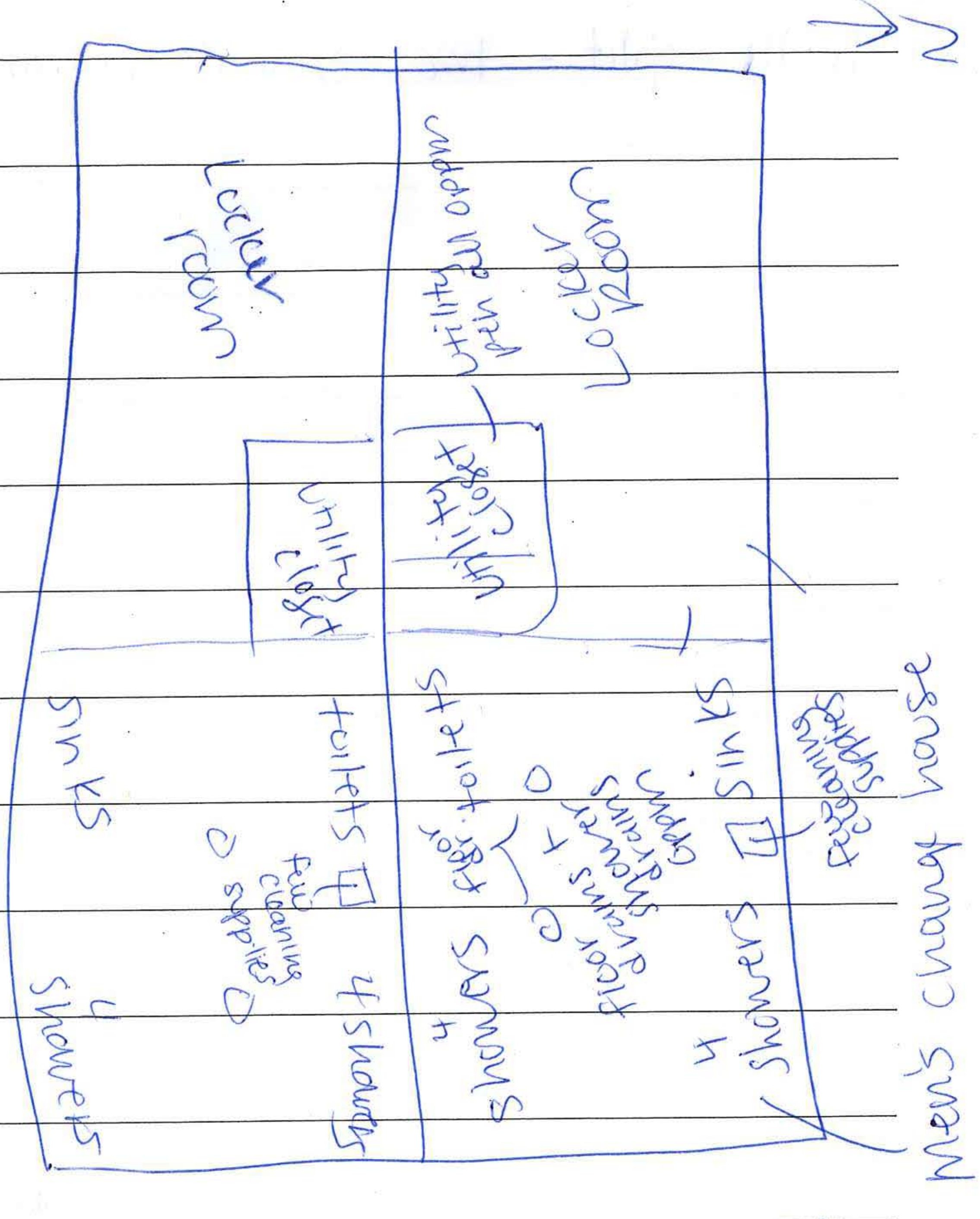
If yes, describe:

Initials TG

Facility ID: C755 T16

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C755T16

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

Trailer split - two separate entrances

Initials TG

Geosyntec consultants

Facility ID: C755 T16

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C756 T16

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

T6

Walkdown Signature _______________ Date 2/12/2020

Reviewer Signature _______________ Date Feb 12, 2020

eosyntec
consultants

Facility ID: C-755-T27

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s, rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-755-~~T13~~-T27 OFFICE TRAILER

Facility Location: J-9

General Facility Use: OFFICE FOR OPERATIONS & MAINTENANCE

Building Contact/Facility Representative: SST (BARRY KINSALL)

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y] / N

Non-office Staff? (circle one) Y / N

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: office trailer
Note: 26 + 28 also offices

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Offices / BR

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply)

a. Above grade construction: [✓ wood frame], concrete, stone, brick, steel

N/A

b. Basement type: full, crawlspace, slab, other __________

c. Basement floor: concrete, dirt, stone, other __________

d. Basement floor: uncovered, covered, covered with __________

e. Concrete floor: unsealed, sealed, sealed with __________

f. Foundation walls: poured, block, stone, other __________

g. Foundation walls: unsealed, sealed, sealed with __________

h. The basement is: wet, damp, dry, moldy, other __________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

None

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / [✓ other] gravel

Is the building insulated? (circle one) Y / [✓ N] How air tight? Tight / [✓ Average] / Not Tight

Age of building (if information available):

Age of separate additions or expansion (if information available):

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: Electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Throughout

Building Ventilation: __________

Note [✓ bathroom exhaust fans], fume hoods or other venting systems: __________

Loading dock doors left open: N/A

Size:__________ Frequency:__________

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: None

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): No

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
General cleaning supp.	BRs + janitorial closet
" "	under kitchen sink

Initials TG

Facility ID: C-755-T27
Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	**Product Description**	**Size (units)**	**Condition**	**Chemical Ingredients**	**PID Reading**
None					

Initials TB

Facility ID: C-755-T27

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? [✓ Y] / N

If yes, describe locations, covering used (if any), and readings below:

Ambiant IA - 0.0 ppm

BR - 0.0 ppm

Janitorial /hot water closet - 0.0 ppm

floor pen - 0.0ppm

under kitchen sink - 0.0 ppm

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): SOUTHWEST CORNER OF FACILITY

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

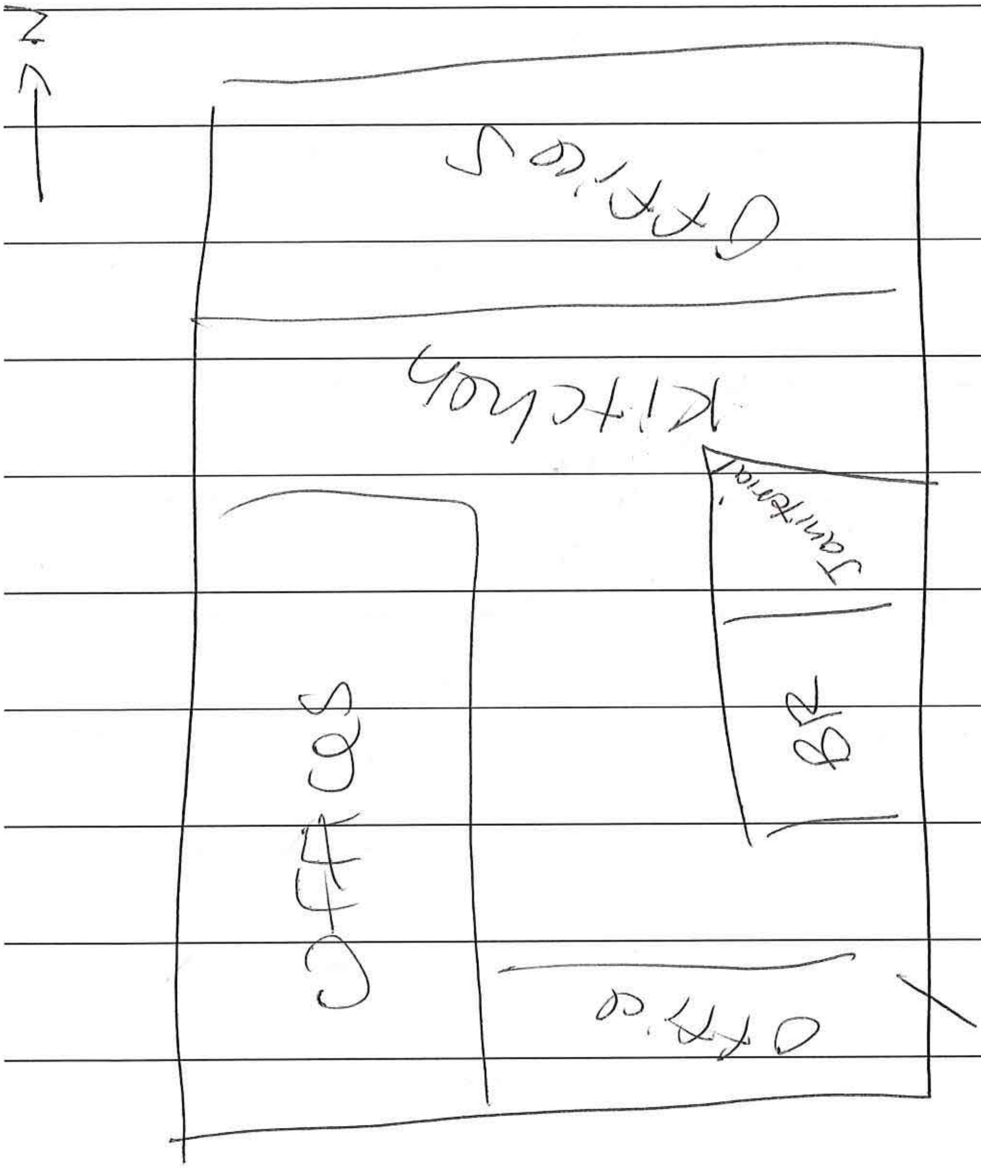
Initials TG

Geosyntec
consultants

Facility ID: C-755-T27

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)



Initials TG

Facility ID: C-755-727

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Geosyntec
consultants

Facility ID: C-755-T27

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-755-T27

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

Facility ID: ~~C-615~~ TG ~~C-746-U1~~ C-764-T3

Date: 2/12/2020

PGDP VAPOR INTRUSION PROJECT FACILITY WALKDOWN

Walkdown Completed by: TG/TO

Date: 2/12/2020

Weather: 30s / rainy

Part I: Facility Identification and Building Information

Facility ID/Name: C-764-T3

Facility Location:

General Facility Use: Offices

Building Contact/Facility Representative: ~~Brad MC Greggor~~ TG Brian Lawrance

Building Occupants (if information readily available):

Office Staff? (circle one) [✓ Y] /N

Non-office Staff? (circle one) Y /[✓ N]

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part II: Building Characteristics and Occupancy

Facility Description: Office trailer

Does facility have a basement? (circle one) Y/[✓ N]

If Yes, Is basement/lowest level occupied? (circle one)

Full-time, Occasionally, Seldom, Almost Never

General Use for Each Floor (e.g., office, storage, manufacturing). Mark NP for not present.

Basement

1st Floor Offices, BR

2nd Floor

3rd Floor

Additional Floors

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part III: Construction Characteristics

(Circle all that apply) Skirted on gravel - some others in complex are wood, some metal

a. Above grade construction: [✓ wood frame], concrete, stone, brick, steel

N/A

b. Basement type: full, crawlspace, slab, other ___________

c. Basement floor: concrete, dirt, stone, other ___________

d. Basement floor: uncovered, covered, covered with ___________

e. Concrete floor: unsealed, sealed, sealed with ___________

f. Foundation walls: poured, block, stone, other ___________

g. Foundation walls: unsealed, sealed, sealed with ___________

h. The basement is: wet, damp, dry, moldy, other ___________

i. Does the basement feel drafty? Y / N

j. Sump present? Y / N

k. Water in sump? Y / N / Not Applicable

Basement/Lowest Level Depth below Grade: approximately ________ (feet)

Describe potential soil vapor entry points (e.g., cracks, expansion joints, utility penetrations, drains):

None

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part III: Construction Characteristics, cont'd

Type of ground cover around outside of building: (circle one)

grass / concrete / asphalt / [✓ other] gravel

Is the building insulated? (circle one) Y/N How air tight? [✓ Tight] / Average / Not Tight

Age of building (if information available): ____

Age of separate additions or expansion (if information available): ____

Describe location of any tunnels: N/A

Describe location(s) of internal load-bearing walls:

N/A

Does a gap exist between footings and the floor slab (describe if yes)? Yes / No

N/A

Describe location of roof support columns or isolation piers noting joints where the floor meets piers or columns, if present:

N/A

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part IV: Heating, Venting and Air Conditioning (complete where information readily available)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation], Heat pump, Hot water baseboard, Space Heaters, Stream radiation,

Radiant floor, Electric baseboard, Wood stove, Outdoor wood boiler, Other__________

What is the primary type of fuel used is: (circle all that apply – note primary)

Natural Gas, Fuel Oil, Kerosene, [✓ Electric], Propane, Solar, Wood, Coal

Hot water tank fueled by: electric

Boiler/furnace located in (circle one): Basement, Outdoors, Main Floor, Other__________

Air conditioning (circle one): [✓ Central Air], Window units, Open Windows, None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints.

Thraghout

Building Ventilation: ______________________________

Note [✓ bathroom exhaust fans], fume hoods or other venting systems: ______________________________

Loading dock doors left open: N/A

Size:__________________ Frequency:__________________

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part V: Outside Contaminant Sources (complete where information readily available)

Additional Building Vents: N/A

Stationary sources nearby (emission stacks, etc.): None

Heavy vehicular traffic nearby (or other mobile sources): NO

Initials TG

Facility ID: C-764-73

Date: 2/12/2020

Part VI: Indoor Contaminant Sources

Identify potential indoor sources in the building and the location of the source (floor and room):

Potential Source(s) Location(s)	Description
BR (general janitorial)	

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part VI: Indoor Contaminant Sources, cont'd

If readily accessible, list specific products found in the building that have the potential to affect indoor air quality. If possible, record VOC concentrations in the product head space using a PID.

Location	Product Description	Size (units)	Condition	Chemical Ingredients	PID Reading
	general janitorial				

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part VII: Screening-Level Indoor Air Quality

Were any readings of indoor air taken using a PID? Y / N

If yes, describe locations, covering used (if any), and readings below:

Indoor air - 0.0 ppm

restrooms - 0.0 ppm

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part VIII: Miscellaneous Items (complete where information readily available)

Describe location of designated smoking areas (if any): out front of trailer

Describe odors in the building: None

Any known spills of a chemical immediately outside or inside the building? Y / [✓ N]

Describe with location:

Are vehicles or heavy machinery used within the building? Y / [✓ N]

If yes, describe:

Has the building ever had a fire? Y / [✓ N]

If yes, describe:

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part IX: Additional Notes from Walkdown (e.g., notable air flow, measured pressure differentials, potential soil vapor entry point screening, condition of trailer skirt (if present), sketches, etc.)

Trailer skirt - good condition with minor holes; no current access opening

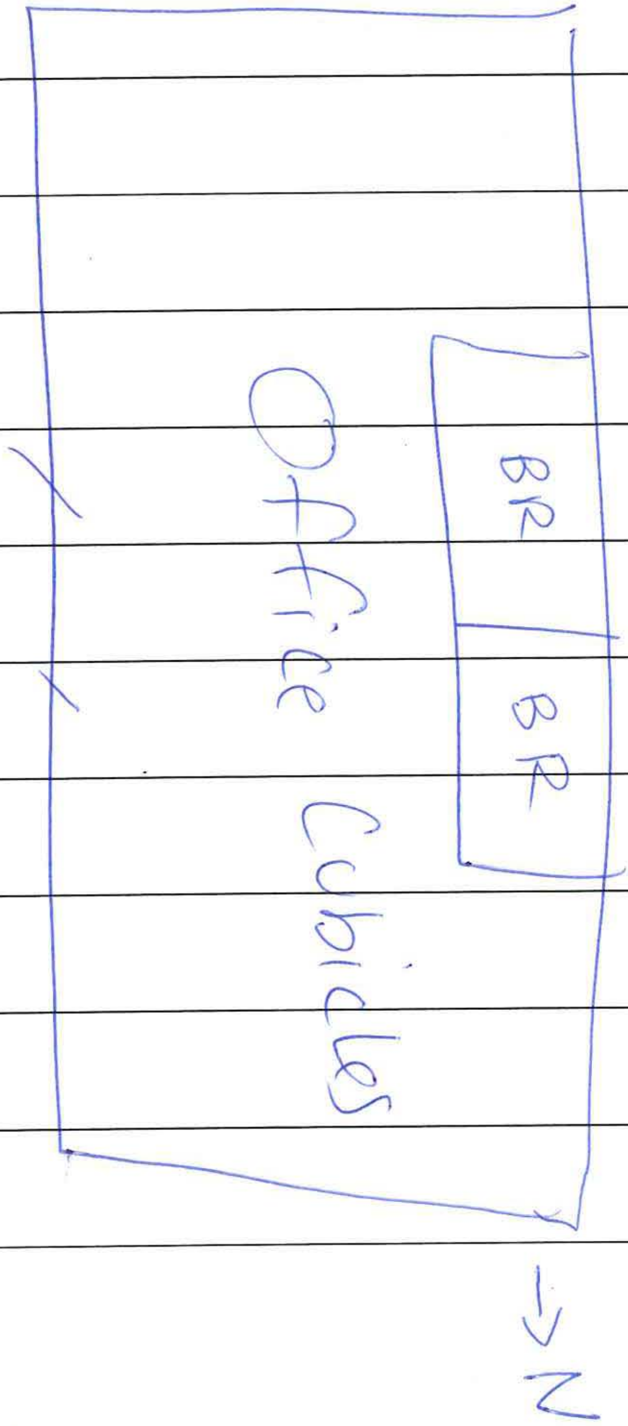
Gravel beneath trailer

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd



Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Initials TG

Facility ID: C-764-T3

Date: 2/12/2020

Part IX: Additional Notes from Walkdown, cont'd

TG

Walkdown Signature Theresa Geb Date 2/12/2020

Reviewer Signature Date Feb 12, 2020

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APPENDIX D

DETAILED SAMPLING LOCATIONS

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ACRONYMS

FCA	fissile control area
FM	facility manager
PID	photoionization detector
RGA	Regional Gravel Aquifer
UCRS	Upper Continental Recharge System

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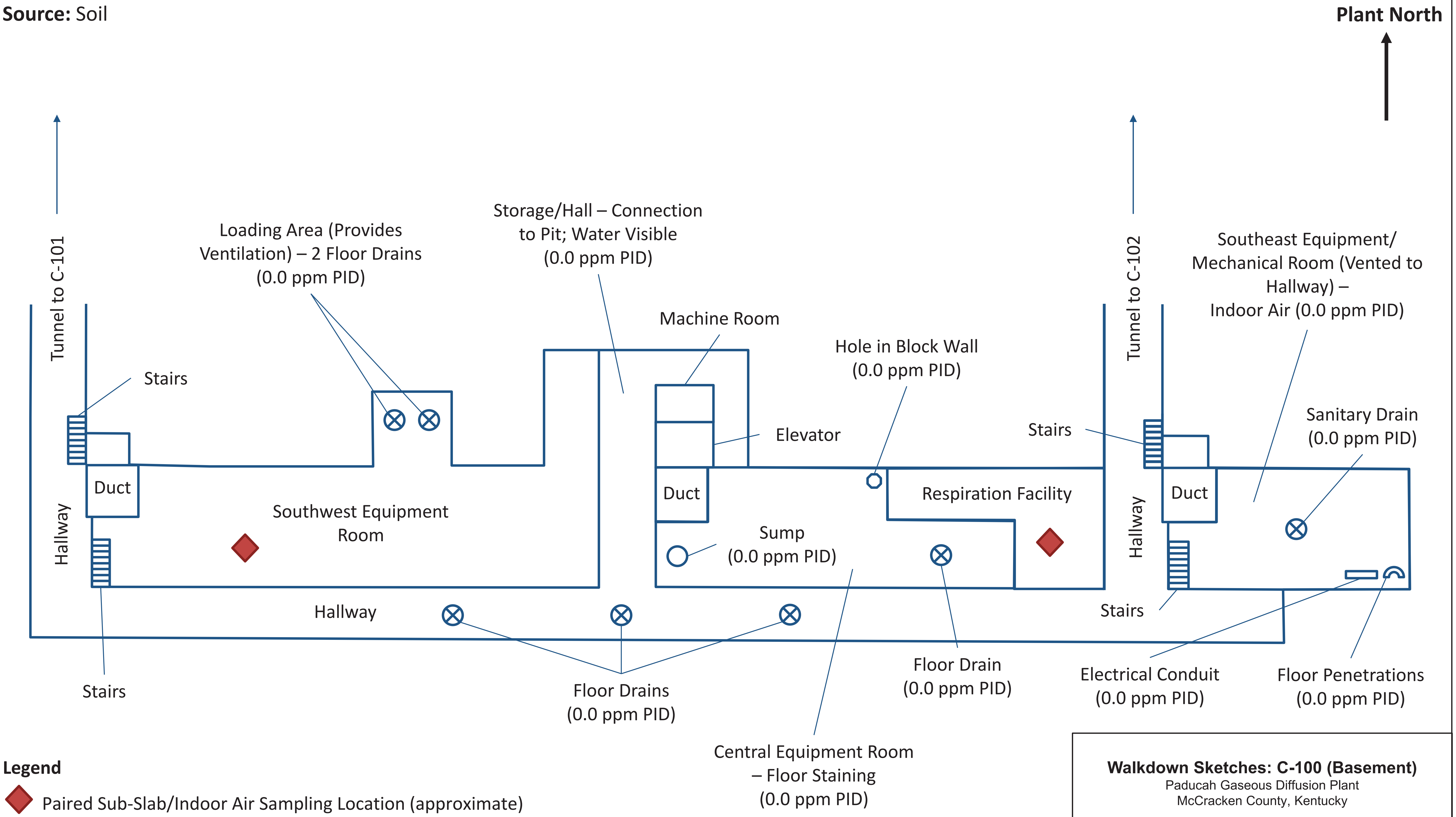
Source: Soil



Legend

◆ Paired Sub-Slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size:	41,617 ft^2
Basement Size:	5,700 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-100 (Basement)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

Geosyntec consultants

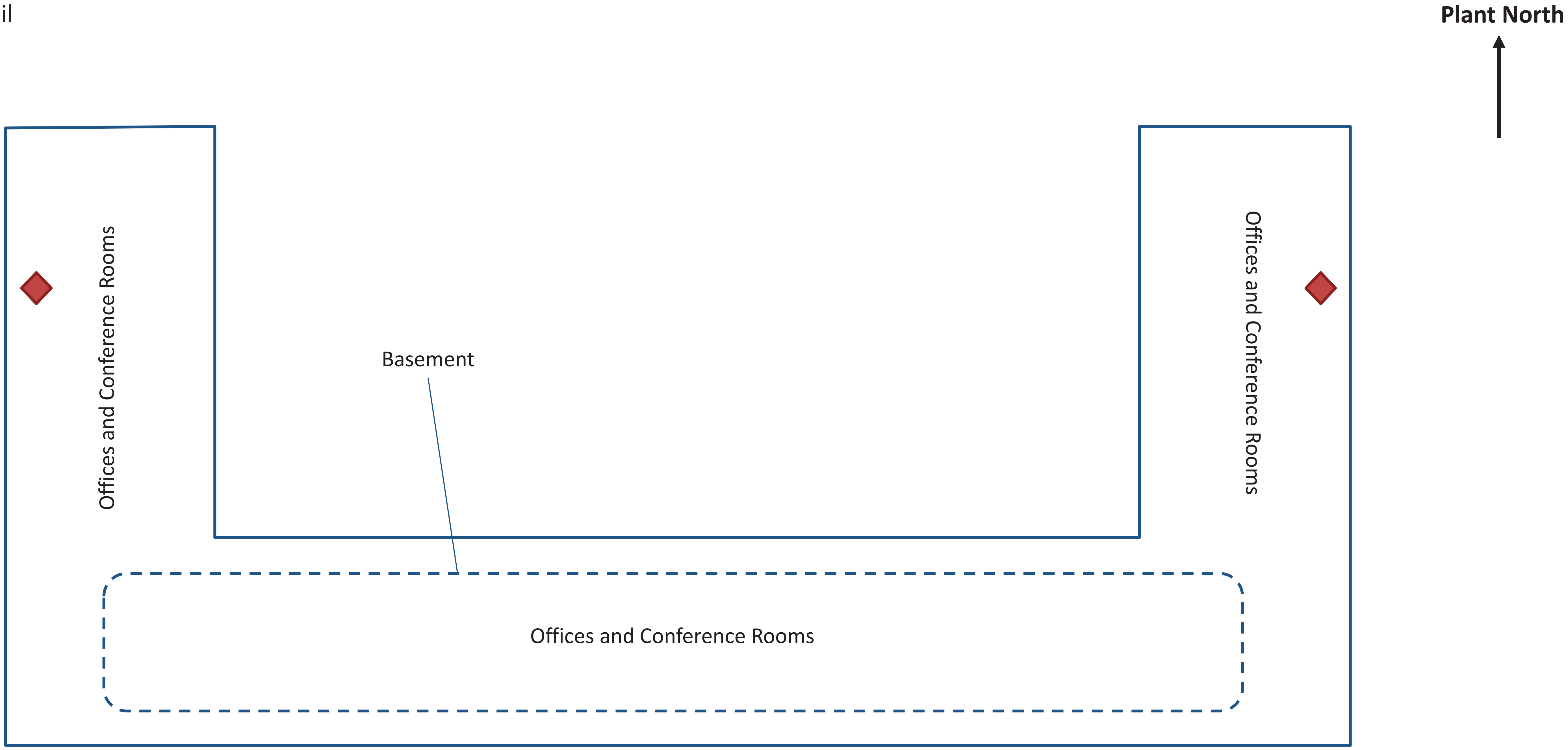
Washington, D.C.

April 2020

Figure D-1

Figure D.1. Walkdown Sketches: C-100 (Basement)

Source: Soil



Legend

◆ Paired Sub-Slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size:	41,617 ft^2
Basement Size:	5,700 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-100 (First Floor)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

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Figure

D-2

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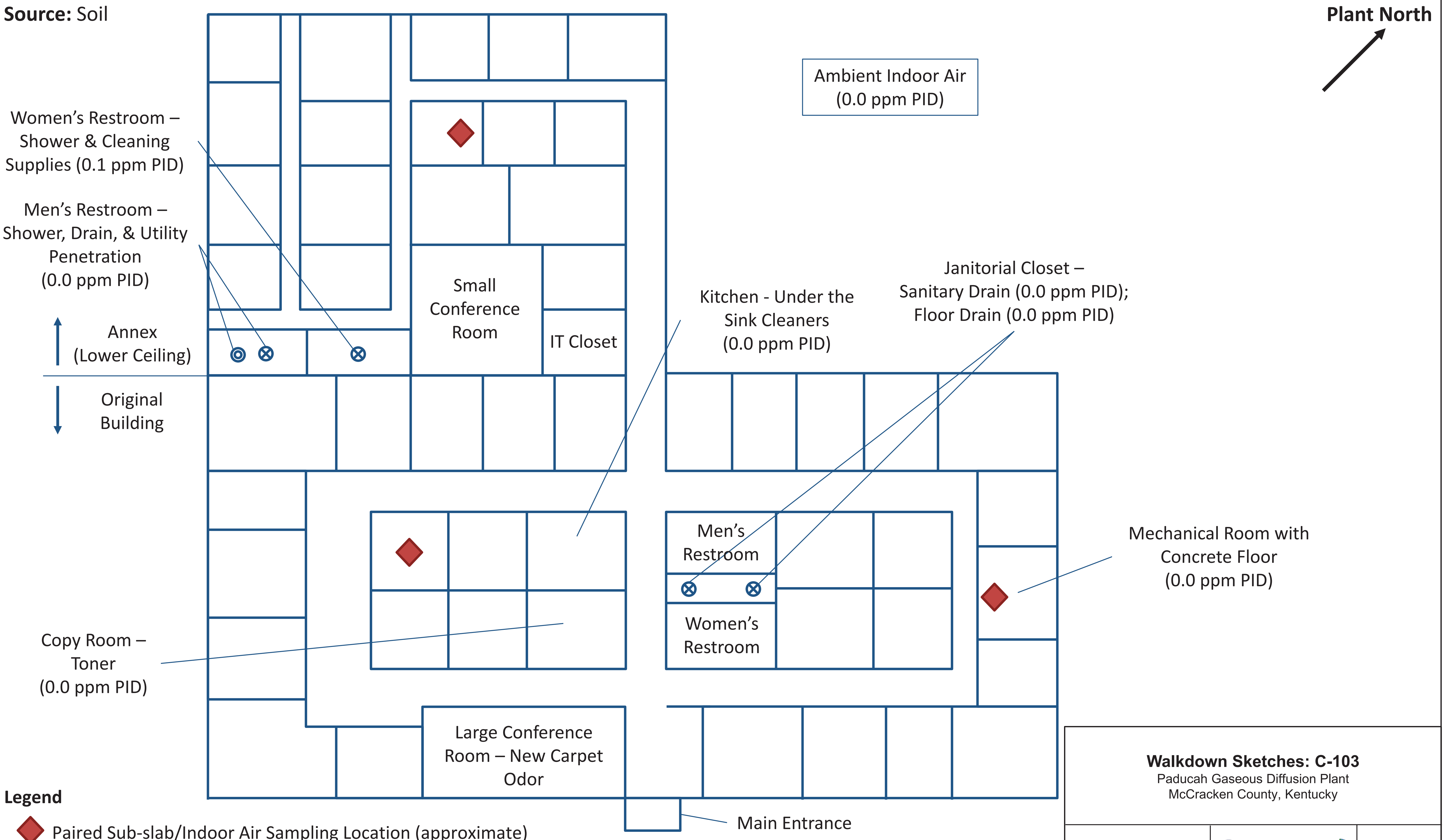
Figure D.2. Walkdown Sketches: C-100 (First Floor)



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size: 11,432 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-103
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

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Figure

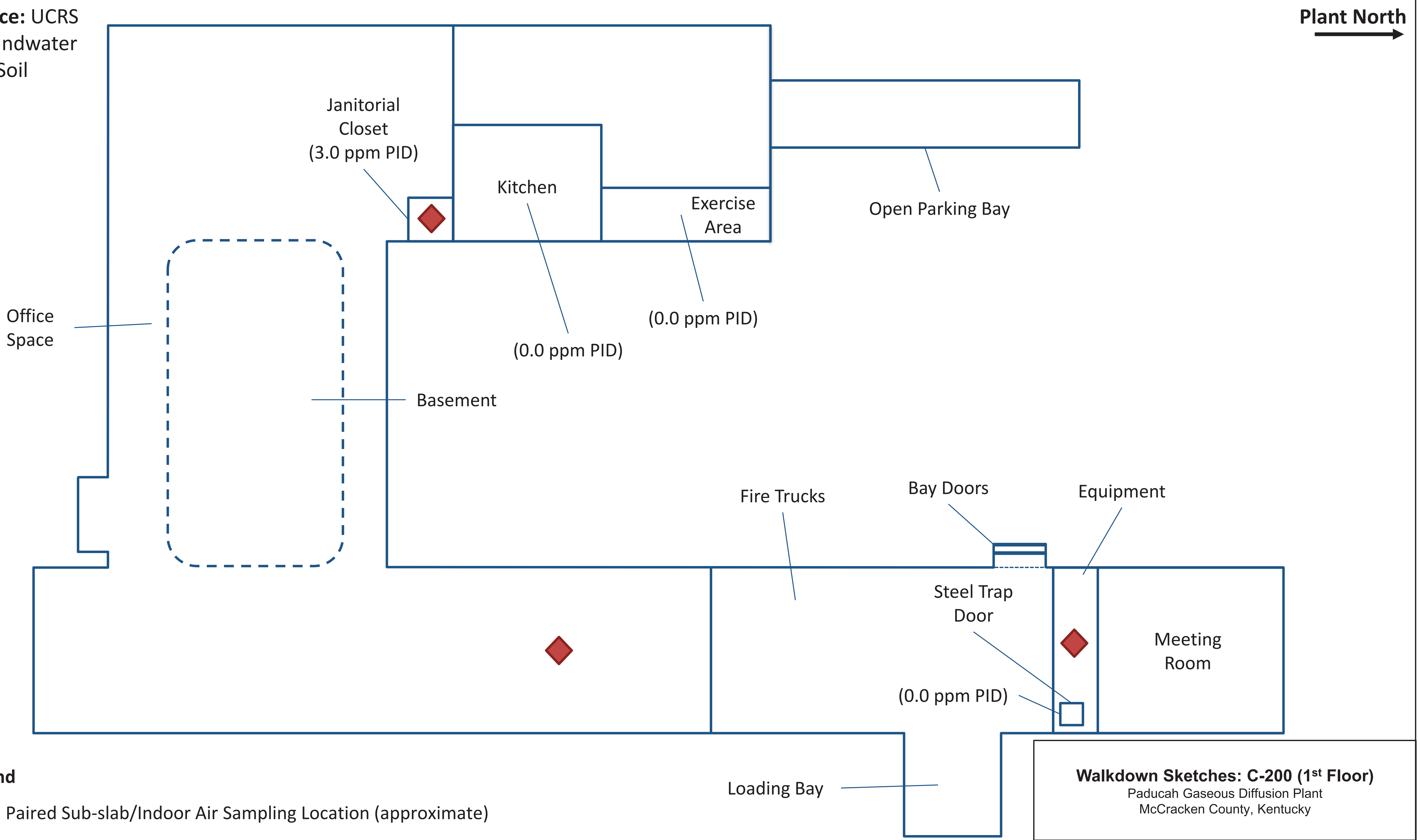
Washington, D.C.

April 2020

D-3

Figure D.3. Walkdown Sketches: C-103

Source: UCRS Groundwater and Soil



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size: 18,532 ft^2

Basement Size: 800 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-200 (1st Floor)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

U.S. DEPARTMENT OF ENERGY
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PADUCAH GASEOUS DIFFUSION PLANT

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Figure D-4

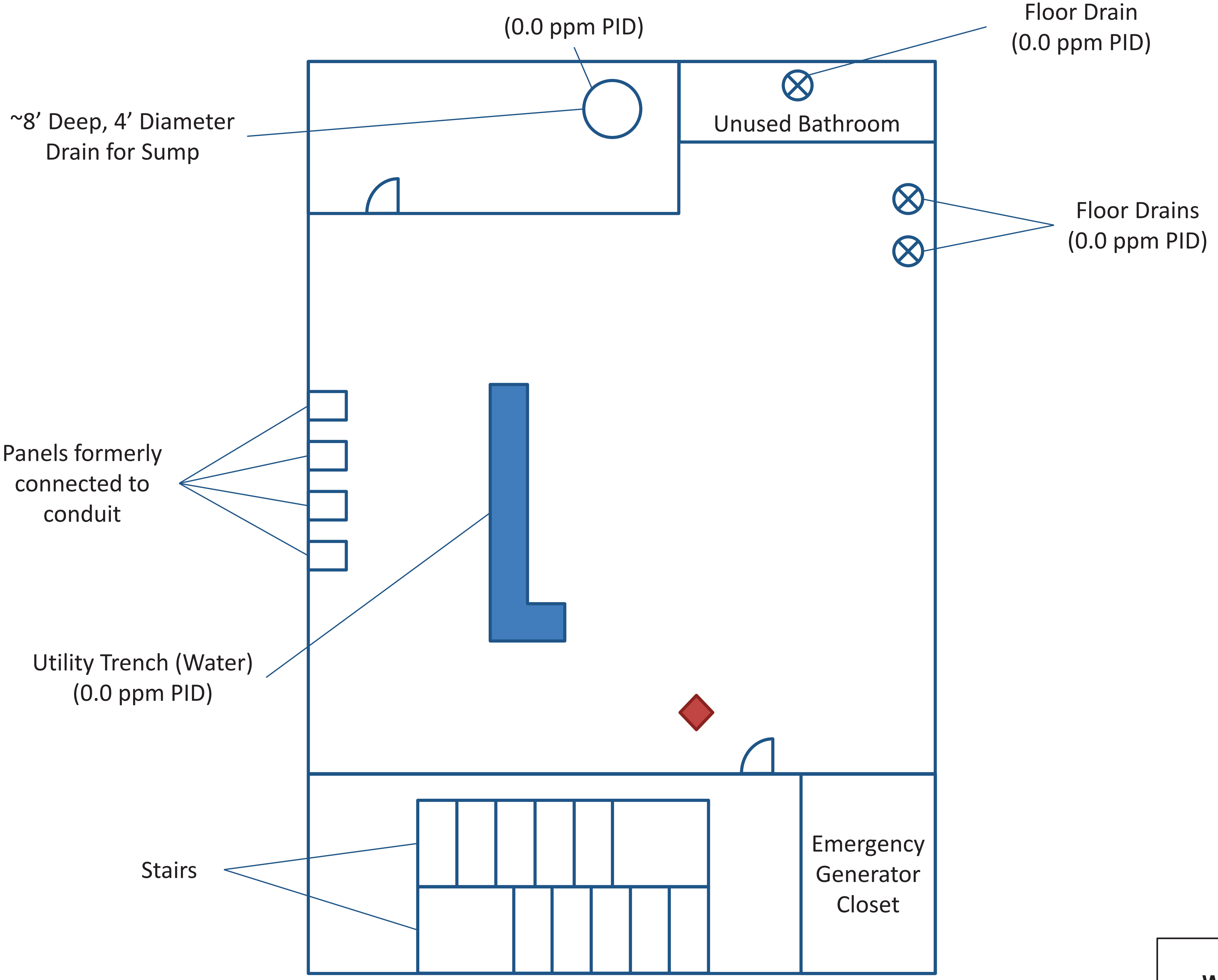
Washington, D.C.

April 2020

Figure D.4. Walkdown Sketches: C-200 (First Floor)

Source: UCRS Groundwater and Soil

Plant North



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size:	18,532 ft^2
Basement Size:	800 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-200 (Basement)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

Washington, D.C.

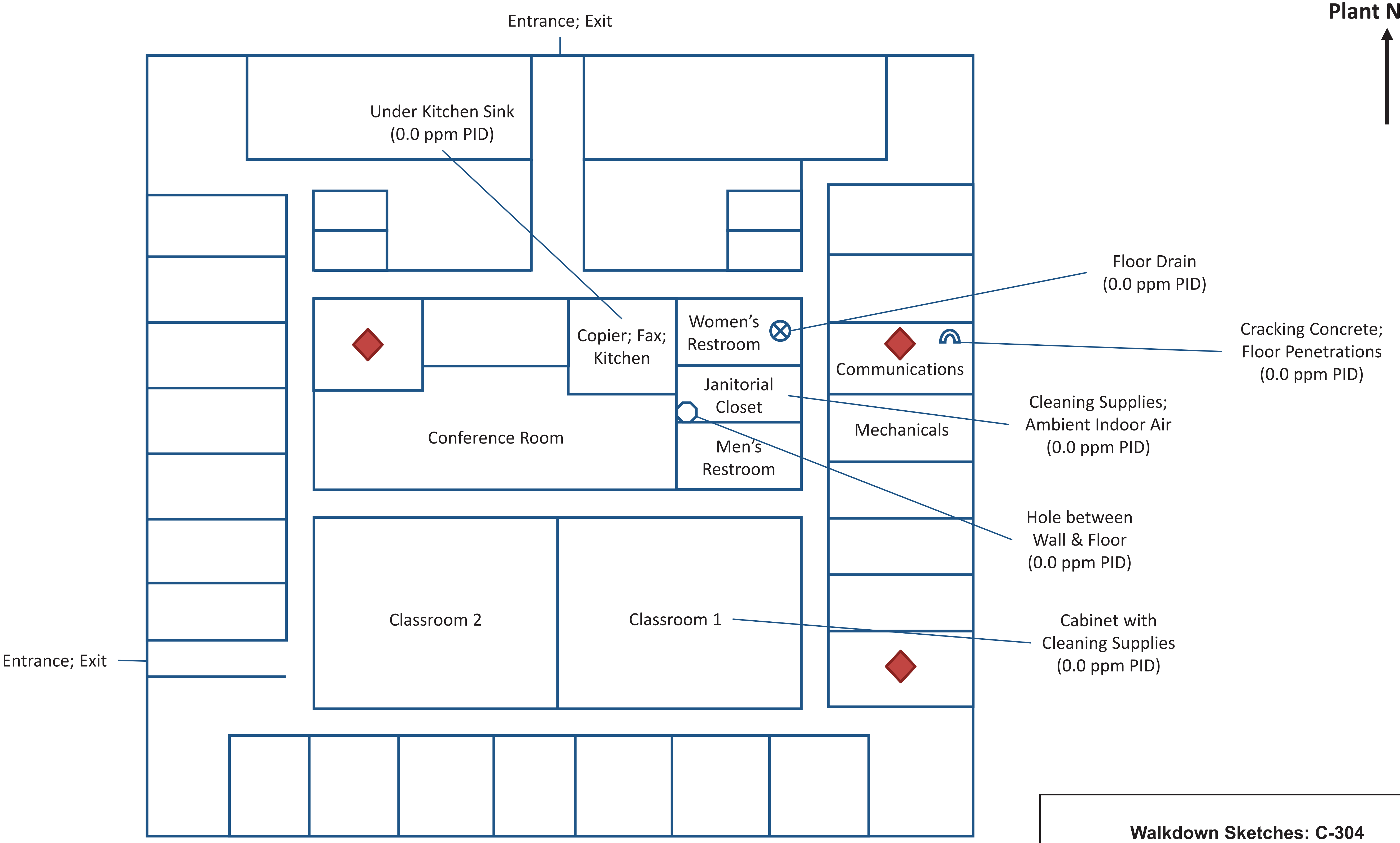
April 2020

D-5

Figure D.5. Walkdown Sketches: C-200 (Basement)

Source: Soil

Plant North



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size: 7,833 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-304
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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PADUCAH GASEOUS DIFFUSION PLANT

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Figure

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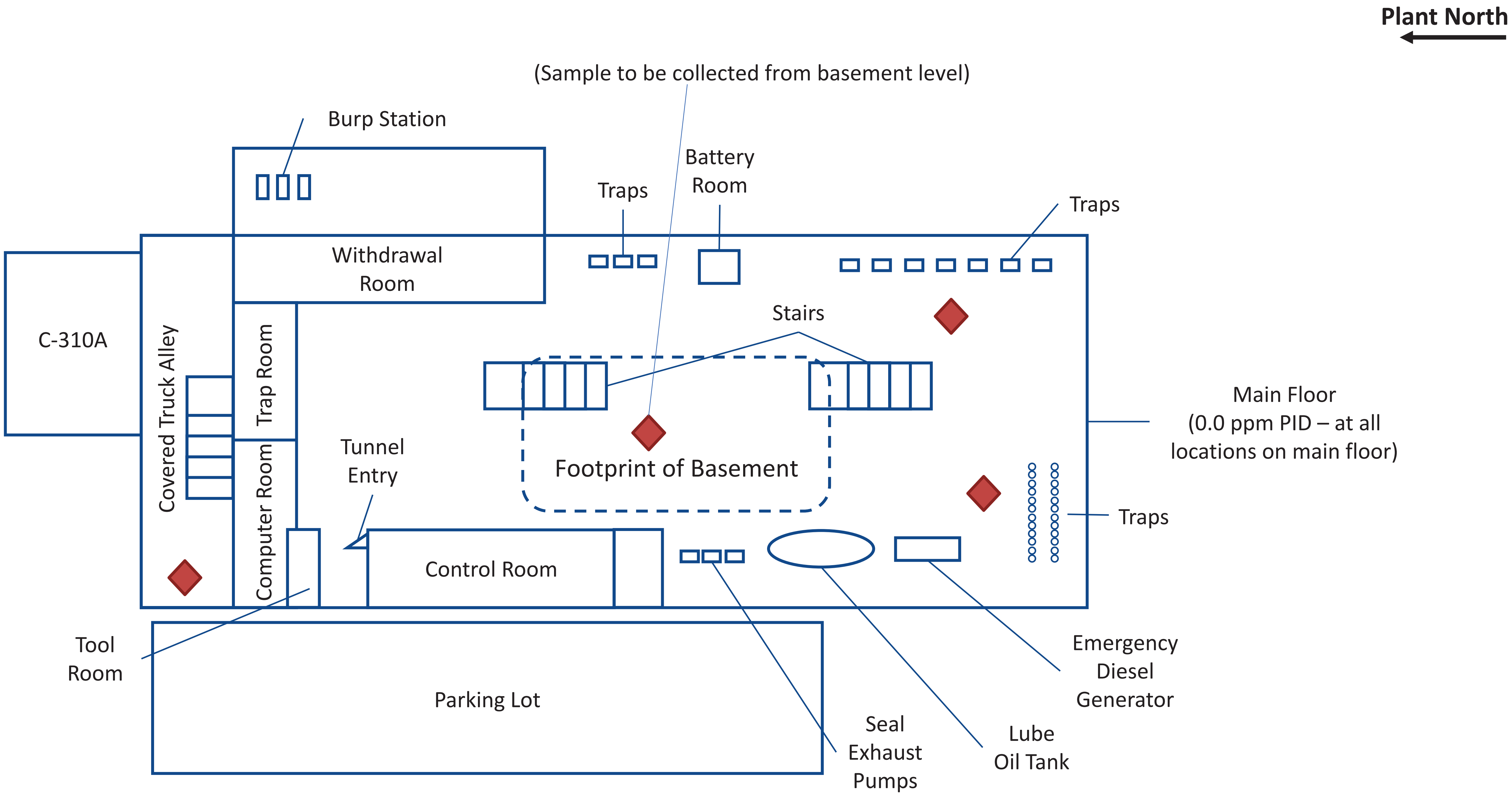
April 2020

D-6

Figure D.6. Walkdown Sketches: C-304

Source: Soil



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size:	62,863 ft^2
Basement Size:	2,100 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-310
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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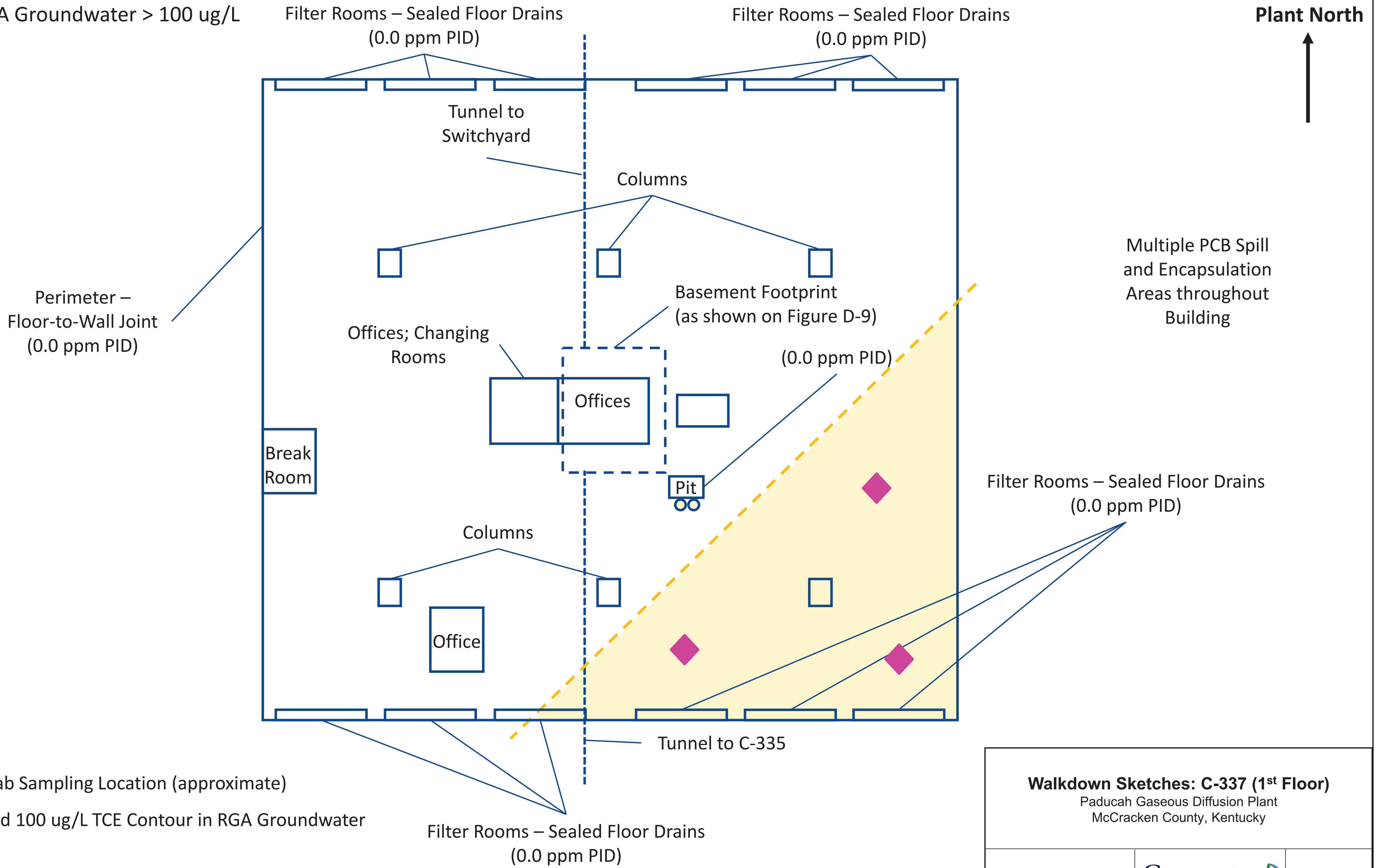
D-7

Figure D.7. Walkdown Sketches: C-310

Source: RGA Groundwater > 100 ug/L



Legend

◆ Sub-slab Sampling Location (approximate)

▨ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size:	1,069,093 ft^2
Basement Size:	4,500 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-337 (1st Floor)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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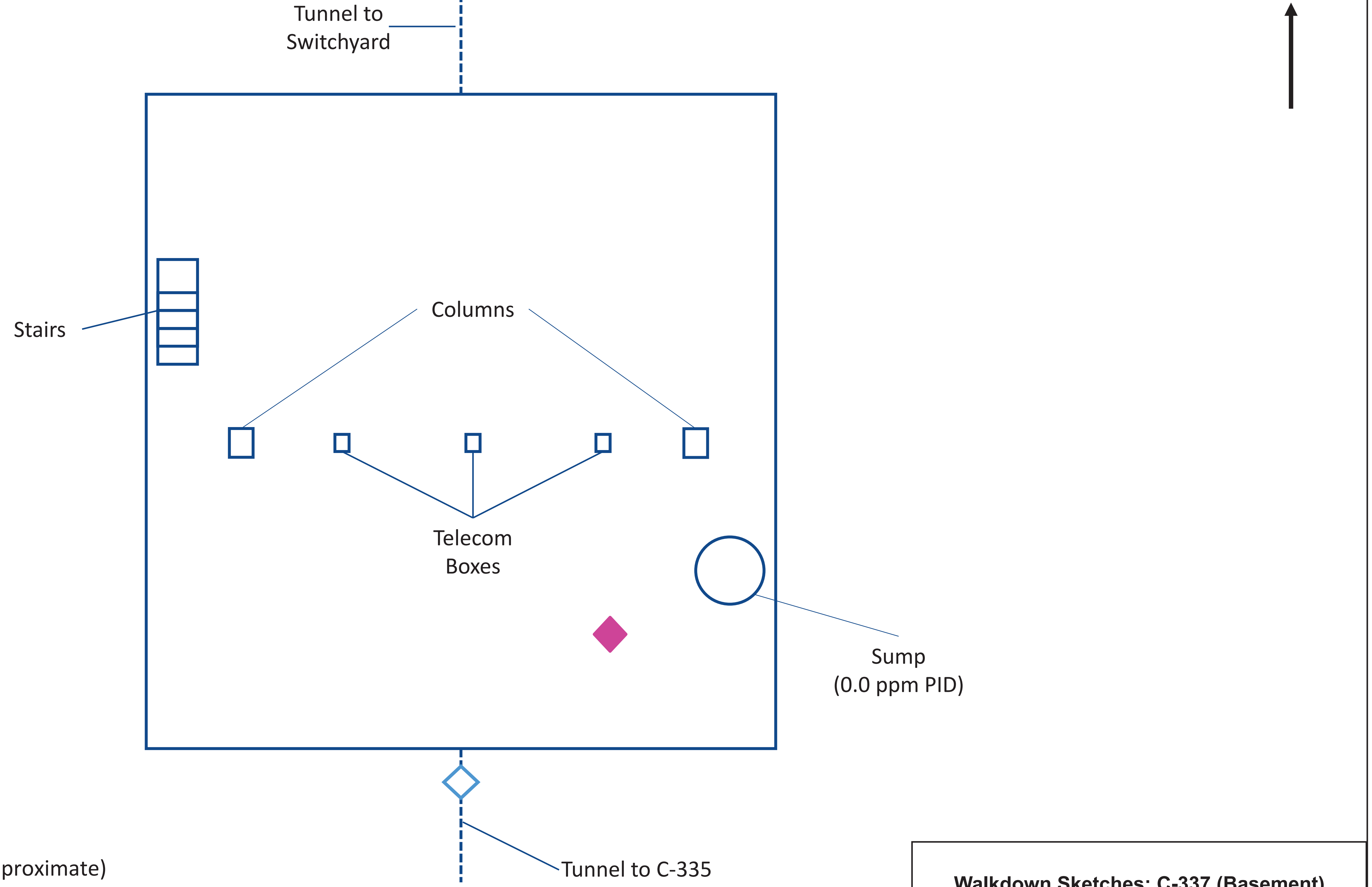
April 2020

D-8

Figure D.8. Walkdown Sketches: C-337 (First Floor)

Source: RGA Groundwater > 100 ug/L



Legend

◇ Indoor Air Sampling Location (approximate)

◆ Sub-slab Sampling Location (approximate)

Notes

Facility Size:	1,069,093 ft^2
Basement Size:	4,500 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-337 (Basement)
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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PADUCAH GASEOUS DIFFUSION PLANT

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Figure

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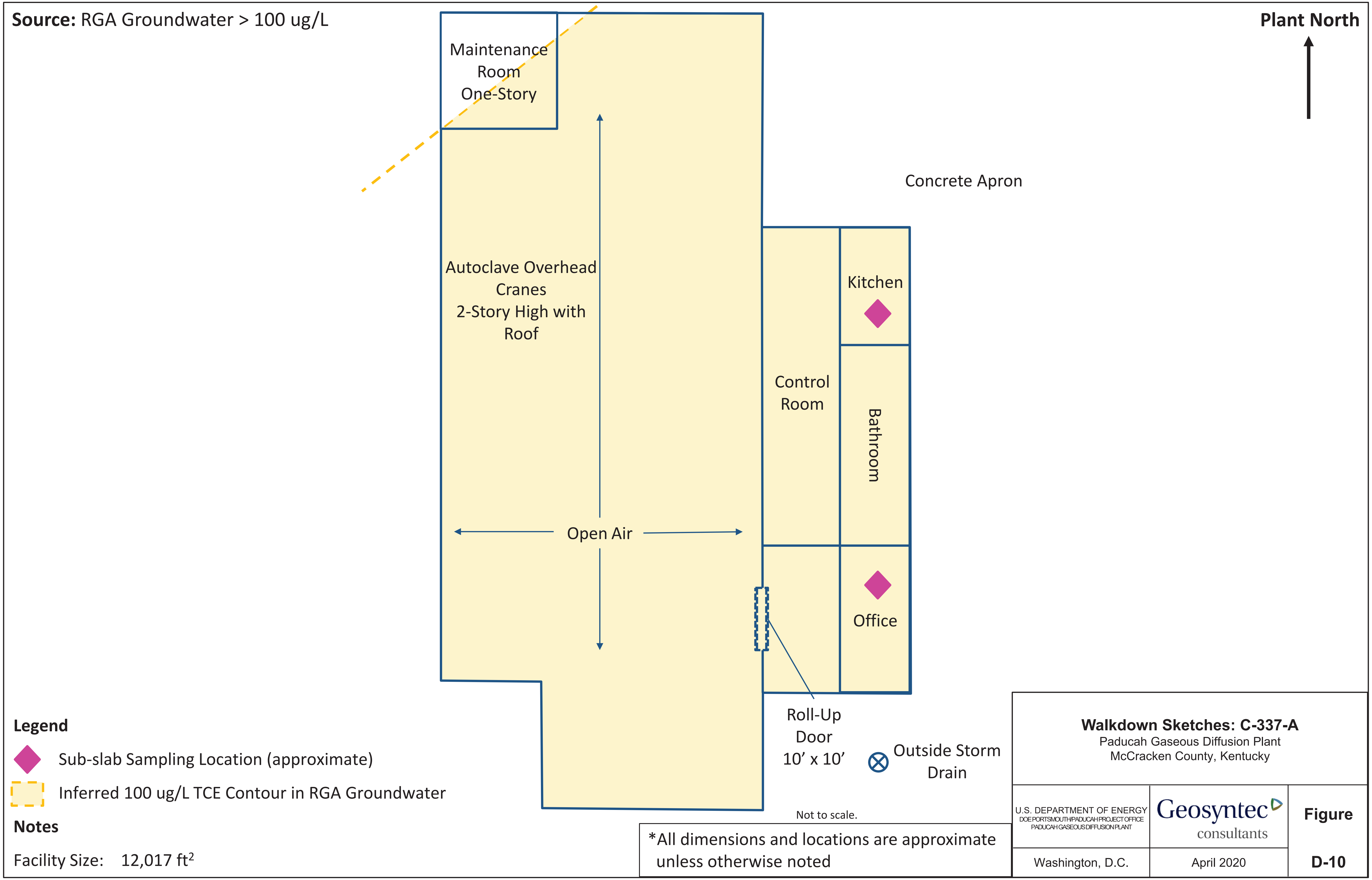
April 2020

D-9

Figure D.9. Walkdown Sketches: C-337 (Basement)

Source: RGA Groundwater > 100 ug/L



Legend

◆	Sub-slab Sampling Location (approximate)
▭	Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 12,017 ft^2

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-337-A
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure D-10

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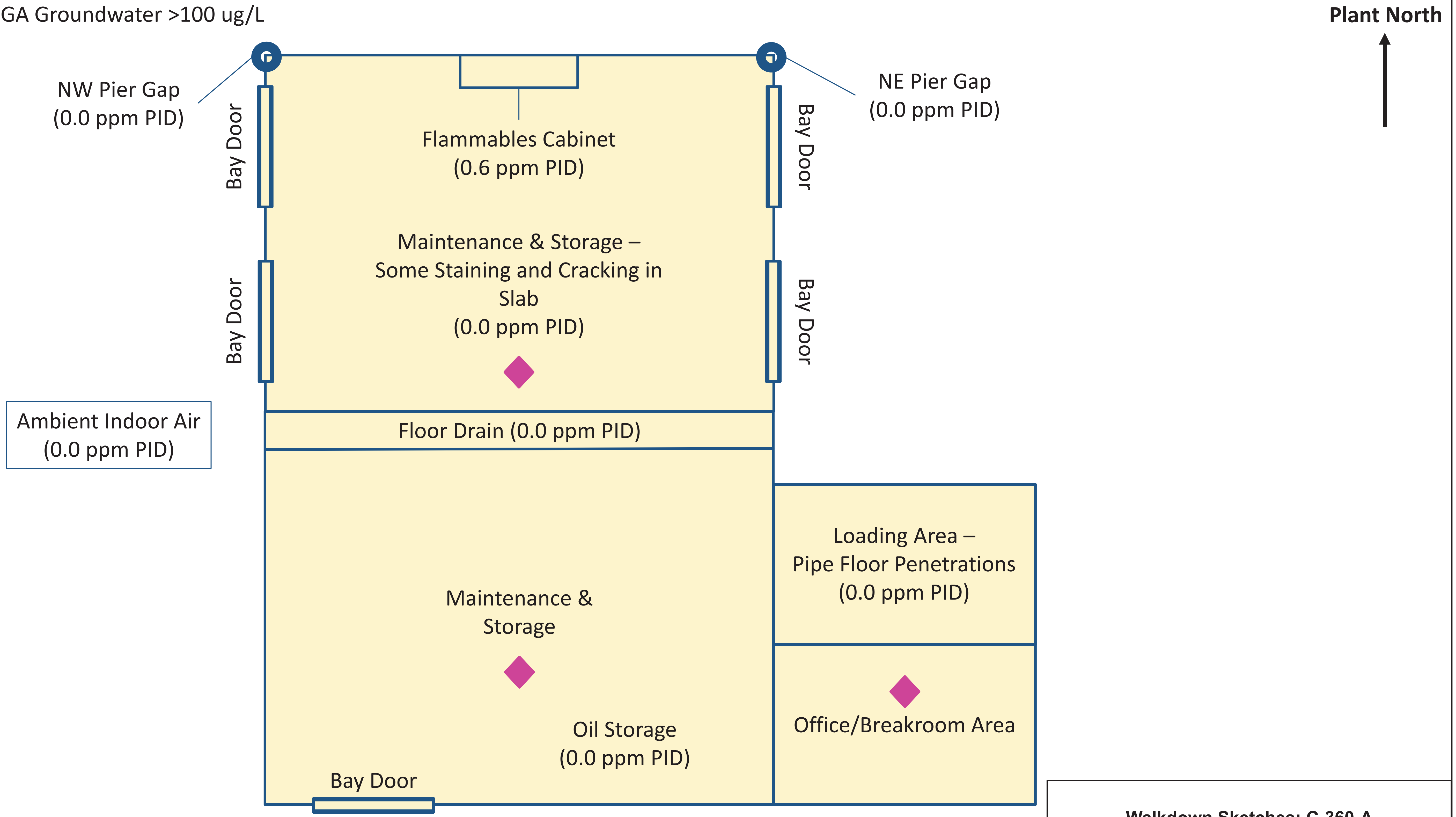
Figure D.10. Walkdown Sketches: C-337-A

Source: RGA Groundwater >100 ug/L



Legend

◆ Sub-slab Sampling Location (approximate)

🟨 Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 8,468 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-360-A
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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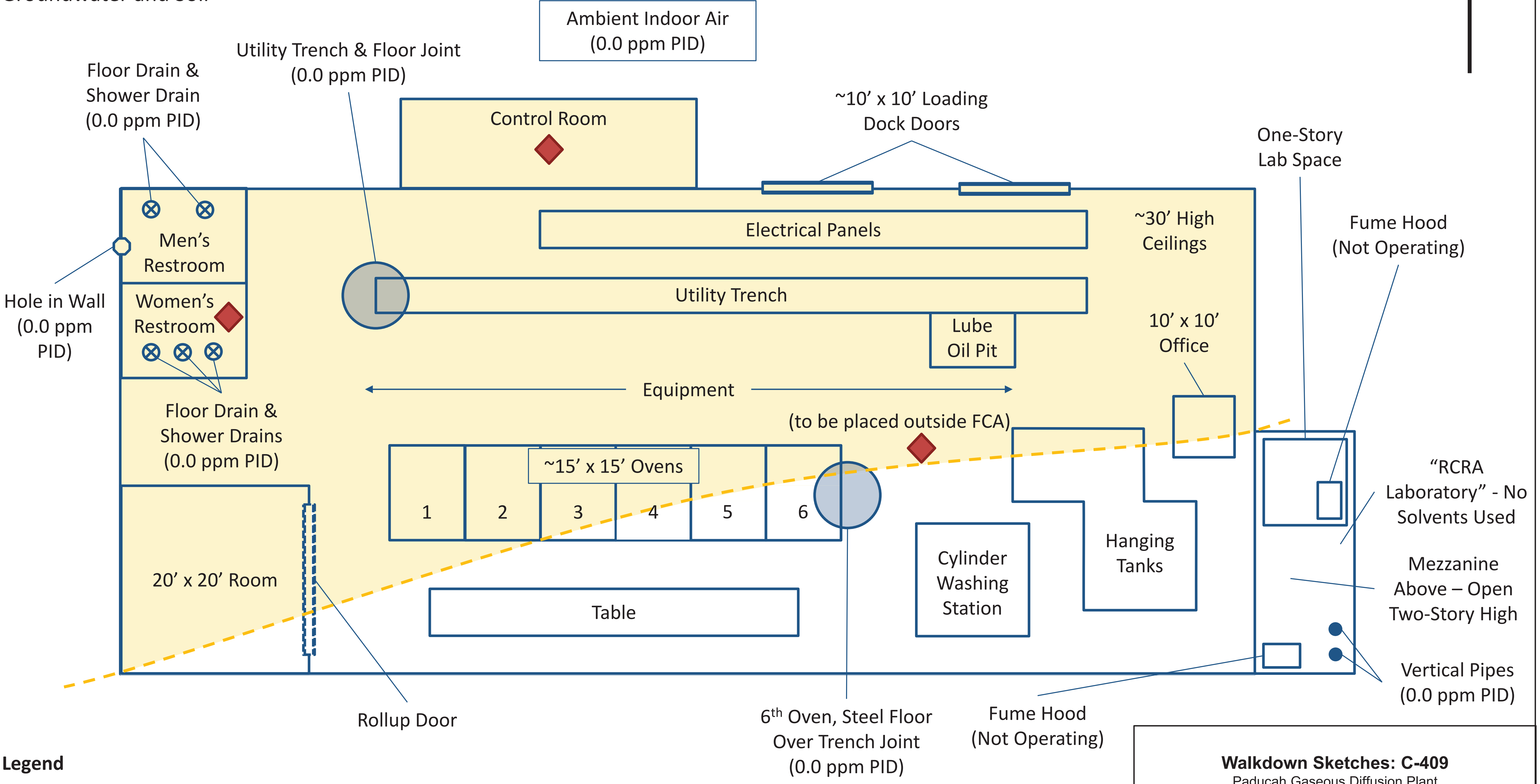
D-11

Figure D.11. Walkdown Sketches: C-360-A

Source: RGA Groundwater > 100 ug/L and UCRS Groundwater and Soil



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

▨ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 27,252 ft²

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-409
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

D-12

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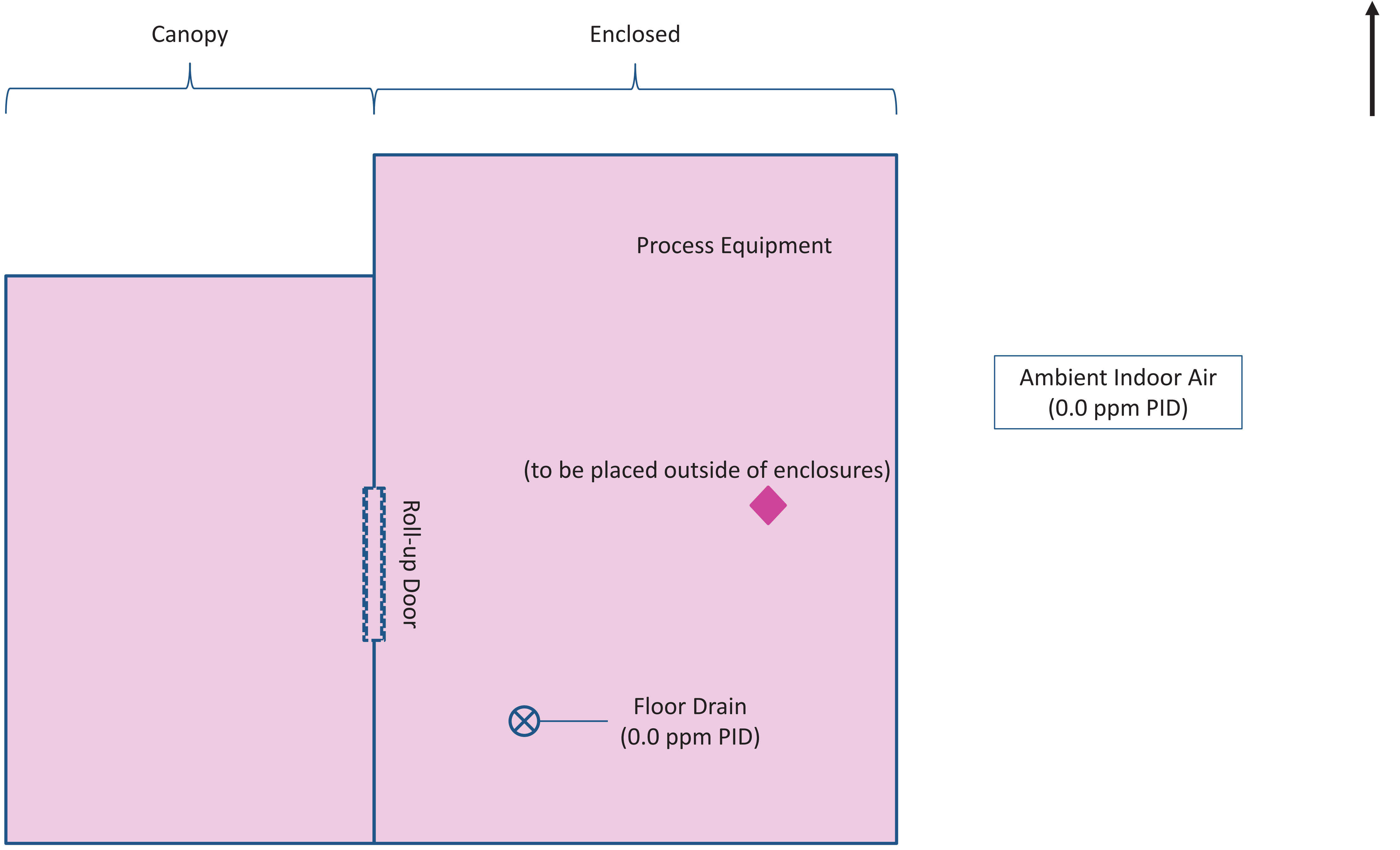
Figure D.12. Walkdown Sketches: C-409

Source: RGA Groundwater > 1,000 ug/L



Legend

◆ Sub-slab Sampling Location (approximate)

▨ Inferred 1,000 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 2,188 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-410-K
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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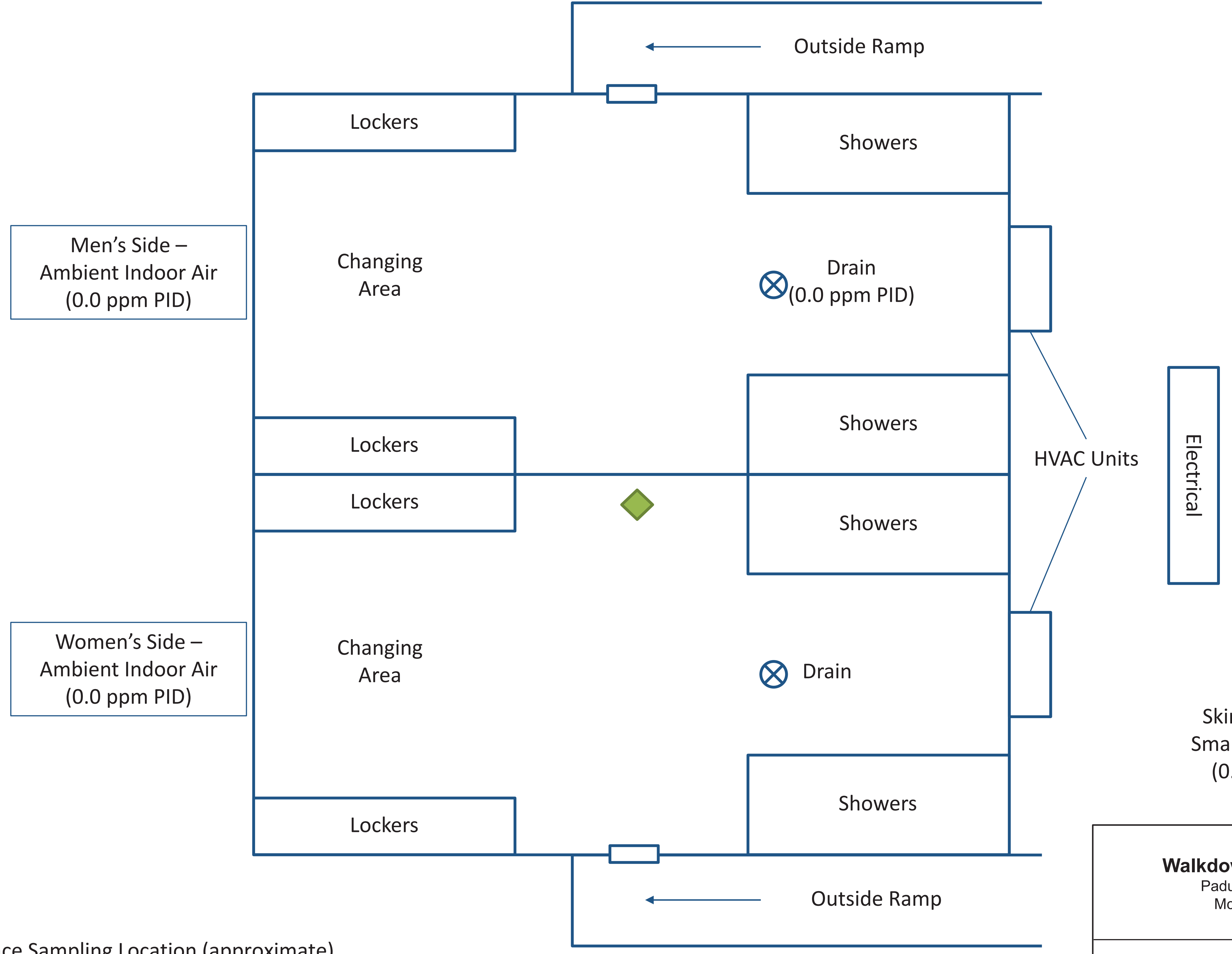
D-13

Figure D.13. Walkdown Sketches: C-410-K

Source: UCRS Groundwater

Plant North



Legend

◆ Crawl Space Sampling Location (approximate)

Notes

Facility Size: 1,578 ft^2

Not to scale.

*All dependencies and locations are approximate unless otherwise noted

Walkdown Sketches: C-412-T11A
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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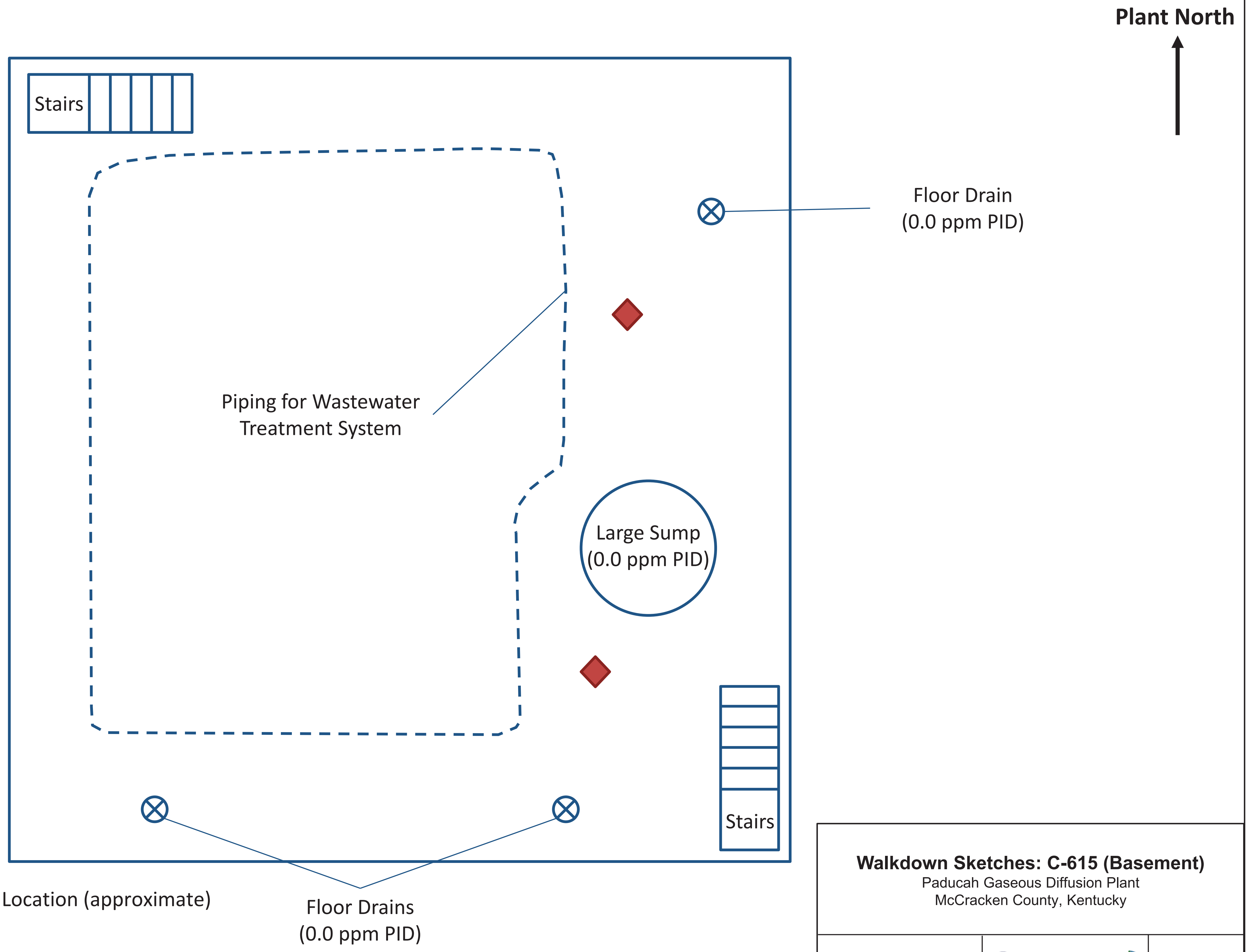
D-14

Figure D.14. Walkdown Sketches: C-412-T11A

Source: Soil



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size:	23,135 ft^2
Basement Size:	650 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-615 (Basement)
Paducah Gaseous Diffusion Plant
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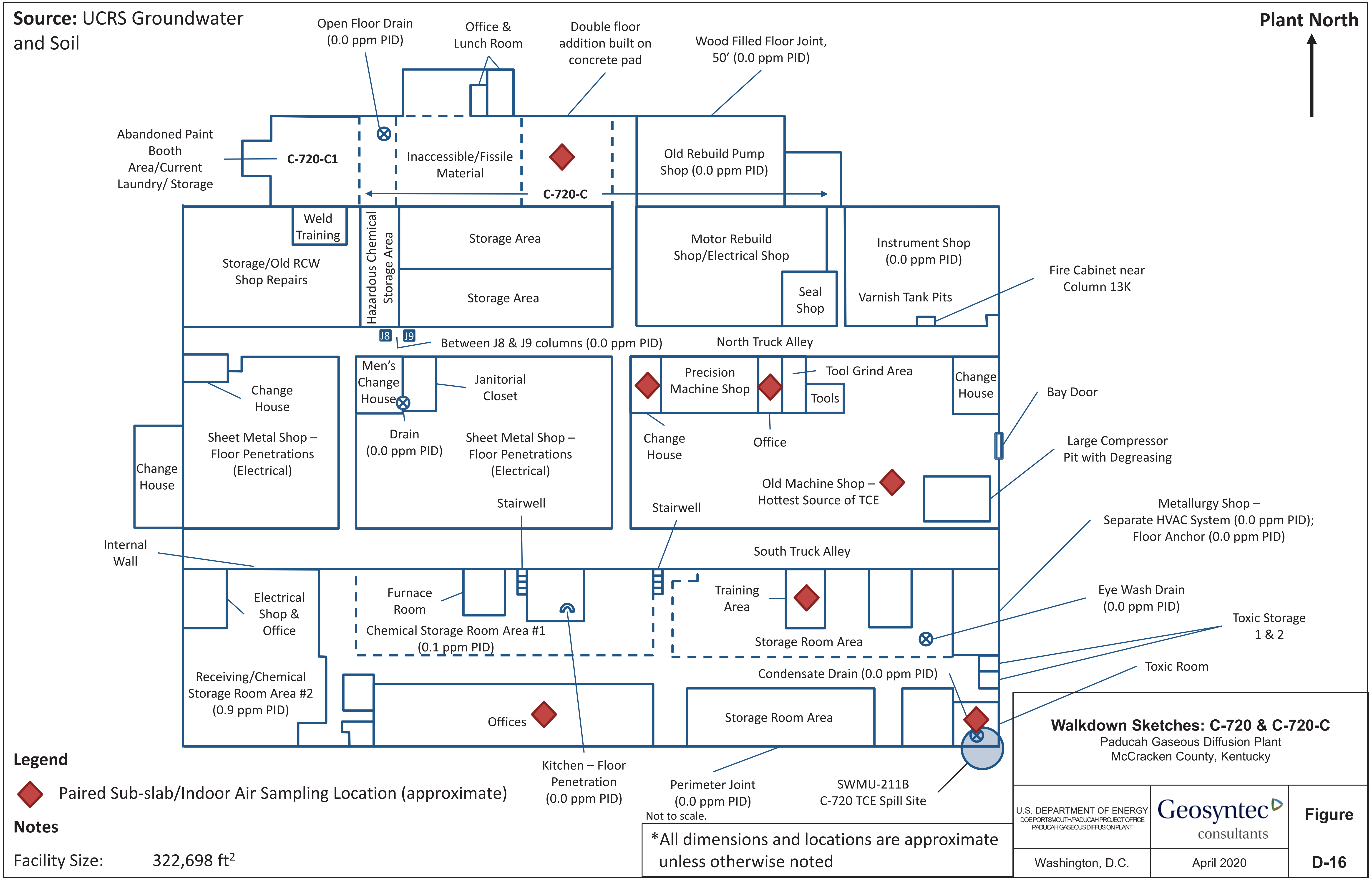
D-15

Figure D.15. Walkdown Sketches: C-615 (Basement)



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size: 322,698 ft^2

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-720 & C-720-C
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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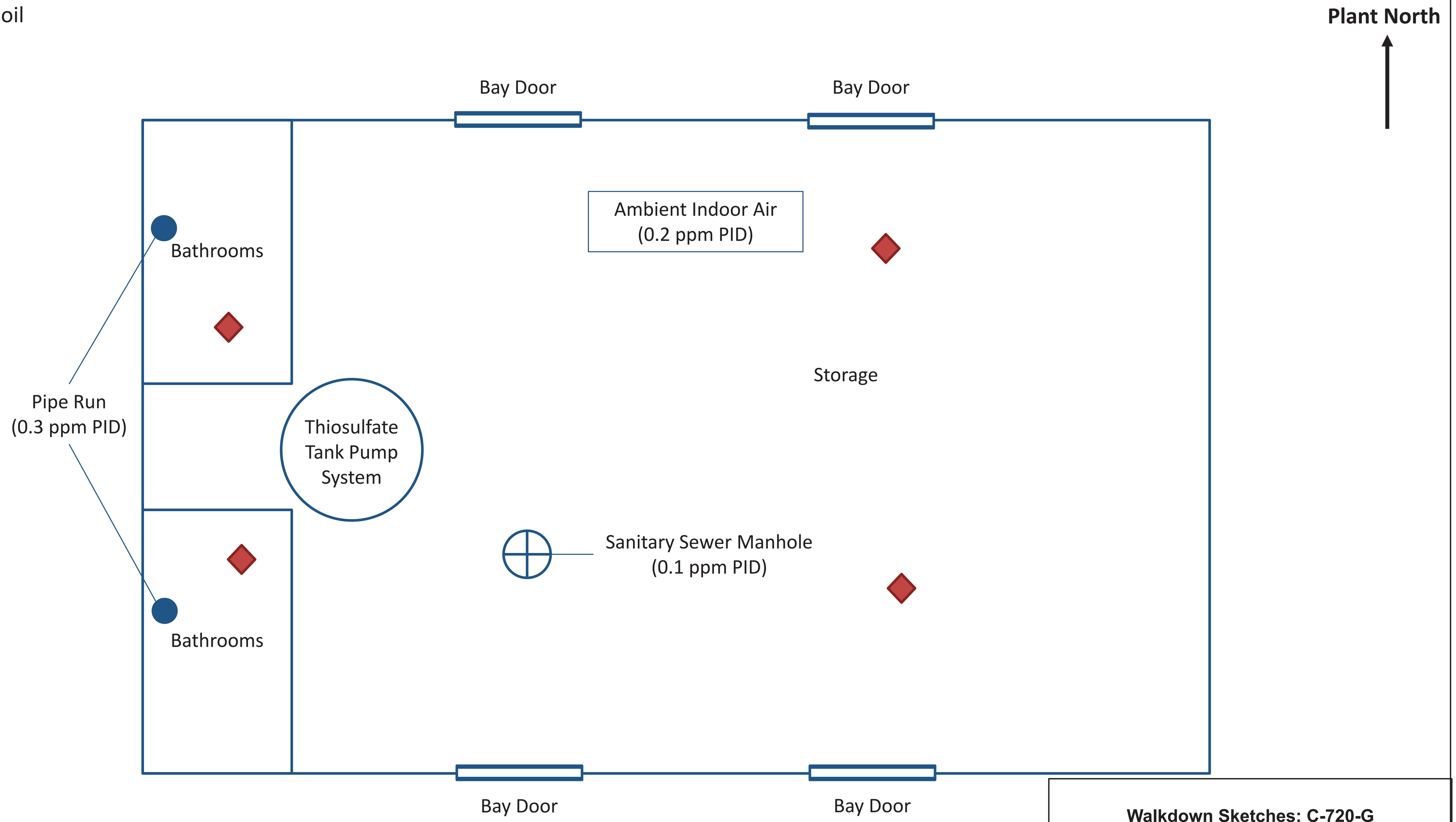
D-16

Figure D.16. Walkdown Sketches: C-720 and C-720-C

Source: Soil



Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

Notes

Facility Size: 10,974 ft^2

Not to scale.

*All dependencies and locations are approximate unless otherwise noted

Walkdown Sketches: C-720-G
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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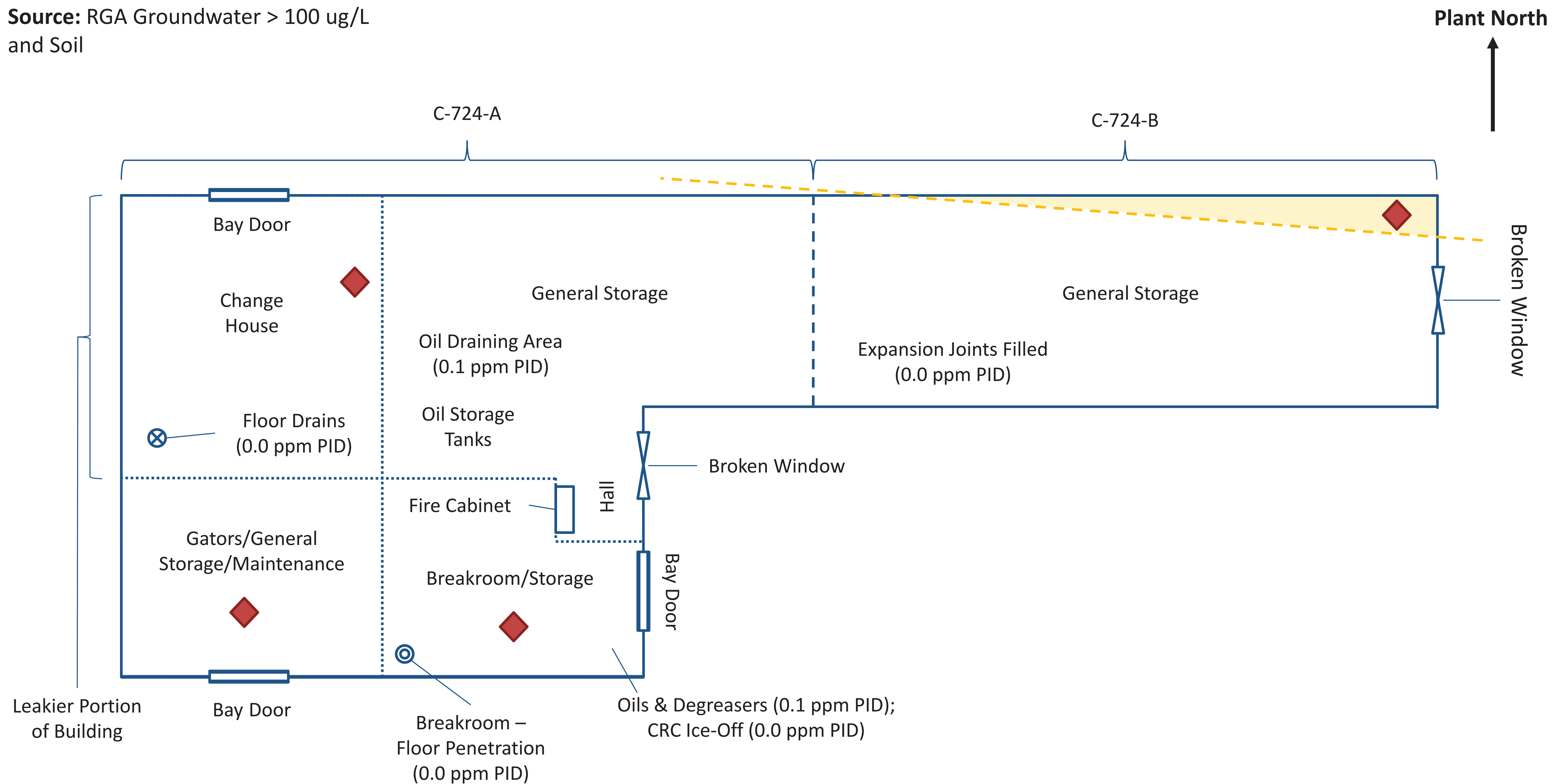
D-17

Figure D.17. Walkdown Sketches: C-720-G



Source: RGA Groundwater > 100 ug/L and Soil

Legend

◆ Paired Sub-slab/Indoor Air Sampling Location (approximate)

🟨 Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 12,812 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-724-A & C-724-B
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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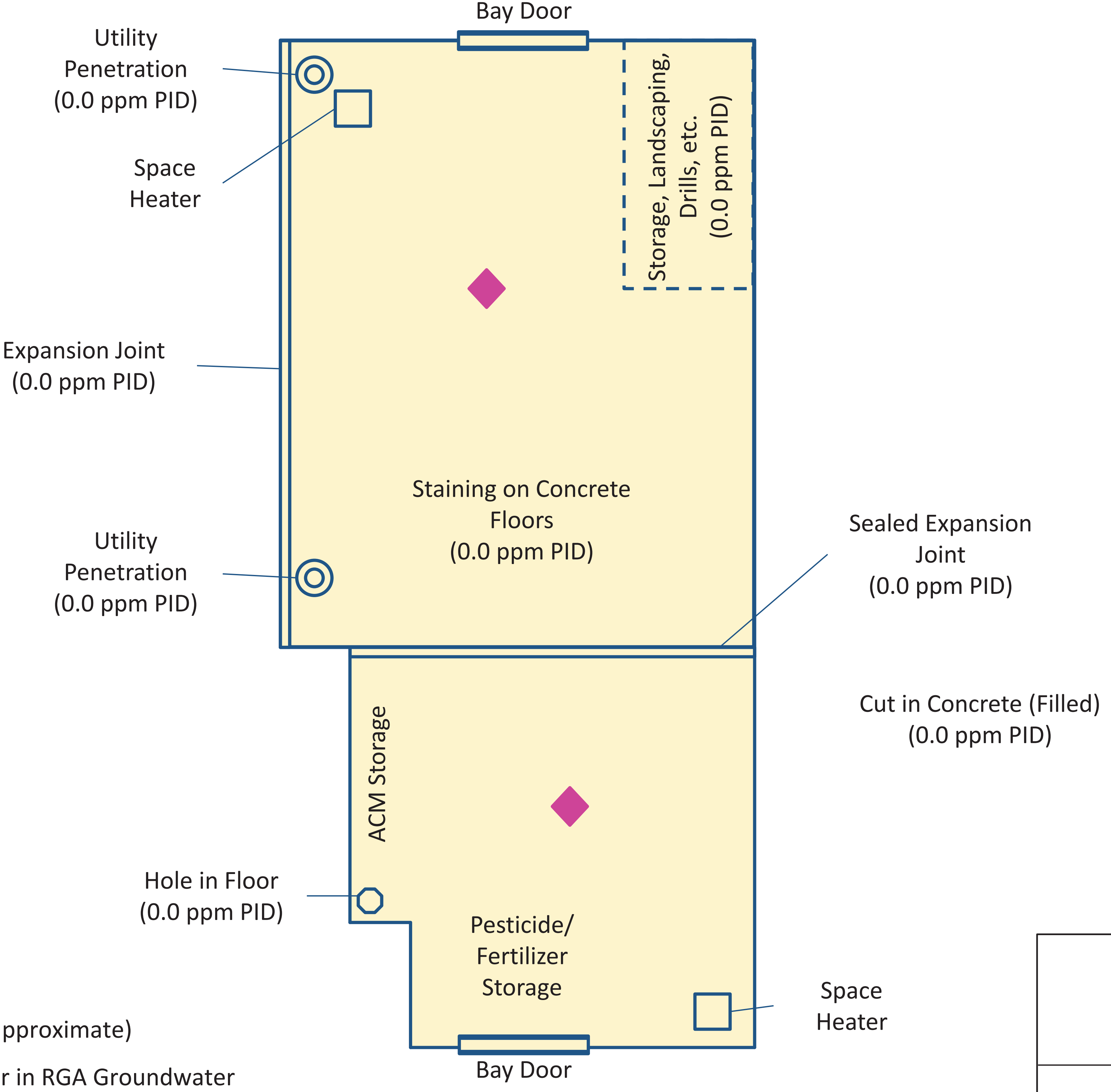
D-18

Figure D.18. Walkdown Sketches: C-724-A and C-724-B

Source: RGA Groundwater >100 ug/L

Plant North



Legend

◆ Sub-slab Sampling Location (approximate)

▨ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 3,368 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-725
Paducah Gaseous Diffusion Plant
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Figure

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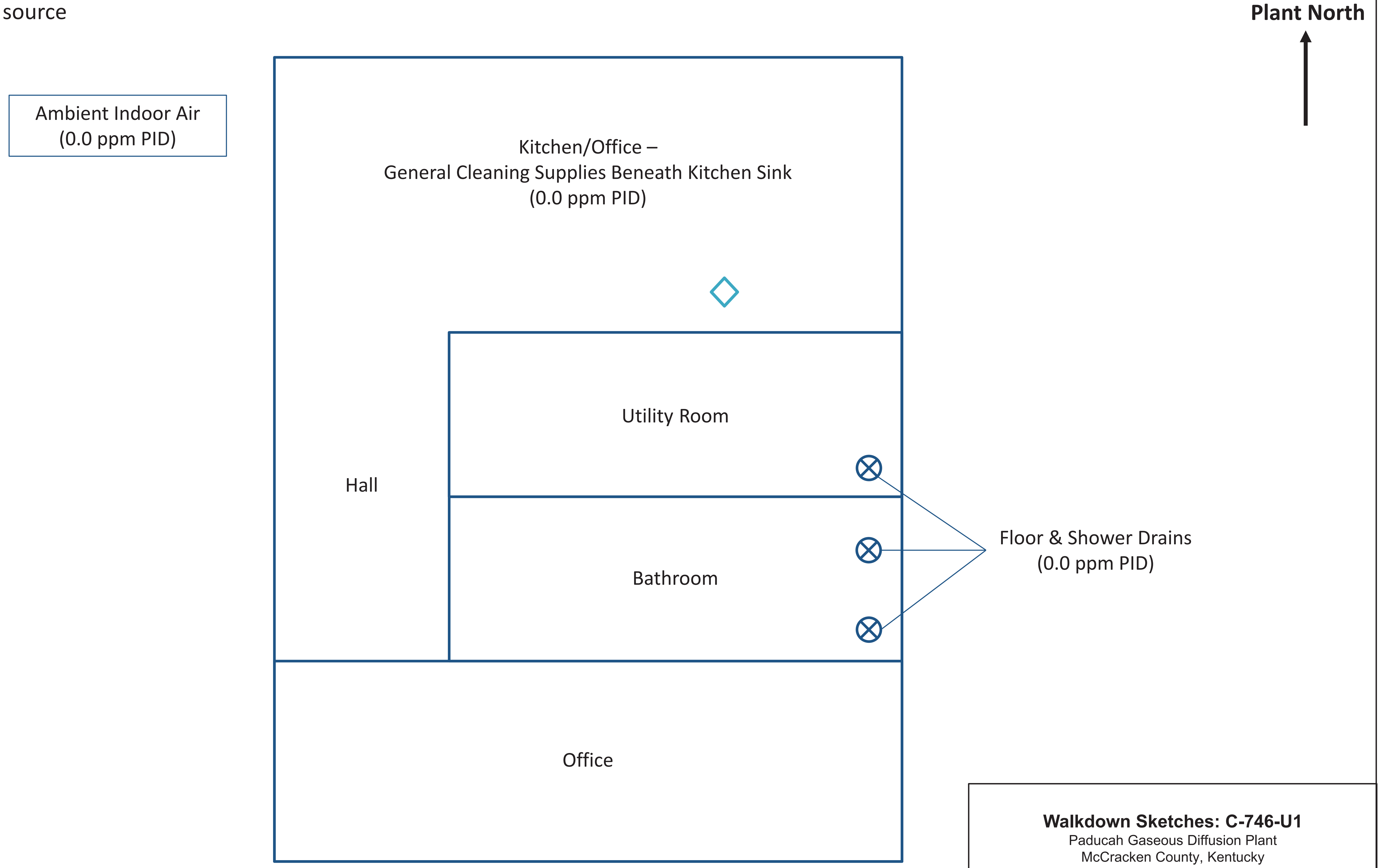
D-19

Figure D.19. Walkdown Sketches: C-725

Source: No known source



Legend

◇ Indoor Air Sampling Location (approximate)

Notes

Facility Size: 763 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-746-U1
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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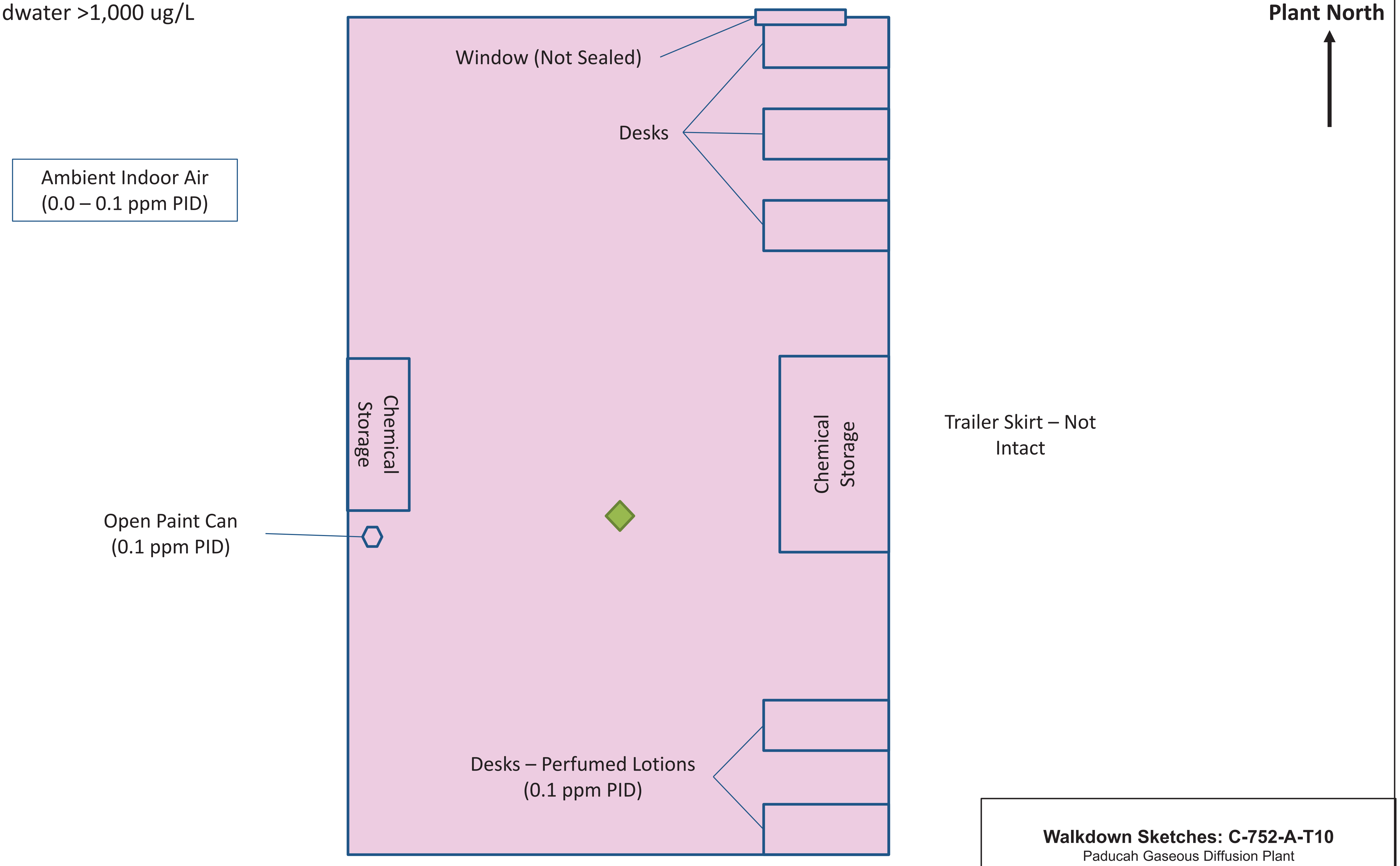
D-20

Figure D.20. Walkdown Sketches: C-746-U1

Source: RGA Groundwater >1,000 ug/L and Soil



Legend

◆ Crawl Space Location (approximate)

▨ Inferred 1,000 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 438 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-752-A-T10
Paducah Gaseous Diffusion Plant
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Figure

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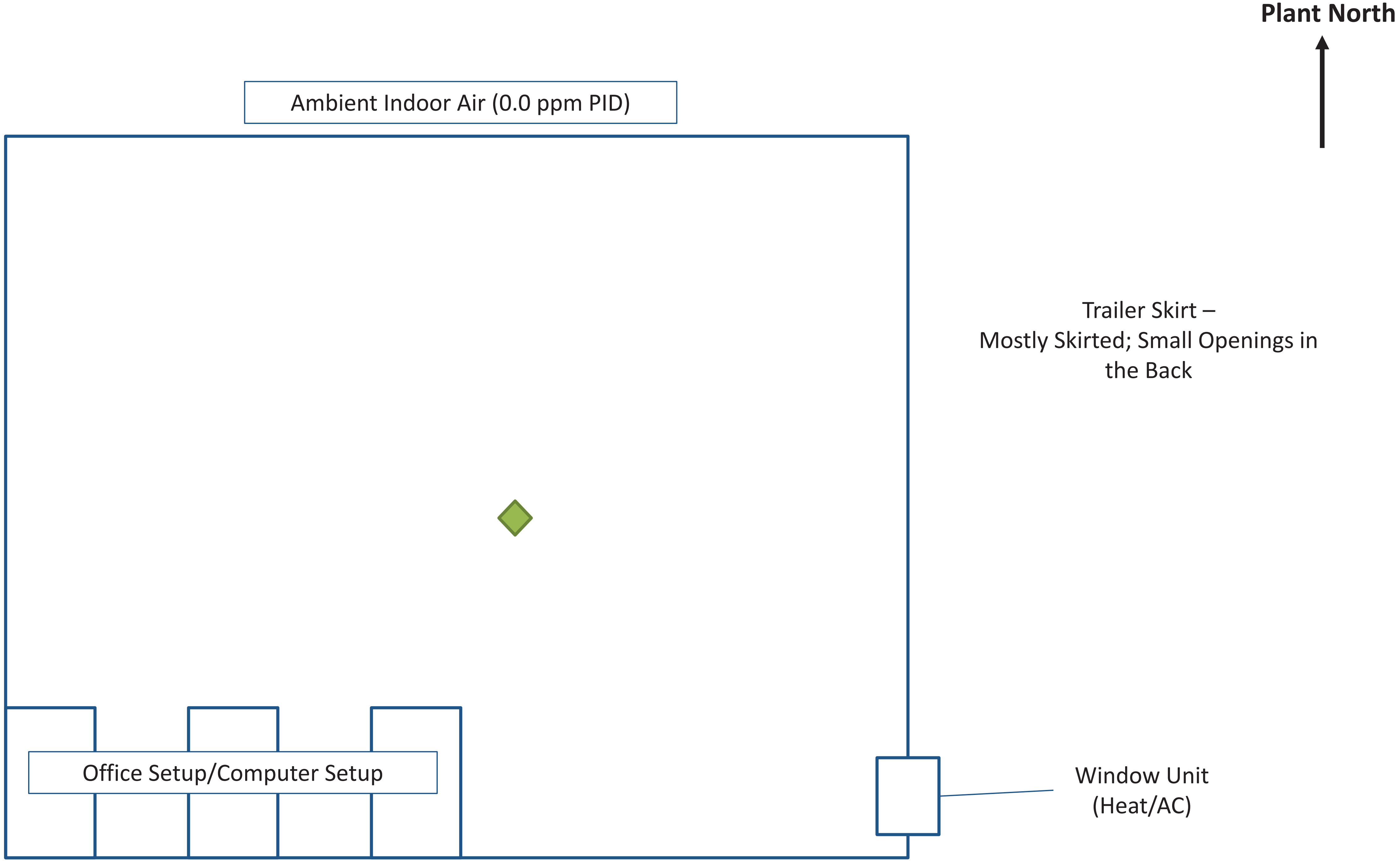
D-21

Figure D.21. Walkdown Sketches: C-752-A-T10

Source: Soil



Legend

◆ Crawl Space Sampling Location (approximate)

Notes

Facility Size: 240 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-752-B-T01
Paducah Gaseous Diffusion Plant
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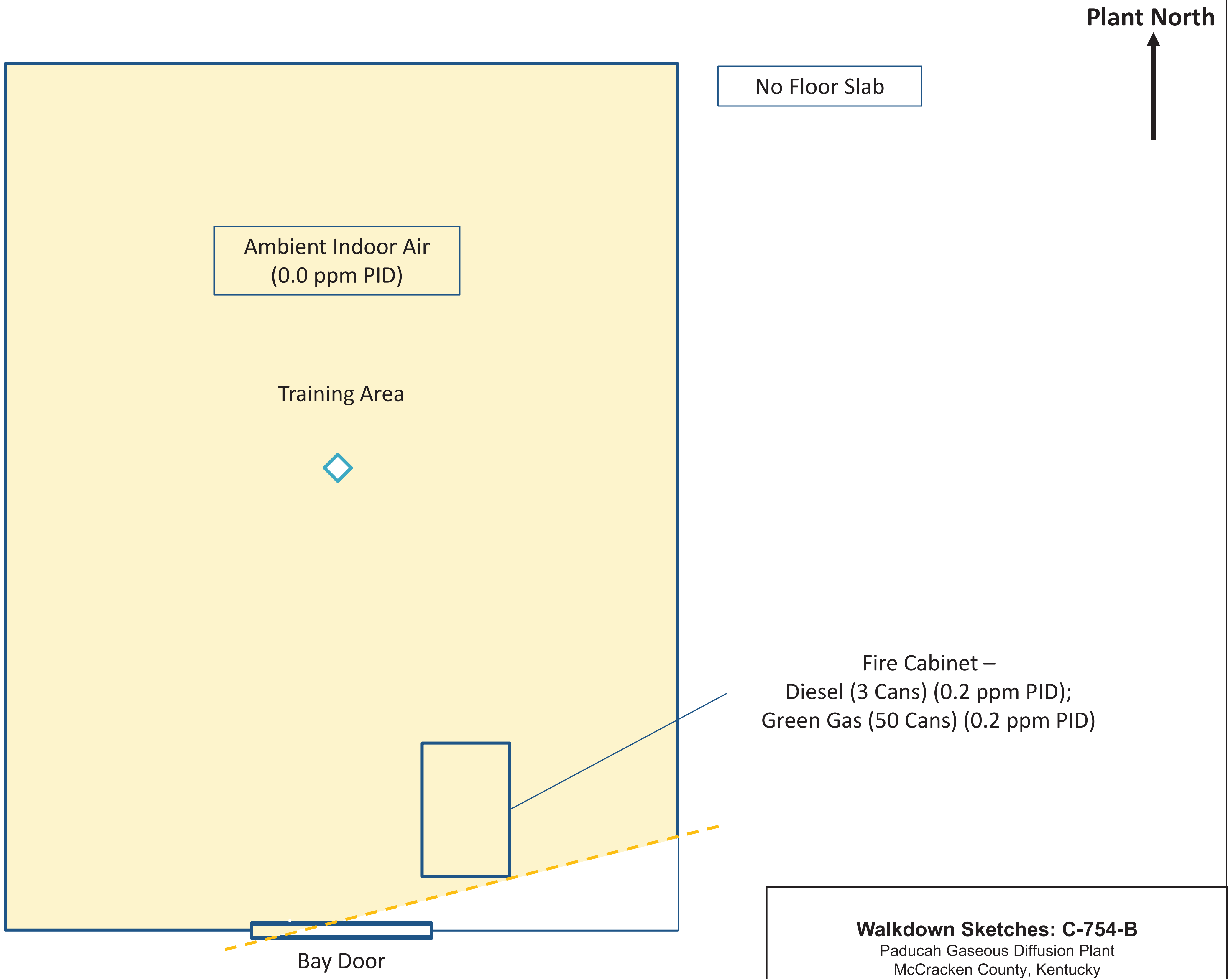
D-22

Figure D.22. Walkdown Sketches: C-752-B-T01

Source: RGA Groundwater >100 ug/L



Legend

◇ Indoor Air Sampling Location (approximate)

▨ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 4,041 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-754-B
Paducah Gaseous Diffusion Plant
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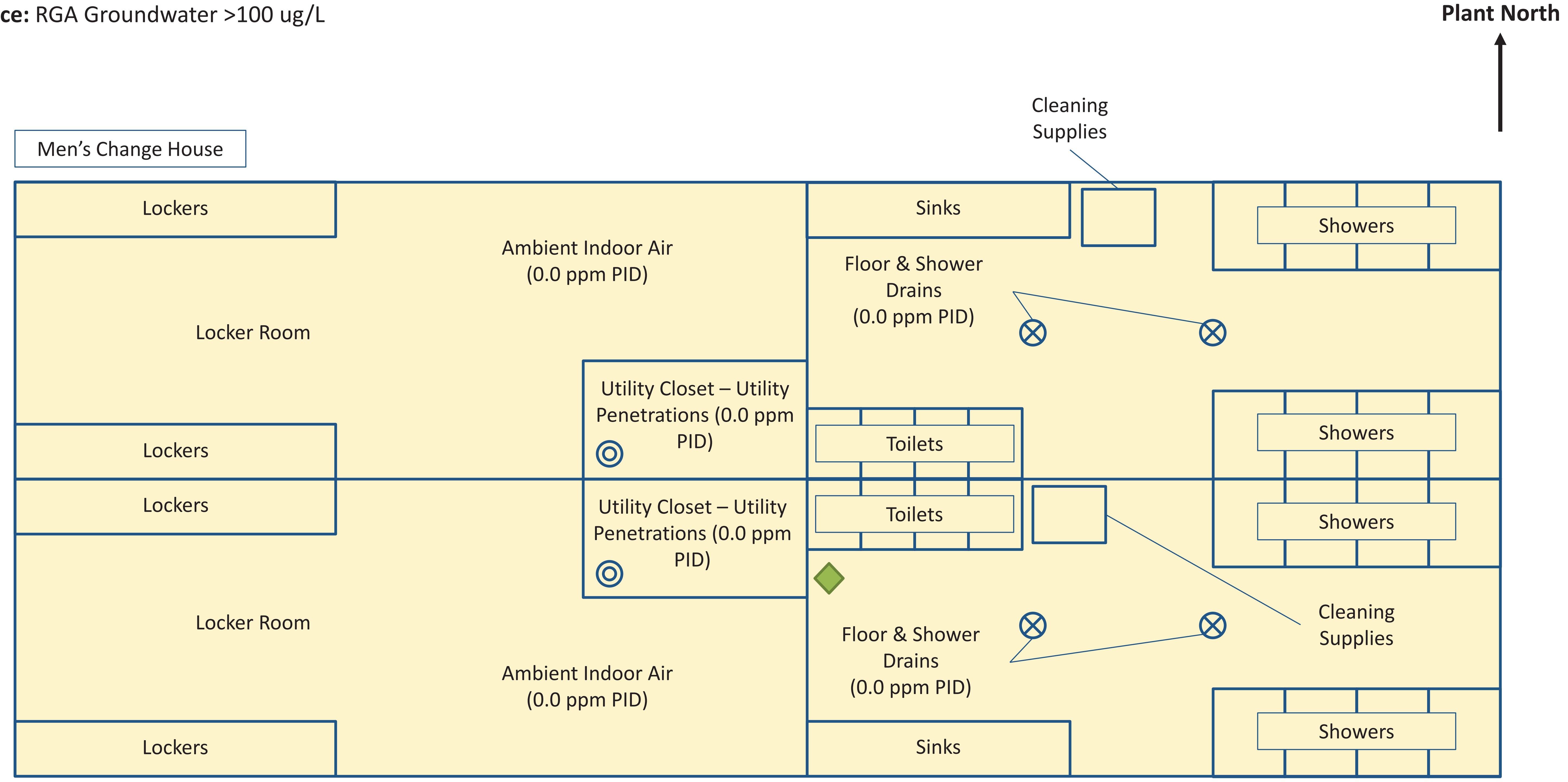
D-23

Figure D.23. Walkdown Sketches: C-754-B

Source: RGA Groundwater >100 ug/L



Legend

◆ Crawl Space Sampling Location (approximate)

⬚ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 866 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-755-T16
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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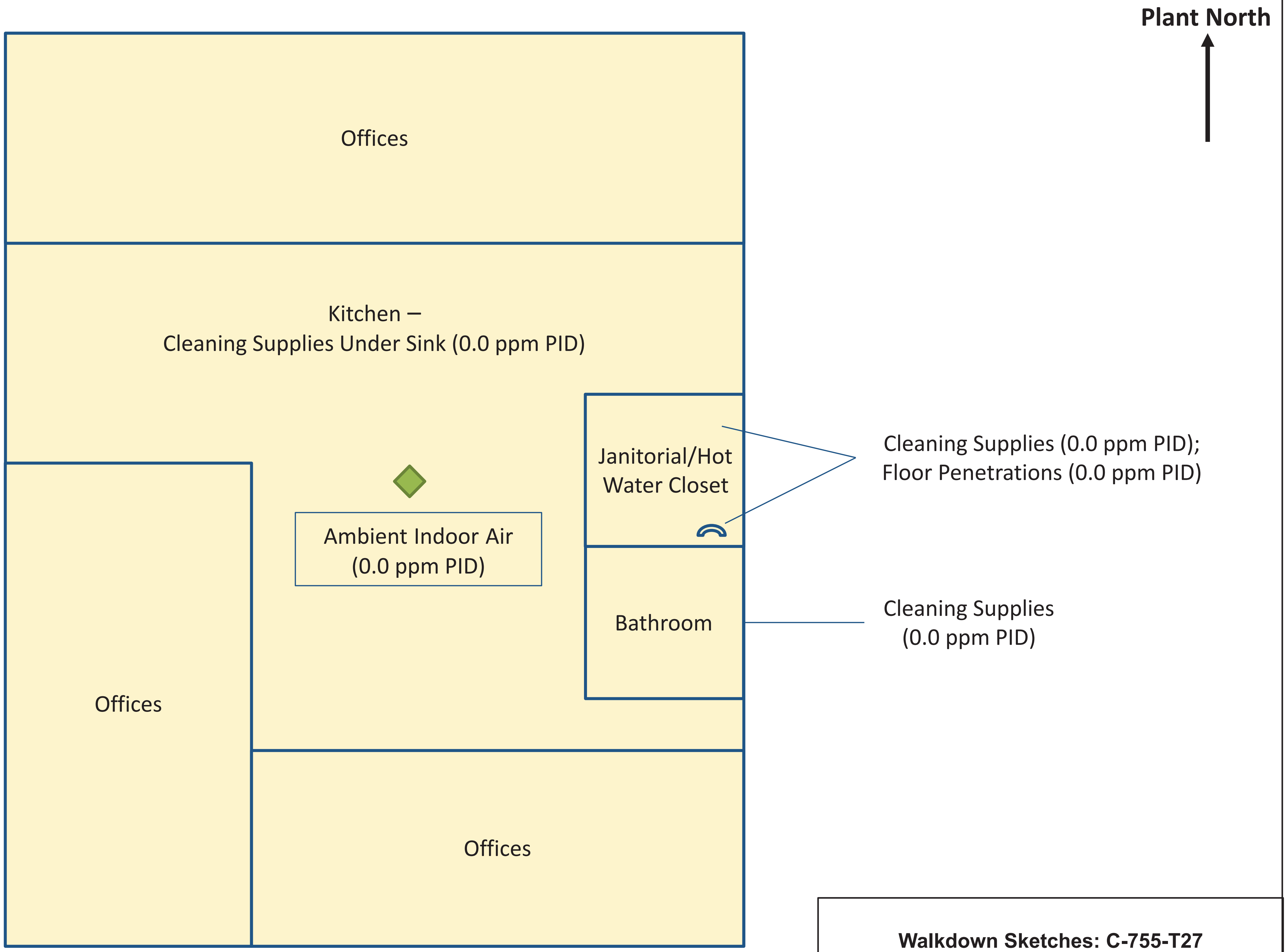
Figure D-24

Figure D.24. Walkdown Sketches: C-755-T16

Source: RGA Groundwater >100 ug/L and Soil



Legend

◆ Crawl Space Sampling Location (approximate)

⬚ Inferred 100 ug/L TCE Contour in RGA Groundwater

Notes

Facility Size: 1,620 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-755-T27
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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Figure

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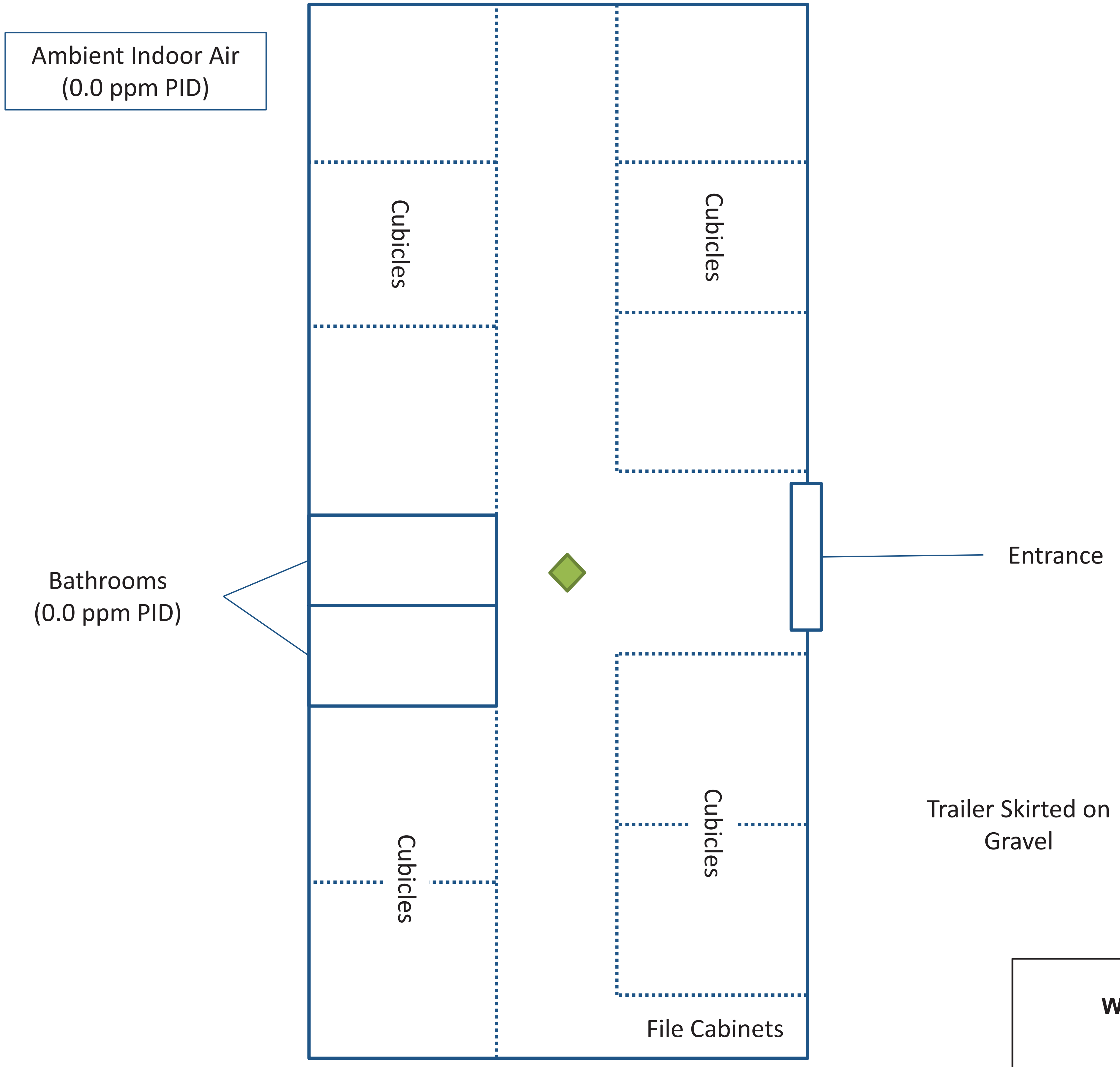
D-25

Figure D.25. Walkdown Sketches: C-755-T27

Source: Soil

Plant North



Legend

◆ Crawl Space Sampling Location (approximate)

Notes

Facility Size:	1,601 ft^2

Not to scale.

*All dimensions and locations are approximate unless otherwise noted

Walkdown Sketches: C-764-T03
Paducah Gaseous Diffusion Plant
McCracken County, Kentucky

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D-26

Figure D.26. Walkdown Sketches: C-764-T03

APPENDIX E

QUALITY ASSURANCE PROJECT PLAN
FOR PADUCAH GASEOUS DIFFUSION PLANT INDUSTRIAL AREA VAPOR INTRUSION STUDY

APPENDIX E

QUALITY ASSURANCE PROJECT PLAN FOR PADUCAH GASEOUS DIFFUSION PLANT INDUSTRIAL AREA VAPOR INTRUSION STUDY

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CONTENTS

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LIST OF QAPP WORKSHEETS

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ACRONYMS

A	analytical
CA	corrective action
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	chemical of potential concern
CPAP	Contractor Performance Assurance Program
CSM	conceptual site model
DOE	U.S. Department of Energy
DOECAP	DOE Consolidated Audit Program
DQO	data quality objective
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
FRNP	Four Rivers Nuclear Partnership, LLC
GC/MS	gas chromatography/mass spectrometry
HSS&Q	Health, Safety, Support, and Quality
HVAC	heating, ventilation, and air-conditioning
IDQTF	Intergovernmental Data Quality Task Force
IRIS	Integrated Risk Information System
KDEP	Kentucky Department for Environmental Protection
MDL	method detection limit
MPC	measurement performance criteria
N/A	not applicable
OREIS	Oak Ridge Environmental Information System
PAL	project action limit
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PEGASIS	Portsmouth/Paducah Project Office Environmental Geographic Analytical Spatial Information System
PGDP	Paducah Gaseous Diffusion Plant
PI	preliminary investigation
PM	project manager
PQL	practical quantitation limit
PT	proficiency testing
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RfC	reference concentration
RPD	relative percent difference
S	sampling
S&A	sampling and analytical
SMO	Sample Management Office
SOP	standard operating procedure
SWMU	solid waste management unit
TBD	to be determined
TPD	training position description
TSA	technical systems audit
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans

VI	vapor intrusion
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compound

1. INTRODUCTION

This project-specific Quality Assurance Project Plan (QAPP) has been prepared to support the Paducah Gaseous Diffusion Plant (PGDP) Industrial Area Vapor Intrusion Study by Four Rivers Nuclear Partnership, LLC, (FRNP) and is based on the 2019 Programmatic QAPP (DOE 2019a), which was developed in alignment with the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual) guidelines for QAPPs (IDQTF 2005), as updated by the Optimized UFP-QAPP Worksheets guidance (IDQTF 2012). (NOTE: As in the optimized guidance, the original worksheet numbers are retained, but combined per the guidance.) Table 1 in Worksheet #1 provides a crosswalk between the UFP-QAPP and the U.S. Environmental Protection Agency's (EPA's) *Guidance on Quality Assurance Project Plans*, CIO 2106-G-05-QAPP (EPA 2012).

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QAPP Worksheets #1 and #2. Title and Approval Page

Site Name/Project Name: Paducah Gaseous Diffusion Plant Industrial Area Vapor Intrusion Study
Site Location: Paducah, Kentucky
Site Number/Code: KY8890008982
Contractor Name: Four Rivers Nuclear Partnership, LLC
Contractor Number: Contract No. DE-EM0004895
Contract Title: Paducah Gaseous Diffusion Plant Deactivation and Remediation Project

---

Document Title: *Quality Assurance Project Plan for Paducah Gaseous Diffusion Plant Industrial Area Vapor Intrusion Study*

Lead Organization: U.S. Department of Energy (DOE)

Preparer's Name and Organizational Affiliation: Stefanie Fountain, Geosyntec Consultants, Inc.

Preparer's Address, Telephone Number, and E-mail Address: 180A Market Place Boulevard, Knoxville, TN 37922, sfountain@geosyntec.com

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Preparation Date (Month/Year): 5/2020
Document Control Number: Appendix B to the PGDP Industrial Area Vapor Intrusion Study, DOE/LX/07-2447&D1

FRNP Environmental Services Director	______________________ Signature Bruce Ford	Date:__________
FRNP Project Manager	______________________ Signature Stefanie Fountain	Date: 4/23/2020
FRNP Environmental Monitoring and Sample Management Office Manager	______________________ Signature Lisa Crabtree	Date:__________
FRNP Quality Assurance/ Quality Control Program Manager	______________________ Signature Jennie Freels	Date:__________

QAPP Worksheets #1 and #2. Title and Approval Page (Continued)

1. Identify guidance used to prepare QAPP:

    - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Implementing Environmental Quality Systems*, Version 2.0.
    - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 1 UFP QAPP Manual*, Version 1.0 (DTIC ADA 427785 or EPA-505-B-04-900A).
    - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 2A UFP QAPP Worksheets*, Version 1.0.
    - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 2A UFP QAPP Worksheets*, Version 1.0, 44 pages.
    - Intergovernmental Data Quality Task Force, March 2005. The *Uniform Federal Policy for Quality Assurance Project Plans: Part 2B Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities*, Version 1.0.
    - Intergovernmental Data Quality Task Force, March 2012. *Uniform Federal Policy for Quality Assurance Project Plans, Optimized UFP QAPP Worksheets*.
    - *Methods for Conducting Risk Assessments and Risk Evaluations at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Volume* 1. *Human Health* (DOE 2019b).

2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and *Federal Facility Agreement for the Paducah Gaseous Diffusion Plant*, DOE/OR/07-1707 (FFA)

3. Identify approval entities: DOE, EPA Region 4, and Kentucky Department for Environmental Protection (KDEP)

4. Indicate whether the QAPP is a generic or a [✓ project-specific] QAPP (circle one).

5. List dates of scoping sessions that were held: PGDP Industrial Area Vapor Intrusion Scoping Sessions

September 27, 2019	Scoping Meeting 1
October 17, 2019	Scoping Meeting 2
October 30, 2019	Scoping Meeting 3
November 22, 2019	Scoping Meeting 4
December 18, 2019	Scoping Meeting 5
January 14, 2020	Scoping Meeting 6

QAPP Worksheets #1 and #2. Title and Approval Page (Continued)

6. List dates and titles of QAPP documents written for previous site work, if applicable:

Title*:*	**Approval Date(s):**
C-400 Vapor Intrusion Study Work Plan to Support the Additional Actions for the CERCLA Five-Year Review at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky; Appendix B, Quality Assurance Project Plan for C-400 Vapor Intrusion Study to Support the Five-Year Review, DOE/LX/07-2403&D2/R1	8/11/2017

7. List organizational partners (stakeholders) and connection with lead organization:
EPA Region 4, KDEP

8. List data users: DOE, FRNP, subcontractors, EPA Region 4, KDEP

9. Table 1 provides a crosswalk of required QAPP elements. No elements are omitted intentionally from this QAPP.

This QAPP includes all 28 combined worksheets that are required based on UFP-QAPP guidance, as updated by the optimized worksheet guidance (37 total worksheets). Each of these worksheets has been reviewed to ensure the accuracy of the information presented in this QAPP.

Table 1. Crosswalk: UFP-QAPP Workbook to 2106-G-05-QAPP

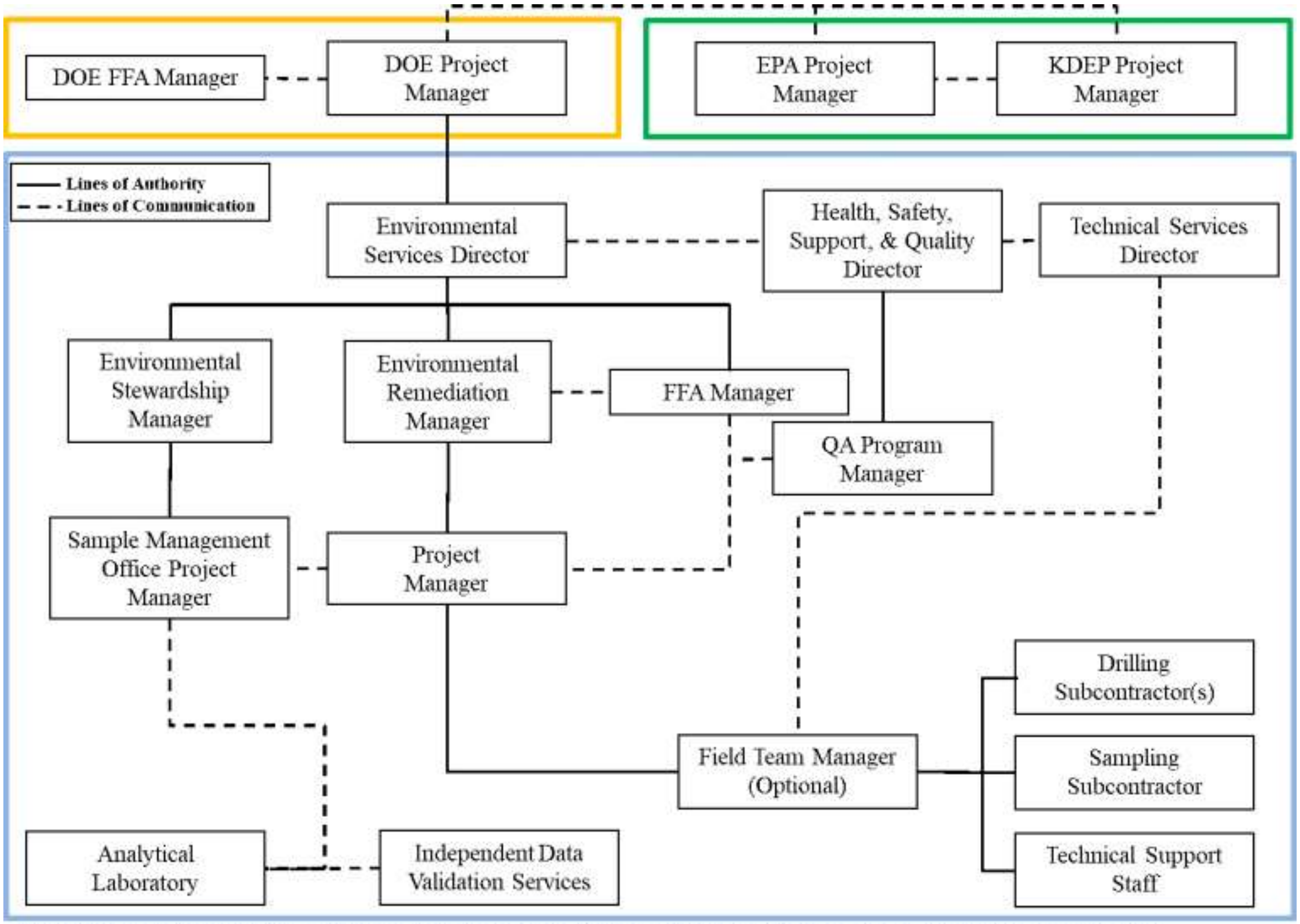
Optimized UFP-QAPP Worksheets		CIO 2106-G-05 QAPP Guidance Section	
1 & 2	Title and Approval Page	2.2.1	Title, Version, and Approval/Sign-Off
3 & 5	Project Organization and QAPP Distribution	2.2.3	Distribution List
		2.2.4	Project Organization and Schedule
4, 7, & 8	Personnel Qualifications and Sign-off Sheet	2.2.1	Title, Version, and Approval/Sign-Off
		2.2.7	Special Training Requirements and Certification
6	Communication Pathways	2.2.4	Project Organization and Schedule
9	Project Planning Session Summary	2.2.5	Project Background, Overview, and Intended Use of Data
10	Conceptual Site Model	2.2.5	Project Background, Overview, and Intended Use of Data
11	Project/Data Quality Objectives	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
12	Measurement Performance Criteria	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
13	Secondary Data Uses and Limitations	Chapter 3	QAPP Elements for Evaluating Existing Data
14 & 16	Project Tasks & Schedule	2.2.4	Project Organization and Schedule
15	Project Action Limits and Laboratory-Specific Detection/Quantitation Limits	2.2.6	Data/Project Quality Objectives and Measurement Performance Criteria
17	Sampling Design and Rationale	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
18	Sampling Locations and Methods	2.3.1	Sample Collection Procedure, Experimental Design, and Sampling Tasks
		2.3.2	Sampling Procedures and Requirements
19 & 30	Sample Containers, Preservation, and Hold Times	2.3.2	Sampling Procedures and Requirements
20	Field QC Summary	2.3.5	Quality Control Requirements
21	Field SOPs	2.3.2	Sampling Procedures and Requirements
22	Field Equipment Calibration, Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
23	Analytical SOPs	2.3.4	Analytical Methods Requirements and Task Description
24	Analytical Instrument Calibration	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies, and Consumables
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection	2.3.6	Instrument/Equipment Testing, Calibration and Maintenance Requirements, Supplies and Consumables
26 & 27	Sample Handling, Custody, and Disposal	2.3.3	Sample Handling, Custody Procedures, and Documentation
28	Analytical Quality Control and Corrective Action	2.3.5	Quality Control Requirements
29	Project Documents and Records	2.2.8	Documentation and Records Requirements
31, 32, & 33	Assessments and Corrective Action	2.4	Assessments and Data Review (Check)
		2.5.5	Reports to Management
34	Data Verification and Validation Inputs	2.5.1	Data Verification and Validation Targets and Methods
35	Data Verification Procedures	2.5.1	Data Verification and Validation Targets and Methods
36	Data Validation Procedures	2.5.1	Data Verification and Validation Targets and Methods
37	Data Usability Assessment	2.5.2	Quantitative and Qualitative Evaluations of Usability
		2.5.3	Potential Limitations on Data Interpretation
		2.5.4	Reconciliation with Project Requirements

QAPP Worksheets #3 and #5. Project Organization and QAPP Distribution

Minimum Distribution List

Position Title	Organization	QAPP Recipients	Current Telephone Number	Current E-mail Address
FFA Manager	DOE	Tracey Duncan	(270) 441-6862	tracey.duncan@pppo.gov
Project Manager (PM)	DOE	Richard Bonczek	(270) 441-6800	rich.bonczek@pppo.gov
Environmental Services Director and Environmental Remediation Manager	FRNP	Bruce Ford	(270) 441-5357	bruce.ford@pad.pppo.gov
Environmental Stewardship Manager	FRNP	Kelly Layne	(270) 441-6726	kelly.layne@pad.pppo.gov
PM	FRNP	Stefanie Fountain	(270) 441-5722	stefanie.fountain@pad.pppo.gov
FFA Manager	KDEP	Brian Begley	(502) 564-6716	brian.begley@ky.gov
FFA Manager	EPA	Julie Corkran	(404) 562-8547	corkran.julie@epa.gov
PM	EPA	Victor Weeks	(404) 562-9189	weeks.victor@epa.gov
FFA Manager	FRNP	LeAnne Garner	(270) 441-5436	leanne.garner@pad.pppo.gov
Quality Assurance (QA)/Quality Control (QC) Program Manager	FRNP	Jennie Freels	(270) 441-5407	jennie.freels@pad.pppo.gov
Environmental Monitoring and Sample Management Office (SMO) PM	FRNP	Lisa Crabtree	(270) 441-5135	lisa.crabtree@pad.pppo.gov
Health, Safety, Support, and Quality (HSS&Q) Director	FRNP	Bob Macfarlane	(270) 441-6920	bob.macfarlane@pad.pppo.gov
SMO	FRNP	Jaime Morrow	(270) 441-5508	jaime.morrow@pad.pppo.gov

QAPP Worksheets #3 and #5. Project Organization and QAPP Distribution (Continued)



Note: DOE personnel are in Orange Box, Regulatory personnel are in Green Box, and DOE Prime Contractor personnel are in Blue Box.

QAPP Worksheets #4, #7, and #8. Personnel Qualifications and Sign-off Sheet

ORGANIZATION: Four Rivers Nuclear Partnership, LLC

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date*
Bruce Ford	Environmental Services Director, FRNP	> 4 years relevant work experience	No specialized training or certification. See Training Project Description (TPD).	
Kelly Layne	Environmental Stewardship Manager, FRNP	> 4 years relevant work experience	No specialized training or certification. See TPD.	
Lisa Crabtree	Environmental Monitoring and SMO PM, FRNP	> 4 years relevant work experience	No specialized training or certification. See TPD.	
Jaime Morrow	SMO, FRNP	> 4 years relevant work experience	No specialized training or certification. See TPD.	
Jason Boulton	Sample Team Leader, GEO Consultants Corporation	> 4 years relevant work experience	No specialized training or certification. See TPD.	
To Be Determined (TBD)	Data Validator, Veolia Nuclear Solutions Federal Services	Bachelor degree plus relevant experience	No specialized training or certification.	Follows FRNP data validation plans.

ORGANIZATION: Laboratory

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date*
Laboratory PM	Analytical Laboratory PM	> 4 years relevant work experience	No specialized training or certification. See TPD.	Follows the laboratory statement of work.

*Signature indicates personnel have read and agree to implement this QAPP as written.

QAPP Worksheet #6. Communication Pathways

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Regulatory agency interface	DOE, EPA, KDEP	DOE PM: Richard Bonczek; EPA Remedial PM: Julie Corkran; KDEP PM: Brian Begley	rich.bonczek@pppo.gov corkran.julie@epa.gov brian.begley@ky.gov	Formal communication among DOE, EPA, and KDEP.
FFA	DOE, EPA, KDEP	DOE FFA Manager: Tracey Duncan; EPA FFA Manager: Julie Corkran; KDEP FFA Manager: Brian Begley	tracey.duncan@pppo.gov corkran.julie@epa.gov brian.begley@ky.gov	Formal communication among DOE, EPA, and KDEP.
Field progress reports	FRNP	FRNP Environmental Services Director: Bruce Ford	bruce.ford@pad.pppo.gov	Formal communication among the project staff, the site lead, and the DOE PM.
Stop work due to safety issues	FRNP	FRNP Environmental Services Director: Bruce Ford; and FRNP HSS&Q: Bob Macfarlane	bruce.ford@pad.pppo.gov bob.macfarlane@pad.pppo.gov	FRNP will communicate work stoppages to DOE PM as required by procedure.
QAPP changes prior to fieldwork	FRNP	FRNP Environmental Services Director: Bruce Ford; and FRNP QA/QC Program Manager: Jennie Freels	bruce.ford@pad.pppo.gov jennie.freels@pad.pppo.gov	Obtain approval from DOE PM. Submit QAPP amendments to DOE, KDEP, and EPA.
QAPP changes during project execution	FRNP	FRNP Environmental Services Director: Bruce Ford; and FRNP QA/QC Program Manager: Jennie Freels	bruce.ford@pad.pppo.gov jennie.freels@pad.pppo.gov	Obtain approval from DOE PM. Submit QAPP amendments to DOE, KDEP, and EPA.

QAPP Worksheet #6. Communication Pathways (Continued)

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Field corrective actions	FRNP	FRNP Environmental Services Director: Bruce Ford	bruce.ford@pad.pppo.gov	Field corrective actions will need to be approved by FRNP Project Director and communicated to the DOE, EPA, and KDEP PMs.
Sample receipt variances	FRNP	FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	lisa.crabtree@pad.pppo.gov	Communication between FRNP and analytical laboratory.
Analytical laboratory interface	FRNP	FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	lisa.crabtree@pad.pppo.gov	Communication between FRNP and analytical laboratory.
Laboratory quality control variances	Contracted Laboratory	Laboratory PM: TBD	TBD	Notify FRNP SMO. SMO will notify FRNP PM to determine corrective actions.
Analytical corrective actions	Contracted Laboratory, FRNP	Laboratory PM: TBD; and FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	TBD lisa.crabtree@pad.pppo.gov	Notify FRNP SMO. SMO will notify the project.
Data verification issues (e.g., incomplete records)	Veolia Nuclear Solutions Federal Services	Data Validator: TBD; and FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	TBD lisa.crabtree@pad.pppo.gov	Data verification issues will be reported to the FRNP SMO.
Data validation issues (e.g. noncompliance with procedures)	Veolia Nuclear Solutions Federal Services	Data Validator: TBD; and FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	TBD lisa.crabtree@pad.pppo.gov	Issues with data quality will be reported to the FRNP SMO.
Data review corrective actions	FRNP	FRNP Environmental Monitoring and SMO PM: Lisa Crabtree	lisa.crabtree@pad.pppo.gov	SMO will notify the project.

NOTE: This QAPP is position-based with names of the current positions presented. In the event the contractor changes and the position titles change, DOE will notify EPA and KDEP of the change.

QAPP Worksheet #9. Project Planning Session Summary

Name of Project: PGDP Industrial Area Vapor Intrusion Study

Date of Session: September 27, 2019 Scoping Meeting 1; October 17, 2019 Scoping Meeting 2; October 30, 2019 Scoping Meeting 3; November 22, 2019 Scoping Meeting 4; December 18, 2019 Scoping Meeting 5; January 14, 2020 Scoping Meeting 6

Scoping Session Purpose: DOE and its contractors, EPA and its contractors, and KDEP met to scope the PGDP Industrial Area Vapor Intrusion Study and develop data quality objectives (DQOs).

Position Title	Affiliation	Name	Phone #	E-mail Address	Project Role
Project Manager	DOE	Bonczek, Richard	859-219-4051	rich.bonczek@pppo.gov	Project management
Project Manager	FRNP	Fountain, Stefanie	270-441-5722	stefanie.fountian@pad.pppo.gov	Project management
FFA Manager and Project Manager	EPA	Corkran, Julie	404-562-8547	corkran.julie@epa.gov	Project management
FFA Manager	KDEP	Begley, Brian	502-782-6317	brian.begley@ky.gov	Project management
Technical support	EPA	Bentkowski, Ben	404-562-8507	bentkowski.ben@epa.gov	Technical support
Technical support	EPA	Frederick, Tim	404-562-8598	frederick.tim@epa.gov	Technical support
Technical support	EPA	Davis, Eva	580-436-8548	davis.eva@epa.gov	Technical support
Technical support	TechLaw	Dawson, Jana	703-627-0821	jdawson@techlawinc.com	Technical support
Technical support	TechLaw	McRae, Mac	678-493-1247	mmcrae@techlawinc.com	Technical support
Technical support	CHFS	Brock, Stephanie	502-564-8390	stephaniec.brock@ky.gov	Technical support
Technical support	CHFS	Garner, Nathan	502-564-8390	nathan.garner@ky.gov	Technical support
Technical support	KDEP	Higginbotham, Jeri	502-782-6654	jeri.higginbotham@ky.gov	Technical support
Technical support	KDEP	Jung, Christopher	502-782-6391	christopher.jung@ky.gov	Technical support
Technical support	KDEP	Lainhart, Brian	270-898-8468	brian.lainhart@ky.gov	Technical support
Technical support	KDEP	Owens, Tabitha	502-564-9298	tabitha.owens@ky.gov	Technical support
Technical support	KDEP	Travis, Chris	270-898-8468	christopher.travis@ky.gov	Technical support
Technical support	Pro2Serve	Jennifer Johnson	270-441-6846	jennifer.johnson@pppo.gov	Technical support
Technical support	SMSI	Clauberg, Martin	865-259-7155	martin.clauberg@pppo.gov	Technical support
Technical support	FRNP	Ford, Bruce	270-441-5357	bruce.ford@pad.pppo.gov	Technical support
Technical support	FRNP	Davis, Ken	270-441-5049	ken.davis@pad.pppo.gov	Technical support
Technical support	FRNP	Creamer, Todd	603-205-8054	tcreamer@geosyntec.com	Technical support
Technical support	FRNP	Dawson, Helen	202-370-4350	hdawson@geosyntec.com	Technical support
Technical support	FRNP	Gabris, Theresa	202-370-4351	tgabris@geosyntec.com	Technical support

CHFS = Kentucky Cabinet for Health and Family Services
SMSI = Strategic Management Solutions, LLC

QAPP Worksheet #10. Conceptual Site Model

A general vapor intrusion (VI) conceptual site model is provided below. See Work Plan Section 6, Vapor Intrusion Conceptual Site Model, for facility-specific conceptual site model descriptions.

Vapor Intrusion

Volatile organic compounds (VOCs) in the groundwater plumes and/or soil contamination underlying Paducah Site structures can volatilize and the vapor can migrate through the vadose zone via soil pores or larger pathways, such as fractures in rock or soil, and enter the overlying structure via vapor penetration points (i.e., cracks or holes) in the building foundation. The vapors also can migrate into anthropogenic "preferential pathways" (e.g., utility conduits, pits, sumps) and from there directly into structures (bypassing portions of the vadose zone) via improperly sealed utility penetrations in structure foundations or walls.

Fine-grained material in the vadose zone can slow migration and thereby act as a sort of barrier to VI; however, given the height of the water table on-site, the silty clay overburden is unlikely to serve as a barrier. The pressure differential between indoor air and subslab also influences VI. A negatively pressurized building (meaning the subslab pressure is greater than the indoor air pressure) can induce VI across the slab. The pressurization of a building fluctuates in response to indoor-to-outdoor temperature differentials, wind, and building heating and cooling system operations. When air inside a building is heated, either by a heating system or from the sun, hot air will rise and leak through the roof and windows on the upper floor, which will draw in soil vapor from lower levels of the building. This is referred to as the "stack effect."

Vapor Migration in the Vadose Zone

Concentrations of compounds in soil gas generally decrease as the compounds migrate from near the source through the vadose zone and into indoor air. The transport mechanisms that are important for understanding subsurface vapor transport are diffusion and advection. Near a building, both diffusion and advection may be important; deeper underneath a building, diffusion through soil gas is typically the dominant transport process. Diffusion is caused by the random motion of molecules and occurs along concentration gradients. Contaminants will move from areas of higher concentration to areas of lower concentration, even when there is no movement of a fluid. Because diffusion through water is significantly slower than diffusion through air, the rate of diffusion is related to the soil moisture content. As soil moisture increases, the rate of vapor diffusion decreases. Diffusion from VOCs or groundwater tends to move contaminant vapors upward toward lower concentrations at the ground surface or the underside of a building while diffusion from residual soil contamination in the vadose zone, if present, can diffuse laterally and vertically in all directions.

Advection in the vadose zone is the bulk movement of soil gas caused by pressure gradients in the subsurface. Advection occurs from areas of higher pressure to areas of lower pressure. The air pressure inside a building can be higher or lower than the soil gas pressure underneath a building and even small differences can cause advection and the flow of vapors into or out of a building. Pressure gradients driving advection can develop from the operation of exhaust fans, heating units, or air conditioners, fluctuations in barometric pressure, the wind load on building walls, the piston action of elevators, or temperature differences between inside and outside air. Advection can also be enhanced when gases generated by microbial activity (e.g., methane or carbon dioxide generated from degradation of hydrocarbons) in groundwater are sufficiently high.

QAPP Worksheet #10. Conceptual Site Model (Continued)

Contaminant vapors can migrate further through preferential flow pathways such as the granular fill underneath a building and surrounding utility pipes, or other areas where the porosity of the soil is higher. Conversely, low permeability layers in the vadose zone like silt or clay layers and areas with high moisture levels can impede the upward migration of vapors in the subsurface. The vadose zone underneath the PGDP is predominantly sandy and silty clay, which is expected to impede soil gas migration.

Transformation within the Vadose Zone

Some of the compounds present in the VOCs and groundwater may be susceptible to biodegradation in the vadose zone. The degree to which this would alter the composition of soil gas as it migrates upward depends on the compound biodegradability, soil moisture, oxygen concentration, nutrient availability, and microbial population. Biodegradation tends to be a more significant process when conditions in the vadose zone are aerobic and the compounds are petroleum-based because they are readily biodegradable by common soil microorganisms when there is oxygen present. Highly chlorinated compounds such as tetrachloroethene and trichloroethene (TCE) are not known to biodegrade as primary substrates under aerobic conditions; however, lesser chlorinated compounds such as vinyl chloride (VC), in general, can biodegrade in the vadose zone under aerobic, moist conditions, and bacteria capable of oxidizing VC are thought to be ubiquitous in soil.

Soil Gas Entry into Buildings

Vapors in soil gas can migrate into buildings through floor slab cracks and expansion joints, perimeter cracks between floor slab and walls that allow for expansion and contraction, other gaps in building foundations, floors, and walls, such as utility penetrations, sump pits, floor drains, or even concrete that appears to be free of cracks.

Air Exchange and Mixing

Once vapors from soil gas enter into a building, the natural or mechanical ventilation will mix the compounds throughout the air space within the building. Natural ventilation is air flow through open windows, doors, and other openings in the building envelope. Mechanical ventilation is air flow controlled by fans. Heating, ventilation, and air-conditioning (HVAC) systems in industrial buildings typically blow air into the building, exhausting a portion of the indoor air and providing a certain amount of fresh outdoor air. Air flow within a building can be impeded by the presence of doors, walls, and other partitions that separate rooms or building areas. In general, concentrations of compounds from soil gas tend to be higher in rooms with limited ventilation and rooms that are near openings where soil gas can enter the building such as cracks or sumps.

Variability

Pressure differentials between a building and subslab soil gas and the intrusion of vapors into a building can fluctuate over time due to a number of factors, including the following:

- Diurnal and seasonal changes in ambient air temperature;
- Ambient air pressure changes;
- Wind direction and speed changes; and
- Mechanical ventilation or HVAC system operational changes.

These variations can occur over different time scales, within a single day, over several days as the weather changes, or between seasons.

QAPP Worksheet #11. Project/Data Quality Objectives

Step 1. State the Problem: Hazardous substances that historically have been present and/or migrated from the PGDP source areas and solid waste management units (SWMUs) have been released to environmental media. These substances, in turn, have infiltrated into groundwater and been transported through subsurface pathways. The nature and extent of contamination have been defined adequately for some SWMUs and areas, and risk assessments have been prepared. For other SWMUs and areas, the nature and extent of contamination have not been defined adequately to assess whether potential contaminants pose unacceptable risks to human health and the environment across the PGDP Industrial Area.

Problem Description: The problem being addressed is a concern that VOC vapors, including TCE; 1,1,1-trichloroethane (1,1,1-TCA); 1,1,2-TCA; 1,1-dichloroethene (1,1-DCE); *cis*-1,2-DCE; *trans*-1,2-DCE; 1,1-dichloroethane (1,1-DCA); 1,2-1,2-DCA; and VC, may be migrating from the PGDP Regional Gravel Aquifer plume and from contaminated soils and groundwater of the Upper Continental Recharge System and into PGDP industrial area buildings at unacceptable levels.

The environmental questions being asked: Are vapors migrating from VOCs in the groundwater into the air of PGDP industrial area buildings at levels that exceed Vapor Intrusion Screening Level (VISLs)?

Observations from any site reconnaissance reports: See Work Plan Section 6.1, Site Operations that Could Have Released VOCs; Section 6.2, Chemicals of Interest; and Section 6.4, Building Characteristics.

A synopsis of secondary data or information from site reports: See Work Plan Section 6.5, Potential Sources of Chemicals of Interest.

The possible classes of contaminants and the affected matrices: VOCs listed above and in Work Plan Section 5, Preliminary Analysis and Facility PGDP Ranking; Work Plan Table 1.

The rationale for inclusion of chemical and nonchemical analyses: See Worksheet #17; Work Plan Section 6.2, Chemicals of Interest (PY Analytes); and Work Plan Section 8, VI Assessment Methods.

Project decision conditions ("If..., then..." statements): See Work Plan Section 10, Investigation Decision Rules.

QAPP Worksheet #11. Project/Data Quality Objectives (Continued)

Step 2: Identify the Goals of the Study: The information gathered as a result of this PGDP Industrial Area VI preliminary investigation (PI) and evaluated in the context of the PI and building-specific VI conceptual site models (CSMs) will be used to help determine whether measured VOC concentrations in indoor air (primarily TCE) present an unacceptable risk to human health due to VI in PI facilities.

Step 3. Identify Information Inputs: See Work Plan Section 4, Site Background and Work Plan Section 5, Preliminary VI Analysis and Facility Ranking.

Step 4. Identify the Boundaries of the Study: See Work Plan Section 3, Investigation Boundaries.

Step 5. Develop the Analytical Approach: See Work Plan Section 8, VI Assessment Methods.

- The samples will undergo chemical analysis at a contract laboratory, consistent with the contract protocols.
- The potential of a completed subsurface-to-indoor air VI pathway of chlorinated and nonchlorinated VOCs will be evaluated based on the existing groundwater and soil concentration data and soil vapor and indoor air samples, as well as visual inspections and differential pressure monitoring. The CSM will serve as the framework for integrating site information into a comprehensive portrayal of site conditions.

Step 6. Specify Performance or Acceptance Criteria: Analytical sample results must undergo assessment and validation successfully to be used to support the PGDP Industrial Area VI Study and to support future CERCLA analysis.

Step 7. Develop the Detailed Plan for Obtaining Data:

- The process of obtaining the data has been laid out in the Work Plan.
- The sampling program was designed to evaluate the subsurface-to-indoor air VI pathway. Subsurface or near slab data is collected to determine if a source is present directly below the structure. Building construction and subsurface features (sumps, pits, cracks, expansion joints, etc.) are examined by visual inspection, through building pressure control or differential pressure monitoring, to include or exclude elements of the pathway from the subsurface to indoor air. Indoor air is collected to examine the end impact of the source and pathway. Indoor air sampling is prone to background interference from internal building sources and initial data collection and building assessments are critical.

QAPP Worksheet #11. Project/Data Quality Objectives (Continued)

Who will use the data? DOE, FRNP, KDEP, and EPA.

What will the data be used for? To determine whether measured VOC concentrations in indoor air (primarily TCE) present an unacceptable risk to human health due to VI in PI facilities.

What type of data is needed? (target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques): Indoor air data, ambient (upwind) air data, subslab air data.

How "good" do the data need to be in order to support the environmental decision? Data need to have practical quantitation limits below the respective VISL. Data will meet the measurement quality objective and data quality indicators established by the systematic planning process consistent with procedure CP3-ES-5003, *Quality Assured Data.* Results will undergo 10% data validation.

Where, when, and how should the data be collected/generated? See Work Plan Section 7, Sampling Locations and Rationale; Section 8, VI Assessment Methods; and Appendix C, Sampling Locations.

Who will collect and generate the data? FRNP. Additionally, weather reporting data from the weather station located at the Paducah airport (i.e., official weather data) also will be included in the project's report with a focus on wind direction to supplement the on-site wind direction determination.

How will the data be reported? Field data will be recorded on chain-of-custody forms, in field logbooks, and field data sheets. The fixed-base laboratory will provide data in an electronic data deliverable (EDD). Project data following verification assessment and validation will be placed into and reported from the Paducah Oak Ridge Environmental Information System (OREIS). Data loaded into Paducah OREIS will be made available to the public stakeholders via the Portsmouth/Paducah Project Office Environmental Geographic Analytical Spatial Information System (PEGASIS).

How will the data be archived? Electronic data will be archived in Paducah OREIS in accordance with Work Plan Section 13, Project Documentation, and the *Data and Documents Management and Quality Assurance Plan* (DOE 1998).

QAPP Worksheet #12. Measurement Performance Criteria (VOCs, Air)

Matrix	Air
Analytical Group	VOCs including trichloroethene; 1,2-dichloroethene; vinyl chloride; 1,1-dichloroethene
Concentration Level	Very Low

Sampling Procedure	**Analytical Method/Standard Operating Procedure (SOP)**[a]	**Data Quality Indicators**	**Measurement Performance Criteria (MPC)**[c]	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)**
See Worksheet #21	TO-15, See Worksheet #23	Precision—Lab	N/A	Evaluate lab data packages gas chromatography/mass spectrometry (GC/MS) results	A
		Precision	Relative percent difference (RPD) ≤ 50%	Field Duplicates	S
		Accuracy/Bias	% recovery[d]	Laboratory Sample Spikes	A
		Accuracy/Bias Contamination	No target compounds > practical quantitation limit (PQL)	Method Blanks/Instrument Blanks	A
		Completeness[b]	90%	Data Completeness Check	S&A

[a] The most current version of the method the laboratory is accredited to perform will be used.

[b] Completeness is calculated as the number of valid analytical results reported divided by the number of analytical results planned, multiplied by 100 to obtain the percentage.

[c] MPC is listed as N/A for EPA Method TO-15 because air samples are stand-alone samples, and the results of one sample cannot be used to evaluate sampling and analysis precision, accuracy, or bias. Thus, MPC cannot be provided. Replicate samples will be collected per the work plan and they will be reviewed to estimate the degree of sampling precision, accuracy, and bias without defined MPC.

[d] Percent recovery is laboratory-specific, calculated from studies performed every six months. Percent recovery ranges will be provided in the laboratory data packages based on the most current study.

QAPP Worksheet #13. Secondary Data Uses and Limitations

Secondary Data Type	**Data Source (Originating Organization, Report Title, and Date)**	**Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)**	**How Data Will Be Used**	**Factors Affecting Reliability and Limitations on Data Use**
OREIS Database	Various The decision rules that were used in determining the usability of historical data are described in the Work Plan Section 10, Investigation Decision Rules.	Various	The data will be used to evaluate VI pathway completeness.	Data have been verified, assessed, and validated (if validation is required). Rejected data will not be used.
Historical Documentation	Tracer Research Corporation 1989. *Shallow Soil Gas Survey at Martin Marietta Energy Systems Facility Paducah Kentucky*, Tracer Research Corporation, August. CH2M HILL 1991. *Results of the Site Investigation, Phase I, at the Paducah Gaseous Diffusion Plant*, KY/ER-4, CH2M HILL Southeast, Inc., Oak Ridge, TN, March. CH2M HILL 1992. *Results of the Site Investigation, Phase II, at the Paducah Gaseous Diffusion Plant*, KY/SUB/13B-97777C P-03/1991/1, CH2M HILL Southeast, Inc., Oak Ridge, TN, April. EPA 2005. Memorandum from Tim Slagle, Superfund and Air Section to David Williams, Remedial Project Manager, EPA Region IV, Waste Management Division, North Site Management Branch, "Laboratory Results of Paducah Gaseous Diffusion Plant, Paducah, Kentucky, SESD Project Number: 05-0806," November 3. DOE 2016. *Water Policy Area Vapor Intrusion Screening Study Report for the Five-Year Review of Remedial Actions Paducah, Kentucky*, DOE/LX/07-1289&D2/Rl/ Al/Rl, U.S. Department of Energy, Paducah, KY, February.	DOE contractors, soil and aqueous, 1989–2018 Various	Information will be used in conjunction with newly collected data to select facilities for sampling. Information will be used as guidance on related project work.	Data have been verified, assessed, and validated (if validation required). Rejected data will not be used. Information from historical documents will be limited to the available documentation as it relates to a specific project. Use of historical data may be limited based on how long ago the data were collected and whether site conditions have changed since data collection.

QAPP Worksheet #13. Secondary Data Uses and Limitations (Continued)

Secondary Data Type	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/Collection Dates)	How Data Will Be Used	Factors Affecting Reliability and Limitations on Data Use
Historical Documentation (Continued)	DOE 2017. *C-400 Vapor Intrusion Study Work Plan to Support the Additional Actions for the CERCLA Five-Year Review at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-2403&D2/Rl, U.S. Department of Energy, Paducah, KY, July. DOE 2018. *Five-Year Review for Remedial Actions at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky [Appendix D: C-400 Vapor Intrusion Additional Actions]*, DOE/LX/07-1289&D2/Rl/ A3/Rl, U.S. Department of Energy, Paducah, KY, November.	DOE contractors, soil and aqueous, 1989–2018 Various	Information will be used in conjunction with newly collected data to select facilities for sampling. Information will be used as guidance on related project work.	Data have been verified, assessed, and validated (if validation required). Rejected data will not be used. Information from historical documents will be limited to the available documentation as it relates to a specific project. Use of historical data may be limited based on how long ago the data were collected and whether site conditions have changed since data collection.

NOTE; Paducah OREIS is the repository for environmental and waste characterization analytical results. OREIS is a limited access database. Most of the results in OREIS are downloaded to PEGASIS periodically (usually on a quarterly basis). The general public can access data in PEGASIS.

QAPP Worksheets #14 and 16. Project Tasks & Schedule

Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)	Deliverable Due Date
Mobilization/demobilization	FRNP	October 12, 2020	December 15, 2020	Field notes	January 15, 2021
Sample collection	FRNP	October 12, 2020	December 15, 2020	Field notes	January 15, 2021
Analysis	Contract Lab	December 16, 2020	January 15, 2021	Report of analysis	January 15, 2021
Validation	Veolia Nuclear Solutions Federal Services	February 16, 2021	March 22, 2021	Validation summary	March 22, 2021
Data report	Project Team	May 27, 2021	September 30, 2021	Data report	September 30, 2021

QAPP Worksheet #15. Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (VOCs, Air)

Matrix: Air
Analytical Group: VOCs

					Laboratory-Specific[c]	
VOCs	**CAS Number**	**Project Action Limit (PAL) (μg/m^3)**	**Project Action Limit Reference**[a]	**Site COPC?**[b]	**PQLs (μg/m^3)**	**Method Detection Limits (MDLs) (μg/m^3)**
1,1,1-Trichloroethane	71-55-6	22000	VISL, Commercial	Yes	4.37	2.02
cis-1,2-Dichloroethene	156-59-2	N/A, 3500[d]	No VISL, Provisional Value	Yes	3.17	0.396
Chloroform	67-66-3	0.53	VISL, Commercial	Yes	3.91	0.342
Mercury (elemental)	7439-97-6	1.31	VISL, Commercial	Yes	N/A	N/A
trans-1,2-Dichloroethene	156-60-5	N/A, 3500[d]	No VISL, Provisional Value	Yes	3.17	0.59
Trichloroethene	79-01-6	3.0	VISL, Commercial	Yes	2.15	0.322
Vinyl Chloride	75-01-4	2.8	VISL, Commercial	Yes	1.02	0.665

[a] VISL = Vapor Intrusion Screening Level. [The VISL values are taken from the VISL calculator (May 2016 version 3.5.1, https://semspub.epa.gov/src/document/11/196702) derived for a commercial exposure scenario at a target excess cancer risk of 1.0E-06 and a target hazard quotient of 1.0. Per the VISL calculator, the commercial exposure scenario has a 70-year averaging time for carcinogens, a 25-year averaging time for noncarcinogens, an exposure duration of 25 years, an exposure frequency of 250 days/year, and an exposure time of 8 hours/day.]

[b] Analytes marked with chemical of potential concern (COPC) are from Table 2.1 of the Risk Methods Document (DOE 2019b) and represent the list of chemicals, compounds, and radionuclides compiled from COPCs retained as contaminates of concern in risk assessments previously performed at PGDP.

[c] Laboratory has a PQL of 0.5 parts per billion (in air) by volume (ppbv) and MDL of 0.15 ppbv. These values were converted to μg/m^3 at 25°C.

[d] PALs are listed as N/A for *cis*-1,2-DCE and *trans*-1,2-DCE because there are no VISL values available for these analytes. EPA has provided a provisional value for *trans*-1-2-dichloroethene. In addition, EPA recommended use of the *trans*-1,2-DCE value as a surrogate for *cis*-1,2-dichloroethene, as presented in this worksheet. Additional information regarding the derivation of these values can be found in the Agency for Toxic Substances and Disease Registry Guidance (ATSDR 1996).

QAPP Worksheet #15. Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (VOCs, Air) (Continued)

Supplemental Information on Air Sampling, including Benchmarks for Exposure of Pregnant Women to TCE

"TRICHLOROETHYLENE: ASSESSING & MANAGING VAPOR INTRUSION RISKS," slides prepared by Kelly Schumacher, EPA Region 7, see http://www.mowastecoalition.org/resources/Documents/Vapor%20Intrusion%20Seminar/Schumacher%20TCE%20VI%20HHRA.pdf.

EPA Region 7: Two co-critical endpoints [each can support reference concentration (RfC) independently]:

- Autoimmune disease following chronic exposure in adults (1.8 μg/m^3)
- Heart defects following exposure during early pregnancy (2.0 μg/m^3)

EPA Region 7: One supporting endpoint (less confidence than critical endpoints):

- Nephrotoxicity (kidney effects) following chronic exposure in adults (3.0 μg/m^3)

Add information on air sampling, including benchmarks for exposure of pregnant women to TCE.

EPA's Developmental Toxicity Risk Assessment Guidelines states that "a single exposure at a critical time in development may produce an adverse developmental effect." A single exposure to ***some*** level of TCE at any time during the three-week critical window of valvuloseptal morphogenesis could result in one or more types of heart defects. The Integrated Risk Information System (IRIS) combined the incidence of all the types of heart defects observed in the critical study to calculate the benchmark dose level (lower, 95% confidence) associated with a 1% excess risk of an "abnormal heart." Because the heart defects occurred throughout valvuloseptal morphogenesis, **the critical exposure period used to derive the RfC = 3 weeks.**

Schumacher cited: June 30, 2014, EPA Region 9 Interim Action Levels and Response Recommendations to Address Potential Developmental Hazards Arising from Inhalation Exposures to TCE in Indoor Air from Subsurface Vapor Intrusion.

QAPP Worksheet #15. Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (VOCs, Air) (Continued)

Supplemental Information on Air Sampling, including Benchmarks for Exposure of Pregnant Women to TCE (Continued)

EPA Region 9 Interim TCE Indoor Air Response Action Levels—
Residential and Commercial TCE Inhalation Exposure from Vapor Intrusion

Exposure Scenario	Accelerated Response Action Level (HQ=1)	Urgent Response Action Level (HQ=3)
Residential[a]	2 μg/m^3	6 μg/m^3
Commercial/Industrial[b] (8-hour workday)	8 μg/m^3	24 μg/m^3
Commercial/Industrial[b] (10-hour workday)	7 μg/m^3	21 μg/m^3

[a] The residential HQ=1 accelerated response action level is equivalent to the inhalation reference concentration (RfC) since exposure is assumed to occur continuously.

[b] Commercial/Industrial accelerated response action levels are calculated as a time-weighted average from RfC, based on the length of a workday and rounding to one significant digit (e.g., for an 8-hour workday:
Accelerated Response Action Level = (168 hours per week/40 hours per week) × 2 μg/m^3 = 8 μg/m^3). Time-weighted adjustments can be made as needed for workplaces with longer work schedules.

Note: Indoor air TCE exposures corresponding to these accelerated response action levels would pose cancer risks near the lower end of the Superfund target cancer risk range, considering the IRIS toxicity assessment; thus, the health protective risk range for both accelerated response actions and long-term exposures becomes truncated to: 0.5–2 μg/m^3 for residential exposures and 3–8 μg/m^3 for 8-hour/day commercial/industrial exposures.

Schumacher also cited EPA REGION 10: "…to protect against potential noncancer fetal malformation outcomes, it is appropriate to recommend that average exposures over any 21-day period of time not exceed the concentrations in air or other media that are calculated to be protective…." Not to be exceeded, average 21-day exposure to women of reproductive age to prevent fetal cardiac malformations, HQ = 1.0.

- Residential settings = 2.0 μg/m^3
- Industrial/commercial settings = 8.4 μg/m^3
- Based on 260 days/year (i.e., 5 days/week for 52 weeks/year)

QAPP Worksheet #15. Project Action Limits and Laboratory-Specific Detection/Quantitation Limits (VOCs, Air) (Continued)

Supplemental Information on Air Sampling, Including Benchmarks for Exposure of Pregnant Women to TCE (Continued)

Schumacher also cited: Massachusetts Department of Environmental Protection:

Imminent Hazard Values for Pregnant Women and Those Who May Become Pregnant

Residential Exposure Scenario	**Indoor Air Concentration**	**Concern Level**	**Actions**
Fetal developmental effects (Subchronic Exposure Noncancer Risk, HQ = 1)	> 6 µg/m^3	Imminent Hazard 2-hour Notification	Immediate Response Action Goal to reduce levels to *at least* less than 6 µg/m^3 as soon as possible (within several days if possible)
Typical Workplace Exposure Scenario	**Indoor Air Concentration**	**Concern Level**	**Actions**
Fetal developmental effects Subchronic Exposure Noncancer Risk, HQ = 1)	> 24 µg/m^3	Imminent Hazard 2-hour Notification	Immediate Response Action Goal to reduce levels to *at least* less than 24 µg/m^3 as soon as possible (within several days if possible)

QAPP Worksheet #17. Sampling Design and Rationale

Worksheet #17 provides the sampling and analysis requirements for the project, including sampling locations, frequencies, rationale for selection, and analytical parameters for each location. The exact sample locations and the total number of samples might change from those described, depending on field conditions encountered. The purpose of the sampling process design is to describe relevant components of the investigation design; define the key parameters to be investigated; indicate the number and type of samples to be collected; and describe where, when, and how the samples are to be collected.

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach): See Work Plan Section 7, Sampling Locations and Rationale. The goal of this investigation is to collect samples to determine whether the VI pathway is complete and presents unacceptable risks to humans in PGDP industrial area buildings. To that end, air samples will be collected in areas believed to be susceptible to VI, along with subslab samples at some of the same locations and ambient air samples. The air results will be used to determine if building occupants are exposed to contaminants of interest at levels of concern. Those levels will depend, in part, on the amount of time individuals spend in the building and are exposed to the vapors.

Describe the sampling design and rationale in terms of which matrices will be sampled:

- **What analyses will be performed and at what analytical limits?** See Worksheets #12 and #15.
- **Where are the sampling locations (including QC, critical, and background samples)?** See Work Plan Appendix C, Sampling Locations.
- **How many samples to be taken?** 121

How many samples to be taken? 121. See Worksheet #18.

What is the sampling frequency? See Worksheet #18.

Describe the physical boundaries for the area under study: See Work Plan Section 3, Investigation Boundaries.

If a sample cannot be collected where planned, describe the decision process for changing the location: Sample location areas have been selected based on conceptual site model information as well as information obtained during the facility walkdowns performed February 11-14, 2020, and may be moved within the sample location area to accommodate utilities or other obstacles.

If sample locations will be determined in the field, describe the decision process for doing so: Sample location areas have been selected based on conceptual site model information as well as information obtained during the facility walkdowns performed February 11–14, 2020.

Describe contingencies in the event field conditions are different than expected and could have an effect on the sample design: Sampling locations will be adjusted within the areas shown in Appendix D of the Work Plan during fieldwork and will be optimized considering factors such as the following:

- Bias toward areas anticipated to have greater concentrations of PI analytes from subsurface sources;
- Bias away from hazards associated with active facility operations (e.g., forklifts carrying loads);
- Bias away from traces of utilities; and
- Place at least 5 ft away from floor joints/cracks (to the extent possible).

QAPP Worksheet #18. Sampling Locations and Methods

Sampling Location/ID Number	Matrix	Analytical Group	Method*	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Outside Ambient Air Locations	Air	VOCs	TO-15	18 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-100, Administration Building	Air	VOCs	TO-15	8 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-103, DOE Site Office and Annex	Air	VOCs	TO-15	6 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-200, GUARD and Fire Headquarters	Air	VOCs	TO-15	8 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-304, Training and Cascade Office Building	Air	VOCs	TO-15	6 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-310, Purge and Product Building	Air	VOCs	TO-15	8 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-337, Process Building	Air	VOCs	TO-15	5 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-337-A, Feed Vaporization Facility	Air	VOCs	TO-15	2 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-360-A, TOll Transfer and Sampling Building Annex	Air	VOCs	TO-15	3 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-409, Stabilization Building	Air	VOCs	TO-15	6 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-410-K, Fluorine Facility Building	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-412-T11A, Shower and Change Trailer	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-615, Sewage Disposal Plant	Air	VOCs	TO-15	4 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-720/C-720-C, Maintenance and Stores Building	Air	VOCs	TO-15	14 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-724-A/C-724-B, Carpenter Shop	Air	VOCs	TO-15	8 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan

QAPP Worksheet #18. Sampling Locations and Methods (Continued)

Sampling Location/ID Number	Matrix	Analytical Group	Method*	Number of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
C-720-G, Warehouse	Air	VOCs	TO-15	8 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-725, Paint Shop	Air	VOCs	TO-15	2 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-746-U1, Leachate Office Building	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-752-A-T10, Waste Operations Office Trailers	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-752-B-T01, Fueling Station Trailer	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-754-B, Low-Level Waste Storage	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-755-T16, Radiological Control Trailer	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-755-T27, Office Trailer	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan
C-764-T03, Office Trailer	Air	VOCs	TO-15	1 (minimum of 5%)	See Worksheet #21	See Section 7 of the Work Plan

*See Analytical SOP References Table (Worksheet #23).

QAPP Worksheet #19 and 30. Sample Containers, Preservation, and Hold Times

Laboratory: TBD

List any required accreditations/certifications: DOE Consolidated Audit Program (DOECAP), if applicable

Back-up Laboratory: N/A

Sample Delivery Method: Overnight delivery

Analyte/ Analyte Group	Matrix	Method/SOP	Accreditation Expiration Date	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Data Package Turnaround Time
VOCs	Air	TO-15	TBD	SUMMA® canister with 10-hour sample duration	N/A	N/A	N/A*	28-day

NOTE: Sample volume and container requirements will be specified by the laboratory.

* The maximum holding time is listed as N/A for the analysis because the method does not specify a holding time; however, EPA Method TO-15 has a suggested guideline of 30 days.

QAPP Worksheet #20. Field QC Summary

Matrix	Analyte/ Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # of Analyses
Air	VOCs	115	6 (1 per 20 samples)	0	0	0	0	0	0	121

QAPP Worksheet #21. Field SOPs

Reference Number	Title and NumberRevision Date[a]	Originating Organization[b]	Equipment Type	Modified for Project Work? (Y/N)	Comments
1	CP4-ES-0043, *Temperature Control for Sample Storage* (1/3/2019)	Contractor	Sampling	N	N/A
2	CP2-WM-0001, *FRNP Waste Management Plan* (10/26/2018)	Contractor	N/A	N	N/A
3	CP4-ES-1001, *Transmitting Data to the Paducah Oak Ridge Environmental Information System (OREIS)* (12/21/2017)	Contractor	N/A	N	N/A
4	CP4-ES-2700, *Logbooks and Data Forms* (12/7/2017)	Contractor	N/A	N	N/A
5	CP4-ES-2702, *Decontamination of Sampling Equipment and Devices* (1/4/2018)	Contractor	Sampling	N	N/A
6	CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals* (12/12/2017)	Contractor	N/A	N	N/A
7	CP3-ES-5003, *Quality Assured Data* (1/9/2018)	Contractor	N/A	N	N/A
8	CP4-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance* (6/25/2018)	Contractor	N/A	N	N/A
9	CP4-ES-5007, *Data Management Coordination* (4/25/2019)	Contractor	N/A	N	N/A
10	CP2-ES-5105, *Volatile and Semivolatile Data Verification and Validation* (9/27/2018)	Contractor	N/A	N	N/A
11	CP3-ES-1003, *Developing, Implementing, and Maintaining Data Management Implementation Plans* (12/27/2017)	Contractor	N/A	N	N/A
12	CP4-ES-1002, *Submitting, Reviewing, and Dispositioning Changes to the Environmental Databases OREIS and PEMS* (12/21/2017)	Contractor	N/A	N	N/A
13	CP4-ER-1035, *Vapor Sampling* (1/10/2018)	Contractor	N/A	N	N/A
14	CP3-OP-0500, *Performance Observations (5/1/2019)*	Contractor	N/A	N	N/A
15	CP3-QA-1003, *Management and Self-Assessment* (3/27/2019)	Contractor	N/A	N	N/A
16	CP3-QA-1004, *Independent Assessment Program* (12/7/2017)	Contractor	N/A	N	N/A

[a] SOPs are posted to the FRNP intranet website. External FFA parties can access this site using remote access with privileges upon approval. It is understood that SOPs are contractor specific. The project reports will specify any deviation between the procedures presented in this worksheet, those at the FRNP intranet website, and those actually used during the project.

[b] The work will be conducted by FRNP staff or a subcontractor. In either case, SOPs listed will be followed.

QAPP Worksheet #22. Field Equipment Calibration, Maintenance, Testing, and Inspection

Differential pressure will be measured using factory-calibrated Dwyer Magnehelic gauges (or equivalent) sufficient to monitor the pressure difference to a precision of 0.1 inch water column (between the inside of buildings and the ambient air).

Field Equipment*	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
MiniRAE Photoionization Detector Toxic Gas Monitor with 10.5 eV Lamp or Similar Meter	Calibrate at the beginning of the day; check at the end of the day	As needed in the field; semiannually by the supplier	Measure known concentration of isobutylene 100 ppm (calibration gas)	Upon receipt, successful operation	Calibrate a.m., check p.m.	± 10% of the calibrated value	Manually zero meter or service as necessary and recalibrate	Sample Team Leader	Manufacturer's specifications
Landfill Gas Meter (GEM 2000 or equivalent)	Calibrate at the beginning of the day; check at the end of the day	As needed in the field; semiannually by the supplier	Measure known concentrations of CH_4, CO_2, and O_2 gases (calibration gases)	Upon receipt, successful operation	Calibrate a.m., check p.m.	± 10% of the calibrated value	Service, as necessary, and recalibrate	Sample Team Leader	Manufacturer's specifications
Differential Pressure/Flow Gauge and Recorder (The Energy Conservatory DG-700 or equivalent)	N/A	Replace batteries as needed	Per Instrument specifications	N/A	Check if operating properly daily	Pass/Fail	Return to manufacturer or rental vendor, if necessary	Sample Team Leader	Manufacturer's user manual
Mercury vapor analyzer (Jerome 431X or equivalent)	N/A	Change fuse as needed in the field; regular maintenance by the supplier	Measure known concentrations of mercury vapor (calibration test kit)	Upon receipt, successful operation	Check a.m. and p.m.	± 10% of the known value	Service as necessary	Sample Team Leader	Manufacturer's specifications

*Additional equipment may be needed; additional equipment will follow manufacturer's specifications for calibration, maintenance, inspection, and testing. Calibration data will be documented in logbooks consistent with CP4-ES-2700, *Logbooks and Data Forms*.

QAPP Worksheet #23. Analytical SOPs

Reference Number*	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group/Matrix	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
TO-15	Determination of VOCs in air collected in specially prepared canisters and analyzed by GC/MS	Definitive	VOCs/ Air	GC/MS	TBD	No

*Information will be based on laboratory used. Analysis will be by the most recent revision.

QAPP Worksheet #24. Analytical Instrument Calibration

Laboratories used by the DOE Prime Contractor are participants in DOE Consolidated Audit Program (DOECAP). In the fall of 2017, DOECAP began implementing accreditation of environmental laboratories through third-party organizations. If not in DOECAP, laboratories are audited by contractors for compliance with DOECAP program requirements. As such, laboratory equipment and instruments used for quantitative measurements are calibrated in accordance with the laboratory's formal calibration program as summarized in the SOPs. The laboratory is responsible for maintaining instrument calibration information per its QA Plan, including control charts established for instrumentation.

Whenever possible, the laboratory uses recognized procedures for calibration such as those published by EPA or American Society for Testing and Materials. If established procedures are not available, the laboratory develops a calibration procedure based on the type of equipment, stability, characteristics of the equipment, required accuracy, and the effect of operation error on the quantities measured. Whenever possible, physical reference standards associated with periodic calibrations such as weights or certified thermometers with known relationships to nationally recognized standards are used. Where national reference standards are not available, the basis for the reference standard is documented. Equipment or instruments that fail calibration or become inoperable during use are tagged to indicate they are out of calibration. Such instruments or equipment are repaired and successfully recalibrated prior to reuse. High resolution mass spectrometer instruments undergo extensive tuning and calibration prior to running each sample set. The calibrations and ongoing instrument performance parameters are recorded and reported as part of the analytical data package.

Instrument*	Calibration Procedure	Calibration Range	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

*The laboratory is responsible for maintaining instrument calibration information per their QA Plan, including control charts established for instrumentation. This information is audited.

QAPP Worksheet #25. Analytical Instrument and Equipment Maintenance, Testing, and Inspection

Laboratories used by the DOE Prime Contractor are participants in DOECAP. In the fall of 2017, DOECAP began implementing accreditation of environmental laboratories through third party organizations. If not in DOECAP, laboratories are audited by contractors for compliance with DOECAP program requirements. As such, laboratory equipment and instruments used for quantitative measurements are calibrated in accordance with the laboratory's formal calibration program as summarized in the SOPs. The laboratory is responsible for maintaining instrument calibration information per its QA Plan, including control charts established for instrumentation. If the project has specific requirements that are different from those contained in the laboratory's quality manual, this table should be completed for those items.

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference*
All	Per laboratory quality manual	QC standards	Per laboratory quality manual	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Laboratory Section Manager	See Worksheet #23
GC/MS	Replace/clean ion source; clean injector, replace injector liner, replace/clip capillary column, flush/replace tubing on purge and trap; replace trap	QC standards	Ion source, injector liner, column, column flow, purge lines, purge flow, trap	As needed	Must meet initial and/or continuing calibration criteria	Repeat maintenance activity or remove from service	Laboratory Section Manager	See Worksheet #23

*The laboratory is responsible for maintaining instrument and equipment maintenance, testing, and inspection information per their QA Plan. This information is audited. Field survey/sampling instrumentation will be maintained, tested, and inspected according to manufacturer's instructions.

QAPP Worksheet #26 and 27. Sample Handling, Custody, and Disposal

Sampling Organization: FRNP/GEO Consultants Company
Laboratory: TBD
Method of sample delivery (shipper/carrier): Overnight
Number of days from reporting until sample disposal: Six months (182 days)

Activity	Organization and title or position of person responsible for the activity	SOP reference
Sample labeling	Sampling Teams/DOE Prime Contractor and Subcontractors	CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP4-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*
Chain-of-custody form completion	Sampling Teams/DOE Prime Contractor and Subcontractors	CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP4-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*
Packaging	Sampling Teams/DOE Prime Contractor and Subcontractors	CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP4-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*
Shipping coordination	SMO/DOE Prime Contractor	CP4-ES-2708, *Chain-of-Custody Forms, Field Sample Logs, Sample Labels, and Custody Seals*; and CP4-ES-5004, *Sample Tracking, Lab Coordination, and Sample Handling Guidance*
Sample receipt, inspection, and log-in	Sample Management/Contracted Laboratory	TBD
Sample custody and storage	Sample Management/Contracted Laboratory	TBD
Sample disposal	Sample Management/Contracted Laboratory	TBD

QAPP Worksheet #28. Analytical Quality Control and Corrective Action (Air)

Matrix: Air
Analytical Group/Concentration Level: VOCs/Low
Sampling SOP: See Worksheet #21
Analytical Method/SOP Reference: TO-15
Sampler's Name/Field Sampling Organization: FRNP
Analytical Organization: TBD
No. of Sample Locations: TBD

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Field Duplicate	Minimum 5%	As with other samples	Data reviewer will place qualifiers on samples affected	Project	Homogeneity/ Precision	RPD ≤ 50%
Routine Laboratory	Per lab SOP	Per lab SOP	Per lab SOP	Per lab SOP	Per lab SOP	Per lab SOP

QAPP Worksheet #29. Project Documents and Records

All project data and information must be documented in a format that is usable by project personnel. The QAPP describes how project data and information shall be documented, tracked, and managed from generation in the field to final use and storage in a manner that ensures data integrity, defensibility, and retrieval. Project data and associated documents will be managed in accordance with the *Data and Documents Management and Quality Assurance Plan for Paducah Environmental Management and Enrichment Facilities*, DOE/OR/07-1595&D2, which describes the data base and document requirements for all FFA-related records.

Field data will be recorded on chain-of-custody forms, in field logbooks, and field data sheets. The fixed-base laboratory will provide data in an EDD. Project data following verification assessment and validation will be placed into and reported from Paducah OREIS. Data loaded into Paducah OREIS will be made available to the public stakeholders via PEGASIS. Field and analytical data are entered/transferred electronically, verified and assessed per DOE Prime Contractor procedure CP3-ES-5003, *Quality Assured Data*.

Data assessment packages will be created per this procedure. The data assessment packages will include field and analytical data, chains-of-custody, data verification and assessment queries, and other project-specific information needed for personnel to review the package adequately. Data assessment packages will be reviewed to document any issues pertaining to the data and to indicate if data met the DQOs of the project. Data is loaded for storage in the Paducah OREIS data system, maintained on the Paducah Site servers and included in the Administrative Record by reference. The system will be maintained for future reference as part of the Administrative Record at the Paducah Site.

Sample Collection and Field Records

Record	Generation	Verification	Storage location/archival
Field logbook or sample data forms	Field Team	Sample Team Leader	Project File
Chain-of-Custody Forms	Field Team	Sample Team Leader	Project File
Air Bills	Contract Laboratory	Contract Laboratory	Project File
Equipment Calibration Forms	Field Team	Sample Team Leader	Project File
Deviations	Project Manager	Project Director	Project File
Corrective Action Reports	Project Manager	Project Director	Project File
Correspondence	Project Manager	Project Director	Project File

Project Assessments

Record	Generation	Verification	Storage location/archival
Data Verification Checklists	SMO/Data Validator	SMO	Project File
Data Validation Report	Data Validator	SMO	Project File
Data Usability Assessment Report	Data Validator	SMO	Project File

QAPP Worksheet #29. Project Documents and Records (Continued)

Laboratory Records			
Record	**Generation**	**Verification**	**Storage location/archival**
Level IV Laboratory Reports	Laboratory Staff	Laboratory Project Manager	Project File
EDDs	Laboratory Staff	Laboratory Project Manager	Project File

QAPP Worksheets #31, 32, and 33. Assessments and Corrective Action

FRNP will ensure that protocol outlined in the QAPP is implemented adequately. Assessment activities help to ensure that the resultant data quality is adequate for its intended use and that appropriate responses are in place to address nonconformances and deviations from the QAPP.

Assessments:

Assessment Type	Responsible Party & Organization	Number/Frequency	Estimated Date	Assessment Deliverable	Deliverable Due Date
Field Sampling technical systems audit (TSA)	Sample Team Leader/ FRNP	One each on first day of soil, biota, and groundwater sampling episodes	TBD	As described in CP3-QA-1003, *Management and Self-Assessment*	As described in CP3-QA-1003, *Management and Self-Assessment*
On-site analytical TSA	Sample Team Leader/ FRNP	Prior to start of on-site analytical work and every two weeks thereafter	TBD	As described in CP3-QA-1003, *Management and Self-Assessment*	As described in CP3-QA-1003, *Management and Self-Assessment*
Offsite Laboratory Technical Systems Audit	Laboratory Manager/Technical Director	Annually	Annually/Ongoing	Internal Audit Repot	Per Individual Laboratory QA Manual
Management Assessment	Project Director/ FRNP	Interim management review following site mobilization; final management review upon completion of fieldwork	TBD	As described in CP3-QA-1003, *Management and Self-Assessment*	As described in CP3-QA-1003, *Management and Self-Assessment*
Independent Assessment	Contractor Performance Assurance Program (CPAP) Manager	As needed	TBD	As described in CP3-QA-1004, *Independent Assessment Program*	As described in CP3-QA-1004, *Independent Assessment Program*

QAPP Worksheets #31, 32, and 33. Assessments and Corrective Action (Continued)

Provisions shall be taken in the field and laboratory to ensure that any problems that may develop shall be dealt with as quickly as possible to ensure the continuity of the project/sampling events. Corrective action in the field may be necessary when the sampling design is changed.

Assessment Response and Corrective Action:

Assessment Type	**Responsibility for Responding to Assessment Findings**	**Assessment Response Documentation**	**Time Frame for Response**	**Responsibility for Implementing Corrective Action**	**Responsible for Monitoring Corrective Action implementation**
Field Sampling TSA	Sample Team Leader/FRNP	Field Sampling Corrective Action Response (following CP3-QA-3001, *Issues Management*)	24 hours from receipt of memorandum	Sample Team Leader/FRNP	CPAP Manager/FRNP
On-site analytical TSA	Sample Team Leader/ FRNP	On-site Analytical Corrective Action Response (following CP3-QA-3001, *Issues Management*)	48 hours from receipt of memorandum and before further analyses can be conducted	Sample Team Leader/ FRNP	CPAP Manager/FRNP
Off-site Laboratory Technical Systems Audit	Laboratory Manager/Technical Director	Internal Audit Report Deficiency Memorandum	Seven days following receipt of proficiency testing (PT) deficiency report and before analysis field samples	Laboratory Technical Director	QA/QC Program Manager/FRNP
Management Assessment	Project Director/ FRNP	Management Response	As described in CP3-QA-1003, *Management and Self-Assessment*	As assigned in Management Response	CPAP Manager/FRNP
Independent Assessment	Director/Manager of the Assessed Organization	As required by CP3-QA-1004, *Independent Assessment Program*	As required by CP3-QA-1004, *Independent Assessment Program*	Sample Team Leader/ FRNP	CPAP Manager/FRNP

QAPP Worksheet #34. Data Verification and Validation Inputs

Item	Description	Verification (Completeness)	Validation (Conformance to Specifications)
Planning Documents/Records			
1	Approved QAPP	X	
2	Contract	X	
3	Field SOPs	X	
4	Laboratory SOPs	X	
Field Records			
5	Field logbooks and/or sample data forms	X	X
6	Equipment calibration records	X	X
7	Chain-of-custody forms	X	X
8	Sampling diagrams/surveys	X	X
9	Drilling logs	X	X
10	Geophysics reports	X	X
11	Relevant correspondence	X	X
12	Change orders/deviations	X	X
13	Field audit reports	X	X
14	Field corrective action reports	X	X

QAPP Worksheet #34. Data Verification and Validation Inputs (Continued)

Item	Description	Verification (Completeness)	Validation (Conformance to Specifications)
Analytical Data Package			
15	Cover sheet (laboratory identifying information)	X	X
16	Case narrative	X	X
17	Internal laboratory chain-of-custody	X	X
18	Sample receipt records	X	X
19	Sample chronology (i.e., dates and times of receipt, preparation, and analysis)	X	X
20	Communication records	X	X
21	Project-specific PT sample results	X	X
22	Limit of detection/limit of quantification establishment and verification	X	X
23	Standards Traceability	X	X
24	Instrument calibration records	X	X
25	Definition of laboratory qualifiers	X	X
26	Results reporting forms	X	X
27	QC sample results	X	X
28	Corrective action reports	X	X
29	Raw data	X	X
30	EDD	X	X

QAPP Worksheet #35. Data Verification Procedures

Records Reviewed	Requirement Documents	Process Description	Responsible Person/Organization
Field logbook and/or sample data forms	QAPP, Field SOPs	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed and results are documented.	Sample Team Leader/FRNP— SMO/FRNP
Data deliverables, analytes, and holding times	QAPP, contract, and procedures	The documentation from the contractual screening will be included in the data assessment packages, per DOE Prime Contractor procedure CP3-ES-5003, *Quality Assured Data*. Data assessment qualifiers and definitions are included in the procedure CP3-ES-5003, *Quality Assured Data*.	Laboratory PM/Contract Laboratory SMO/FRNP
Chain-of-custody, sample handling, sampling methods and procedures, and field transcription	QAPP, contract, and procedures	These items will be validated during the data assessment process as required by DOE Prime Contractor procedure CP3-ES-5003, *Quality Assured Data*, and CP3-ES-1003, *Developing, Implementing, and Maintaining Data Management Plans*. The documentation of this validation will be included in the data assessment packages.	SMO/FRNP
Analytical methods and procedures, laboratory data qualifiers, and standards	QAPP, contract, and procedures	These items will be reviewed during the data validation process as required by DOE Prime Contractor data validation procedures. Data validation will be performed in parallel with data assessment. The data validation report and data validation qualifiers will be considered when the data assessment process is being finalized. Data validation qualifiers and definitions are listed in the procedures used for validation (see Worksheet #36).	Data Validation Subcontractor and SMO/FRNP

QAPP Worksheet #35. Data Verification Procedures (Continued)

Records Reviewed	Requirement Documents	Process Description	Responsible Person/Organization
Audit reports, corrective action reports	QAPP and procedures	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	CPAP Manager/FRNP
Deviations and qualifiers	QAPP and procedures	Any deviations and qualifiers resulting from process will be documented in the data assessment packages.	SMO/FRNP

QAPP Worksheet #36. Data Validation Procedures

Data Validator: Veolia Nuclear Solutions Federal Services

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator* (Title and Organizational Affiliation)
Step IIa/IIb	Air	VOCs	Very Low	National Functional Guidelines; Worksheets #12, #15, and #28; and CP2-ES-5105	Veolia Nuclear Solutions Federal Services

*Validation is to be conducted by a qualified individual, independent from sampling, laboratory, project management, or other decision making personnel for the task. This could be an outside party or someone within FRNP who is not involved in the project.

QAPP Worksheet #37. Data Usability Assessment

FRNP will determine the adequacy of data based on the results of validation and verification. The usability step involves assessing whether the process execution and resulting data meet project quality objectives documented in the QAPP.

Summarize the usability assessment process and procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: Field and analytical data are verified and assessed per procedure CP3-ES-5003, *Quality Assured Data*. Data assessment packages will be created per this procedure. Data assessment packages will include field and analytical data, chains-of-custody, data verification and assessment queries, and other project-specific information needed for personnel to review the package adequately. Data assessment packages will be reviewed to document any issues pertaining to the data and to indicate if DQOs of the project were met. For data selected for validation, the following procedure is used: CP2-ES-5105, *Volatile and Semivolatile Analysis Data Verification and Validation, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

Describe the evaluative procedures used to assess overall measurement error associated with the project: PARCCS parameters (precision, accuracy, representativeness, comparability, completeness, and sensitivity) will be evaluated per procedure, CP3-ES-5003, *Quality Assured Data*. This information will be included in the data assessment packages for review by project personnel. Data assessment also will include documentation of QC exceedances, trends, and/or bias in the data set. Data assessment will document any statistics used; however, for this project, the sampling design is not random and statistical tests may not be appropriate.

Identify the personnel responsible for performing the usability assessment:
Project Director: Bruce Ford
Project QA/QC Manager: Jennie Freels
PM: Stefanie Fountain
Risk Assessor: LeAnne Garner
Data Validator: Veolia Nuclear Solutions Federal Services
Sample Management Office: Lisa Crabtree
Sample Team Leader: Jason Boulton

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: Data assessment packages will be created, which will include data assessment comments/questions and laboratory comments. Data verification and assessment queries indicating any historical outliers and background exceedances also will be included in the data assessment packages. Once data assessment is complete, project personnel will compare the data against the DQOs to determine if the data collected are sufficient to meet the objectives. Data summaries will be prepared to demonstrate that DQOs have been met and the information is suitable for decision making. This information typically is included in the project report, along with the final decisions associated with the project.

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