Confidential Business Information

Soil Sample Characterization Final Report
SB Energy Piketon, OH Site

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1 Introduction

SB Energy is evaluating property in Piketon, Ohio for development as a large-scale data center campus with associated energy generation and supporting infrastructure. The property is located near the Portsmouth Gaseous Diffusion Plant (PORTS), where uranium enrichment and related nuclear fuel-cycle activities occurred for several decades. The proximity of the proposed development to PORTS established the need for property-specific soil characterization to support SB Energy's environmental due diligence and future planning.

The investigation was completed in phases. Phase 1 (Oklo property) established the initial radiological characterization of property immediately east of the PORTS reservation boundary. Phase 2 (Roe Farms - PO-22703) expanded the geographic coverage and analytical scope across additional portions of the proposed development area. SB Energy selected the Phase 2 sample population, and Visual Sample Plan (VSP) was used to spatially distribute the predetermined sampling locations. Deep-soil sampling (Roe Farms PO-22779) was completed separately to evaluate radiological and pesticide conditions below the surface-soil interval.

This report integrates the Phase 1, Phase 2, and deep-soil datasets into a single characterization of the areas investigated. The evaluation considers the analytical results, laboratory data quality, applicable comparison criteria, background conditions, and spatial and vertical relationships within the dataset. The resulting findings provide a documented basis for understanding soil conditions within the sampled areas.

1.1 Project Purpose and Scope

The purpose of the soil characterization is to establish property-specific soil conditions within the areas investigated and evaluate whether radiological or selected non-radiological constituents are present at concentrations, depths, or spatial distributions that warrant consideration in environmental due diligence and future site planning.

The characterization includes three investigation components:

- **Phase 1 radiological soil characterization**, focused on property immediately east of the PORTS reservation boundary.
- **Phase 2 surface-soil characterization**, which expanded the investigation area and included both radiological and selected non-radiological analyses.
- **Deep-soil characterization**, completed at selected locations to evaluate radiological and pesticide conditions separately from the surface-soil dataset.

The report also evaluates laboratory data quality, analytical sensitivity, qualifiers, and other conditions that affect use of the analytical results for the intended characterization.

The scope of the characterization is defined by the locations, depths, analytes, and soil media represented by the investigation. Conclusions presented in this report apply to those investigated conditions.

1.2 Investigation Objectives

The investigation was performed to develop sufficient property-specific data to characterize soil conditions within the areas evaluated and support a technically defensible interpretation of the combined Phase 1, Phase 2, and deep-soil results.

The objectives were to:

- Establish the radiological condition of the Phase 1 area and evaluate the results in relation to appropriate PORTS and regional background information.
- Expand the surface-soil characterization across a broader portion of the proposed development area through Phase 2 sampling.
- Evaluate the targeted radiological and non-radiological constituents using the project comparison criteria applicable to each analyte or analyte group.
- Determine whether analytical results and spatial relationships are consistent with background conditions or identify a pattern requiring source evaluation.
- Evaluate the deep-soil radiological and pesticide results separately to determine whether the subsurface data identify conditions materially different from the surface-soil characterization.
- Determine whether laboratory analytical sensitivity, qualifications, and quality-control performance support use of the results for the intended characterization.
- Integrate the Phase 1, Phase 2, and deep-soil findings to characterize the sampled soils and identify material conditions or remaining uncertainty relevant to interpretation.

2 Property Setting and Site Background

The property setting, current land conditions, relationship to PORTS, and available property history provide the context for the soil investigation. This section also establishes the potential source, transport, environmental-media, and depth relationships carried forward in the conceptual site model.

2.1 Property Description and Proposed Development

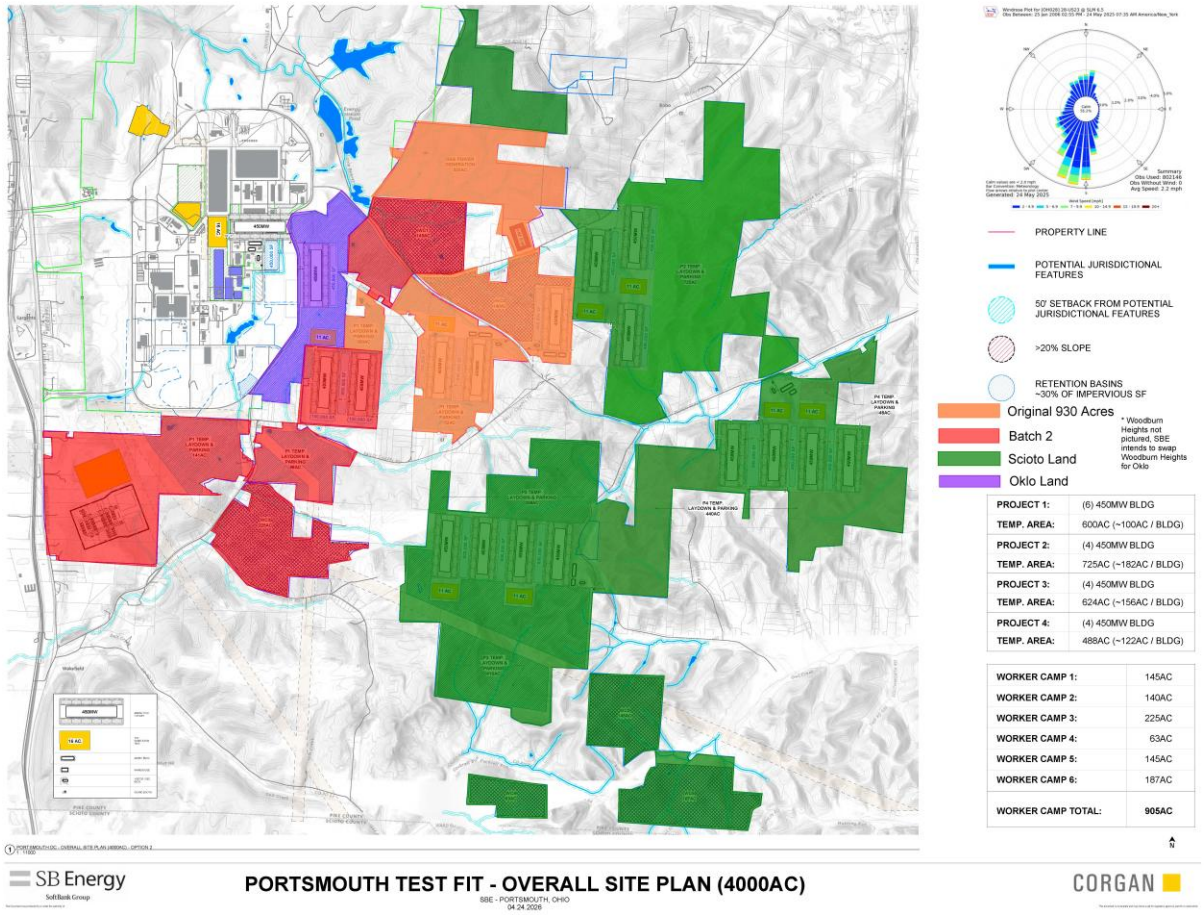
The SB Energy project is located in Piketon, Ohio. The environmental sampling RFP describes an approximately 11,000-acre proposed hyperscale data center campus consisting of eighteen data center buildings and approximately 9.2 gigawatts of natural-gas generation infrastructure. The requested environmental work was intended to document existing conditions across the proposed development.

Project planning continued to develop after issuance of the RFP. A later Portsmouth test-fit depicts multiple data center areas, gas-power-generation facilities, substations, temporary laydown and parking areas, worker-support facilities, retention basins, and associated infrastructure. The drawing also identifies potential jurisdictional features, setbacks, and areas of steep slope.

The acreage shown in the procurement documents and later planning drawings does not define the area characterized by this investigation. The characterization is tied to the locations and depths actually sampled.

Future development remains relevant to the physical intervals evaluated by the investigation. Clearing, grading, foundation construction, underground utility installation, access construction, stockpiling, and other earthwork may disturb both surface and deeper soil. Characterization of those intervals provides information on existing conditions that may be encountered during future site work.

Figure 2-1. Conceptual SB Energy Portsmouth Development Test Fit and Due-Diligence Areas



2.2 Physical Setting and Current Land Conditions

The Phase 1 survey area consisted of approximately 200 acres of undeveloped land immediately east of the PORTS reservation boundary. Field documentation describes the area as heavily wooded, with dense vegetation, mature trees, uneven ground, and variable topography. These conditions affected access and movement between locations, but all planned Phase 1 sampling locations were accessed and sampled. Field observations identified no evidence of radiological operations, radioactive-material disposal, or other visible conditions associated with radioactive-material management within the area sampled.

The broader project drawings identify steep slopes, potential jurisdictional features, and stormwater-related features within portions of the proposed development. SB Energy's environmental sampling scope also identified downhill drainage, runoff flow paths, and locations where stormwater leaves the property as considerations for the

investigation. These features are incorporated into the potential transport relationships described in the CSM.

2.3 Relationship to the Portsmouth Gaseous Diffusion Plant

PORTS is the principal nearby historical industrial facility associated with the radiological questions addressed by the investigation. The Phase 1 area lies immediately east of the PORTS reservation boundary, and the original sampling locations were distributed across the approximately 200-acre area with additional emphasis along and near the eastern fenceline. This provided direct soil information from the portion of the proposed development property closest to historical PORTS operations.

Construction of PORTS began in 1952, and enriched uranium production began in 1954. Uranium enrichment by gaseous diffusion continued through 2001. The facilities were returned to DOE in 2011 for decontamination and decommissioning, which remains ongoing.

PORTS therefore serves as the principal potential external radiological source in the CSM. The relationship is evaluated using the property-specific analytical record, appropriate background information, and the spatial and vertical relationships developed through the investigation.

2.4 Property and Surrounding-Area History

The available project record contains limited parcel-specific historical information for the broader proposed development area. Phase 1 documentation describes the initial investigation area as undeveloped and relatively undisturbed and states that the property was not known to have been used for radiological operations. Field observations were consistent with that description. The records reviewed for this report do not establish a parcel-by-parcel land-use chronology for the broader proposed development area.

2.5 Constituents of Potential Concern

The constituents of potential concern (COPCs) reflect the environmental questions addressed by the investigation. Radiological constituents were selected because of the property's proximity to PORTS and the need to evaluate naturally occurring radionuclides in the context of historical uranium-enrichment activities. Phase 2 expanded the analytical scope to selected non-radiological constituents identified through SB Energy's environmental sampling scope. Pesticides were evaluated in both the Phase 2 surface-soil and deep-soil components.

COPC designation identifies the scope of evaluation. It is not a finding that a constituent was detected, exceeded a comparison criterion, or originated from a site-related source

Table 2-1. Constituents Evaluated in the Soil Characterization

Constituent group	Targeted parameters	Basis for inclusion	Principal characterization question
Uranium	Uranium isotopes	Naturally occurring in soil and associated with historical PORTS uranium-enrichment activities	Are measured activities and isotope relationships compatible with appropriate background conditions, or do they require source evaluation?
Transuranic radionuclides	Americium-241 and plutonium isotopes	Relevant to the broader nuclear-fuel-cycle source context	Are confirmed activities present in a magnitude or distribution suggestive of an anthropogenic contribution?
Technetium	Technetium-99	Associated with PORTS operations and included in environmental monitoring around PORTS	Is confirmed Tc-99 present at an activity or distribution requiring source evaluation?
Metals	Lead and mercury	Selected Phase 2 due-diligence analytes	How do measured concentrations compare with the selected project criteria?
Petroleum hydrocarbons	Low- and high-fraction TPH	Evaluates potential fuel or oil-related soil impacts	Do the results identify petroleum-related soil conditions relative to the selected project criteria?
Pesticides	Targeted pesticide analytical suite	Phase 2 surface- and deep-soil due-diligence scope	Are targeted pesticide residues present in the sampled surface or deep soil at concentrations requiring further evaluation?
Asbestos	Bulk-soil PLM analysis	Evaluates asbestos within sampled soil material	Was asbestos identified in the sampled soil material?

2.5.1 Radiological Constituents

The radiological characterization includes uranium isotopes, plutonium isotopes, americium-241, and technetium-99. Phase 1 established the initial property-specific dataset for these constituents nearest PORTS, and the same general radiological scope was retained when the investigation expanded geographically during Phase 2.

Uranium requires source-sensitive interpretation because it occurs naturally in soil and was also central to historical PORTS operations. Its significance cannot be determined from the presence of a measured activity alone. Background, isotope relationships, analytical uncertainty, associated radionuclides, depth, and spatial distribution provide the context needed for evaluation.

Americium, plutonium, and technetium provide additional information regarding a potential anthropogenic contribution. Their usefulness depends on detection status, magnitude, analytical sensitivity, and whether results occur as isolated observations or as part of a broader constituent or spatial relationship.

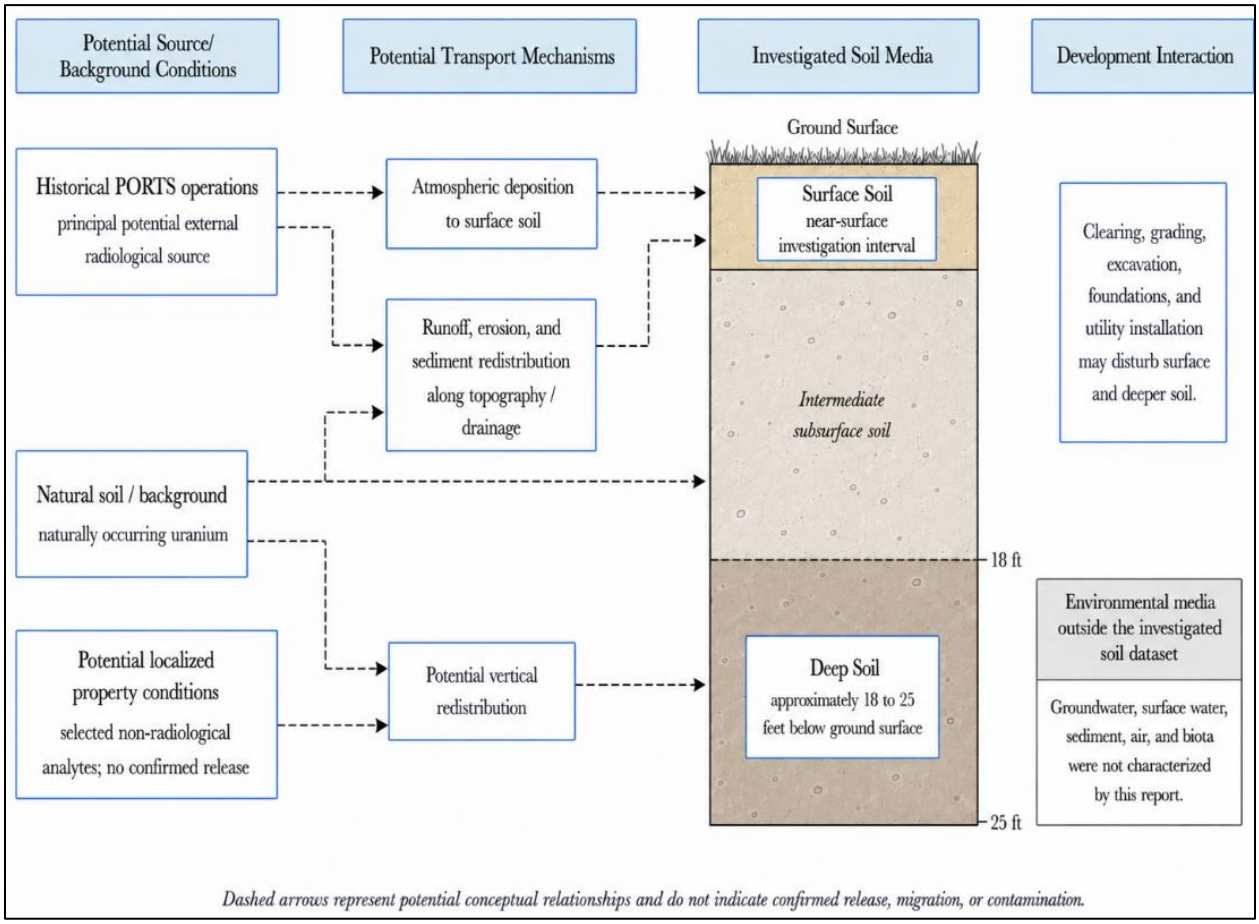
2.5.2 Non-Radiological Constituents

Phase 2 expanded the surface-soil characterization to include lead, mercury, petroleum hydrocarbons, pesticides, and asbestos. Pesticides were also included in the six-sample deep-soil analytical scope. These analyte groups address different potential environmental conditions and are evaluated independently rather than treated as evidence of a common source.

2.6 Conceptual Site Model

The conceptual site model (CSM) identifies the source, transport, environmental-media, and exposure relationships used to organize the investigation. Historical PORTS operations are included as a potential external radiological source; natural background is treated separately for naturally occurring constituents; and localized property conditions are considered for the selected non-radiological analytes. Surface and deep soil remain distinct components because they represent different physical intervals and provide different information regarding potential source and transport relationships.

Figure 2-2. Conceptual Site Model



2.6.1 Potential Sources

Historical PORTS operations represent the principal external radiological source incorporated into the CSM. The proximity of the Phase 1 area to the eastern reservation boundary and the history of uranium enrichment support evaluation of the targeted radionuclides in nearby soil. Phase 1 documentation identifies no known radiological operation on the investigated property, and field activities found no evidence of radioactive-material handling or disposal within the initial survey area.

Natural background is a separate source category, particularly for uranium. PORTS 2017 Methods developed soil background populations from locations and soil formations selected to represent naturally occurring and ubiquitous constituents in and around PORTS.

The available project record does not identify a common property-specific source for the Phase 2 non-radiological analytes. Those constituents remain part of the CSM as potential localized soil conditions addressed through sampling.

2.6.2 Potential Transport Mechanisms

Historical atmospheric deposition is a plausible mechanism by which airborne material from an external source could reach surface soil. The location of the Phase 1 area immediately east of PORTS makes that mechanism pertinent to the original radiological question.

Runoff, erosion, and sediment movement are also relevant where topography and drainage provide a physical connection between areas. The project scope specifically identified downhill drainage and runoff flow paths, as well as locations where stormwater exits the property.

Vertical distribution addresses a different relationship. Material present near the surface may remain shallow, be redistributed through physical disturbance, or move downward under conditions that permit migration. Constituents present at depth may instead reflect native subsurface material. The deep-soil component provides direct data for evaluating that relationship.

2.6.3 Environmental Media and Exposure Considerations

Soil is the environmental medium characterized in this report. Surface soil is the interval most directly associated with near-surface deposition, shallow releases, runoff-related redistribution, and initial land disturbance. Deeper soil may become accessible during foundation construction, utility installation, excavation, or other intrusive work.

Groundwater, surface water, sediment, ambient air, and biota are separate environmental media and are not part of the soil analytical dataset evaluated in this report.

2.6.4 Basis for Surface- and Deep-Soil Evaluation

Surface-soil results provide the primary information for evaluating near-surface conditions and spatial distribution across the areas sampled. Deep-soil sampling addresses conditions below that interval and includes both radiological and pesticide data, allowing the subsurface conditions represented by those samples to be considered separately from the surface-soil characterization.

PORTS 2017 Methods distinguishes soil background populations for naturally occurring constituents by depth and geologic setting rather than applying one background population to all soil intervals. The project therefore evaluates deep-soil uranium within its applicable subsurface background context. The surface and deep datasets are then considered together to determine whether the subsurface data identify conditions materially different from the surface-soil characterization.

3 Investigation Scope and Surface-Soil Sampling

The investigation developed from an initial radiological characterization of property nearest the PORTS boundary into a broader evaluation of surface soil across additional portions of the proposed development area. Deep-soil sampling was completed separately to address conditions below the surface interval.

This section describes the investigation strategy, scope, study boundaries, sample-location approach, field implementation, and controls used to generate the soil datasets. Phase 1, Phase 2 surface soil, and deep soil are retained as distinguishable components because each provides different spatial or depth-specific information.

3.1 Overall Investigation Strategy

Phase 1 focused on the portion of the proposed development property nearest PORTS. Twenty primary soil locations were selected by SB Energy within an approximately 200-acre survey area immediately east of the reservation boundary. The locations were distributed across the survey area with additional emphasis along and near the eastern PORTS fenceline.

The Phase 1 investigation established the initial property-specific radiological dataset for the area most directly associated with the original PORTS-related question. It also documented the field setting, sampling locations, shallow-soil intervals, sample-control procedures, and analytical results used to determine how the investigation should be expanded. Phase 1 remains a substantive part of the final characterization.

Phase 2 broadened both the spatial coverage and the analytes evaluated. SB Energy selected a population of 40 primary surface-soil samples before the spatial design was developed. VSP was then used to spatially distribute those predetermined locations across the defined study area. The final location set is identified as VSP-01 through VSP-40 in the coordinate record and Pace analytical packages.

The Phase 2 surface analytical scope retained the radiological evaluation and added lead, mercury, petroleum hydrocarbons, pesticides, and asbestos. Four additional samples were identified as QC-01 through QC-04. Six deep-soil samples were

evaluated separately at approximately 18 to 25 feet below ground surface for the project radiological suite and 21 pesticides.

Table 3-1. Investigation Components

Investigation Component	Primary Purpose	Location Approach	Role in Final Characterization
Phase 1	Establish initial radiological soil conditions in the portion of the property nearest PORTS	Twenty SB Energy-selected locations within the approximately 200-acre survey area, with emphasis along and near the eastern PORTS boundary	Established the initial property-specific radiological dataset and informed expansion of the investigation
Phase 2 Surface Soil	Expand geographic coverage and analytical scope across the broader study area	Forty predetermined primary locations spatially distributed using a VSP-based sampling design	Provides broader surface-soil coverage for radiological and selected non-radiological constituents and supports evaluation of spatial relationships
Deep Soil	Evaluate radiological and pesticide conditions below the surface-soil interval	Six selected subsurface samples evaluated separately from the VSP surface population	Provides depth-specific information for comparison with surface conditions and future soil-disturbance considerations

3.2 Scope of Characterization

The soil characterization consists of Phase 1 and Phase 2 investigations, with deep-soil sampling maintained as a distinct component of Phase 2. Phase 1 addressed radiological conditions within the initial survey area adjacent to PORTS. Phase 2 expanded the geographic coverage and analytical scope across a broader portion of the proposed development area.

The datasets answer related but different questions. Phase 1 provides the initial radiological characterization nearest PORTS; the Phase 2 surface-soil dataset provides broader spatial coverage for radiological and selected non-radiological constituents; and the deep-soil samples provide radiological and pesticide information from selected subsurface intervals. Maintaining those distinctions allows each dataset to be evaluated within the setting and depth it represents.

3.2.1 Phase 1 Soil Characterization

Phase 1 consisted of 20 primary soil samples collected within the approximately 200-acre area immediately east of the PORTS reservation boundary. SB Energy selected the sampling locations based on the proposed use of the property, with locations distributed throughout the survey area and additional emphasis near the PORTS boundary.

Soil was collected from approximately 2 to 3 inches and 5 to 6 inches below ground surface and analyzed for the radionuclides selected for the initial investigation. Two field duplicate samples, QC #1 and QC #2, were collected with the primary sample set. The resulting field dataset therefore consists of 20 primary samples and two documented field duplicates.

These data provide direct radiological information from the portion of the property nearest PORTS and remain a substantive part of the combined evaluation.

3.2.2 Phase 2 Soil Characterization

Phase 2 expanded the surface-soil investigation to 40 primary locations identified as VSP-01 through VSP-40. The predetermined population was spatially distributed across the defined study area using VSP. Phase 2 retained the radiological constituents evaluated during Phase 1 and added lead, mercury, petroleum hydrocarbons, pesticides, and asbestos. The Pace records also contain four samples identified as QC-01 through QC-04.

The separate deep-soil component consists of P1B1-01, P1B1-03, P1B1-04, P1B1-08, P1B1-09, and P1B1-10. The samples represent approximately 18 to 25 feet below ground surface and were analyzed for the project radiological suite and the 21-pesticide suite. Their depth and comparison context differ from the VSP surface population, so they are retained separately throughout the report.

3.3 Data Quality Objectives and Decision Basis

The investigation objectives established the type and quality of information needed to support the soil characterization. The principal data needs were adequate coverage of the selected investigation areas, traceability from field location through laboratory result, analytical sensitivity appropriate to the comparison being made, and sufficient supporting information to distinguish detections, nondetects, and qualified results.

PORTS 2017 Methods is the primary technical reference for the evaluation and provides the project basis for treatment of screening, background, analytical

sensitivity, and related data-evaluation concepts. The specific comparison values selected for the investigation are presented in Section 5.

3.3.1 Characterization Questions

The soil characterization was developed to address the following questions:

- Are radiological conditions within the Phase 1 area consistent with the applicable PORTS and regional background information?
- Do the broader Phase 2 surface-soil results identify radiological concentrations or spatial relationships requiring additional evaluation?
- Are uranium results consistent with naturally occurring soil conditions when activity, isotope relationships, depth, and associated radionuclides are considered together?
- Do the Phase 2 non-radiological results identify concentrations requiring further evaluation against the selected project comparison criteria?
- Do the surface results identify localized or broader spatial relationships relevant to source evaluation?
- Do the deep-soil radiological and pesticide results identify subsurface conditions materially different from the surface-soil characterization?
- Are the analytical results sufficiently complete, sensitive, traceable, and technically usable to support the intended characterization?

3.3.2 Decision Criteria

Results are evaluated against the project comparison criteria established in Section 5. For naturally occurring constituents, including uranium, the applicable PORTS background information is considered with the measured activity and the surrounding analytical record. Other radiological and non-radiological constituents are evaluated against the screening or comparison values selected for those analytes.

A numerical comparison may identify a result requiring additional review without determining the final interpretation by itself. Where appropriate, the evaluation retains detection status, laboratory qualifier, analytical sensitivity, uncertainty, associated constituents, sample depth, and spatial context. The project comparison matrices preserve the resulting reviewer adjudications and do not treat a detection limit above a comparison value as a measured exceedance.

3.3.3 Study Boundaries

Phase 1 is bounded spatially by the approximately 200-acre initial survey area east of PORTS and the 20 primary locations selected within that area. Vertically, the samples represent shallow soil collected from approximately 2 to 3 inches and 5 to 6 inches below ground surface.

The Phase 2 surface study area is represented by the final VSP-01 through VSP-40 location set. The coordinate record provides the final easting and northing for each location, and the same field identifiers are retained in the radiological, chemistry, and asbestos Pace sample summaries.

The deep-soil dataset has a separate vertical boundary. The six P1B1 samples represent approximately 18 to 25 feet below ground surface and provide both radiological and pesticide data from those subsurface intervals. Field access also influenced implementation at individual surface locations because wooded terrain, slopes, wetlands, streams, drainage corridors, and similar features affected how planned locations could be reached.

3.3.4 Required Data Quality and Analytical Sensitivity

The analytical record needed to preserve the information required to interpret each result. For radiological analyses, that includes the reported activity, detection status, qualifier, MDA or MDC, and reported uncertainty. For non-radiological analyses, the record includes the measured concentration or nondetect designation, applicable reporting limit, qualifier, and supporting laboratory QC.

Analytical sensitivity is evaluated relative to the comparison being made. A nondetect is not treated as zero, and an MDA or MDC is not treated as a measured activity. Where achieved analytical sensitivity is above a selected comparison value, the result requires technical review using the available sample-specific information rather than automatic classification as an exceedance or an acceptable measured concentration.

Laboratory qualifications and other conditions affecting data use are evaluated in Section 7 after the field and laboratory records are established.

3.4 Phase 1 Sampling

Phase 1 sampling was performed at 20 locations selected by SB Energy within the initial survey area. Soil was collected from approximately 2 to 3 inches and 5 to 6

inches below ground surface. The two shallow intervals provided information from different portions of the near-surface soil profile.

The common surface-soil collection, identification, equipment-cleaning, and sample-control procedures used for the investigation are described in Section 3.6. Phase 1 included two documented field duplicates, QC #1 and QC #2, collected under the same field conditions as their associated primary samples.

The Phase 1 samples were transferred to GEL Laboratories under chain of custody. GEL received the sample set on June 10, 2026 and documented appropriate custody and no visible evidence of sample-container tampering or breakage.

Figure 3-2. Northern Phase 1 Sampling Locations Along the Eastern PORTS Fenceline

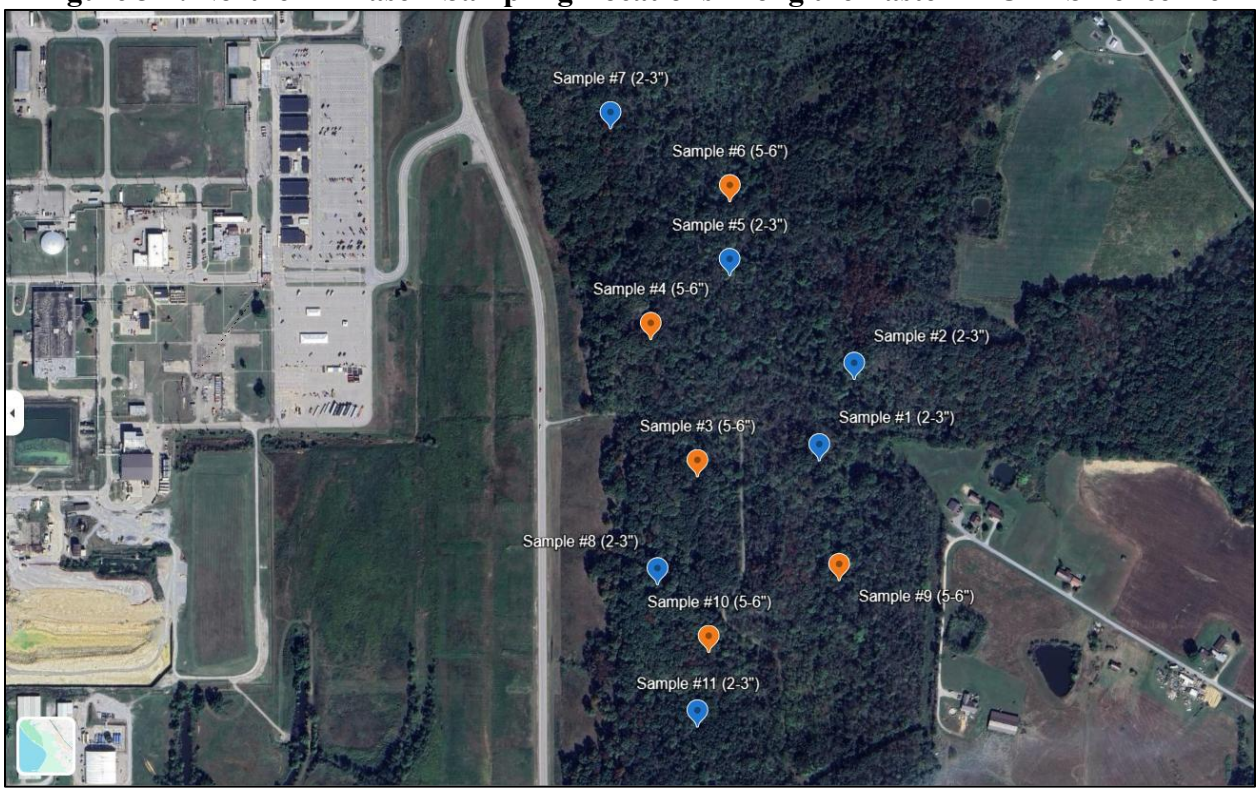


Figure 3-3. Central Phase 1 Sampling Locations Along the Eastern PORTS Fenceline

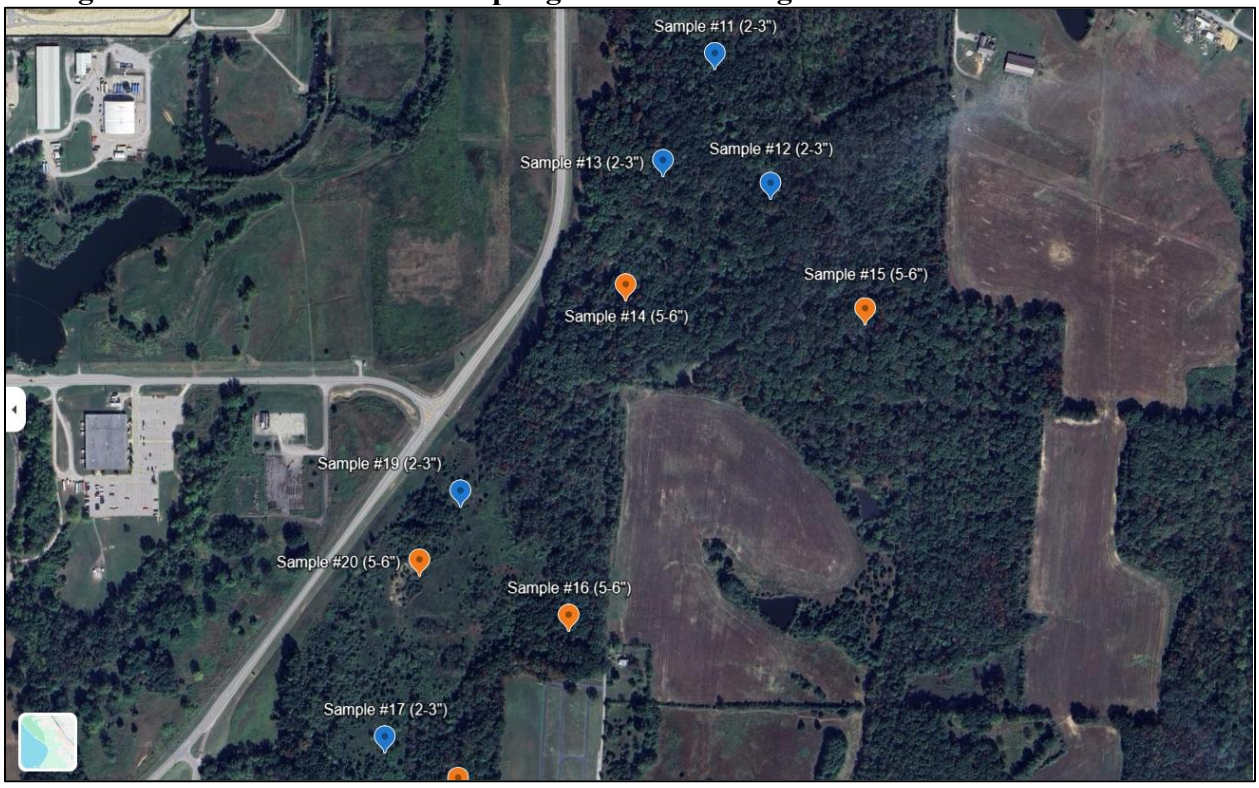
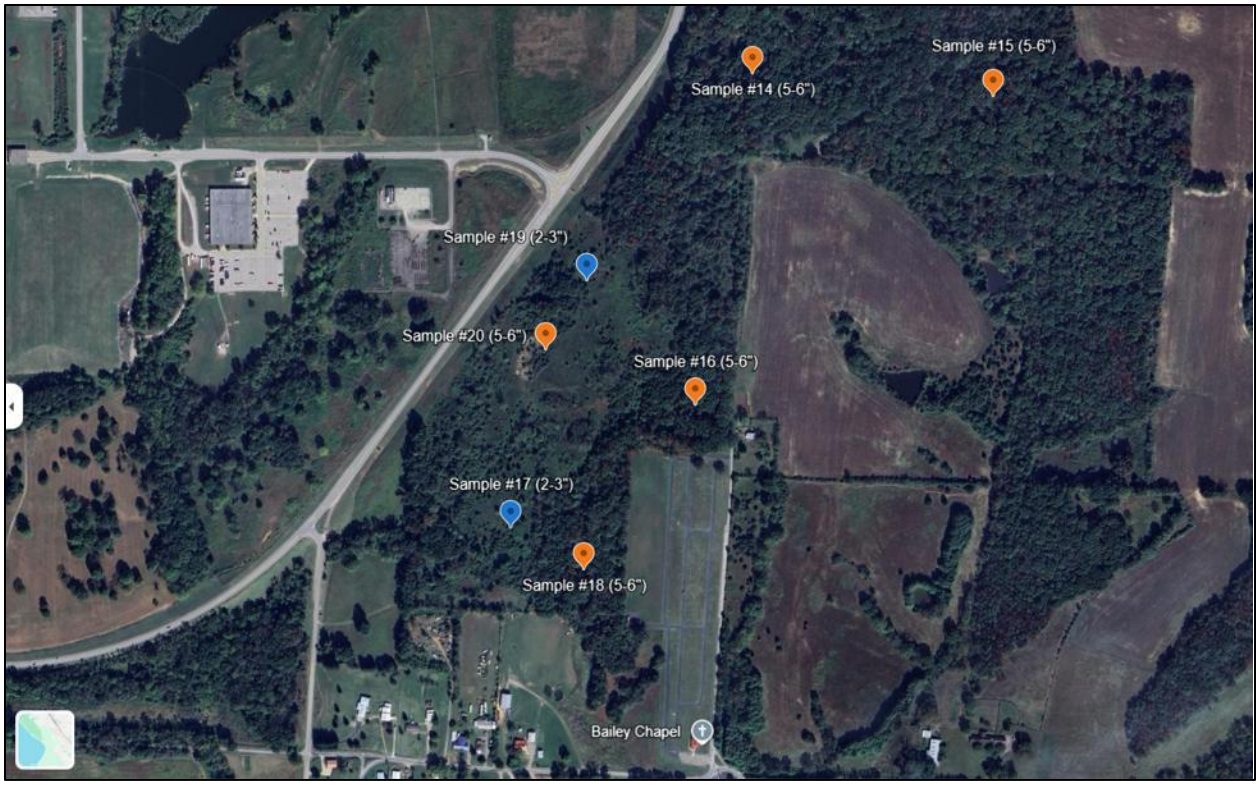


Figure 3-4. Southern Phase 1 Sampling Locations Along the Eastern PORTS Fenceline



3.5 Phase 2 Sampling

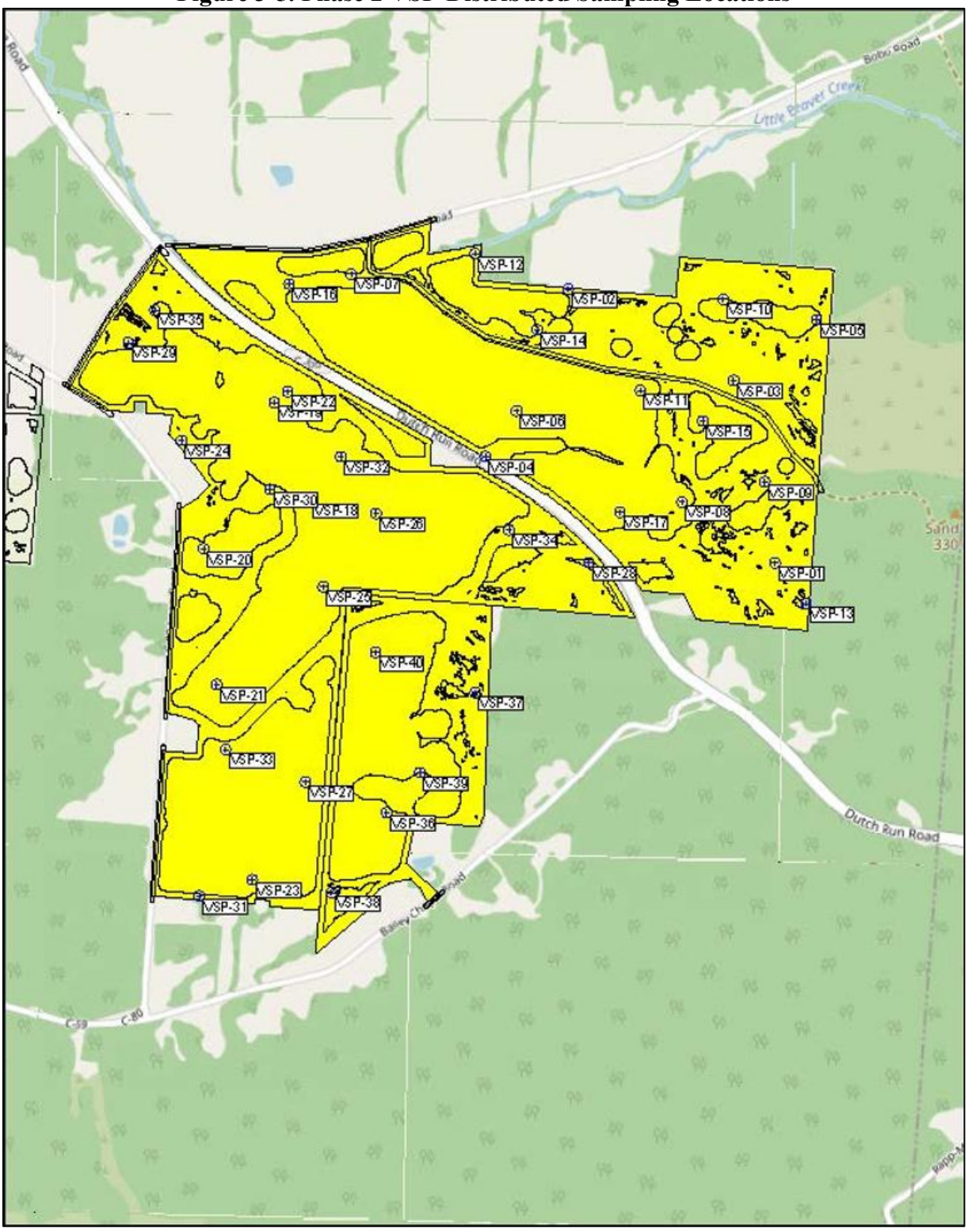
Phase 2 expanded the investigation across the 40-location VSP-distributed surface population and added selected non-radiological analyses to the radiological scope. Four QC-designated samples accompanied the surface dataset. The six deep-soil samples are described separately because they represent a different depth interval and include both radiological and pesticide analysis.

3.5.1 Phase 2 Sample Population and Spatial Distribution

SB Energy established the Phase 2 population at 40 primary surface-soil locations. VSP was used to spatially distribute those predetermined locations across the defined study area. The final coordinates are identified as VSP-01 through VSP-40 and span the mapped Phase 2 investigation area.

Phase 1 placed greater emphasis on property nearest the PORTS boundary. The broader Phase 2 distribution extended surface-soil coverage beyond that original area and provides the spatial dataset used for evaluating relationships among the Phase 2 results.

Figure 3-5. Phase 2 VSP-Distributed Sampling Locations



3.5.2 Surface-Soil Sampling

The Phase 2 primary surface samples, VSP-01 through VSP-40, were collected on July 7 and July 8, 2026. The Pace surface-soil packages retain the same field identifiers and document laboratory receipt on July 10, 2026, preserving the relationship among the mapped locations, collection record, and analytical data.

The analytical scope included the project radiological suite together with lead, mercury, low- and high-fraction petroleum hydrocarbons, pesticides, and asbestos. The individual analytical methods and laboratory reporting conventions are addressed in Section 4.

The available field, coordinate, and laboratory records establish the sample population and individual locations but do not establish one common numerical surface-soil collection interval for all 40 VSP locations. An exact interval is therefore not assigned to the Phase 2 surface population in this report.

3.5.3 Deep-Soil Sampling

Six deep-soil samples were collected: P1B1-01, P1B1-03, P1B1-04, P1B1-08, P1B1-09, and P1B1-10. The project record identifies the samples as representing approximately 18 to 25 feet below ground surface.

The six deep samples are reported as collected on July 28, 2026. Pace received the samples on July 30, 2026. The P1B1 identifiers are retained through the radiological and pesticide analytical records, and the pesticide package documents the same six samples for the 21-analyte suite.

The reviewed project record does not establish the method used to obtain the deep-soil material. SB Energy's field clarification states that Qal-Tek would not perform boring or drilling. No drilling method or drilling activity is therefore attributed to Qal-Tek in this report.

3.5.4 Quality-Control Samples

Phase 1 included two documented field duplicates, QC #1 and QC #2. Phase 2 included four separately identified samples, QC-01 through QC-04, which are retained in the applicable Pace analytical packages.

The available Phase 2 project record does not establish the parent VSP location or a specific field-duplicate relationship for QC-01 through QC-04. They are

therefore described according to their documented QC designation without assigning a more specific relationship than the record supports.

Laboratory-generated blanks, laboratory control samples, matrix spikes, laboratory duplicates, and matrix-spike duplicates are separate from these project QC samples and are addressed with the laboratory QC record in Section 4.5.

3.6 Field Sampling and Sample Management

Field procedures were used to maintain sample identity, preserve the relationship between field location and laboratory result, and limit the potential for cross-contamination during collection. The same general surface-soil collection, sample identification, custody, and field QA/QC processes applied to Phase 1 and Phase 2. Phase-specific differences are identified where they occurred.

3.6.1 Field Sampling Methods

Surface soil was collected using hand tools, including soil scoops and shovels, and placed into laboratory-supplied sample containers. Each sample was assigned a unique field identifier and associated with its documented sampling location. Vegetation, debris, and other foreign material were excluded from collected soil where practicable, and reusable sampling equipment was cleaned before use and between locations to minimize the potential for cross-contamination. Phase 1 locations were documented using GPS equipment, and the final Phase 2 locations are preserved in the project coordinate record.

Phase 2 implementation was subject to additional access and site-protection requirements established by SB Energy before mobilization. Vehicle access was limited to existing roads, with personnel directed to park and proceed to sampling locations on foot. Temporary access paths, tracked equipment, and ATV/UTV access were not authorized. Limited vegetation clearing was permitted provided protected species, nesting birds, and protected plants were avoided. Restrictions also applied in wooded areas, on steep slopes, and around wetlands, streams, drainage corridors, and similar features. Where a planned point could not be safely accessed, relocation to the nearest accessible location that continued to meet the sampling objective was permitted, with inaccessible locations documented.

3.6.2 Sample Handling and Chain of Custody

Samples were placed into laboratory-supplied containers, labeled with their assigned field identifiers, and maintained under chain of custody from

collection through laboratory receipt. The field and laboratory records preserve those identifiers so that analytical results remain traceable to the corresponding project sample and location.

The Phase 1 sample set was transferred to GEL Laboratories, which received the samples on June 10, 2026. Phase 2 surface samples were submitted to Pace and received on July 10, 2026. The separate deep-soil samples were maintained under their P1B1 identifiers and received by Pace on July 30, 2026; those identifiers are retained in both the radiological and pesticide packages.

Pace documented one sample-handling condition specific to the Phase 2 low-fraction petroleum hydrocarbon analysis. The affected samples were received in bulk containers, and Method 5035 preservation was not completed within 48 hours of collection. This condition is retained with the analytical record and evaluated for its effect on data usability in Section 7.6.2.

3.6.3 Field Quality Assurance and Quality Control

The field QA/QC framework included cleaning reusable sampling equipment between locations, maintaining sample and location identification, preserving custody documentation, and collecting the separately identified project QC samples described in Section 3.5.4. Phase 1 documented two field duplicates, while the available Phase 2 record identifies QC-01 through QC-04 without establishing their parent VSP relationships.

Laboratory QC, analytical sensitivity, qualifiers, and the effect of individual QC conditions on data usability are addressed separately in Sections 4 and 7.

4 Laboratory Analytical Program

Laboratory analysis was completed in phases corresponding to the field investigation. Phase 1 radiological samples were analyzed by GEL Laboratories, LLC. Phase 2 surface-soil samples were analyzed by Pace for the radiological and non-radiological constituents selected for the expanded characterization, with asbestos analysis performed through Pace's Wheat Ridge laboratory. The deep-soil samples were analyzed separately by Pace for the project radiological suite and pesticides.

The analytical packages contain the sample-specific results, detection and reporting parameters, analytical uncertainty for radiological measurements, qualifiers, and laboratory QC. This section summarizes the analytical laboratories, methods, reporting conventions, and laboratory QC documented in those packages. Analytical results are presented in Section 6, and data usability is evaluated in Section 7.

4.1 Analytical Laboratories and Program Overview

Phase 1 samples were submitted to GEL Laboratories, LLC in Charleston, South Carolina under Work Order 781064. GEL received the samples on June 10, 2026 and analyzed the 20 primary samples and two field duplicates for americium-241, plutonium-238, plutonium-239/240, uranium-233/234, uranium-235/236, uranium-238, and technetium-99. GEL reported the alpha-emitting radionuclides by alpha spectrometry and technetium-99 by liquid scintillation counting.

Phase 2 surface-soil analyses were performed through Pace Analytical. Non-radiological results are reported under SDG L1993475 and include lead, mercury, petroleum hydrocarbon fractions, and pesticides. Asbestos results are reported separately under SDG L1993486 and were analyzed by Pace Analytical Services in Wheat Ridge, Colorado. Radiological results for the 40 VSP samples and four QC-designated samples are reported under SDG L1993495.

The six deep-soil samples are reported under Pace SDG L1999549 for radiological analyses and SDG L1999548 for pesticides. The final radiological package includes americium-241, plutonium-238, plutonium-239/240, uranium-234, uranium-235, uranium-238, and technetium-99. The pesticide package includes total solids and 21 pesticides analyzed by Method 8081B. The deep-soil results are retained as a separate analytical dataset because the samples represent a substantially deeper soil interval than the Phase 1 and Phase 2 surface samples.

Laboratory-reported concentrations or activities, qualifiers, detection parameters, uncertainties, and QC information are taken from the respective analytical packages. The project comparison matrices preserve the selected comparison levels and project-specific adjudication used in the subsequent evaluation.

4.2 Radiological Analytical Methods

GEL analyzed the Phase 1 samples using modified DOE Environmental Measurements Laboratory HASL-300 procedures. The laboratory package identifies the following analytical methods:

- Americium-241: DOE EML HASL-300, Am-05-RC Modified, alpha spectrometry.
- Plutonium-238 and plutonium-239/240: DOE EML HASL-300, Pu-11-RC Modified, alpha spectrometry.
- Uranium-233/234, uranium-235/236, and uranium-238: DOE EML HASL-300, U-02-RC Modified, alpha spectrometry.
- Technetium-99: DOE EML HASL-300, Tc-02-RC Modified, liquid scintillation counting.

GEL reported the americium, plutonium, and uranium results on a dry-weight-corrected basis. Technetium-99 was reported on an as-received basis. Americium-243, plutonium-242, uranium-232, and technetium-99m were used as tracers to monitor radiochemical recovery.

Pace analyzed the Phase 2 surface-soil radiological samples using Method 907M for americium and plutonium, Method D3972 U-02 for uranium isotopes, and HASL 300 Tc-02-RC for technetium-99. The Pace packages report the activity result together with 2-sigma counting error, total propagated uncertainty, MDA, critical level, and applicable tracer information.

The deep-soil samples were analyzed using the same Pace method designations for americium, plutonium, uranium isotopes, and technetium-99.

4.3 Non-Radiological Analytical Methods

The Phase 2 non-radiological analyses were performed by Pace under SDG L1993475. The analytical package identifies the following methods:

- Lead: EPA Method 6020B by inductively coupled plasma mass spectrometry.
- Mercury: EPA Method 7471B.
- Low-fraction petroleum hydrocarbons: Method 8015D by gas chromatography.
- High-fraction petroleum hydrocarbons: Method 8015 by gas chromatography.
- Pesticides: EPA Method 8081B by gas chromatography.
- Total solids: Method 2540 G-2011, used in support of the soil analyses.

The laboratory reported the low-fraction petroleum hydrocarbon analysis within the volatile-organic-compound portion of the package and the high-fraction petroleum hydrocarbon analysis within the semi-volatile portion. Pace documented that samples associated with the 8015D analysis were received in bulk containers and that Method 5035 preservation was not completed within 48 hours of collection. The condition is retained with the affected analytical results and evaluated in Section 7.6.2.

The six deep-soil samples were analyzed separately under Pace SDG L1999548 for the same 21-pesticide suite using EPA Method 8081B, with total solids by Method 2540 G-2011.

Asbestos samples were analyzed under Pace SDG L1993486 using EPA 600/R-93/116, *Method for the Determination of Asbestos in Bulk Building Materials*, with polarized light microscopy. Pace reported ND where asbestos was not identified and a method detection limit of 1 percent. The laboratory sought the regulated asbestos mineral types in each submitted sample layer.

4.4 Laboratory Reporting Limits, MDAs/MDCs, and Qualifiers

The GEL and Pace laboratory packages use different reporting conventions. Those conventions are retained in the evaluation so that analytical sensitivity and reporting parameters remain distinct from measured concentrations or activities and from the project comparison criteria.

GEL reported Phase 1 radiological results with a reporting limit, sample-specific minimum detectable concentration (MDC), total propagated uncertainty, and counting uncertainty. The laboratory states that the MDC is sample specific and that total propagated uncertainty and counting uncertainty are calculated at the 95-percent confidence level, or 1.96 sigma. GEL defines the U qualifier to mean that the analyte was analyzed for but was not detected above the applicable MDL, MDA, MDC, or LOD.

Pace reports radiological sensitivity primarily as the minimum detectable activity (MDA). The radiological packages also report the critical level (Lc), 2-sigma counting error, and total propagated uncertainty. Pace defines its principal radiochemistry qualifiers as follows:

U: Result plus error is less than the MDA.

J: Result is less than the MDA, but result plus error is greater than the MDA.

A U-qualified Pace result remains a laboratory nondetect. A J-qualified radiological result is an estimated result below the MDA and is retained with its reported activity, MDA, and uncertainty. Neither convention is converted to zero during the evaluation. The Phase 2 surface and deep-soil packages also contain tracer and QC qualifications where method-specific recovery or control criteria were not met; those qualifications remain associated with the affected results for evaluation in Section 7.

For the non-radiological analyses, Pace reports method detection limits and reporting detection limits as applicable to the analytical method. Across the L1993475 and L1999548 packages, Pace uses qualifiers including:

- **J:** the analyte identification is acceptable and the reported value is estimated.
- **J3:** associated batch QC was outside the established quality-control range for precision.
- **J4:** associated batch QC was outside the established quality-control range for accuracy.
- **J7:** surrogate recovery cannot be used for control-limit evaluation because of dilution.

- **P:** the relative percent difference between the primary and confirmatory analyses exceeded 40 percent.

Asbestos reporting follows a separate convention. Pace reported ND where asbestos was not identified by the bulk-material method and identified a method detection limit of 1 percent.

Specific analytical-sensitivity conditions and qualifications affecting project results are evaluated in Section 7.

4.5 Laboratory Quality Control

Both GEL and Pace performed batch-specific laboratory QC with the project analyses. Depending on the analytical method, the laboratory controls included method blanks, laboratory control samples, matrix spikes, laboratory duplicates or matrix-spike duplicates, and radiochemical tracer recoveries.

For the Phase 1 radiological analyses, GEL reported method-specific laboratory QC and tracer recovery with Work Order 781064. Americium-243, plutonium-242, uranium-232, and technetium-99m were used to monitor radiochemical recovery. The QC summaries include laboratory control samples, method blanks, duplicate analyses, and associated recovery or precision information.

Pace reported laboratory QC by analytical method and workgroup. The Phase 2 surface-soil radiological package contains separate QC summaries for the americium, plutonium, uranium, and technetium methods. The final deep-soil radiological package contains corresponding QC for each radiological method, including method blanks, laboratory control samples, duplicate or matrix-spike analyses, and tracer recoveries. The deep-soil pesticide package contains method blanks, laboratory control samples, matrix-spike and matrix-spike duplicate analyses, and surrogate recoveries for Method 8081B. The Phase 2 non-radiological package contains method-specific QC for lead, mercury, petroleum hydrocarbons, pesticides, and supporting total-solids analyses.

For deep-soil pesticide batch WG2805456, Pace reported an endrin laboratory control sample recovery of 20.4 percent compared with the 34 to 137 percent control range. Endrin results for P1B1-08, P1B1-09, and P1B1-10 were J4-qualified. The effect of that qualification is evaluated in Section 7.

Section 7 evaluates laboratory QC performance, analytical sensitivity, duplicate performance, and individual qualifications as part of the overall data-usability assessment.

5 Technical Evaluation Basis and Comparison Criteria

The analytical data were evaluated using comparison values selected according to the constituent, soil interval, and purpose of the comparison. PORTS 2017 Methods is the primary technical reference because it provides both risk-based soil screening levels and soil background concentrations developed for PORTS and surrounding representative soils. The two are used differently. Screening levels identify concentrations that warrant further evaluation, while background concentrations provide a reference for determining whether naturally occurring or ubiquitous constituents differ from expected environmental conditions.

The project comparison matrices apply those values to the individual analytical results while retaining laboratory detection status, qualifiers, MDAs or MDCs, and uncertainty where those parameters affect interpretation. A numerical comparison is made first. Where that comparison does not resolve the result, the reviewer notes document the additional evaluation used to reach the project disposition.

5.1 Evaluation Approach

The evaluation maintains a distinction between the analytical result and the value used to interpret it. A measured concentration or activity is compared with the applicable screening or background value. An MDA, MDC, MDL, or reporting limit describes analytical sensitivity and is not substituted for the measured result. Laboratory qualifiers are retained with the data rather than removed during comparison.

PORTS 2017 Methods uses maximum detected concentrations as a principal screening metric and provides separate comparisons to Type 1 screening levels, Type 2 screening levels, and established background values for naturally occurring inorganic constituents and radionuclides. For this characterization, the selected criteria were also applied sample by sample in the project matrices. This preserves location-specific information and allows numerical differences, detection-limit conditions, and spatial relationships to remain visible before the datasets are summarized. PORTS Methods is intended to accommodate risk evaluations ranging from streamlined screening evaluations to more detailed assessments, with the level of evaluation matched to the investigation.

A result below the applicable comparison value generally requires no further interpretation on concentration alone. Results above a selected value, or nondetects for which the achieved analytical sensitivity is above the value being evaluated, are reviewed in context. The project matrices consider detection status, uncertainty where available, related radionuclides, appropriate background information, and whether the result is supported by a broader spatial or isotopic pattern. This approach is reflected in the Phase 1, Phase 2 surface, and deep-soil adjudication records.

The same evaluation sequence is not applied indiscriminately to every analyte. Naturally occurring constituents require background interpretation. Constituents without a relevant natural background comparison are evaluated primarily against the selected screening or other project comparison value.

5.2 PORTS 2017 Methods and Soil Evaluation Approach

PORTS 2017 Methods was developed for human-health risk assessments and risk evaluations at PORTS and provides screening values, soil-background data, analytical-sensitivity considerations, and procedures for evaluating environmental data during investigation. The guidance is intended to accommodate evaluations ranging from streamlined screening to baseline assessments and to be applied flexibly according to the nature of the investigation.

This report applies the elements directly relevant to the SB Energy soil data: Type 2 soil screening values, PORTS background concentrations for naturally occurring constituents, and the distinction between a screening comparison, a background comparison, and analytical sensitivity.

5.2.1 Type 2 Screening Levels

Appendix B of PORTS 2017 Methods provides Type 1 and Type 2 screening levels for multiple exposure scenarios and environmental media. Type 2 levels are based on a target cancer risk of 1×10^-6 and a target noncancer hazard quotient of 0.1.

The project radiological matrices use the applicable Type 2 resident-soil screening levels from Appendix B, Table B.2 for radionuclides evaluated on a screening basis. The same table supplies the selected lead, inorganic mercury, and pesticide values used in the non-radiological evaluation. The analyte-specific values are presented in Sections 5.3 and 5.4.

Type 2 values function as screening criteria. A concentration above a Type 2 value identifies a result requiring additional evaluation; that comparison alone does not establish site-related contamination or define a cleanup concentration. PORTS Methods places screening within a broader evaluation that considers background, detection frequency, spatial distribution, and other available site information.

Analytical sensitivity is considered separately. Where a radionuclide is reported as nondetect but the sample-specific MDA or MDC is greater than the selected Type 2 value, the detection limit is not treated as a measured exceedance. The project matrices retain the nondetect designation and

document the additional review used to determine whether the sensitivity condition affects the final disposition.

5.2.2 PORTS Site-Specific Background Concentrations

Appendix C of PORTS 2017 Methods documents the soil background investigation developed to characterize naturally occurring and ubiquitous constituents in soils representative of PORTS and surrounding areas. Background locations included Scioto River Valley soils, Minford soils, Gallia deposits, and upland surface soils selected outside areas affected by PORTS releases or other significant sources. Although the background study included analysis of organic constituents, only naturally occurring metals and radionuclides were retained for calculation of soil background concentrations.

The background data were grouped according to geology and depth before the final comparison populations were established. PORTS identifies separate populations for Scioto River Valley surface and subsurface soil, PORTS-representative surface soil, unsaturated Minford, saturated Minford, Gallia deposits, and upland surface soil. The saturated Minford population represents soil from 16 to 30 feet bgs.

The Phase 1 and Phase 2 surface-soil matrices use selected PORTS surface-soil background values for evaluation of naturally occurring uranium. The six deep-soil samples represent approximately 18 to 25 feet bgs; the deep-soil radiological matrix therefore applies the Appendix C saturated Minford 16-to-30-foot background concentrations to uranium. Surface-soil background values are not substituted for those depth-specific comparisons.

PORTS calculated the final background concentrations using a 95-percent upper tolerance limit, an upper-bound concentration, or the maximum detected value, depending on detection frequency and the distribution of the applicable background dataset.

5.2.3 Treatment of Naturally Occurring Constituents

PORTS 2017 Methods uses background concentrations to distinguish naturally occurring or ubiquitous constituent levels from concentrations potentially attributable to site activities. Uranium is the principal radiological application in this characterization because measurable uranium is expected in regional soil and cannot be attributed to PORTS solely on the basis of detection.

Uranium results are evaluated using the applicable surface or subsurface background population together with the measured activity, analytical uncertainty, isotope relationships, and associated radionuclide results. A

concentration above the selected background value is retained for technical review rather than treated automatically as evidence of site-related contamination. The project matrices preserve that distinction in the final reviewer disposition.

PORTS 2017 Methods also distinguishes naturally occurring uranium from processed uranium in its treatment of uranium-series equilibrium. Naturally occurring radioactive material in unprocessed uranium-bearing material may exhibit secular-equilibrium relationships, whereas processed or enriched uranium cannot necessarily be assumed to retain those relationships. Uranium-series references and environmental soil studies provide additional technical support for considering uranium isotope activity relationships, particularly the U-234/U-238 relationship, when evaluating whether measured uranium is consistent with natural material or warrants evaluation for a processed uranium contribution (IAEA, 2021; Ivanovich and Harmon, 1992; Murugan et al., 2022). These isotope relationships are used as supporting source-attribution evidence and do not replace the PORTS background comparisons.

5.3 Radiological Comparison Criteria

The radiological comparison criteria used in this report were selected from PORTS 2017 Methods and are the same values carried through the project comparison matrices. Surface-soil results are evaluated using the selected Type 2 resident-soil screening levels for americium, plutonium, technetium-99, U-234, and U-235, with U-238 evaluated against the PORTS Site Surface Soil background concentration. The Phase 1 GEL isotope designations U-233/234 and U-235/236 are evaluated using the corresponding uranium comparison applied in the Phase 1 matrix.

The deep-soil comparison differs for uranium. Americium, plutonium, and technetium-99 retain the selected Type 2 screening levels, while U-234, U-235, and U-238 are compared to the PORTS saturated Minford background concentrations for the 16- to 30-foot interval. That treatment follows the approximately 18- to 25-foot depths represented by the deep-soil samples and the depth-specific background population selected in the project matrix.

5.3.1 PORTS Radionuclide Screening Levels

Appendix B, Table B.2 of PORTS 2017 Methods provides the Type 2 resident-soil screening levels selected for the project evaluation. The values used in the Phase 1 and Phase 2 matrices are summarized in Table 5-1. Uranium background comparisons are included in the table so that the surface- and deep-soil criteria remain traceable in one location.

Table 5-1. Radiological Comparison Criteria Used for Soil Evaluation

Radionuclide	Surface-Soil Comparison (pCi/g)	Surface Comparison Type	Deep-Soil Comparison (pCi/g)	Deep Comparison Type
Americium-241	2.31	Type 2 resident-soil screening level	2.31	Type 2 resident-soil screening level
Plutonium-238	4.27	Type 2 resident-soil screening level	4.27	Type 2 resident-soil screening level
Plutonium-239/240	3.78	Type 2 resident-soil screening level	3.78	Type 2 resident-soil screening level
Uranium-233/234 / Uranium-234	5.83	Type 2 resident-soil screening level	2.36	Saturated Minford background
Uranium-235/236 / Uranium-235	0.194	Type 2 resident-soil screening level	0.17	Saturated Minford background
Uranium-238	1.36	PORTS Site Surface Soil background	2.41	Saturated Minford background
Technetium-99	114	Type 2 resident-soil screening level	114	Type 2 resident-soil screening level

The screening and background values are applied to reported activities without substituting an MDA or MDC for the measured result. This distinction is particularly relevant to the U-235/U-235/236 analytical-sensitivity conditions retained in the project matrices.

5.3.2 PORTS Radionuclide Background

Appendix C of PORTS 2017 Methods establishes separate soil background populations according to geologic setting and depth. The project surface-soil matrices use 1.36 pCi/g as the primary PORTS Site Surface Soil background concentration for U-238. The project reviewer notes also use the 1.85 pCi/g Scioto River Valley surface-soil concentration as additional regional context where individual U-238 results exceed 1.36 pCi/g. The 1.85 pCi/g value does not replace the selected Site Surface Soil comparison.

The comparison matrices preserve the difference between a numerical background exceedance and the interpretation assigned after review. Individual U-238 values above 1.36 pCi/g remain identified in the direct comparison field. The reviewer notes then consider the magnitude of the difference, analytical uncertainty where applicable, the Scioto River Valley surface-soil concentration, companion uranium results, and the presence or absence of associated americium, plutonium, or technetium-99 detections before assigning the final disposition.

The deep-soil uranium comparison uses a different PORTS population. Appendix C groups saturated Minford soil from 16 to 30 feet bgs separately from surface soil and unsaturated Minford. The six deep samples fall within approximately 18 to 25 feet bgs, and the deep-soil matrix therefore applies background concentrations of 2.36 pCi/g for U-234, 0.17 pCi/g for U-235, and 2.41 pCi/g for U-238.

These values are background reference concentrations, not radiological screening levels.

5.3.3 Current PORTS Environmental Monitoring Context

The 2024 PORTS ASER provides current context for radionuclide occurrence in soil around PORTS. Soil was monitored at 15 ambient air monitoring locations. Plutonium-239/240 was detected at an average activity of 0.0188 pCi/g at A9 southwest of PORTS; no other transuranic radionuclides, technetium-99, or U-235/236 were detected at the monitored soil locations in 2024.

Uranium, U-233/234, or U-238 were detected at each soil-monitoring location, and DOE reported that uranium-isotope activities were generally similar among off-site locations and the background location A37. A15, east-southeast of PORTS on Loop Road, had the highest uranium activities among the off-site locations reported for 2024. U-233/234 and U-238 activities at A15 were 1.14 and 1.28 pCi/g, respectively, compared with 0.933 and 1.17 pCi/g at A37.

These monitoring results are used as current environmental context. The project comparison criteria remain those established from PORTS 2017 Methods and the project matrices.

5.4 Non-Radiological Comparison Criteria

The Phase 2 surface-soil non-radiological matrix uses constituent-specific comparison values rather than a single common criterion. Lead, inorganic mercury, and the available pesticide values are drawn from PORTS 2017 Methods Appendix B, Table

B.2. Petroleum hydrocarbons are evaluated against the Ohio Soil Class 1 action levels selected in the project matrix, and asbestos is evaluated against the 1 percent PLM threshold used in the matrix.

The six deep-soil samples were analyzed for the same 21-pesticide suite. The deep-soil pesticide matrix retains the available Type 2 resident-soil values from Table B.2 as the project comparison basis.

Table 5-2. Non-Radiological Comparison Criteria

Analytical Group	Project Comparison Level	Units	Comparison Source/Type
Lead	400	mg/kg	PORTS Type 2 resident-soil screening level
Inorganic mercury	2.35	mg/kg	PORTS Type 2 resident-soil screening level
TPH low fraction	1,000	mg/kg	Selected Soil Class 1 TPH action level
TPH high fraction	2,000	mg/kg	Selected Soil Class 1 TPH action level
Pesticides	0.0319 to 37.9, analyte-specific where available	mg/kg	PORTS Type 2 resident-soil screening levels
Asbestos	1	%	PLM method/material threshold used in project matrix

5.4.1 Metals

Lead and inorganic mercury are compared to 400 mg/kg and 2.35 mg/kg, respectively. Both values are the selected Type 2 resident-soil screening levels carried into the Phase 2 non-radiological matrix from PORTS 2017 Methods. Detected concentrations are compared directly to these values; for nondetected mercury results, the laboratory reporting limit remains separate from the comparison concentration.

5.4.2 Petroleum Hydrocarbons

The project matrix compares the low- and high-fraction TPH analyses to 1,000 mg/kg and 2,000 mg/kg, respectively. These values are identified in the matrix as the selected Ohio Soil Class 1 TPH action levels rather than PORTS risk-based soil screening levels.

The laboratory reporting limits remain separate from those action levels. A detected high-fraction TPH concentration is evaluated using the reported concentration, while a low-fraction nondetect is retained with the applicable reporting limit. The sample-preservation condition documented for the low-fraction analysis does not alter the comparison value; its effect on data usability is addressed in Section 7.6.2.

5.4.3 Pesticides

The Phase 2 surface and deep-soil pesticide evaluations use the analyte-specific Type 2 resident-soil values available in PORTS 2017 Methods Appendix B, Table B.2. The laboratory analytical suite contains 21 pesticides. Numerical Table B.2 criteria were identified for 17 of those analytes and range from 0.0319 to 37.9 mg/kg. No separate Table B.2 numerical value was identified for delta-HCH, endrin aldehyde, endrin ketone, or toxaphene. The project matrices therefore make quantitative screening comparisons where a PORTS value is available while retaining the laboratory result and detection status for the full 21-analyte suite.

The same comparison basis is used for the six deep-soil pesticide samples. PORTS Appendix C does not provide pesticide background concentrations because only metals and radionuclides were retained for calculation of soil background values. PORTS Methods separately provides construction-worker screening levels for subsurface soil, but the deep-soil matrix retains the established Table B.2 resident-soil values as the more conservative project comparison and to maintain consistency with the Phase 2 surface evaluation.

Because pesticide reporting limits vary by analyte, each RDL is compared with its corresponding numerical criterion where one is available. An overall RDL range is not compared to the overall screening-value range.

5.4.4 Asbestos

Asbestos results are compared to the 1 percent PLM threshold used in the Phase 2 matrix. The threshold is retained as a method/material comparison and is not characterized in this report as a PORTS risk-based soil screening level.

5.4.5 Interpretation of Detections, Nondetects, and Qualified Results

Detected non-radiological results are evaluated using the laboratory-reported concentration and the applicable project comparison value. Detection alone does not indicate that a comparison value has been exceeded; the reported concentration controls that comparison.

For a nondetect, the laboratory RDL or MDL defines the sensitivity achieved for the affected analyte. The reporting or detection limit is not substituted for a measured concentration. Where an applicable RDL or MDL is below the project comparison value, the result establishes that the analyte was not detected at or above that analytical sensitivity. For pesticides, the comparison is made analyte by analyte because both the laboratory reporting limits and available PORTS criteria differ within the analytical group.

Qualified results retain the laboratory qualifier and reported value through evaluation. A qualification is assessed according to the condition that produced it and whether that condition affects the intended comparison. Results are not rejected solely because a qualifier is present, and analytical limitations are not resolved by removing the qualifier or replacing a nondetect with zero. Conditions requiring a data-usability determination are carried forward to Section 7.

6 Analytical Results

This section presents the analytical results from the Phase 1 surface-soil investigation, Phase 2 surface-soil sampling, and the separate Phase 2 deep-soil investigation. Results are discussed using the laboratory-reported detection status and the project comparison approach established in Section 5. Reported nondetects, estimated activities, MDAs or MDCs, and reporting limits are retained as separate analytical concepts. Analytical sensitivity, laboratory qualifications, QC performance, and overall data usability are evaluated in Section 7.

6.1 Results Overview

The Phase 1 radiological results were dominated by nondetects for americium, plutonium, U-235/236, and technetium-99, while U-233/234 and U-238 were detected in a portion of the samples. Several U-238 results were numerically above the selected 1.36 pCi/g PORTS Site Surface Soil background concentration and were evaluated individually in the Phase 1 matrix using the accompanying uncertainty and regional background information. No Phase 1 americium, plutonium, U-235/236, or technetium-99 result was reported as a confirmed detection.

Phase 2 produced a larger surface-soil radiological dataset in which uranium isotopes were routinely detected and low-level americium and plutonium detections occurred at individual locations. U-234 and confirmed U-235 results within the 40 primary VSP locations remained below their selected screening levels. VSP-14 had a U-238 activity above the selected PORTS Site Surface Soil background value but below the Scioto River Valley surface-soil concentration used as secondary context in the project matrix. Technetium-99 was not detected in the primary Phase 2 surface-soil samples.

The Phase 2 non-radiological results consisted primarily of lead and high-fraction TPH detections at concentrations below the selected comparison values. Mercury was detected at three primary locations and was otherwise reported as nondetect. Low-fraction TPH, the targeted pesticides, and asbestos were reported as nondetect in the primary Phase 2 samples. The non-radiological matrix assigned PASS to the primary-sample comparisons.

The deep-soil results include the project radiological suite and pesticides. U-234 and U-238 activities remained below the applicable saturated Minford background concentrations. One detected U-235 result at P1B1-08 was above the 0.170 pCi/g background value, and one J-qualified U-235 result at P1B1-04 had an MDA slightly above that value. Both were retained as PASS in the adjudicated deep-soil radiological matrix. All 21 pesticides were nondetect in each of the six deep-soil samples.

6.2 Phase 1 Radiological Results

Phase 1 provided the initial property-specific radiological dataset for the investigation. In the 20 primary samples, Am-241, Pu-238, Pu-239/240, U-235/236, and Tc-99 were reported with the GEL U qualifier and were therefore nondetects relative to their sample-specific MDCs. U-233/234 and U-238 were detected in a portion of the samples, although each detected U-233/234 result remained below the 5.83 pCi/g comparison value. The Phase 1 matrix assigned PASS to each primary-sample comparison.

The U-235/236 results require a distinction between detection status and analytical sensitivity. U-235/236 was not detected in any of the primary Phase 1 samples, but the sample-specific MDCs were above the 0.194 pCi/g comparison value. For example, the MDC was 0.574 pCi/g at Sample #1, 1.01 pCi/g at Sample #12, and 0.964 pCi/g at Sample #16. These MDCs are measures of analytical sensitivity rather than measured U-235/236 activities. The nondetect designation is retained for these results, with the achieved analytical sensitivity evaluated in Section 7.

U-238 results above the selected 1.36 pCi/g PORTS Site Surface Soil background concentration occurred at Samples #1, #6, #7, #8, #12, and #16. Reported activities at Samples #1, #6, #7, #8, and #16 ranged from 1.49 to 1.82 pCi/g and remained at or below the 1.85 pCi/g Scioto River Valley surface-soil concentration used as additional regional context. GEL 95-percent TPU also overlapped the 1.36 pCi/g background value for these results.

Sample #12 had the highest primary-sample U-238 result at 2.00 pCi/g. The result was above both 1.36 pCi/g and the 1.85 pCi/g Scioto River Valley value, but the reported GEL 95-percent TPU of ±1.33 pCi/g overlapped both background concentrations. U-235/236 remained U-qualified at this location, and americium, plutonium, and

technetium-99 were also nondetect. The Phase 1 matrix retained PASS for the Sample #12 U-238 comparison.

6.3 Phase 2 Radiological Results

The 40 Phase 2 surface-soil locations expanded the radiological dataset across the defined study area. The Pace results included unqualified detections, U-qualified nondetects, and J-qualified estimated activities depending on radionuclide and sample. The subsections below summarize the primary-sample results by radionuclide group while retaining the project matrix dispositions.

6.3.1 Americium

Am-241 results were predominantly U-qualified nondetects or J-qualified estimated activities below the MDA, with confirmed low-level detections at individual locations. VSP-03 was reported at 0.0837 pCi/g with an MDA of 0.0506 pCi/g, and VSP-24 was reported at 0.063 pCi/g with an MDA of 0.0629 pCi/g. Both were below the 2.31 pCi/g project comparison level.

VSP-14 was reported at 0.118 pCi/g with a J qualifier and an MDA of 0.202 pCi/g. The result therefore remains an estimated activity below the MDA rather than a confirmed detection. The associated Am-243 tracer-recovery qualification is retained with the analytical record for evaluation in Section 7.

6.3.2 Plutonium

Pu-238 results were predominantly U- or J-qualified and remained below the 4.27 pCi/g comparison value. Pu-239/240 included qualified low-level results and unqualified detections. Confirmed Pu-239/240 detections included 0.0529 pCi/g at VSP-03, 0.0265 pCi/g at VSP-22, and 0.055 pCi/g at VSP-24. Each remained below the 3.78 pCi/g comparison level, and no primary Phase 2 Pu-238 or Pu-239/240 result exceeded its applicable project comparison value.

6.3.3 Uranium Isotopes

U-234 was detected throughout the Phase 2 surface-soil dataset, with reported activities below the 5.83 pCi/g comparison level. VSP-14 was reported at 1.87 pCi/g and VSP-40 at 1.50 pCi/g.

U-235 results included nondetects, estimated activities below the MDA, and confirmed detections. Within the 40 primary VSP locations, confirmed detections remained below the 0.194 pCi/g screening level. VSP-05 was reported at 0.169 pCi/g, VSP-14 at 0.152 pCi/g, and VSP-40 at 0.191 pCi/g.

Several nondetect or estimated results had MDAs above 0.194 pCi/g, including VSP-01 at 0.270 pCi/g, VSP-17 at 0.292 pCi/g, and VSP-23 at 0.195 pCi/g. The reported U or J status was retained in each case rather than treating the MDA as a measured U-235 activity.

VSP-14 had a U-238 activity of 1.78 pCi/g, above the selected 1.36 pCi/g PORTS Site Surface Soil background concentration and below the 1.85 pCi/g Scioto River Valley surface-soil concentration. At the same location, U-234 was 1.87 pCi/g and U-235 was 0.152 pCi/g, both below their selected comparison levels. Am-241 and Pu-239/240 were J-qualified below their MDAs, while Pu-238 and Tc-99 were U-qualified. The project matrix retained PASS for the U-238 comparison.

Other primary U-238 results were at or below the selected 1.36 pCi/g background comparison in the project matrix. VSP-40, for example, had a detected U-238 activity of 1.31 pCi/g.

6.3.4 Technetium-99

Tc-99 was U-qualified throughout the primary Phase 2 surface-soil dataset. Sample-specific MDAs were generally near 2 pCi/g and remained well below the 114 pCi/g comparison level. VSP-01 had an MDA of 2.13 pCi/g, while VSP-40 had an MDA of 1.64 pCi/g. The numerical activities associated with these U-qualified results are retained as laboratory-reported values and are not treated as confirmed Tc-99 detections.

6.4 Phase 2 Non-Radiological Results

The Phase 2 non-radiological matrix presents the surface-soil results for lead, mercury, TPH, pesticides, and asbestos using the constituent-specific comparison levels established in Section 5. The primary-sample comparisons were assigned PASS throughout the matrix.

6.4.1 Lead and Mercury

Lead was detected throughout the Phase 2 surface-soil dataset at concentrations below the 400 mg/kg comparison level. VSP-14 was reported at 58.5 mg/kg. Other representative results include 16.0 mg/kg at VSP-03, 18.2 mg/kg at VSP-39, and 15.5 mg/kg at VSP-40.

Mercury was detected at three primary Phase 2 locations: 0.103 mg/kg at VSP-14, 0.0401 mg/kg at VSP-29, and 0.0532 mg/kg at VSP-36. Each detected concentration remained below the 2.35 mg/kg project comparison value. Mercury was reported as nondetect in the remaining primary samples, generally at an RDL of 0.040 mg/kg.

6.4.2 Petroleum Hydrocarbons

Low-fraction TPH was reported as nondetect in the Phase 2 primary samples at an RDL of 2.50 mg/kg, compared with the 1,000 mg/kg project value. The laboratory case narrative documents that samples for the low-fraction analysis were received in bulk containers and were not preserved for Method 5035 within 48 hours of collection. That sample-preservation condition is retained in the analytical record and evaluated for data usability in Section 7.6.2.

High-fraction TPH produced both detections and nondetects. VSP-14 had the highest result identified in the project matrix at 308 mg/kg. The sample was analyzed at a dilution factor of 40 with an RDL of 160 mg/kg; the reported concentration remained below the 2,000 mg/kg comparison value. Other detected results included 12.8 mg/kg at VSP-03, 16.0 mg/kg at VSP-05, and 14.2 mg/kg at VSP-39.

6.4.3 Pesticides

All 21 targeted pesticides were reported as nondetect in each of the 40 primary Phase 2 surface-soil samples. Analyte-specific RDLs ranged from 0.020 to 0.400 mg/kg. For the pesticides with numerical PORTS comparison values identified in Section 5.4.3, the applicable RDLs were below those criteria.

6.4.4 Asbestos

Asbestos was reported as nondetect by PLM for VSP-01 through VSP-40. The laboratory report identifies a 1-percent method detection limit, and no primary Phase 2 sample had a reported asbestos result at or above the 1-percent project threshold.

6.5 Phase 2 Deep-Soil Results

The six deep-soil samples are reported separately from the Phase 2 surface-soil dataset and are evaluated using the depth-specific radiological comparison basis established in Section 5. Tc-99 was U-qualified throughout the six-sample deep-soil dataset, with MDAs of approximately 2 pCi/g and below the 114 pCi/g comparison level. The same six locations were also analyzed for the 21-pesticide suite.

6.5.1 Americium

Am-241 was U-qualified in each of the deep-soil samples. At P1B1-10, the reported numerical activity was 0.0639 pCi/g with an MDA of 0.192 pCi/g and remained a nondetect. The associated Am-243 tracer recovery was 24.3 percent

and carried the laboratory C2 qualification. The qualification is evaluated in Section 7.

6.5.2 Plutonium

Deep-soil plutonium results were U- or J-qualified below their respective MDAs and remained below the selected screening levels. P1B1-03 had a J-qualified Pu-238 result of 0.018 pCi/g with an MDA of 0.0449 pCi/g and a U-qualified Pu-239/240 result of 0.00216 pCi/g with an MDA of 0.0338 pCi/g.

At P1B1-08, Pu-238 and Pu-239/240 were both U-qualified. The Pu-242 tracer recovery was 111 percent, one percentage point above the laboratory control range identified in the project matrix. Both plutonium results remained nondetect, and the tracer-recovery condition is evaluated with the radiochemical qualifications in Section 7.

6.5.3 Uranium Isotopes

U-234 and U-238 were detected in the deep-soil samples at activities below the applicable saturated Minford background concentrations. At P1B1-03, U-234 and U-238 were 0.986 and 1.11 pCi/g, respectively. P1B1-04 was reported at 1.72 pCi/g for U-234 and 1.58 pCi/g for U-238, while P1B1-08 was 1.24 and 1.22 pCi/g.

P1B1-04 had a U-235 result of 0.0746 pCi/g with a J qualifier and an MDA of 0.186 pCi/g. The estimated activity remained below the 0.170 pCi/g deep-soil background value, while the MDA exceeded that value by 0.016 pCi/g. Companion U-234 and U-238 activities were below their applicable background concentrations, and americium, plutonium, and technetium-99 were not detected. The deep-soil matrix retained PASS for this result.

P1B1-08 had a detected U-235 activity of 0.299 pCi/g, 0.129 pCi/g above the 0.170 pCi/g saturated Minford background concentration. Pace reported a 2-sigma TPU of ±0.209 pCi/g for the result, which is greater than the numerical difference between the measured activity and the background value. U-234 and U-238 at the same location were 1.24 and 1.22 pCi/g, respectively, both below their applicable background concentrations; Am-241, Pu-238, Pu-239/240, and Tc-99 were nondetect. The adjudicated deep-soil matrix retained PASS for the P1B1-08 U-235 result.

At P1B1-09, U-235 was U-qualified at 0.0255 pCi/g with an MDA of 0.173 pCi/g. P1B1-10 had a detected U-235 activity of 0.167 pCi/g, immediately below the 0.170 pCi/g background concentration.

6.5.4 Pesticides

All 21 pesticides were reported as nondetect in each of the six deep-soil samples. The analyte-specific RDLs ranged from 0.020 to 0.400 mg/kg. For the 17 analytes with numerical PORTS Type 2 resident-soil criteria identified in the deep-soil comparison matrix, the applicable RDLs were below those screening values. The matrix retained PASS for the available quantitative screening comparisons.

Endrin was reported as ND at an RDL of 0.020 mg/kg in all six samples. Results for P1B1-08, P1B1-09, and P1B1-10 carried the J4 qualifier associated with the pesticide batch accuracy condition. The endrin result remained a nondetect in each affected sample; the effect of the J4 qualification on data usability is evaluated in Section 7.

7 Data Quality Assessment

This section evaluates whether the analytical data are suitable for the characterization and comparison purposes established for the investigation. The assessment considers completeness, analytical sensitivity, precision, laboratory control performance, representativeness, comparability, and the effect of reported qualifications or analytical limitations. Consistent with the PORTS evaluation approach and the project data-quality objectives, laboratory reporting limits and MDAs or MDCs are considered in relation to the applicable comparison and the decision supported by the result; they are not treated as measured concentrations or activities.

Analytical findings are repeated only where necessary to evaluate data quality. Section 7.7 provides the overall data-usability determination.

7.1 Data Completeness

The analytical record contains the primary data required for the investigation components and analyte groups evaluated in this report. Phase 1 includes results for 20 primary soil samples and two documented field duplicates. Phase 2 includes the 40 VSP-distributed surface-soil locations and four QC-designated samples across the applicable radiological, non-radiological, and asbestos analyses.

The six deep-soil samples are represented in both the radiological and pesticide analytical records. The radiological package contains the project radionuclide suite, while Pace SDG L1999548 contains total solids and the 21-pesticide suite for P1B1-01, P1B1-03, P1B1-04, P1B1-08, P1B1-09, and P1B1-10.

The laboratory packages and project comparison matrices provide the reported results, qualifiers, analytical-sensitivity parameters, and supporting QC information needed for

the comparisons established in Section 5. No missing primary analytical result was identified that prevents evaluation of the targeted constituents. The data-quality conditions requiring additional discussion are limited to analytical sensitivity, sample preservation, and specific laboratory qualifications.

7.2 Analytical Sensitivity

Analytical sensitivity was generally sufficient for the intended comparisons for americium, plutonium, technetium-99, lead, mercury, petroleum hydrocarbons, pesticides, and asbestos. For the Phase 2 surface-soil non-radiological analyses, the applicable reporting limits for mercury, low-fraction TPH, and pesticides were below the selected project criteria. The 160 mg/kg RDL associated with the diluted VSP-14 high-fraction TPH result also remained below the 2,000 mg/kg comparison level. Asbestos was evaluated at a 1-percent method detection limit, which supports comparison to the 1-percent PLM threshold but does not establish absence below that analytical level.

The deep-soil pesticide analyses had RDLs ranging from 0.020 to 0.400 mg/kg. For the 17 pesticide analytes with numerical PORTS criteria identified in the project matrix, the applicable RDLs were below those values. All 21 analytes were reported as nondetect in each of the six samples.

The principal recurring sensitivity limitation is U-235/U-235/236. In Phase 1, U-235/236 was U-qualified as not detected, while the sample-specific MDCs were above the selected 0.194 pCi/g comparison level. Sample #2, for example, had an MDC of 0.652 pCi/g, and Sample #12 had an MDC of 1.01 pCi/g. The adjudication record retains PASS because the reported values remain U-qualified nondetects and the MDC is not treated as a measured U-235/236 activity.

The Phase 1 U-235/236 results therefore do not analytically exclude every possible concentration between 0.194 pCi/g and the applicable sample-specific MDC. They also do not establish that U-235/236 was present above 0.194 pCi/g. Both facts are retained in the evaluation.

Phase 2 achieved lower U-235 MDAs at many surface locations, although several remained above the 0.194 pCi/g comparison level. VSP-01 was U-qualified with an MDA of 0.270 pCi/g; VSP-10 was U-qualified with an MDA of 0.310 pCi/g; VSP-17 had a J-qualified estimated activity of 0.131 pCi/g with an MDA of 0.292 pCi/g; and VSP-23 was U-qualified with an MDA of 0.195 pCi/g. The project adjudication retains the detection status and PASS disposition while recognizing that these MDAs limit the strength of a direct nondetect comparison below 0.194 pCi/g.

The same distinction applies to two deep-soil U-235 results relative to the selected 0.170 pCi/g saturated Minford background concentration. P1B1-04 had a J-qualified

result of 0.0746 pCi/g and an MDA of 0.186 pCi/g. P1B1-09 had a U-qualified result of 0.0255 pCi/g and an MDA of 0.173 pCi/g. The MDAs exceed the background value by 0.016 and 0.003 pCi/g, respectively, but neither MDA represents a measured U-235 activity.

These uranium sensitivity conditions are retained as specific analytical limitations without extending them to radionuclides or analytical groups for which the achieved sensitivity was adequate for the intended comparison.

7.3 Precision and Duplicate Performance

Precision was evaluated using laboratory duplicates, matrix-spike duplicates, and related QC reported with the analytical packages. GEL evaluates relative percent difference directly when activities are sufficiently above the required detection level and uses an absolute control relationship where one or both duplicate values are low relative to that level. This avoids assigning disproportionate significance to percentage differences between very low radiochemical results.

The Pace radiochemical QC record similarly uses uncertainty-based evaluation where appropriate. The P1B1-10 Am-241 laboratory duplicate produced a nominal RPD of 200 percent because both results were very low, while the reported relative error ratio was 0.533 against a control limit of 3. The original P1B1-10 result remained U-qualified. The uncertainty-based duplicate criterion therefore supports acceptable agreement despite the large nominal percentage difference.

Other laboratory precision checks were within their reported controls. Phase 2 uranium matrix-spike and matrix-spike duplicate recoveries were 121 and 103 percent for U-234 and 133 and 114 percent for U-238, within the reported 60-to-140-percent range. The RPD for both uranium isotopes was 13.4 percent against a 20-percent limit.

The Phase 2 surface-soil pesticide QC contains J3 qualifications associated with matrix-spike duplicate precision for multiple analytes. That batch-specific condition is discussed with the affected pesticide QC in Section 7.6.3.

The deep-soil pesticide QC did not show the same precision condition for endrin. In batch WG2805456, the endrin MS/MSD RPD was 8.00 percent against a 37-percent control limit. The separate endrin qualification in that batch arose from laboratory control sample recovery and is therefore treated as an accuracy condition rather than a precision failure.

7.4 Accuracy and Laboratory Control Performance

The Phase 1 GEL package documents calibration, instrument controls, process controls, method blanks, laboratory control samples, and laboratory duplicates with the

analytical batches. Sample #1 was recounted for technetium-99 to verify the result; the recount remained part of the final laboratory record and does not represent a rejected analysis.

The Pace radiological and non-radiological packages provide comparable evidence of laboratory control. Representative Phase 2 uranium laboratory control sample recoveries were 108 percent for U-234 and 104 percent for U-238 within the stated 75-to-125-percent range. Lead laboratory control recovery was 101 percent within the reported 80-to-120-percent range, and mercury controls included recoveries of 99.5 and 91.0 percent within their applicable ranges.

The deep-soil plutonium QC reported laboratory control recoveries of 91.4 percent for Pu-238 and 88.0 percent for Pu-239/240. Sample-specific tracer qualifications are addressed separately in Section 7.6.1.

The deep-soil pesticide package identified one accuracy exception requiring separate treatment. In batch WG2805456, the endrin laboratory control sample recovery was 20.4 percent compared with the laboratory control range of 34 to 137 percent. Pace applied the J4 accuracy qualifier to the endrin results for P1B1-08, P1B1-09, and P1B1-10. The associated endrin matrix-spike and matrix-spike duplicate recoveries were 42.7 and 46.1 percent within their 19-to-143-percent acceptance range, and the 8.00-percent RPD was within the 37-percent precision limit. The effect of the J4 qualification on the three deep-soil results is addressed in Section 7.6.3.

The reviewed QC record therefore identifies specific sample- or batch-level conditions without indicating a broader loss of laboratory control across the analytical program.

7.5 Representativeness and Comparability

Representativeness is evaluated in relation to the investigation design and the soil actually sampled. Phase 1 remains a substantive property-specific radiological investigation for the locations and shallow-soil intervals represented by that dataset. Phase 2 expanded geographic coverage through the 40 VSP-distributed surface-soil locations.

The six deep-soil samples represent selected subsurface locations and are not pooled with the surface-soil population. That distinction is required for the radiological evaluation because depth-specific PORTS background concentrations are applied to deep uranium. The same six P1B1 locations were analyzed for pesticides, providing a corresponding deep-soil non-radiological dataset rather than a separate location population.

Comparability between Phase 1 and Phase 2 radiological data is sufficient for integrated evaluation when laboratory-specific reporting conventions are preserved.

GEL reported U-233/234 and U-235/236 as combined isotope designations and used sample-specific MDC terminology. Pace reported U-234 and U-235 separately and used MDA terminology. U- and J-qualified Pace results remain defined according to Pace reporting conventions rather than being converted to zero or treated as unqualified detections.

The Phase 2 surface pesticide and deep-soil pesticide data were both generated using Method 8081B for the same 21-analyte suite. The datasets therefore support a consistent analytical comparison of pesticide detection status between the sampled surface and deep intervals, while retaining the different sample depths and the comparison basis established in Section 5.

Within the Phase 2 surface investigation, the VSP identifiers provide direct location correspondence among the radiological, non-radiological, and asbestos datasets. The P1B1 identifiers provide the same traceability between the deep radiological and pesticide packages.

7.6 Qualified Results and Analytical Limitations

Laboratory qualifications were evaluated according to the condition represented by the qualifier and its effect on the intended use of the result. A qualifier was not treated as automatic rejection, and nondetect or estimated values were not converted to zero.

7.6.1 Radiological Qualifications

For Pace radiochemical data, a U qualifier identifies a result below the laboratory detection criterion, while a J qualifier identifies an estimated result below the MDA under the laboratory reporting convention. The U-235 sensitivity conditions associated with these results are addressed in Section 7.2.

VSP-14 had an Am-241 result of 0.118 pCi/g with a J qualifier and an MDA of 0.202 pCi/g. The associated Am-243 tracer recovery was 21.2 percent and carried the C2 qualification because recovery was below the 30-to-110-percent laboratory range. Am-241 remained an estimated activity below the MDA, and the Phase 2 matrix retained PASS.

P1B1-10 had a comparable Am-241 tracer condition. The result was 0.0639 pCi/g with a U qualifier and an MDA of 0.192 pCi/g, while Am-243 recovery was 24.3 percent with a C2 qualification. The qualification remains associated with the sample but does not convert the U-qualified result into a detection.

At P1B1-08, Pu-242 tracer recovery was 111 percent and carried the C1 qualification, one percentage point above the reported 30-to-110-percent range.

Pu-238 and Pu-239/240 were both U-qualified nondetects, and the adjudicated deep-soil matrix retained PASS for both results.

No reviewed radiological qualifier requires removal of an associated primary result from the project dataset. The qualifications remain relevant to the weight assigned to individual low-activity results and are retained with those data.

7.6.2 TPH Low-Fraction Preservation

The principal non-radiological sample-handling limitation is the preservation condition reported for low-fraction TPH. Pace documented that samples submitted for Method 8015D were received in bulk containers and that Method 5035 preservation was not completed within 48 hours of collection. The condition applies to VSP-01 through VSP-40 and QC-01 through QC-04.

The preservation condition limits the strength of the low-fraction TPH nondetects because the specified preservation requirement was not met before analysis. The nondetects are therefore not interpreted as demonstrating absence or zero concentration. The condition introduces uncertainty regarding recovery at low concentrations and remains a defined limitation of that analytical group.

The primary low-fraction TPH samples were reported as nondetect at an RDL of 2.50 mg/kg compared with the selected 1,000 mg/kg project value. The preservation condition reduces confidence in trace-level interpretation but does not constitute a measured exceedance. The project matrix retains PASS while preserving the limitation in the data-usability assessment.

7.6.3 Other Analytical Qualifications

VSP-14 high-fraction TPH was analyzed at a dilution of 40 and reported at 308 mg/kg with an RDL of 160 mg/kg. The associated o-terphenyl surrogate carried the J7 qualifier, which Pace defines as a condition where surrogate recovery cannot be used for control-limit evaluation because of dilution. The qualification applies to surrogate evaluation and does not change the reported 308 mg/kg high-fraction TPH concentration.

The Phase 2 surface-soil pesticide QC contains J3 qualifications associated with matrix-spike duplicate precision for multiple analytes. J3 identifies batch QC outside the established precision range. The primary surface-soil pesticide samples remained nondetect for the targeted suite, and the qualification does not create a pesticide detection or provide a basis for replacing the reported nondetects with concentrations.

The deep-soil pesticide package contains a separate J4 accuracy qualification for endrin. P1B1-08, P1B1-09, and P1B1-10 were reported as ND for endrin at an RDL of 0.020 mg/kg and carried J4 because the associated batch LCS recovery was 20.4 percent compared with the 34-to-137-percent control range. The 0.020 mg/kg RDL remains below the selected 1.90 mg/kg PORTS screening value, and the associated endrin MS/MSD recovery and precision results were within their stated control ranges. The deep-soil pesticide matrix therefore retains PASS for the affected comparisons while preserving the J4 qualification as a batch-specific accuracy condition.

No other reviewed non-radiological qualification establishes a material limitation requiring separate treatment at the project-comparison level.

7.7 Overall Data Usability

The combined Phase 1, Phase 2 surface-soil, and deep-soil datasets are suitable for the intended soil characterization and support the project comparisons established in Section 5. The required analytical suites were completed, sample identity and location relationships were maintained, and the reviewed field and laboratory QC records support use of the results for evaluation of radiological and non-radiological soil conditions. The deep-soil dataset now includes both radiological and pesticide results for the six P1B1 locations.

The identified qualifications are limited in scope and do not materially affect overall data usability. Phase 1 and selected Phase 2 U-235/U-235/236 results have sample-specific detection limits above the selected comparison values; those results remain properly identified as nondetect or estimated measurements, and the sensitivity conditions are retained in the subsequent interpretation. The radiochemical tracer qualifications are isolated and do not indicate a broader loss of analytical control.

The low-fraction TPH preservation condition remains a specific limitation on interpretation at low concentrations. The affected samples were reported as nondetect at an RDL substantially below the selected project comparison value, so the condition does not prevent use of the dataset for the intended project comparison.

The Phase 2 surface pesticide J3 condition and the deep-soil endrin J4 condition are similarly bounded. All deep-soil pesticide analytes were nondetect, the RDLs for the 17 analytes with numerical project criteria were below those values, and the endrin J4 qualification affects three samples within one analytical batch rather than the pesticide dataset as a whole.

The analytical record is technically defensible and sufficiently complete for evaluation of the sampled property. No systematic analytical condition was identified that

requires rejection of a material portion of the Phase 1, Phase 2 surface-soil, or deep-soil datasets or prevents the investigation objectives from being addressed.

8 Integrated Site Evaluation

The usable Phase 1, Phase 2 surface-soil, and deep-soil datasets were evaluated collectively to determine what the analytical record indicates about soil conditions within the areas investigated. The evaluation considers the magnitude of results relative to the project comparison criteria, relationship to PORTS background concentrations, constituent associations, depth, and spatial distribution. The combined record supports a radiological condition most reasonably associated with natural or background soil radioactivity and non-radiological results below the selected project comparison criteria. No coherent analytical pattern was identified that supports a site-related soil contamination condition.

8.1 Screening-Level Evaluation

The radiological screening evaluation is favorable. Americium, plutonium, technetium-99, U-234, and confirmed U-235 results evaluated against the selected PORTS Type 2 screening levels remained below those values. Sample-specific U-235/U-235/236 analytical sensitivity exceeded the selected screening level at certain locations, but those conditions represent limits on the strength of the nondetect comparison rather than measured exceedances. Phase 2 americium and plutonium detections were low relative to their applicable screening values and were not accompanied by a recurring radionuclide association.

No primary Phase 2 surface-soil non-radiological result exceeded its selected comparison criterion. At VSP-14, where several of the higher results occurred, lead was 58.5 mg/kg compared with 400 mg/kg, mercury was 0.103 mg/kg compared with 2.35 mg/kg, and high-fraction TPH was 308 mg/kg compared with 2,000 mg/kg. Low-fraction TPH was reported as nondetect, and all 21 pesticides and asbestos were also nondetect at that location.

The deep-soil pesticide results extend that finding below the surface interval. All 21 pesticides were nondetect in each of the six P1B1 samples. For the 17 analytes with numerical PORTS Type 2 resident-soil criteria identified in the project matrix, the applicable RDLs were below those screening values.

8.2 Background and Source-Attribution Evaluation

PORTS 2017 Methods uses background concentrations to distinguish naturally occurring or ubiquitous constituents from concentrations that may warrant evaluation for a site-related source. The PORTS background study separates surface and subsurface soils by geology and depth, including the saturated Minford population used for the project deep-soil uranium evaluation.

Phase 1 established the initial property-specific uranium pattern. Several U-238 results were above the selected 1.36 pCi/g PORTS Site Surface Soil background concentration but remained at or below the 1.85 pCi/g Scioto River Valley surface-soil concentration used as additional regional context. Sample #12 had the highest primary Phase 1 U-238 activity at 2.00 pCi/g. Although that result was slightly above 1.85 pCi/g, the GEL 95-percent total propagated uncertainty of ±1.33 pCi/g overlapped both background values. U-235/236, americium, plutonium, and technetium-99 were nondetect at the same location.

Phase 2 produced a similar uranium distribution across the broader surface-soil dataset. VSP-14 had a U-238 activity of 1.78 pCi/g, above the 1.36 pCi/g Site Surface Soil value and below the 1.85 pCi/g Scioto River Valley value. U-234 and U-235 were below their selected comparison levels, while Am-241 and Pu-239/240 were estimated below their MDAs and Pu-238 and technetium-99 were nondetect. The adjudicated matrix retained PASS because the result was not accompanied by a radiological pattern indicative of a site-related release.

The observed uranium activities are therefore more reasonably interpreted as background variability than as evidence of a PORTS-related soil release. That interpretation rests on the magnitude of the uranium results, the applicable PORTS and regional background context, analytical uncertainty where relevant, and the absence of a recurring association with americium, plutonium, or technetium-99.

8.3 Naturally Occurring Constituents

Uranium is a naturally occurring constituent addressed specifically in the PORTS soil background study. The property results show U-233/234 or U-234 and U-238 at activities and relative distributions compatible with that background context. The 2024 PORTS environmental-monitoring record provides current context rather than a replacement comparison basis. DOE reported that uranium and uranium isotopes were generally detected at similar levels at off-site soil locations and background location A37 and interpreted that pattern as naturally occurring.

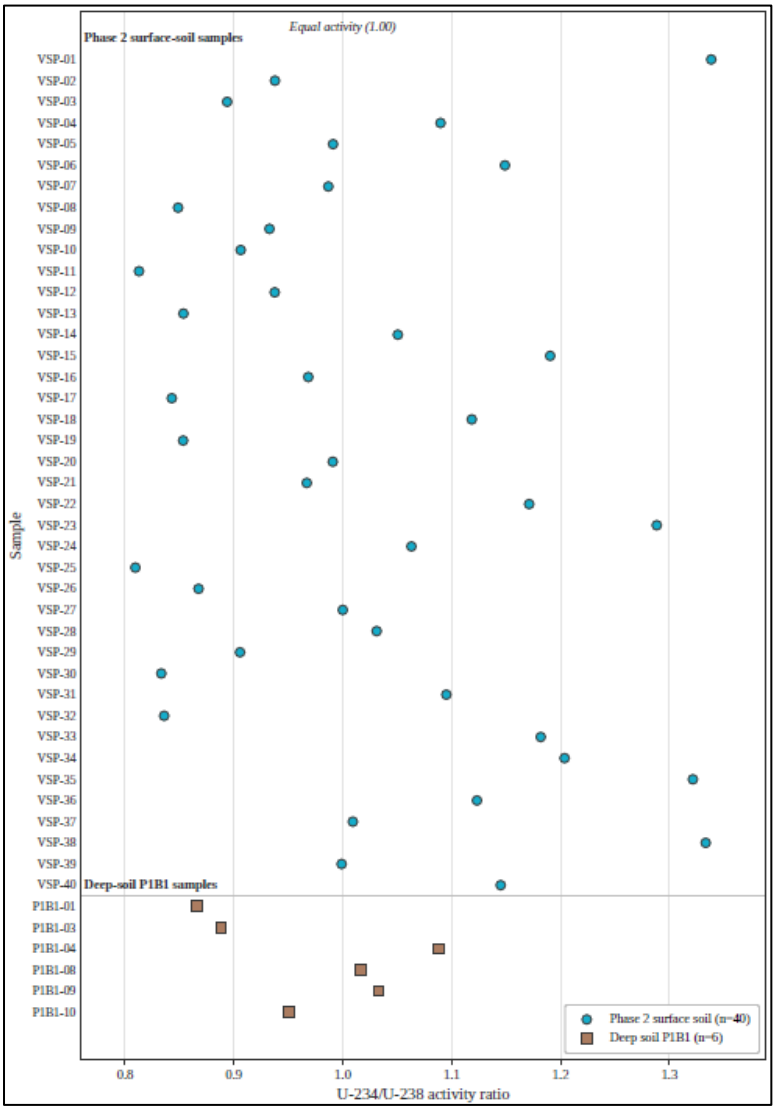
At A15, the off-site location with the highest uranium activities reported in 2024, U-233/234 and U-238 were 1.14 and 1.28 pCi/g, respectively, compared with 0.933 and 1.17 pCi/g at A37. The SB Energy uranium results are evaluated primarily against the project comparison framework established from PORTS 2017 Methods, with the ASER values retained only as current environmental context.

The surface- and deep-soil uranium results are more reasonably interpreted as natural soil radioactivity than as evidence of a release. Low-level americium or plutonium detections are not classified as naturally occurring merely because they were present. Their low magnitude, lack of a recurring spatial association, and absence of a

corresponding uranium or technetium-99 pattern mean that they do not change the source-attribution finding.

Where U-234 and U-238 were reported separately as confirmed detections, the two isotopes generally occurred at similar activities. At VSP-14, U-234 and U-238 were 1.87 and 1.78 pCi/g, respectively. At P1B1-08, the corresponding activities were 1.24 and 1.22 pCi/g. The near-unity U-234/U-238 activity relationship at these locations is consistent with the secular-equilibrium relationship expected for naturally occurring uranium and provides supporting evidence for the natural-background interpretation described above. The U-235 result at P1B1-08 is evaluated separately using its depth-specific PORTS background concentration, reported analytical uncertainty, and the accompanying radionuclide results.

Figure 8-1. U-234 versus U-238 Activity Relationship



8.4 Surface and Deep-Soil Comparison

The six deep-soil samples represent approximately 18 to 25 feet bgs and were evaluated using the depth-specific comparison basis established in Section 5. U-234 and U-238 activities remained below the selected saturated Minford background concentrations of 2.36 and 2.41 pCi/g, respectively. Americium, plutonium, and technetium-99 did not identify a separate subsurface radiological pattern.

P1B1-08 contained the deep-soil U-235 result requiring the most additional review. The reported activity of 0.299 pCi/g was 0.129 pCi/g above the selected 0.170 pCi/g saturated Minford background concentration, while the Pace 2-sigma total propagated uncertainty was ±0.209 pCi/g. U-234 and U-238 at the same location were 1.24 and 1.22 pCi/g, respectively, below their applicable subsurface background concentrations. Americium, plutonium, and technetium-99 were nondetect. The isolated U-235 result was retained as PASS and is not considered indicative of a site-related subsurface contamination condition.

The pesticide data provide a corresponding non-radiological comparison at depth. All 21 pesticides were nondetect in the Phase 2 surface-soil dataset and in each of the six deep-soil samples. The deep-soil matrix retained PASS for the available quantitative screening comparisons.

The deep-soil dataset does not identify a distinct subsurface radiological or pesticide condition that differs materially from the surface-soil characterization.

8.5 Spatial Distribution and Pattern Evaluation

Phase 2 broadened the geographic coverage of the investigation through the VSP-distributed surface-soil locations. The radiological and non-radiological results do not develop into a recurring multi-constituent pattern across that population. Uranium results requiring additional background review occur without a corresponding americium, plutonium, or technetium-99 association, and the higher non-radiological results remain below their selected comparison criteria. The final VSP coordinates preserve the distribution of the 40 primary sampling locations across the defined Phase 2 study area.

Only VSP-14 had a U-238 activity of 1.78 pCi/g and also contained the highest identified high-fraction TPH result and higher lead and mercury concentrations relative to much of the Phase 2 dataset. U-238 remained below the 1.85 pCi/g Scioto River Valley surface-soil concentration, U-234 and U-235 remained below their selected levels, and no confirmed americium, plutonium, or technetium-99 pattern accompanied the uranium result. Lead, mercury, and high-fraction TPH were also below their respective project comparison criteria, while pesticides and asbestos were nondetect.

No broader source pattern is evident from the VSP-distributed surface-soil results.

8.6 No Evidence of Site-Related Contamination

The radiological record does not provide evidence of a site-related soil contamination condition within the areas investigated. Phase 1 established a condition dominated by uranium activities within or compatible with the selected PORTS and regional background context, without an associated americium, plutonium, or technetium-99 pattern characteristic of a release. Phase 2 did not identify a different condition across the broader surface-soil study area.

The deep-soil results do not identify a subsurface radiological condition that changes that interpretation. U-234 and U-238 remained below the selected saturated Minford background concentrations, and the isolated P1B1-08 U-235 result was not accompanied by elevated companion uranium isotopes or other targeted radionuclides. No recurring pattern was identified that would indicate subsurface accumulation of the targeted radiological constituents.

The non-radiological record likewise does not identify a soil contamination condition within the sampled areas. Lead, mercury, and petroleum hydrocarbon detections remained below the selected project comparison criteria. Surface-soil pesticides and asbestos were nondetect, and all 21 pesticides were also nondetect in the six deep-soil samples

8.7 Data Gaps and Remaining Uncertainty

No data gap was identified that prevents the intended site-level interpretation. The remaining analytical uncertainty is defined principally by the sample-specific U-235/U-235/236 sensitivity conditions and the low-fraction TPH preservation condition evaluated in Section 7. The localized surface-pesticide precision qualifications and deep-soil endrin J4 accuracy qualification are also retained in the analytical record, but they do not materially change the pesticide interpretation or create a separate data gap.

The conclusions apply to the locations, depths, analytes, and analytical methods included in the investigation. Within those boundaries, the Phase 1, Phase 2 surface-soil, and deep-soil datasets provide sufficient information for the source-attribution and weight-of-evidence findings presented here.

8.8 Overall Weight-of-Evidence Finding

The radiological evidence is most consistent with natural or regional background soil conditions. Phase 1 established the initial property-specific condition nearest PORTS, Phase 2 broadened that evaluation across the study area, and the deep-soil results do not identify a different radiological condition at depth. The limited uranium results

requiring additional interpretation are resolved by the applicable background context, analytical uncertainty where relevant, companion-isotope results, and absence of a corroborating americium, plutonium, or technetium-99 pattern.

The non-radiological evidence is similarly favorable. Detected lead, mercury, and petroleum hydrocarbons remained below the selected project comparison criteria; surface pesticides and asbestos were nondetect; and the six deep-soil samples were nondetect for the complete 21-pesticide analytical suite. The available data do not support attribution of a soil contamination condition to PORTS or another site-related source. Within the locations, depths, analytes, and methods evaluated, the sampled soils are adequately characterized for the purposes of this report.

9 Conclusions

The combined investigation results support a favorable soil characterization. Phase 1 established the initial radiological condition of the property nearest PORTS, Phase 2 expanded the surface-soil evaluation across the broader study area, and the deep-soil investigation provided a separate assessment of subsurface radiological and pesticide conditions. The resulting analytical record is usable for the intended characterization, and the identified qualifications and sensitivity conditions are localized and do not materially affect the overall interpretation.

Across these datasets, no sampled area exhibited a coherent combination of concentration magnitude, constituent association, spatial distribution, or vertical behavior indicative of site-related soil contamination.

9.1 Radiological Findings

Phase 1 established the first property-specific radiological dataset for the area immediately east of PORTS. Americium, plutonium, U-235/236, and technetium-99 were not detected in the primary Phase 1 samples. Detected uranium consisted principally of U-233/234 and U-238. U-233/234 remained below its selected screening value, while several U-238 results were numerically above the 1.36 pCi/g PORTS Site Surface Soil background concentration. Most remained at or below the 1.85 pCi/g Scioto River Valley surface-soil concentration used as additional regional context, with analytical uncertainty also supporting the adjudicated PASS determinations where additional review was required.

Sample #12 contained the highest primary Phase 1 U-238 result at 2.00 pCi/g. Although the activity was slightly above the 1.85 pCi/g Scioto River Valley value, the GEL 95-percent total propagated uncertainty of ±1.33 pCi/g overlapped both background concentrations. U-235/236 remained a nondetect, and americium, plutonium, and technetium-99 were also nondetect at the location. The project matrix retained PASS for the U-238 result.

The expanded Phase 2 dataset did not identify a different radiological condition. Low-level americium and plutonium detections remained below their selected screening levels, technetium-99 was not detected in the primary surface-soil samples, and confirmed U-234 and U-235 results remained below their applicable surface-soil screening values. Selected U-235 nondetects or estimated activities had MDAs above the screening value, but those MDAs represent analytical sensitivity rather than measured activities and were not accompanied by a corroborating radionuclide pattern.

VSP-14 contained a U-238 activity of 1.78 pCi/g, above the selected 1.36 pCi/g PORTS Site Surface Soil background concentration and below the 1.85 pCi/g Scioto River Valley surface-soil value. U-234 and U-235 were below their selected comparison levels, and the accompanying americium, plutonium, and technetium-99 results did not form a pattern indicative of a PORTS-related release. The Phase 2 matrix retained PASS for the U-238 result.

The deep-soil results provide additional support for the radiological finding. U-234 and U-238 remained below the selected saturated Minford background concentrations. At P1B1-08, U-235 was detected at 0.299 pCi/g compared with the 0.170 pCi/g background concentration; the 0.129 pCi/g difference was less than the reported ±0.209 pCi/g 2-sigma total propagated uncertainty. U-234 and U-238 at the same location were 1.24 and 1.22 pCi/g, respectively, both below their applicable subsurface background concentrations, while americium, plutonium, and technetium-99 were nondetect. The adjudicated matrix retained PASS and did not identify the isolated U-235 result as evidence of a site-related subsurface condition.

The combined radiological dataset does not identify a spatial, vertical, isotopic, or multi-radionuclide pattern indicative of site-related radiological contamination within the sampled areas.

9.2 Non-Radiological Findings

The Phase 2 non-radiological results were favorable across the VSP-distributed surface-soil locations. Lead and detected mercury concentrations remained below their selected comparison values. High-fraction TPH detections also remained below the applicable project criterion, including the 308 mg/kg result at VSP-14 compared with the selected 2,000 mg/kg value.

Low-fraction TPH was reported as nondetect in the primary surface-soil samples. The preservation condition associated with that analysis remains a defined limitation on trace-level interpretation but does not change the project comparison outcome or overall non-radiological finding. All 21 targeted pesticides were nondetect in the primary Phase 2 surface-soil samples, and asbestos was nondetect by PLM across the VSP sample population.

The deep-soil pesticide results are consistent with the surface-soil finding. All 21 pesticides were nondetect in each of the six P1B1 samples, with RDLs ranging from 0.020 to 0.400 mg/kg. The deep-soil pesticide matrix retained PASS for the available quantitative PORTS screening comparisons.

The combined non-radiological dataset does not identify a concentration or analyte pattern indicative of a site-related soil contamination condition within the areas sampled.

9.3 Background and Source-Attribution Findings

The uranium results are most reasonably attributed to naturally occurring background. PORTS 2017 Methods establishes separate background populations for naturally occurring radionuclides according to soil setting and depth, allowing the surface and deep-soil results to be evaluated against the applicable reference populations rather than a single soil value.

The project data do not show a constituent relationship indicative of a distinct radiological source contribution. Surface uranium activities were not accompanied by a recurring association with technetium-99 or elevated transuranic radionuclides. The broader Phase 2 dataset did not identify a concentration cluster or recurring radionuclide pattern attributable to proximity to PORTS. At depth, U-234 and U-238 remained below their selected saturated Minford background concentrations, and the uranium data do not show increasing activity with depth or another pattern indicative of downward migration.

Current PORTS environmental monitoring provides additional context for that interpretation. The 2024 ASER reports uranium isotope activities at similar levels among off-site and background soil locations and identifies the observed uranium pattern as naturally occurring. The project comparison and source-attribution conclusions remain based primarily on PORTS 2017 Methods and the property-specific analytical record.

The combined surface- and deep-soil evidence does not support attribution of the observed uranium activities or low-level radiological detections to a PORTS-related soil contamination condition.

9.4 Overall Site Characterization Finding

The Phase 1, Phase 2 surface-soil, and deep-soil investigations generated usable radiological and non-radiological data across the areas evaluated. The analytical findings are supported by the field and laboratory records, and the identified qualifications and sensitivity conditions are localized and do not materially affect the overall interpretation.

Radiological results are most reasonably explained by regional and depth-appropriate background conditions. The results requiring additional review did not form a corroborating spatial, vertical, isotopic, or multi-radionuclide source pattern. Non-radiological detections remained below the selected project comparison criteria, while surface-soil pesticides and asbestos were nondetect and all 21 pesticides were nondetect in the six deep-soil samples.

Within the locations, depths, and analytes evaluated, the combined Phase 1, Phase 2, and deep-soil evidence supports the conclusion that the sampled soils are adequately characterized for the purposes of this report and do not exhibit a site-related contamination condition.

10 References

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