Request for Bid

Fixed-Price Bid to Result

Supplemental Site Characterization Activities, Remedial System Operation & Maintenance, Attainment Demonstrations, RACR Preparation, and Site Restoration

Solicitor

SAS Oil, Inc.

Aspinwall Citgo

304 Freeport Road
Aspinwall Borough, Allegheny County, Pennsylvania 15215

PADEP Facility ID #: 02-24885 PAUSTIF Claim #: 2010-0131(F)

Date of Issuance

January 13, 2015

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The Pennsylvania Underground Storage Tank Indemnification Fund (PAUSTIF), on behalf of the claimant who hereafter is referred to as the Client or Solicitor, is providing this Request for Bid (RFB) to prepare and submit a bid to complete the Scope of Work (SOW) for the referenced Site. The Solicitor is the former owner/operator of the Site. PAUSTIF has determined that the claim reported by the Solicitor is eligible for coverage from the PAUSTIF subject to the applicable statutes and regulations. Reimbursement of Solicitor approved reasonable and necessary costs, not to exceed the claim aggregate limit, for the corrective action work described in this RFB will be provided by PAUSTIF. Solicitor is responsible to pay any applicable deductible and/or proration.

Each bid response will be considered individually and consistent with the evaluation process described in the PAUSTIF Competitive Bidding Fact Sheet which can be downloaded from the PAUSTIF website http://www.insurance.pa.gov.

Calendar of Events

Activity	Date and Time
Notification of Intent to Attend Site Visit	January 23, 2015 by 5 p.m.
Mandatory Pre-Bid Site Visit	January 27, 2015 at 11 a.m.
Deadline to Submit Questions	February 20, 2015 by 5 p.m.
Bid Due Date and Time	February 27, 2015 by 3 p.m.

Contact Information

Technical Contact
Mr. Robert D. Breakwell, P.G. **Excalibur Group, LLC** **1193 State Road** **Monessen, PA 15062** **rbreakwell@excaliburgrpllc.com**

All questions regarding this RFB and the subject Site conditions must be directed via email to the Technical Contact identified above with the understanding that all questions and answers will be provided to all bidders. The email subject line must be **"Aspinwall Citgo #2010-0131(F) – RFB QUESTION".** Bidders must neither contact nor discuss this RFB with the Solicitor, PAUSTIF, the Pennsylvania Department of Environmental Protection (PADEP), or ICF International (ICF) unless approved by the Technical Contact. Bidders may discuss this RFB with subcontractors and vendors to the extent required for preparing the bid response.

Requirements

Mandatory Pre-Bid Site Meeting

The Solicitor, the Technical Contact, or their designee will hold a mandatory Site visit on the date and time listed in the Calendar of Events to conduct a Site tour for one (1) participant per bidding company. The Technical Contact may answer questions at the Site meeting or may collect questions and respond via email. All questions and answers will be provided via email to all attendees. This meeting is mandatory for all bidders, no exceptions. This meeting will allow each bidding company to inspect the Site and evaluate Site conditions. **A notice of the bidder's intent to attend this meeting is requested to be provided to the Technical Contact via email by the date listed in the Calendar of Events with the subject "Aspinwall Citgo #2010-0131(F) – SITE MEETING ATTENDANCE NOTIFICATION".** The name and contact information of the company participant should be included in the body of the email. Notification of intent to attend is appreciated; however, it is not required. Attendance at the Pre-Bid Site Meeting is mandatory.

Submission of Bids

To be considered for selection, **one (1) hard copy of the signed bid package and one (1) electronic copy (one (1) PDF file on a compact disk (CD) included with the hard copy) must be provided directly to the PAUSTIF's third party administrator, ICF, to the attention of the Contracts Administrator.** The Contracts Administrator will be responsible for opening the bids and providing copies to the Technical Contact and the Solicitor. Bid responses will only be accepted from those companies that attended the Mandatory Pre-Bid Site Meeting. **The ground address for overnight/next-day deliveries is ICF International, 4000 Vine Street, Middletown, PA 17057, Attention: Contracts Administrator. The outside of the shipping package containing the bid must be clearly marked and labeled with "Bid – Claim #2010-0131(F)".** Please note that the use of U.S. Mail, FedEx, UPS, or other delivery method does not guarantee delivery to this address by the due date and time listed in the Calendar of Events for submission. Companies mailing bids should allow adequate delivery time to ensure timely receipt of their bid.

The bid must be received by 3 p.m., on the due date shown in the Calendar of Events. Bids will be opened immediately after the 3 p.m. deadline on the due date. Any bids received after this due date and time will be time-stamped and returned. If, due to inclement weather, natural disaster, or any other cause, the PAUSTIF's third party administrator, ICF's office is closed on the bid due date, the deadline for submission will automatically be extended to the next business day on which the office is open. The PAUSTIF's third party administrator, ICF, may notify all companies that attended the Mandatory Pre-Bid Site Meeting of an extended due date. The hour for submission of bids shall remain the same. Submitted bid responses are subject to the Pennsylvania Right-to-Know Law.

Bid Requirements

The Solicitor wishes to execute a mutually agreeable contract with the selected consultant ("Remediation Agreement"). The Remediation Agreement is included as Attachment 1 to this RFB. The bidder must identify and document in their bid any modifications that they wish to propose to the Remediation Agreement language in Attachment 1 other than obvious modifications to fit this RFB (e.g., names, dates, and descriptions of milestones). The number and scope of any modifications to the standard agreement language will be one (1) of the criteria used to evaluate the bid. **Any bid that does not clearly and unambiguously state whether the bidder accepts the Remediation Agreement language in Attachment 1 "as is", or that does not provide a cross-referenced list of requested changes to this agreement, will be considered non-responsive.** This statement should be made in a Section in the bid entitled "Remediation Agreement". Any proposed changes to the agreement should be specified in the bid; however, these changes will need to be reviewed and agreed upon by both the Solicitor and the PAUSTIF.

The selected consultant will be provided an electronic copy (template) of the draft Remediation Agreement in Microsoft Word format to allow agreement-specific information to be added. The selected consultant shall complete the agreement-specific portions of the draft Remediation Agreement and return the document to the Technical Contact within 10 business days from date of receipt.

The Remediation Agreement fixed costs shall be based on unit prices for labor, equipment, materials, subcontractors/vendors, and other direct costs. The total cost quoted in the bid by the selected consultant will be the maximum amount to be paid by the Solicitor unless a change in scope is authorized and determined to be reasonable and necessary. There may be deviations from and modifications to this SOW during the project. The Remediation Agreement states that any significant changes to the SOW will require approval by the Solicitor, PAUSTIF, and PADEP. NOTE: Any request for PAUSTIF reimbursement of the reasonable costs to repair or replace a well will be considered on a case-by-case basis.

The bidder shall provide its bid cost using the Bid Cost Spreadsheet (included as Attachment 2) with descriptions for each task provided in the body of the bid document. Please note, if costs are provided within the text of the submitted bid and there is a discrepancy between costs listed in the Bid Cost Spreadsheet and in the text, the costs listed within the Bid Cost Spreadsheet will be used in the evaluation of the bid and in the Remediation Agreement with the selected consultant. Bidders are responsible to ensure spreadsheet calculations are accurate. The technical score for bids will be based solely on those tasks represented as milestones included in the Bid Cost Spreadsheet and the total bid cost. Any optional bidder-defined tasks, milestones, or cost adders that are not requested as part of this RFB will not be considered by the Bid Evaluation Committee in the technical review and technical score for the bid.

In addition, the bidder shall provide:

1. The bidder's proposed unit cost rates for each expected labor category, subcontractors, other direct costs, and equipment;
2. The bidder's proposed markup on other direct costs and subcontractors (if any);
3. The bidder's estimated total cost by task consistent with the proposed SOW identifying all level-of-effort and costing assumptions; and
4. A unit rate schedule that will be used for any out of scope work on this project.

Each bid will be assumed to be valid for a period of up to 120 days after receipt. The costs quoted in the Bid Cost Spreadsheet will be assumed to be valid for the duration of the Remediation Agreement.

Please note that the total fixed-price bid must include all costs, including those cost items that the bidder may regard as "variable". These variable cost items will not be handled outside of the total fixed-price quoted for the SOW unless the RFB requests costing alternatives for specific items or services. Any bid that disregards this requirement will be considered non-responsive to the bid requirements and, as a result, will be rejected and will not be evaluated.

The RFB is requesting a total fixed-price bid (unless the RFB requests costing alternatives for specific items or services). PAUSTIF will not agree to assumptions (in bids or the selected bidders executed Remediation Agreement) referencing a level of effort and/or hours. Costs provided in your bid should be developed using your professional opinion, experience, and the data provided. PAUSTIF will not reimburse costs for additional hours to complete activities included as part of the base bid/contract price.

Each bid response document must include at least the following:

1. Demonstration of the bidder's understanding of the Site information provided in this RFB, standard industry practices, and objectives of the project.
2. A clear description, specific details, and original language of how the proposed work scope will be completed for each milestone. The bid should specifically discuss all tasks that will be completed under the Remediation Agreement and what is included (e.g., explain groundwater purging/sampling methods, which guidance documents will be followed, what will be completed as part of the Site specific work scope/SCR/RAP implementation). Recommendations for changes/additions to the Scope of Work proposed in this RFB shall be discussed, quantified, and priced separately; however, failure to bid the SOW "as is" may result in a bid not being considered.
3. A copy of an insurance certificate that shows the bidder's level of insurance consistent with the requirements of the Remediation Agreement. Note: The selected consultant

shall submit evidence to the Solicitor before beginning work that they have procured and will maintain Workers Compensation, commercial general and contractual liability, commercial automobile liability, and professional liability insurance commensurate with the level stated in the Remediation Agreement and for the work to be performed.

4. The names and brief resumes/qualifications of the proposed project team including the proposed Professional Geologist and Professional Engineer (if applicable) who will be responsible for overseeing the work and applying a professional seal to the project deliverables (including any major subcontractor(s)).

5. Responses to the following specific questions:

    a. Does your company employ a Pennsylvania-licensed Professional Geologist or Professional Engineer that is designated as the proposed project manager? How many years of experience does this person have?

    b. How many Pennsylvania Chapter 245 projects is your company currently the consultant for in the PADEP Region where the Site is located? Please list up to 10.

    c. How many Pennsylvania Chapter 245 Corrective Action projects involving an approved SCR, RAP, and RACR has your company and/or the Pennsylvania-licensed Professional Geologist or Professional Engineer closed (i.e., obtained Relief from Liability from the PADEP) using any standard?

    d. Has your firm ever been a party to a terminated PAUSTIF-funded Fixed-Price (FP) or Pay-for-Performance (PFP) contract without attaining all of the milestones? If so, please explain.

6. A description of subcontractor involvement by task. Identify and describe the involvement and provide actual cost quotations/bids/proposals from all significant specialized subcontracted service (e.g., drilling/well installations, laboratory, etc.). If a bidder chooses to prepare its bid without securing bids for specialty subcontract services, it does so at its own risk. Added costs resulting from bid errors, omissions, or faulty assumptions will not be considered for PAUSTIF reimbursement.

7. A detailed schedule of activities for completing the proposed SOW including reasonable assumptions regarding the timing and duration of Solicitor reviews (if any) needed to complete the SOW. Each bid must provide a schedule that begins with execution of the Remediation Agreement with the Solicitor and ends with completion of the final milestone proposed in this RFB. Schedules must also indicate the approximate start and end date of each of the tasks/milestones specified in the Scope of Work, and indicate the timing of all proposed key milestone activities (e.g., within 30 days of the contract being executed).

8. A description of how the Solicitor, ICF, and the PAUSTIF will be kept informed as to project progress and developments and how the Solicitor (or designee) will be informed of and participate in evaluating technical issues that may arise during this project.

9. A description of your approach to working with the PADEP. Describe how the PADEP would be involved proactively in the resolution of technical issues and how the PADEP case team will be kept informed of activities at the Site.
10. Key exceptions, assumptions, or special conditions applicable to the proposed SOW and/or used in formulating the proposed cost estimate. Please note that referencing extremely narrow or unreasonable assumptions, special conditions, and exceptions may result in the bid response being deemed “unresponsive”.

General Site Background and Description

Each bidder should carefully review the existing information and documentation provided in Attachment 3. The information and documentation has not been independently verified. Bidders may wish to seek out other appropriate sources of information and documentation specific to this Site. If there is any conflict between the general Site background and description provided herein and the source documents within Attachment 3, the bidder should defer to the source documents.

General Site Features and Site Background

The Aspinwall Citgo facility is located at 304 Freeport Road in Aspinwall Borough, Allegheny County, Pennsylvania (Attachment 3A, Figure 1) and is currently operated as a Sunoco-branded retail gasoline and diesel fuel service station and convenience store. The Solicitor was the owner / operator of this facility until it was purchased by VRAM, Inc. in February 2014. Currently, the Solicitor retains only the environmental cleanup responsibilities. Although the facility brand changed from Citgo to Sunoco over three years ago, the Citgo name is retained for this RFB solicitation consistent with the PAUSTIF claim.

Existing features on this approximate 0.1-acre rectangular-shaped parcel consist of a slab-on-grade convenience store building located in the eastern portion of the property, a fuel dispensing island with four product dispensers and canopy cover located in the central part of the property, a small slab-on-grade building located south of the canopy (possibly used for storage), a diesel fuel dispenser positioned near the southwest property corner, and two underground storage tanks (UST) located southwest and west of the canopy. Additional information regarding the current and historical facility UST systems is provided in the next subsection of this RFB. The entire ground surface at the Aspinwall Citgo facility is paved with either concrete or asphalt.

As part of the previous site characterization activities conducted for the Aspinwall Citgo facility, a total of fifteen (15) groundwater monitoring wells were installed including on-property wells MW-5 through MW-9 and off-property wells MW-1 through MW-4 and MW-10 through MW-15. In addition to the monitoring wells, two soil vapor monitoring points (VP-1 and VP-2) are currently located at the west and north sides of the convenience store building, respectively. Additionally, a soil vapor extraction (SVE) / air-sparge (AS) remediation system was recently installed, and generally includes a remediation shed located at the western property boundary, two SVE wells (RW-1 and RW-2), four AS wells (SP-1 through SP-4) and associated underground piping. The AS / SVE remediation system is described in more detail later in this RFB. The general facility layout, site features and surrounding area are depicted on Figure 2 in Attachment 3A. Photographs of the Aspinwall Citgo facility and surrounding properties are contained in Attachment 3B.

The Aspinwall Citgo facility is serviced by overhead and underground utilities including municipal water (Aspinwall Borough), combined sanitary and storm sewers (Allegheny County Sanitary Authority), telephone (Verizon Communications and Comcast), natural gas (Equitable Gas) and electric (Duquesne Light). The locations of buried and overhead utilities are depicted on Figure 3 in Attachment 3A.

In general, land use in the vicinity of the Aspinwall Citgo facility consists of commercial, residential and municipal properties. The facility is bounded to the northwest, north and northeast by commercial businesses located at the opposite side of Freeport Road with additional businesses and private residences beyond. To the east and west of the facility are parking areas for these businesses. An active railroad right-of-way (ROW) borders the facility to the south, and beyond the railroad ROW is a small tract of undeveloped wooded land followed by the Aspinwall Marina and the Allegheny River.

History of Facility Petroleum Storage and Dispensing Operations

In June 1987, three USTs were installed on the Aspinwall Citgo property, and included Tank #001 (15,000-gallon steel; unleaded gasoline), Tank #002 (15,000-gallon steel; unleaded gasoline) and Tank #003 (4,000-gallon steel; diesel fuel).[1] Tanks #001 and #002 were located immediately west of the fuel dispensing island and Tank #003 was positioned southwest of the dispensing island. The locations of these tanks are depicted in the 3/2/12 UST Closure Report contained in Attachment 3C.

In late October 2010, a release of unleaded gasoline was suspected based on automatic tank gauging and stick readings collected from Tank #002. The PADEP was verbally notified of a potential release on 11/5/10[2] and, as a precaution, all unleaded gasoline was removed from Tank #002 on, or shortly after that notification date. On 11/8/10, Tanks #001, #002 and #003 were subject to tightness testing completed by Petroleum Testing Services with passing results for #001 and #003, but failing results for #002. To investigate the potential release of unleaded gasoline, the Solicitor retained the services of Letterle & Associates, LLC (Letterle) in December 2010 to conduct a preliminary soil and groundwater investigation.[3]

In mid-June 2011, Letterle supervised a limited soil investigation that involved advancing four soil borings (GB-1 through GB-4) and collecting / analyzing soil samples to confirm the release and evaluate the extent and magnitude of any unleaded gasoline impacts.[4] Soil boring GB-1 was completed near Tank #002, boring GB-2 was completed near Tanks #002 and #001, and borings GB-3 and GB-4 were advanced south of the USTs along the southern property

[1] Tanks #001 and #002 were lined with fiberglass in November 1996, and then relined in November 2006 reportedly due to a fiberglass thickness concern.
[2] A written Notification of Reportable Release was submitted to the PADEP on 12/6/10.
[3] Letterle is the current consultant of record.
[4] Based on available historical information, it does not appear that groundwater samples were collected from these soil borings.

boundary. Soil analytical results for unsaturated and periodically saturated (smear zone) soil samples collected from depths ranging from approximately 6 to 22 feet below grade (ft-bg) at these boring locations revealed elevated levels of benzene (up to 1,090 micrograms per kilogram [µg/kg]), 1,2,4-trimethylbenzene (TMB) (up to 71,200 µg/kg) and 1,3,5-TMB (up to 24,000 µg/kg). These maximum concentrations moderately to substantially exceeded the PADEP Act 2 Soil to Groundwater SHS MSCs for a used aquifer in a residential and non-residential setting.[5]

In September 2011, USTs #001 and #002 were decommissioned by removal during which approximately 625 tons of petroleum impacted soil was excavated and disposed off-property. When uncovered and inspected, holes were observed in Tank #002 and significant impacts were observed in the tank cavity. Tank #001 was severely corroded and pitted, but no holes were observed in the tank shell. However, the spill bucket for Tank #001 was observed to be highly corroded with questionable integrity. The depth of the UST excavation ranged from approximately 15 to 20 ft-bg and no groundwater entered the excavation. During the UST closure work, four post-excavation confirmation soil samples were collected and submitted for laboratory analysis of the PADEP Act 2 post-March 2008 short list of unleaded gasoline parameters. The confirmation soil samples included “001 Bottom” (20 ft-bg; below Tank #001), “001 North” (14 ft-bg; Tank #001 sidewall), “001 West” (14 ft-bg; Tank #001 sidewall), and “001 South” (14 ft-bg; Tank #001 sidewall).[6] The locations of these soil samples are indicated in the 3/2/12 UST Closure Report contained in Attachment 3C. Analytical results for borderline smear zone soil sample “001 Bottom” revealed levels of benzene, toluene, ethylbenzene, naphthalene, 1,2,4-TMB and 1,3,5-TMB which slightly to significantly exceeded the PADEP Act 2 Soil to Groundwater SHS MSCs for a used aquifer in a residential and non-residential setting. Unsaturated soil sample “001 North” contained 1,2,4-TMB and 1,3,5-TMB at concentrations exceeding only the residential Soil to Groundwater SHS MSCs. Soil samples “001 West” and “001 South” contained no analyte concentrations that exceeded the aforementioned standards. Residual soil impacts could not be excavated further because they were either present at depth beyond the reach of the excavator or very near the northern property boundary resulting in concern with the stability of Freeport Road. Analytical results for the confirmation soil samples are provided in the UST Closure Report (Attachment 3C).

Currently, two USTs exist on the Aspinwall Citgo property. These USTs include diesel fuel tank #003 as described previously, and a new 20,000-gallon compartmentalized fiberglass tank (Tank #004) installed in March 2012 that contains different grades of unleaded gasoline. Tank #004 occupies a portion of the September 2011 excavation west of the fuel dispenser island.

[5] Soil impacts at the locations of borings GB-1 and GB-2 were reportedly excavated during the subsequent September 2011 UST closure activities.
[6] No confirmation soil samples were collected from the excavated area surrounding Tank #002 apparently because preliminary soil borings GB-1 and GB-2 were previously advanced to 16 ft-bg adjacent to this tank and these impacted soils were reportedly excavated.

In response to the soil impacts observed during the June 2011 preliminary investigations and the soil impacts identified during the September 2011 UST closures, the Solicitor instructed Letterle to develop and implement a plan for further site characterization including an evaluation of remedial alternatives and remedial feasibility testing. Letterle initiated the additional site characterization activities in January 2012 that generally included a sensitive receptor survey, advancing soil borings and soil sampling / analysis, soil vapor sampling and analysis, installation of on- and off-property groundwater monitoring and pilot test wells, groundwater sampling and analysis, professional surveying of facility and environmental features, aquifer testing, developing a conceptual site model, and interim remedial actions (separate-phase hydrocarbon [SPH] recovery).[7] The historical site investigations, as well as the interim remedial actions, were documented in Letterle's August 2013 Site Characterization Report (SCR) provided as Attachments 3D1, 3D2 and 3D3. After issuing the SCR, Letterle submitted a Remedial Action Plan (RAP) to the PADEP in November 2013 that described the remedial alternatives analysis and remedial feasibility testing, and presented a site cleanup strategy designed to address the soil and groundwater impacts and achieve site closure. A copy of the RAP is provided in Attachment 3E. The SCR and RAP were unconditionally approved in the PADEP's 1/9/14 letter (Attachment 3F).[8] Following approval of the SCR and RAP, Letterle initiated installation of the AS / SVE remediation system as described in the RAP (with slight modifications) with system start-up occurring on 9/10/14. A brief summary of key information extracted from the SCR and RAP, including details on the AS / SVE remediation system 'as-built" construction and the proposed system operation & maintenance (O&M) and monitoring activities, is provided in the following sections. Bidders are referred to the SCR and RAP for additional information.

Selection of Remediation Standards

The Solicitor intends to pursue site closure for unleaded gasoline constituents in soil and groundwater by demonstrating attainment of the PADEP SHS for a used aquifer in a residential setting with a TDS concentration of less than or equal to 2,500 mg/l.

Sensitive Receptor Survey

A sensitive receptor survey was completed within a 1,500 ft radius of the site (2,500 ft radius for groundwater) that included a review of surrounding land use, an assessment of underground conduits and utilities and a groundwater use inventory.

[7] Contaminant fate and transport modeling was not completed because the SPH plume at the surface of the unconsolidated aquifer precluded accurate modeling and estimated migration of the contaminant plume downgradient of the UST source area. Fate and transport modeling was to be completed following the removal of SPH from the subsurface to the maximum extent possible.

[8] The letter stated that quarterly groundwater sampling and reporting shall commence immediately upon Letterle's receipt of the letter and that RAPRs are due to the Department on or before 4/30, 7/30, 10/30 and 1/30.

Surrounding Land Use

Land use in the vicinity of the Aspinwall Citgo facility and the types of properties contiguous to the facility were generally described in a previous section of this RFB. The sensitive receptor survey further revealed that most, or all of the structures on the commercial, residential and municipal properties to the northwest, north and northeast of the facility across Freeport Road appear to have basements. The closest structure with a basement is located approximately 50 feet northeast of the UST field source area. Bidders are directed to the SCR in Attachments 3D1, 3D2 and 3D3 for a list specifically identifying potential sensitive receptors.

Underground Utilities

As mentioned earlier, utilities in the vicinity of the property include municipal water, combined sanitary and storm sewers, telephone, natural gas and electric. General information on subsurface utilities that may serve as preferential pathways for contaminant migration is provided below:[9]

- *Natural Gas* – A natural gas main is located parallel to and beneath the southern edge of Freeport Road at a depth of approximately three ft-bg. A service lateral connects to the convenience store building along the northern wall.
- *Communication line* – A communication line is located beyond the southern property boundary and parallels the railroad tracks at an unknown depth.
- *Sanitary and Storm Sewer* – Two main sewer lines are located adjacent to the Aspinwall Citgo property including: 1) an 18-inch diameter clay pipe used for combined storm and sanitary sewer; and 2) a 48-inch reinforced concrete pipe used to convey storm water. The average depth of the 18-inch diameter pipe is approximately 10.5 ft-bg and the depth of the 48-inch line as measured at the catch basin in the northwest corner of the property is about 13.8 ft-bg.
- *Municipal Water* – Two underground municipal water lines extend parallel to and beneath Freeport Road and are approximately four ft-bg. The location of the water line lateral beneath the Aspinwall Citgo property, or the connection to the convenience store building, could not be determined.
- *Electric* – Beneath the facility, electrical service is located underground and extends from a utility pole at the western property boundary to the service connection located at the southwest wall of the convenience store building. Buried electric lines are also located beneath the northern edge of the facility along Freeport Road

[9] Contaminant migration via buried utility conduits would most likely be in the vapor phase given that the depth to groundwater is substantially below the known, or expected invert elevations of the utility conduits.

and connect to light poles on the property. Underground electric utilities are present at about two ft-bg.[10]

Additional details on local utilities can be found in the SCR. The locations of buried and overhead utilities are depicted on Figure 3 in Attachment 3A.

Groundwater Use

A groundwater use survey was completed within a 2,500 ft radius of the Aspinwall Citgo facility that included a review of the Pennsylvania Groundwater Information System (PaGWIS) database and contacting local providers of municipal water and sanitary sewage services and local municipal representatives. The PaGWIS database search identified three water supply wells including #3236 and #3237 located approximately 500 ft south-southwest of the Aspinwall Citgo facility, and #3255 located about 2,430 ft northwest of the facility. According to the Aspinwall Borough Department of Public Works, wells #3236 and #3237, and a third well at the same location not identified by PaGWIS, were public supply withdrawal wells that are not in use. Well #3255 was an industrial withdrawal well that has been abandoned. No additional wells were identified within the surveyed 2,500 ft radius of the site. The Public Works Department also indicated that Aspinwall Borough purchases water from the Pittsburgh Water and Sewer Authority (PWSA) and all properties within 2,500 ft of the site are connected to municipal water. Additionally, according to the PWSA, a surface water intake is located about 0.5 mile upstream of the site in the Allegheny River which, at its closest point, is located about 600 ft south of the site, and a 40-million gallon concrete-lined clear well for storage of filtered water is present adjacent to the Aspinwall Marina and approximately 850 ft southeast of the Aspinwall Citgo facility.[11]

According to the Building Inspector for Aspinwall Borough, there are currently no ordinances in place, or future ordinances planned, that would prevent the installation or use of private water supply wells. However, Chapter 26, Part 2A of the Borough Ordinances (see Attachment 3G) indicates that there are certain areas in the Borough that require specific wellhead protection and limit the type of facilities that may potentially contaminate groundwater.

Overview of Site Geology, Hydrogeology and Hydrology

Geologic characterization of the site subsurface was determined through advancing 25 on-and off-property soil borings (GB-1 through GB-4 and SB-1 through SB-21) completed within and surrounding the UST basins, near the fuel dispensing island and beyond each property boundary to delineate the extent of contamination in soil. Additional geologic information was provided from the borings for soil vapor points VP-1 and VP-2, and from subsurface

[10] Another source indicates that the electric supply for the facility is located below-ground and is assumed to enter from the east and connects to an electrical meter at the southeast corner of the convenience store building.
[11] Water testing of the clear well by the PWSA has not indicated the presence of unleaded gasoline constituents.

observations made during the excavation of USTs #001 and #002 in September 2011. The soil borings were advanced to depths ranging from approximately 16 to 36 ft-bg. Soil boring logs for GB-1 through GB-4 and SB-1 through SB-17 are contained in the SCR (Attachments 3D1, 3D2 and 3D3) with additional logs provided in Attachment 3H (SB-18 through SB-21). Soil boring locations are depicted on Figure 2 in Attachment 3A and in Attachment 3C.[12]

In general, unconsolidated overburden deposits beneath the Aspinwall Citgo facility consist of an approximate 5 to 13 feet thick layer of fill materials beginning beneath the asphalt and concrete surface cover. According to drilling records, the fill consists predominantly of a mixture of gravel, clay, silt and slag. Underlying the fill materials is a natural deposit of sandy to silty clay that extends to an average depth of about 14.5 ft-bg, which is then underlain by a coarse fluvial material consisting primarily of gravel, sand, and silt with some cobbles that represents channel lag terrace deposits derived from the ancestral Allegheny River. Off-property, the lithologic sequence is similar except for depth differences due to changes in surface topography.

Bedrock was not encountered in any of the site borings that were advanced to a maximum depth of 36 ft-bg. According to the SCR, bedrock beneath the site belongs to the Glenshaw Formation of the Conemaugh Group that is characterized by cyclic sequences of sandstone, shale, red beds, thin limestone and coal. Regarding general bedrock structure, strata in the vicinity of the Aspinwall Citgo dip gently to the west to west-northwest toward the axis of the McMurray Syncline. Additional geologic information is provided on the borings logs and cross-sections contained in the SCR.

Hydrogeologic data for the site has been provided through the network of monitoring and remediation wells including MW-1 through MW-15, RW-1 and RW-2, and SP-1 through SP-4. The range in depth to the shallow unconfined water table aquifer beneath the site averages about 19 to 21.5 ft-bg and occurs within the coarse and highly permeable channel lag fluvial deposits. Historical groundwater gauging data is tabulated in the second quarter 2014 Remedial Action Progress Report (RAPR) provided in Attachment 3I. The horizontal hydraulic gradient for the water table aquifer based on the most recent available May 2014 groundwater gauging data was calculated to be approximately 0.023 ft/ft. A much lower horizontal hydraulic gradient of 0.0038 ft/ft was cited in the SCR based on the earlier May 2013 groundwater gauging data. Although historical groundwater movement has been somewhat variable, overall flow appears to be to the south-southwest toward the Allegheny River which is located about 600 ft south of the Aspinwall Citgo facility and about 22 ft below facility grade. Historical

[12] Upon their completion, soil borings SB-1 through SB-13 were completed as groundwater monitoring wells MW-1 through MW-13. Soil borings SB-14 through SB-21 were completed as remediation wells RW-1 and SP-1, monitoring wells MW-14 and MW-15, and remediation wells RW-2, SP-1, SP-2 and SP-3, respectively.

groundwater flow maps developed for the unconfined shallow water table aquifer can be found in the SCR and in the second quarter 2014 RAPR.

Based on slug testing conducted by Letterle in wells MW-3, -4, -9, -11, and -13, the average hydraulic conductivity for the shallow water table aquifer was estimated at about 48.5 ft/day with an average groundwater velocity of about 0.7 ft/day. As discussed in more detail below, bidders should note that during the VEGE pilot testing conducted in well RW-1 on 7/26/13, the groundwater pump recovered approximately 3.9 gallons per minute (gpm) at the start of the test, but decreased only slightly to an average of 3.40 gpm at the end of the test. These values apparently exclude groundwater removed by the applied vacuum. A drawdown of 4.12 ft was maintained during the 6 hour pilot test.

Soil Quality

As previously discussed, soil samples for laboratory analysis were collected from borings GB-1 through GB-4 during the June 2011 preliminary site screening investigation and post-excavation confirmation soil samples were collected and analyzed after USTs #001 and #002 were removed in September 2011. During subsequent site characterization activities, additional soil quality data was gathered from borings SB-1 through SB-17 to assist with defining the lateral and vertical extent of subsurface impacts derived from the UST field source area. Locations for borings SB-1 through SB-17 are depicted on Figure 2 in Attachment 3A.

Soil borings SB-1 through SB-17 were advanced and sampled during various phases of site characterization work conducted during the period from January 2012 through May 2013. One to four soil samples were selected from each boring location for laboratory analysis based on organic vapor levels measured with a photo-ionization device, observations of petroleum staining / odor, or the need for "clean" samples for vertical contaminant delineation. These soil characterization efforts produced a total of 30 samples that were analyzed for the PADEP post-March 2008 short-list of unleaded gasoline parameters.

Analytical results from all historical soil sampling locations indicate that the primary constituents of concern (COCs) in unsaturated and periodically saturated (smear zone) soil appear to be benzene, 1,2,4-TMB and 1,3,5-TMB and, to a lesser extent, toluene, ethylbenzene, xylenes and naphthalene. Concentrations of these compounds in soil exceeding the applicable Soil to Groundwater SHS MSCs have been identified beneath the Aspinwall Citgo property at the locations of borings GB-3, GB-4 and SB-5 through SB-9 and UST excavation confirmation samples "001 Bottom" and "001 North".[13] Soil exceedances have also been identified in off-property soil boring SB-10 which is located slightly beyond the UST source area and the northern property boundary. Based on the sampling locations identified above, the horizontal

[13] Excessive soil impacts at the locations of borings GB-1 and GB-2 were reportedly removed during the September 2011 UST excavation work.

distribution of excessive unleaded gasoline impacts in unsaturated and smear zone soils is limited to the general area of the dispenser island and UST field in the central and western portions of the property. In addition to the documented off-property soil impacts within boring SB-10, soil impacts exceeding the applicable standard may also extend beyond the southern property boundary based on data obtained from several borings located in that area.

Maximum concentrations for the COCs identified in soil were reported for sample "001 bottom" collected from the base of the former UST cavity at a depth of 20 ft-bg, and for the sample collected from 20 to 22 ft-bg within boring SB-5 located near the southwest corner of the site. Concentrations of unleaded gasoline compounds in these smear zone soil samples were reported as:

- *benzene* – 33,000 micrograms per kilogram (ug/kg) ("001 bottom")
- *1,2,4-TMB* – 517,000 ug/kg (boring SB-5)
- *1,3,5-TMB* – 138,000 ug/kg (boring SB-5)
- *toluene* – 762,000 ug/kg (boring SB-5)
- *ethylbenzene* – 247,000 ug/kg (boring SB-5)
- *xylenes* – 1,260,000 ug/kg (boring SB-5)
- *naphthalene* – 38,600 ug/kg (boring SB-5)

Additional information regarding site soil quality can be found in the August 2013 SCR.

Groundwater Quality

Groundwater quality has been assessed through sampling a network of 15 monitoring wells, which include on-property wells MW-5 through MW-9 and off-property wells MW-1 through MW-4 and MW-10 through MW-15. The monitoring wells range in depth from approximately 25 to 30 ft-bg and intersect the shallow water table aquifer.[14] In addition to the monitoring wells, remediation wells SP-1 and RW-2 have been sampled on a limited basis, apparently to collect baseline data, and are not a part of the quarterly compliance sampling network. Locations of the groundwater monitoring and remediation wells are depicted on Figure 2 in Attachment 3A. Boring logs and construction details for the monitoring and remediation wells are provided in the SCR with additional logs provided in Attachment 3H.

For the site monitoring well network, six groundwater gauging / sampling events have currently been completed within the period from April 2012 through May 2014[15] These events have produced 3 to 6 sets of groundwater analytical data for wells MW-1 through MW-4, MW-9, and MW-11 through MW-15, depending on the date the well was installed and other factors such as

[14] Wells MW-1 through MW-4 and MW-11 through MW-15 were constructed using 2-inch diameter PVC and 0.010-inch slotted screen. Wells MW-5 through MW-10 were constructed using 4-inch diameter PVC and 0.020-inch slotted screen.
[15] Most recent data available at the time this RFB package was prepared.

accessibility.[16] Groundwater analytical data have been limited for monitoring wells MW-5 through MW-8 and MW-10 due to the presence of SPH as discussed later in this RFB. Consequently, only 1 to 4 sets of analytical data have been produced for these wells through the second quarter 2014. Also, as mentioned above, only limited sampling of remediation wells SP-1 and RW-2 has been conducted including two events for SP-1 and one event for RW-1. Groundwater samples have been analyzed for the PADEP post-March 2008 short list of unleaded gasoline parameters including benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene, 1,2,4-TMB and 1,3,5-TMB. The most recent groundwater gauging and analytical data, and all historical data, is summarized in the second quarter 2014 RAPR (Attachment 3l).

The COCs in site groundwater in order of decreasing magnitude and areal distribution appear to be benzene, 1,2,4-TMB, 1,3,5-TMB, naphthalene, toluene, ethylbenzene, xylenes and MTBE. Based on a review of the historical groundwater analytical database, concentrations exceeding the SHS MSCS for these compounds have ranged from:

- *benzene* – 52 to 11,300 micrograms per liter (ug/l)
- *1,2,4-TMB* – 211 to 3,650 ug/l
- *1,3,5-TMB* – 60.7 to 1,230 ug/l
- *naphthalene* – 102 to 616 ug/l
- *toluene* – 1,090 to 39,700 ug/l
- *ethylbenzene* – 712 to 3,050 ug/l
- *xylenes* – 13,900 to 16,000 ug/l
- *MTBE* – 26.2 to 46.8 ug/l

Dissolved-phase unleaded gasoline compounds exceeding the SHS MSCs are present in the monitoring and remediation wells surrounding the UST source area and dispenser pad located in the central and western portions of the Aspinwall Citgo property. These wells include MW-5 through MW-9, SP-1 and RW-2. Dissolved-phase contaminants at concentrations exceeding the SHS MSCs have also been detected in off-property well MW-10, located approximately 4 ft beyond the northern property boundary, and in MW-15 installed about 40 ft beyond the southern property boundary. Considering the limited dissolved-phase dataset for the impacted wells (due to the presence of SPH), the most severely contaminated wells appear to be MW-7 and MW-8, located adjacent to the southern side of the fuel dispenser pad, and off-property well MW-10 positioned slightly north of the UST source area. Overall, the dissolved-phase contaminant plume seems to be fairly well defined except off-property to the northeast beyond wells MW-9 and MW-10 (i.e., beneath and across Freeport Road).

In addition to unleaded gasoline parameters, natural attenuation parameters including alkalinity, dissolved iron and manganese, total iron and manganese, nitrate and sulfate were also

[16] Off-property well MW-4 could not be located during the November 2013 and May 2014 sampling events.

analyzed recently for wells MW-3, MW-6, MW-7 and MW-11. Field parameters measured during the groundwater sampling events have included temperature, specific conductance, total dissolved solids (TDS), dissolved oxygen, pH, and oxidation / reduction potential.[17] Results from these analyses and field measurements can be found in the second quarter 2014 RAPR.

Soil Gas

Two soil gas sampling points have been installed on the Aspinwall Citgo property (VP-1 and VP-2) which are located at the western and northern sides of the convenience store building, respectively. The locations of both sampling points are depicted in the figures contained in the second quarter 2014 RAPR and the construction details are contained in the August 2013 SCR (VP-1) and in Attachment 3J (VP-2). Soil gas sampling point VP-1 has been sampled twice with the first event conducted in January 2013 and the second event performed in May 2014. Sampling point VP-2 was sampled only once in May 2014. Soil gas samples were analyzed for the post-March 2008 PADEP short-list of unleaded gasoline constituents.

Soil gas laboratory analytical results indicate that all vapor-phase unleaded gasoline compounds were either not detected or substantially below the residential soil gas standards (MSC_{SG}) for VP-1 and VP-2 during each sampling event. Soil gas analytical data can be found in the second quarter 2014 RAPR.

Separate Phase Hydrocarbons and Recovery

As an interim remedial measure, SPH has historically been gauged and recovered from on-property monitoring and remediation wells MW-5 through MW-9 and RW-1, and off-property monitoring well MW-10 that are each located in the vicinity of the UST source area. A summary of the historical maximum SPH thickness recorded for each of these wells and the thickness based on the 6/10/14 or 6/27/14 SPH gauging data (most recent data available) is provided below in Table 1.

A table providing the complete record of SPH gauging and recovery event data is contained in the second quarter 2014 RAPR. As evident in the table, SPH has gradually diminished due to the ongoing gauging and recovery efforts that were initiated by Letterle in April 2012. As of 6/27/14, approximately 477 gallons of SPH have been recovered.[18] Currently, SPH is removed from the wells via a combination of hand-bailing and use of absorbent socks in the interim between the hand bailing events. In the event that there is not enough volume for hand bailing

[17] It appears that TDS samples collected from wells MW-1 through MW-4, MW-9, MW-11 through MW-13 and SP-1 were also analyzed in the laboratory with concentrations ranging from 380 mg/l to 2,130 mg/l with an average value of 1,309 mg/l.

[18] Initially, most of the recovered liquid was SPH. Recently, over the past 3 to 6 months, the recovered liquid consists of a SPH / groundwater mixture.

at a particular well location, the absorbent sock is simply drained and replaced. Since February 2014, Letterle reports that SPH gauging / recovery events have been conducted approximately every other week.

Table 1 – SPH Thickness

Well ID	Maximum SPH Thickness (ft) and Date	Recent SPH Thickness (ft) and Date
MW-5	1.94 (8/10/12)	0.16 (6/27/14)
MW-6	2.36 (8/10/12)	0.12 (6/27/14)
MW-7	1.71 (10/4/13)	Not present or less than equipment measurement sensitivity (6/27/14).
MW-8	0.56 (12/4/12)	Not present or less than equipment measurement sensitivity (6/10/14).
MW-9	0.01 (10/16/12)	Not measured *
MW-10 (off-property)	1.41 (7/18/12)	0.04 (6/10/14)
RW-1	1.35 (10/16/12)	Not present or less than equipment measurement sensitivity (6/10/14).

* SPH was identified in MW-9 only during the 10/16/12 gauging event and it appears no gauging events for this well have been conducted since that date.

Conceptual Site Model

The August 2013 SCR provided a conceptual site model (CSM) that is briefly summarized in the paragraphs below. In general, the CSM addressed the selection of site remediation standards for soil and groundwater, groundwater flow / contaminant fate and transport modeling, and an exposure pathway analysis.

Site Remediation Standards

The selected site remediation standards for soil and groundwater were previously discussed in this RFB.

Groundwater Flow and Contaminant Fate and Transport Modeling

This section of the SCR primarily presents an overview of the chemical properties for the target unleaded gasoline constituents. As the SCR explains, groundwater flow and contaminant fate and transport modeling has not yet been conducted because the results would most likely be influenced by the SPH plume residing at the surface of the shallow unconsolidated water table

aquifer. The SCR proposed that the modeling work be completed following SPH removal to the maximum extent practical.

Exposure Pathway Analysis

Sensitive receptors have been identified bordering the Aspinwall Citgo facility including several commercial and residential buildings with basements, three institutional properties, and the Aspinwall Borough water supply wells, PWSA water filtration and storage facility, Aspinwall Marina and Allegheny River. Potential exposure pathways were identified and assessed as follows:

- *Direct Contact for the Soil Pathway* – Direct contact for human receptors via ingestion or dermal adsorption is generally considered to be an incomplete exposure pathway.
- *Indirect Contact for the Soil Pathway (inhalation of volatile emissions)* - The comparison of soil vapor sample results to the appropriate standards indicates that indirect contact for human receptors via inhalation is currently an incomplete exposure pathway.
- *Direct Contact for the Groundwater Pathway* – Direct contact for human receptors via ingestion and dermal absorption is considered to be a complete exposure pathway.
- *Indirect Contact for the Groundwater Pathway (inhalation of volatile emissions)* – The initial comparison of the groundwater sample results to the appropriate standards indicates that indirect contact for human receptors via inhalation is currently an incomplete exposure pathway.
- *Direct Contact for Surface Water* – Direct contact for the surface water pathway for human receptors is currently considered to be a complete exposure pathway.

Completing an ecological assessment of the site was not necessary since the regulated substance released was unleaded gasoline and only petroleum products have been managed at the Aspinwall Citgo facility.

Remedial Alternatives Screening, Remedial Feasibility Testing and Selection of Remedial Approach

Remedial Alternatives Screening

As summarized in the November 2013 RAP, an assessment of various remedial alternatives was completed by Letterle according to known site conditions, remedial objectives, current regulations, anticipated implementation and operation costs, and the estimated time frame required to accomplish the site cleanup goals. Given these factors, the remedial alternatives

evaluated for potential site application included enhanced bioremediation, soil excavation, monitored natural attenuation (MNA), total phase extraction (TPE), *in-situ* chemical oxidation (ISCO), vacuum-enhanced groundwater extraction (VEGE), and a combination of air sparge / soil vapor extraction (AS / SVE). Based on the remedial alternatives screening process, installation and operation of a VEGE system or a combined AS / SVE system were identified as the most viable technologies for site remediation and were retained for feasibility testing.

Remedial Feasibility Testing

Remedial feasibility testing was performed to evaluate the potential effectiveness of either a VEGE system or a combined AS / SVE system as outlined below.

VEGE Feasibility Testing - VEGE pilot testing was conducted at recovery well RW-1 and details regarding the pilot test results are presented in the SCR. In general, although the feasibility testing results indicated that VEGE technology could be effective in reducing petroleum hydrocarbons in soil and groundwater, this remedial technology was considered by Letterle to be logistically infeasible due to the size of the treatment trailer, the amount of subsurface trenching, and the small size of the Aspinwall Citgo property. Therefore, a VEGE system was not recommended for application at this site.

AS / SVE Feasibility Testing – Remedial feasibility testing was conducted within sparge well SP-1 and recovery (SVE) well RW-1, and several key criteria determined from the testing are listed in the SCR. In general, these key criteria indicated that installation and operation of an AS / SVE remediation system would represent a viable remedial strategy with the added benefits of having a relatively small footprint with no waste water disposal management / costs.

Selected Remedial Approach

Given the results of the remedial alternatives screening and feasibility testing, installation and operation of an AS / SVE remediation system was selected for the site cleanup as specified in the November 2013 RAP. Additionally, the RAP indicated that the off-property cleanup will also rely on monitored natural attenuation (MNA). As previously mentioned, the SCR and RAP were unconditionally approved in a letter issued by the PADEP on 1/9/14.

Currently, the AS / SVE remediation system installation is complete and system start-up occurred on 9/10/14. A description of the AS / SVE system is provided in the following section along with a summary of the system operation & maintenance (O&M) and monitoring requirements as proposed in the RAP. This RFB generally addresses a fixed-price scope of work for continued O&M / monitoring of the remediation system, attainment demonstrations,

development of a Remedial Action Completion Report (RACR), and site closure activities as detailed in the various tasks under the Scope of Work section below.

AS / SVE System "As-Built" Design, Permitting, and Operation, Maintenance and Monitoring Requirements

As mentioned in the previous section, the AS / SVE remediation system has been installed and is currently in operation. This section provides a summary of the "as-built" system components and configuration and briefly describes the system O&M and monitoring activities that were specified in the RAP. According to Letterle, the AS / SVE system was installed according to RAP specifications with the following exceptions: 1) the SVE blower was originally specified as a 5-horsepower (hp) Rotron EN808 unit, but was upgraded to a 10-hp Rotron EN858; 2) a 7.5-hp Becker rotary vane sparge blower unit with no after cooler was installed instead of a 3.5-hp Busch rotary claw unit with after cooler; and 3) a Falco 300 catalytic oxidizer (CatOx) unit was initially installed for early system operation before it will be replaced by the two RAP-specified 600-pound VGAC units. At start-up, a system "shakedown" period was completed to address any needed troubleshooting or system adjustments / modifications.

Remediation Wells

The AS / SVE remediation system injects atmospheric air into a network of four, 2-inch diameter Schedule 40 PVC air-sparge wells, which include SP-1 through SP-4. The total depth of each air-sparge well is approximately 36 ft-bg with a screened section that spans the depth interval from 34 to 36 ft-bg. Sparged air and petroleum vapors are captured via two, 4-inch diameter Schedule 40 PVC SVE wells that include RW-1 and RW-2. The SVE wells were installed at a depth of approximately 30 ft-bg with a screened section extending from 5 to 30 ft-bg.[19] Each of the six remediation wells was completed with vault / junction boxes installed flush with the ground surface. Boring logs / construction details for remediation wells SP-1 and RW-1 can be found in the August 2013 SCR and details for wells SP-2 through SP-4 and RW-2 are provided in Attachment 3H. Surveyed locations of the AS and SVE remediation wells are depicted on Figure 2 in Attachment 3A.

Trenching and Piping

According to the RAP, subsurface piping for the SVE portion of the remediation system consists of 2-inch diameter Schedule 40 PVC that is individually connected to each SVE well. The AS subsurface piping consists of 1-inch diameter Schedule 80 CPVC with a high pressure / temperature rating. All piping runs were pressure tested before backfilling the trenches. Construction grade 2B-modified stone was installed around the piping in compacted lifts

[19] Screened sections for the AS wells are manufacturer-slotted 0.010-inch. The screened section for SVE well RW-2 is manufacturer-slotted 0.020-inch. The screened section for SVE well RW-1 is also believed to be 0.020-inch slotted as indicated in the SCR narrative, although the boring log / construction detail specifies 0.010-inch slots.

extended to existing grade and manholes provide access to the wells and piping. The depth of the piping trenches is approximately 2 ft-bg and the piping laterals were installed at a depth of approximately 1.5 ft-bg. The width of the trenching is about 1.5 ft. An "as-built" trenching and piping plan diagram that also depicts the location of the remediation shed is provided as Figure 1 in Attachment 3K. A typical piping trench cross-section is contained in the RAP.

AS / SVE System Equipment and Instrumentation

The AS / SVE system was assembled by a subcontractor (Newterra) and delivered to Letterle. Primary system components generally consist of a regenerative vacuum blower (SVE blower), rotary vane compressor, air / water separator and vapor treatment equipment. Following is a brief description of these primary system components.

- *Regenerative Vacuum Blower* - A regenerative vacuum blower with a 10-horsepower explosion-proof motor (Rotron EN858) provides the vacuum application to the subsurface via the two SVE wells. Based on pilot test data and additional friction losses, Letterle proposed to operate the vacuum blower to provide a total flow rate of 250 scfm at 32 in H_2O. The operational requirements for this system are 60-Hz, three-phase, 230-volt power with a running 24-ampere requirement.
- *Rotary Vane Compressor* - A rotary vane compressor with a 7.5-hp XP motor (Becker) provides atmospheric air injection to the subsurface via the four AS wells. Based on pilot test data, Letterle proposed to operate the pressure pump to provide a total flow rate of 44 scfm at 7 psi. The operational requirements for this system are 60 Hz, three-phase, 230-volt power with a running 22-ampere requirement.
- *Air / Water Separator* – The air / water separator (AWS) consists of a 55-gallon steel tank for the separation of water and vapor extracted by the SVE blower. Air is discharged through the top of the unit and water collects at the bottom. The AWS is equipped with a water level sensor (high-level switch) that serves as a fail-safe to deactivate the entire system should the water level rise too high in the tank. Any extracted liquid that collects in the AWS is placed in drums that contain purge water from quarterly sampling events.
- *CatOx Unit* – The recovered vapor stream is currently treated through a Falco 300 CatOx unit prior to atmospheric discharge. However, it is expected that the CatOx unit will have been replaced with VGAC before a Remediation Agreement is executed with the selected consultant. If this is not the case, the selected bidder shall replace the CatOx unit with VGAC as described under Cost Adder Milestone J in the Scope of Work section below.

- *VGAC Vessels* – The CatOx unit presently in use will be replaced with two 600-pound VGAC vessels after concentrations of vapor-phase contaminants have diminished to a

point at which VGAC would represent a more efficient / economical means of treating the extracted vapor stream.[20] As mentioned above, this replacement is expected to occur prior to execution of the Remediation Agreement with the selected bidder.

The AS / SVE remediation system is equipped with various electronic fault controls and probes that will de-energize the entire system in the event of overfills or other failures. The system also includes a control panel containing combination motor starters with overload and short-circuit protection, hour meters and amp meters. Additionally, a remote monitoring system (telemetry) is used to signal the operator (via e-mail alarm notifications) of system shutdowns due to power outages or if a fault occurs. The telemetry system is also equipped with the capability to permit the operator to adjust controls and switches remotely. A telemetry service account is currently set up between Newterra and Letterle and, as discussed under the scope of work below, the selected bidder will need to make arrangements to assume responsibility of the account. An example Newterra Telemetery Services Agreement is provided in Attachment 3L.

Regarding electric power requirements for the AS / SVE system, there are two services consisting of 240-volt three-phase power and 120 / 240-volt single-phase power. Both services require 200 amps. A power pole and service meter boxes have been installed and were inspected by the local electric provider before power was activated.

A fenced enclosure containing an insulated and heated shed has been constructed to secure and house the AS / SVE remediation system. The shed contains the AWS, regenerative vacuum blower, rotary vane compressor, influent AS manifold, SVE intake manifold, pressure gauges, flow meters and all associated valves and piping. The individual injection and vacuum lines appear to be valved to allow separate adjustments for each AS or SVE well. The system controls are housed in a control panel enclosure mounted on the outside of the shed and the CatOx unit is placed outside of, and adjacent to the shed. The remediation shed dimensions are 6-ft by 6-ft by 7-ft high and it sits atop a 6-ft by 10-ft concrete pad along with the CatOx unit.[21] As previously discussed, the CatOx unit is expected to be replaced by VGAC vessels before a contract with the selected bidder is executed.

Available photographs of the AS / SVE remediation system are provided in Attachment 3M. Note that the system photographs show two 600-pound VGAC vessels that have now been temporarily replaced with a CatOx unit. Figures 5A and 6 of Attachment 3K present a remediation system Piping & Instrumentation Diagram and a general plan view of the system enclosure layout, respectively.

[20] According to the RAP, the VGAC vessels shall be connected in series and rated for a maximum pressure of 5 psi and maximum airflow rate of 600 scfm.
[21] Two concrete pads were installed at the site. One pad supports the remediation system shed and CatOx unit and the other serves for staging waste disposal drums from LNAPL recovery and purge water.

AS / SVE Remediation System Permitting

According to Letterle, all mechanical work conforms with applicable state and local codes and structural components were assembled to comply with local and International Building Codes. The electrical compound is classified as a Class 1, Division II hazardous and explosion proof area and complies with local / state codes and the National Electric Code. Also, Letterle had reportedly contacted the Borough of Aspinwall to determine the need for, and file the necessary building permit application(s) and fee(s) to comply with local zoning requirements and regulations for placement of the remediation enclosure and completion of the site excavation and construction activities.

The USEPA has been contacted regarding requirements for an underground injection control (UIC) permit for the AS / SVE remediation system. The USEPA replied that filing a formal permit application was not necessary, although the Agency did request an e-mail summary of the system configuration and an outline of the site history. Letterle has satisfied that USEPA request.

A vapor discharge permit has been secured from the Allegheny County Health Department (ACHD) for operation of the CatOx unit. A copy of the ACHD permit is provided in Attachment 3N. A vapor discharge permit was previously issued by the ACHD for the two 600-lb VGAC vessels and is provided in Attachment O.

AS / SVE Remediation System O&M and Monitoring

Remediation System O&M is currently underway and, according to the RAP, site visits were to be conducted on an approximate weekly basis during the first month of system operation. Thereafter, the RAP specifies that routine O&M site visits are to be conducted at a frequency of once per month.[22] The routine O&M visits typically include: i) a system inspection and preventive maintenance, as necessary, to insure that the AS / SVE remediation system remains in proper working order; ii) monitoring and evaluating various system operational parameters; and iii) making necessary system adjustments to optimize efficiency and maximize hydrocarbon recovery. Periodic change-outs of the vapor-phase GAC units will also be necessary after the units are installed.

The RAP indicates that AS / SVE remediation system monitoring activities will include the following:

- Monitor CatOx and subsequent VGAC hydrocarbon removal efficiency on a monthly basis using a PID to ensure that the treatment equipment is removing hydrocarbons in

[22] Increased frequency may be required depending on the need to respond to any telemetry-triggered events.

accordance with the permit discharge limits and to signal when a VGAC change-out may be needed.

- Collect quarterly vapor samples for laboratory analysis, including influent, midfluent and effluent samples as appropriate based on the treatment equipment in use, to determine hydrocarbon removal efficiency and carbon consumption rates, and to track remediation system effectiveness in recovering contaminant mass from the subsurface.
- Analyze quarterly vapor samples for the post-March 2008 PADEP short-list of unleaded gasoline constituents.

Other Information

To the extent there is any discrepancy between the summary of site conditions provided above and the source documents, bidders shall rely on the source document information. Bidders should carefully consider what information, analyses, and interpretations contained in the background documents can be used in developing their scope of work for their bid in response to this RFB.

Scope of Work

This RFB seeks competitive bids from qualified contractors to perform the activities in the Scope of Work (SOW) specified herein. The draft RFB was provided to the PADEP Southwest Regional Office (SWRO) case manager for review and comment but no response was received.

Objective

In general, the SOW described in this RFB requires supplemental site characterization activities / reporting, contaminant fate & transport modeling, continued O&M of the AS / SVE remediation system and related quarterly groundwater monitoring, sampling and reporting, soil, groundwater and soil vapor attainment demonstrations, preparation and submittal of a Remedial Action Completion Report (RACR), and site closure / restoration activities. These work scope elements are intended to achieve site closure for a release of unleaded gasoline via the PADEP Act 2 SHS for soil and groundwater. The site closure strategy proposed in the PADEP-approved RAP generally involves site cleanup through operation of an AS / SVE remediation system and subsequent attainment demonstrations.

The SOW contained in this RFB has been developed and structured as a "Bid to Result" type solicitation. "Bid to Result" RFBs identify task goals and rely on the bidders to provide a high level of project-specific detail on how they will achieve the goal. Each bid must detail the approach and specific methods for achieving the milestone objectives. In reviewing the quality of bids submitted under "Bid to Result" solicitations, there is an increased emphasis placed on technical approach and reduced emphasis on cost (as compared to bids for "Defined Scope of Work" RFBs).

Constituents of Concern (COCs)

Soil, groundwater and soil gas samples collected at the Aspinwall Citgo site have been analyzed for the PADEP Act 2 post-March 2008 short-list of unleaded gasoline compounds. Based on these analyses, the COCs in site environmental media include the following:

Soil – Benzene, 1,2,4-TMB, 1,3,5-TMB, toluene, ethylbenzene, xylenes and naphthalene.

Groundwater – Benzene, 1,2,4-TMB, 1,3,5-TMB, naphthalene, toluene, ethylbenzene, xylenes and MTBE.

Soil gas – To date, all vapor-phase unleaded gasoline compounds have either been non-detect or substantially below the residential soil gas standards.

General SOW Requirements

The bidder's approach to completing the SOW shall be in accordance with generally accepted industry standards / practices and all applicable federal, state, and local rules, regulations, guidance, and directives. The latter include, but are not limited to, meeting the applicable requirements of the following:

- The Storage Tank and Spill Prevention Act (Act 32 of 1989, as amended);
- Pennsylvania Code, Title 25, Chapter 245 - Administration of the Storage Tank Spill and Prevention Program;
- The Land Recycling and Environmental Remediation Standards Act of 1995 (Act 2), as amended);
- Pennsylvania Code, Chapter 250 - Administration of Land Recycling Program; and
- Pennsylvania's Underground Utility Line Protection Law, Act 287 of 1974, as amended by Act 121 of 2008.

During completion of the milestone objectives specified below and throughout implementation of the project, the selected consultant shall:[23]

- Conduct necessary, reasonable, and appropriate project planning and management activities until the project (i.e., Remediation Agreement) is completed. Such activities may include Solicitor communications / updates, meetings, record keeping, subcontracting, personnel and subcontractor management, quality assurance / quality control, scheduling, and other activities (e.g., utility location). Project planning and management activities will also include preparing and implementing plans for health and safety, waste management, field sampling / analysis, and/or other plans that are necessary and appropriate to complete the SOW, and shall also include activities related to establishing any necessary access agreements. Project planning and management shall include identifying and taking appropriate safety precautions to not disturb Site utilities including, but not limited to, contacting Pennsylvania One Call as required prior to any ground-invasive work. As appropriate, project management costs shall be included in each bidder's pricing to complete the milestones specified below.

[23] As such, all bids shall include the costs of these activities and associated functions within the quote for applicable tasks / milestones.

- Be responsible for coordinating, managing, and completing the proper management, characterization, handling, treatment, and/or disposal of all impacted soils, water, and derivative wastes generated during the implementation of this SOW. The investigation-derived wastes, including purge water, shall be disposed in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Waste characterization and disposal documentation (e.g., manifests) shall be maintained and provided to the Solicitor and the PAUSTIF upon request. All investigation derived wastes shall be handled and disposed per PADEP's Regional Office guidance. It is the selected consultant's responsibility to conform with current PADEP Regional Office guidance requirements in the region where the Site is located.
- Be responsible for providing the Solicitor and facility operator with adequate advance notice prior to each visit to the property. The purpose of this notification is to coordinate with the Solicitor and facility operator to ensure that appropriate areas of the property are accessible. Return visits to the Site will not constitute a change in the selected consultant's SOW or result in additional compensation under the Remediation Agreement.

Site-Specific Guidelines

As part of this RFB, the selected consultant will need to consider the following site-specific guidelines:

On-Property Access. Given that the Aspinwall Citgo property is narrow, covers an area of only about 0.1-acre, and is fronted by a busy roadway, maneuverability can be challenging especially during peak business hours. As such, safety precautions should be carefully considered prior to and during any field activities along with an elevated level of attentiveness. Additionally, due to space constraints on the property, any waste drums or other non-essential items will need to be removed as quickly as possible. If it may be necessary to close or restrict access to the dispenser island to complete any of the milestones within this RFB, the Solicitor requires at least two (2) weeks advance notice and coordination with site personnel.

Off-Property Access. Selected consultant will be responsible for securing off-property access needed to implement the remedial approach. For the purpose of this bid solicitation, bidders shall assume that negotiations to secure two (2) access agreements will be required. Should an additional access agreement, or agreements, become necessary, such additional work would be considered out-of-scope and subject to the changed conditions clause of the Fixed-Price Agreement.

Field Activities. All on- and off-property work should be conducted during the normal business days and hours of 8:00 AM to 5:00 PM from Monday through Friday, unless work outside of these normal business days and hours is authorized by the respective property owner. The selected consultant will be responsible for determining and adhering to other restrictions that may apply to the Site or surrounding properties.

Responsibility. The selected consultant will be the consultant of record for the site. It will be required to take ownership of the project and will be responsible for representing the interests of the Solicitor and PAUSTIF with respect to the project. This includes utilizing their professional judgment to ensure reasonable, necessary and appropriate actions are recommended and undertaken to protect sensitive receptors and carry out adequate remedial actions in order to move the site toward closure.

Field Instrumentation. Each bidder should state in their bid response the appropriate field instrumentation (e.g., pumps, meters, photoionization detectors, etc.) to be used during the completion of the SOW. Specifically, the product associated with the regulated release at this site is unleaded gasoline. As such, any field-screening instrumentation used at the site should be able to detect the presence of hydrocarbons associated with that type of product.

Safety Measures. Each bidder should determine the safety measures necessary to appropriately complete the milestones. Specifically, if a consultant feels that it is appropriate and necessary to complete utility clearance using an air knife, the cost should be included in their fixed-price cost. If a bidder includes costs to conduct specific safety measures or activities, the bidder should specify it in the bid response and discuss why it is appropriate and necessary and indicate which methods will be utilized and to what extent. As discussed in the RFB, cost is not the only factor when evaluating bid responses and other factors are taken into consideration during the bid evaluation process, including appropriate safety measures.

Waste Disposal. The IDW waste (including, but not limited to, soil/rock cuttings, used carbon, well development/purging liquids, and liquids generated during well installation) shall be disposed of per the instructions included in the "General SOW Requirements" section of the RFB. Bidders will be responsible for arranging any off-site waste disposal (if required) and including costs in their bid response to cover the disposal of all potential waste related to the milestones included in the SOW. Containerized soil and groundwater may be temporarily stored on-site, but should be removed from the site as quickly as possible due to space constraints as mentioned above. Bidders will be responsible for including costs in their bid response to cover the disposal of all potential waste related to the milestones included in the SOW. Bidders should estimate the volume of waste using their professional opinion, experience and the data provided. **PAUSTIF will not entertain any assumptions from the selected bidder in the Remediation Agreement with regards to a volume of waste. Invoices submitted by the selected bidder to cover additional waste disposal costs as**

part of activities included under the fixed-price Remediation Agreement for this site will not be paid.

Site-Specific Milestones

Milestone A– Supplemental Site Characterization Activities and Reporting. This milestone provides bidders the opportunity to identify the additional site characterization work that will be completed. Conducting supplemental investigative activities under this Milestone is mandatory. PAUSTIF will be reimbursing up to $10,000 for supplemental site characterization and reporting costs under this milestone. Bidders are to describe what supplemental site characterization will be completed, the rationale for the work, and how the derived data will be used. For purposes of bidding, and to ensure consistent cost scoring of bids, each bidder will enter exactly $10,000 as the bid price for Milestone A in the Bid Cost Tabulation Spreadsheet. PAUSTIF will only reimburse up to $10,000 of reasonable and necessary costs for those tasks actually performed. The selected bidder must provide time and material documentation in addition to supporting documentation required (in Exhibit B of the executed Remediation Agreement) to support the requested reimbursement and completion of this milestone.

Bidders may use this opportunity to: 1) confirm any elements of the site characterization completed by the previous consultant; 2) address any perceived data gaps in the existing site characterization work (e.g., define area for demonstrating attainment for soils); 3) assist in the evaluation of the implemented remedial technologies and system design; and 4) assist with refining the cleanup timeframe estimate. For example purposes only, the bidder may potentially wish to conduct additional source soil delineation beyond the southern property boundary, further delineate the off-property dissolved-phase contaminant plume to the northeast beyond wells MW-9 and MW-10 (i.e., beneath and across Freeport Road), verify AS / SVE remediation system operational parameters and the compatibility of system components, etc. Should the Milestone A activities meet the New Conditions criterion identified in Section 11 of the Remediation Agreement, then applicable clauses of the Agreement will govern how the selected consultant may move forward.[24]

Each bidder shall describe in detail its scope of work for additional site characterization activities along with corresponding technical justification to support the need for each additional activity. When considering what additional site characterization activities may or may not be necessary, bidders are strongly encouraged to review Letterle's August 2013 SCR and November 2013 RAP, and the other documents provided in Attachment 3 rather than relying solely on the summary information presented in this RFB.

[24] For example, the Milestone A activities implemented by the selected consultant may suggest that additional remedial investigations and possible modifications to the existing AS / SVE remediation system are necessary.

Any and all Milestone A activities that are proposed with your firm's bid shall be accompanied by the following:

- The purpose and need for each Milestone A activity and an appropriate breakdown;
- A detailed scope description of each activity including the use and incorporation of any pre-existing site data;
- The timing and schedule of each activity relative to the overall project schedule;
- A description of the anticipated results of each activity and how such results may impact your proposed conceptual remedial action plan.[25]

Milestone A activities shall be conducted as soon as possible following execution of the Fixed-Price Agreement.

Bidders shall document the work performed along with the findings and any analytical data in a concurrent quarterly RAPR to be prepared under Milestone C.

Milestone B – Contaminant Fate & Transport Modeling. As discussed earlier, groundwater flow and contaminant fate & transport modeling has not yet been conducted because of concerns that the results could be influenced by the SPH plume. Therefore, bidders shall provide a firm fixed-price cost to develop a contaminant fate & transport model following SPH removal to the maximum extent practical as specified in the PADEP-approved SCR.

The selected consultant shall be required to develop a quantitative and calibrated contaminant fate and transport model that addresses all dissolved-phase constituents whose concentrations exceed the relevant PADEP SHS-MSCs for groundwater. It is expected that contaminant modeling will be conducted using the PADEP's New Quick Domenico application or equivalent. Model input shall incorporate the site-specific values including hydraulic conductivity and hydraulic gradient that were previously determined through Letterle's site investigations. Results from the contaminant fate and transport modeling shall be presented in a concurrent quarterly RAPR to be prepared under Milestone C and shall: (i) describe all model input / output; (ii) include an explanation of model construction along with identification and justification of all input parameter values and sources; and (iii) provide a discussion of the modeling results and conclusions in detail with respect to assessing current and predicted future plume stability and demonstrating the reliability and veracity of the model.[26]

[25] The Remediation Agreement will include a Site Specific Assumption that the results of Milestone A will not require modification to the SOW.

[26] The need for surface water modeling applications such as SWLOAD5B and PENTOX SD is not expected given the dissolved contaminant concentrations and distance to the Allegheny River. Although unexpected, should the PADEP require surface water modeling, such modeling would be subject to the "New Conditions" provision of the Fixed-Price Agreement.

Milestone C – Continue Remediation System O&M and Quarterly Groundwater Monitoring, Sampling & Reporting. For this milestone, bidders shall provide the Solicitor and PAUSTIF with firm quarterly fixed-price unit costs inclusive of routine O&M of the AS / SVE remedial system;[27] quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells; and quarterly reporting. The quarterly fixed-price cost shall also include responding to any unexpected telemetry-triggered O&M visits. A telemetry service account is currently set up between Newterra and Letterle and the selected bidder shall arrange to assume responsibility of the account.[28] The current Newterra Telemetery Services Agreement is provided in Attachment 3L.

For the purpose of this RFB, it is assumed that Milestone C activities will be required for a period of three years (12 quarters). However, if a bidder believes that the remedial approach will need to extend beyond 12 quarters, each bid *must* specify the additional number of O&M quarters that the remedial approach will need to operate in order to achieve the project goal of reducing soil and groundwater contaminant concentrations below the residential SHS MSCs, enabling initiation of groundwater and soil attainment demonstrations.[29,30] Additional quarters of remediation, beyond the 12 quarters of system O&M specified in this RFB, shall be defined on the Bid Cost Spreadsheet (i.e., if a bidder believes it can complete the remediation in a total of 16 quarters of O&M, the additional number of quarters to be included on the Bid Cost Spreadsheet is 4 quarters). If the bidder's O&M remediation timeframe exceeds the RFB-specified 12 quarters, the number of quarters exceeding 12 will be incorporated in the Remediation Agreement as Cost Adder Milestone I.[31] Bidders shall assume that site remediation will need to continue until the contaminant concentrations in all of the point of compliance (POC) and off-property attainment wells (as defined under Milestone E) have remained below the PADEP SHS for at least two consecutive quarterly monitoring and sampling events. Under these conditions, it is deemed reasonable to initiate the groundwater attainment demonstration. Each bid must explicitly state the bidder's understanding of the project goal for when the remedial system operation would be discontinued and attainment sampling shall begin.

Bidders may idle the remediation system early (before the 12 Milestone C quarters of remediation have been completed); however, the Consultant will bear some risk if groundwater

[27] As applicable, electric usage; telephone, cable, internet service; and any discharge to local treatment facility will be reimbursed as time and material cost adders to the Remediation Agreement.
[28] The Newterra telemetry account is paid annually and is current through mid-September 2015. Annual payments are fixed at $1,460 per year and shall be included in the cost for the base RFB SOW.
[29] During the contract period of O&M, including the base period of 12 quarters and any additional quarters of O&M under Milestone I, the selected consultant, at its own expense (including **all** associated labor), shall be responsible for repairing or replacing equipment purchased under this claim for the RAP implementation that becomes damaged, destroyed or defective (i.e., equipment that was previously purchased by the current consultant of record or that may be purchased by the selected consultant under the Remediation Agreement resulting from this bid solicitation).
[30] The selected consultant will only be reimbursed for O&M events that have been completed.
[31] The Remediation Agreement includes a Site Specific Assumption that quarterly remedial O&M, site monitoring, sampling & reporting events will not exceed the 12 quarters under Milestone C plus additional quarters under Cost Adder Milestone I.

contaminant concentrations rebound during subsequent attainment monitoring. More specifically, if the remedial system is shut down before all of the Milestone C quarterly events are completed, the Consultant will be required to wait a minimum of two months before initiating groundwater attainment activities (Milestone E). If during the first quarter of groundwater attainment, concentrations of contamination rebound above the SHS in any POC well, the Consultant shall be obligated to restart the system within 7 days and continue with the residual quarterly Milestone C activities. Then, **when all 12 quarters of the Milestone C activities have been completed, and any additional quarters (Milestone I), and groundwater attainment activities are re-initiated, the Consultant who initially pre-maturely idled the remediation system will be obligated to perform the first of the restarted series of quarterly attainment events at no cost.** Responsive bids will explicitly state an understanding of the possible consequences of early termination of the 12 quarters of O&M under Milestone C.

During the pre-bid site meeting, bidders will be given an opportunity to inspect the AS / SVE remediation system equipment and observe the equipment in operation. Bidders shall use this opportunity to identify, based on experience, any and all remedial system components that will likely need to be repaired or replaced during the period of performance of the Agreement. As stated in the Agreement, through the effective period of the Agreement, the selected consultant, at its own expense, shall be responsible for all costs for repairing or replacing Client- and Consultant- owned equipment purchased and used for completing the Agreement work scope that may, by any means, have become stolen, damaged, deteriorated, or destroyed over the course of completing the Agreement work scope. This applies to such equipment currently existing at the site and any additional equipment subsequently used or installed by the consultant selected under this bid solicitation. Each bid shall, therefore, be inclusive of all such costs to repair and/or replace remedial system components.

Each bid must specify the number and frequency of site visits to occur each quarter. As provided in the PADEP-approved RAP, O&M tasks are primarily focused on data collection and evaluation to: (1) determine, demonstrate, and document remediation system performance; (2) properly maintain the system equipment; and (3) demonstrate compliance with permits and other applicable regulatory requirements. Each bid shall include a description of the O&M activities including, but not limited to:

- *Performance monitoring* shall include data collection and evaluations geared toward evaluating how well the remedial strategy is working and making necessary adjustments to the system operational configuration to optimize system performance. Performance monitoring activities are to include, but not necessarily be limited to, measurements that allow contaminant mass recovery quantification. The selected consultant shall report quarterly (i.e., via RAPR) concerning its evaluations of system performance and system optimizations performed.

- *System maintenance & monitoring* shall include monitoring and routine maintenance as specified by the equipment manufacturer(s) to ensure warranties are not voided and the equipment is kept in good working order. Operational time shall be logged by system instrumentation and reported to the Solicitor in quarterly RAPRs. The selected consultant is expected to maintain at least an 85% uptime on the system during each quarter. Failure to meet this minimum expectation over two consecutive quarters will constitute, at the Solicitor's sole discretion, a breach of contract and the Solicitor may choose to terminate the contract.
- *Compliance monitoring* shall include system and site sampling needed to demonstrate compliance with the ACHD General Operating Permit for the SVE system and any other applicable regulatory requirements. Documentation of compliance shall be provided to the Solicitor in quarterly RAPRs and to the ACHD as necessary.

Extracted vapors from the AS / SVE system are currently being treated via a CatOx unit.[32] This RFB assumes that the CatOx unit will be replaced with the RAP-specified two 600-pound VGAC vessels prior to execution of the Remediation Agreement with the successful bidder. However, if the CatOx unit is still in use at that time, it shall be removed and replaced with the VGAC vessels under Cost Adder Milestone J below. Note that it may be necessary to reinstate the original ACHD air discharge permit for the VGAC vessels when the CatOx unit is replaced, if applicable.

The quarterly groundwater monitoring and sampling events conducted during operation of the AS / SVE remediation system shall include the 15 existing on- and off-property monitoring wells (MW-1 through MW-15).[33] During each event, the depth to groundwater and any potential SPH shall be gauged in all available monitoring wells prior to purging any of the wells for sampling. Groundwater level measurements obtained from the monitoring wells shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient. The conduct and results of each event shall be documented in quarterly RAPRs. Any well exhibiting more than a sheen of SPH shall not be purged and sampled. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with the PADEP SWRO guidance requirements.

Groundwater samples shall be analyzed for the **post**-March 2008 PADEP short-list of unleaded gasoline parameters (BTEX, MTBE, naphthalene, cumene, 1,2,4-TMB and 1,3,5-TMB) by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and analyzed for the

[32] The CatOx system is rented from Falmouth Products, Inc.
[33] The fixed-price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestone A.

same parameters.[34] In addition, each event shall include field measurements for these water quality parameters: pH, temperature, specific conductance, total dissolved solids, dissolved oxygen (measured *in-situ*), and oxidation / reduction potential.

The RAPRs describing the sampling methods and results shall be provided to the PADEP on a quarterly basis. As indicated in the PADEP's 1/9/14 SCR / RAP approval letter, RAPRs are due to the Department on or before 4/30, 7/30, 10/30 and 1/30 for each year of site remediation. At a minimum, each RAPR shall contain the following:

- A summary of site operations and remedial progress made during the reporting period, including vapor-phase contaminant mass recovery estimates;
- A narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored wells documenting the depth to groundwater and thickness of any free product encountered;
- A groundwater elevation contour map depicting a professional interpretation of groundwater flow direction;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide isoconcentration contour map for each compound detected in any one well above the SHS during the quarter;
- For each well exceeding SHS, a graphical depiction of historical key contaminant concentrations and groundwater elevations to provide an assessment of correlations between fluctuating water levels / precipitation events and contaminant concentrations;
- For each well exceeding SHS, a graphical depiction of recent key contaminant concentration trends;
- A discussion of the data to offer an updated assessment whether these data are consistent with a stable, contracting, or expanding plume;
- Evaluation of system performance including pneumatic influence, contaminant mass recovery quantification and system optimizations performed;
- Operational time shall be logged by system instrumentation and reported in the RAPRs. If less than 85% uptime has been achieved, documentation of operational problems shall be provided along with the changes/modifications implemented to improve performance consistency;

[34] Each bidder's approach to implementing Milestone C shall clearly identify the number of sampling events, number of wells / samples per event, well purging and sampling method(s), QA/QC measures, analytes, purge water management methods, and other key assumptions affecting the bid price.

- Treatment and disposal documentation for waste generated during the reporting period; and
- Demonstration of compliance with the required federal, State and local permits and approvals.

Each quarterly RAPR shall be signed and sealed by a Professional Geologist and / or Professional Engineer registered in the commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the RAPR).[35]

PAUSTIF will only reimburse for the necessary quarterly O&M and groundwater sampling / reporting events actually completed under this milestone (e.g., this milestone shall be considered complete with the initiation of groundwater attainment sampling under Milestone E). If, in order to achieve the cleanup goals, it is necessary to extend the period of O&M beyond the RFB-specified 12 quarters, each additional quarter, up to the bidder's specified total number of additional quarters, will be addressed via Cost Adder Milestone I. Consultant shall seek and obtain written approval from Solicitor and PAUSTIF to continue operation of the remedial system (Milestone I).[36]

To provide added incentive for the successful bidder to regularly scrutinize remedial system performance and optimize system operations for maximum efficiency in completing the remedial O&M to achieve closure as expeditiously and cost effectively as possible, **10% of each quarterly payment for this milestone (and Milestone I, if implemented) will be withheld and accumulated pending successful completion of remediation and initiation of soil and groundwater attainment activities (Milestones D and E).** When this condition has been met, the accumulation of 10% holdback payments for the milestones actually completed will be reimbursed in one lump sum to the successful bidder.[37] The 10% hold-back milestone will not be paid if the selected consultant has not attained the cleanup goal within their bid remediation timeframe.

Milestone D – Soil Attainment Demonstration. Under this milestone, bidders shall provide a firm fixed-price for developing and implementing a soil sample collection and analysis program to demonstrate compliance with 25 PA Code 250.703 (General Attainment Requirements for Soil). The soil attainment demonstration shall be initiated following the successful completion of active site remediation under Milestone C. As described previously under the General Site Background and Description section, the soil investigations completed by Letterle during the

[35] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format form the Solicitor upon request.
[36] The Remediation Agreement includes a Site Specific Assumption that remediation will be complete and soil and groundwater attainment activities will be initiated following the base 12 quarters (Milestones C1 through C12) and total number of additional quarters (Milestone I).
[37] Lump sum payment request shall be made prior to the on-set of initiating Milestones D and E.

UST closures and as part of the subsequent phases of site characterization indicated that concentrations of certain adsorbed-phase unleaded gasoline compounds in unsaturated and smear zone soils were found to exceed the applicable SHS within and in the vicinity of the UST source area and near the dispenser pad.

Bidders shall develop and implement a soil boring program for systematic random soil sampling to demonstrate attainment of the SHS for the unsaturated and periodically saturated soils in areas on-property and other areas off-property where previous site characterization activities have identified soil exceedances of the SHS. Three dimensional attainment sampling shall be completed to demonstrate attainment in these areas and each bidder ***must*** describe in detail its approach to addressing soil attainment, and include the depth interval and a drawing showing the locations where the sampling grid would be applied to demonstrate soil attainment. The location and number of soil samples shall be determined using PADEP's systematic random sampling procedures and other relevant guidance, assuming that one soil sample per boring shall be submitted for laboratory analysis. Bids shall clearly identify the estimated number of soil borings, estimated average drilling depth, and number of attainment soil samples.[38]

Soil boring locations shall be cleared through contacting PA One Call and sampling the initial five (5) feet of each boring location using a hand auger. Below five feet, each soil boring shall be advanced using direct-push sampling methods. Additionally, following sample collection, each soil boring shall be properly sealed and finished at the surface consistent with existing cover materials, and soil boring locations shall be field measured for inclusion on the site plan. Investigation-derived wastes shall be managed as described earlier in this section.

Soil samples shall be analyzed for the **post**-March 2008 PADEP short list of unleaded gasoline parameters (inclusive of TMBs) by a PA-accredited laboratory using proper analytical methods and detection limits. Appropriate QA/QC samples shall also be obtained for laboratory analysis of the same parameters. The soil sampling results shall be evaluated based on PADEP's 75% / 10x Ad Hoc Rule. Results from the soil attainment demonstration shall be incorporated into the RACR (Milestone G).

Milestone E – Groundwater Attainment Demonstration. Consistent with the PADEP-approved RAP, bidders shall provide a firm fixed-price for completing eight (8) consecutive quarters (two years) of groundwater monitoring, sampling and reporting to demonstrate attainment of the applicable SHS MSCs for groundwater. Each groundwater monitoring and sampling event shall include the RAP-specified point-of-compliance (POC) wells which include on-property wells MW-5, MW-6, MW-7 and MW-8 and off-property wells MW-10 and MW-13. The RAP also requires that off-property wells MW-11, MW-12, MW-14 and MW-15 be monitored and sampled during the groundwater attainment demonstration. Consequently, bidder's costs

[38] Most likely, it will not be possible to advance soil borings within the former UST basin since the replacement 20,000-gallon tank occupies at least a portion of the former basin. Also, soil boring completion beneath the dispenser pad will likely not be possible due to the piping infrastructure.

shall be based on monitoring and sampling 10 wells for demonstrating groundwater attainment. Additionally, bidders shall provide an all-inclusive fixed unit-cost per well for gauging, purging, sample collection, sample management and analysis under Cost Adder Milestone L should an additional well, or wells, that may qualify for POC or attainment sampling be installed under Milestone A or should the PADEP request that an additional well, or wells, be sampled for the attainment demonstration.

As previously referenced under Milestone C, the groundwater attainment demonstration shall be initiated once the contaminant concentrations in all of the POC and other attainment wells have remained below the applicable PADEP SHS MSCs for at least two consecutive quarterly monitoring and sampling events. Although this RFB assumes that a total of eight (8) consecutive quarterly groundwater attainment monitoring / sampling events will be required, each bid shall include language to the effect that should groundwater results for the POC and other attainment wells either be non-detect or below the applicable SHS MSCs for four (4) consecutive quarters, then the PADEP shall be petitioned to approve a reduction in the number of groundwater attainment monitoring and sampling events. All work under Milestone E shall be conducted in accordance with 25 PA Code §250.702, §250.704, and §250.707.

Except for the reduced number of wells to be gauged and sampled on a quarterly basis during the groundwater attainment demonstration, all protocols and requirements for groundwater sample collection, sample analysis and management of investigation derived wastes specified under Milestone C shall apply to the attainment sampling program conducted under Milestone E.[39] RAPRs describing the sampling methods and results during the groundwater attainment demonstration period shall be prepared and provided to the PADEP on a quarterly basis according to the schedule identified in the PADEP's 1/9/14 SCR / RAP approval letter. At a minimum, each RAPR submitted during the attainment period shall contain the following:

- A summary of current site operations along with a narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored wells documenting the depth to groundwater and thickness of any free product encountered;
- A groundwater elevation contour map depicting a professional interpretation of groundwater flow direction;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);

[39] Each bidder's approach to implementing Milestone E shall clearly identify the number of sampling events, number of sampling points / samples per event, purging and sampling method(s), QA/QC measures, analytes, analytical method, and other key assumptions affecting the bid price.

- One site-wide isoconcentration contour map for each compound detected in any one well above the SHS during the quarter;
- For each well exceeding SHS, a graphical depiction of historical key contaminant concentrations and groundwater elevations to provide an assessment of correlations between fluctuating water levels / precipitation events and contaminant concentrations;
- For each well exceeding SHS, a graphical depiction of recent key contaminant concentration trends and results of any other qualitative or quantitative trend analysis;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, contracting, or expanding plume;
- An assessment of the progress made toward successful demonstration of attainment during the reporting period (invoking the 75% / 10x and 75% / 2X Ad Hoc statistical rules as necessary);
- Treatment and disposal documentation for waste generated during the reporting period; and
- Demonstration of compliance with the required federal, state and local permits and approvals.

Each quarterly RAPR shall be signed and sealed by a Professional Geologist and / or Professional Engineer registered in the commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine which seals are required based on the work performed for and documented in the RAPR).[40]

Milestone F – Vapor Intrusion Attainment Demonstration. As summarized earlier in the General Site Background and Description section of this RFB, soil gas sampling point VP-1 has been sampled twice whereas sampling point VP-2 has been sampled only once. Laboratory analytical results from these sampling events indicate that all target vapor-phase unleaded gasoline compounds were either not detected or were substantially below the residential soil gas standards. According to the November 2013 RAP, and as restated in the second quarter 2014 RAPR, one additional round of soil vapor sampling shall be completed following active site remediation and shut-down of the AS / SVE remedial system.

Under this task, bidders shall provide a firm fixed-price cost to conduct post-remediation soil gas sampling consistent with the requirements, guidance and decision matrices in the *Land Recycling Program Technical Guidance Manual – Section IV.A.4, Vapor Intrusion Into Buildings from Soil and Groundwater*. The selected bidder shall conduct one sampling event for the two existing soil gas monitoring points (VP-1 and VP-2) and the samples shall be submitted to a PADEP-accredited laboratory for analysis of the PADEP **Post**-March 2008 short-list of unleaded

[40] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format form the Solicitor upon request.

gasoline parameters using appropriate analytical methods and detection levels. Each bidder shall describe its approach in detail for the purging and sampling of the soil gas sampling points, including sample analysis and a general schedule for when the sampling would be anticipated to occur.[41, 42] Results from the vapor intrusion attainment demonstration shall be incorporated into the RACR (Milestone G).

Milestone G – Preparation, Submittal and PADEP Approval of Remedial Action Completion Report (RACR). Under this milestone, bidders shall provide a firm fixed-price for preparing a draft and final RACR following the successful completion of Milestones D, E and F. The RACR shall contain all information required under 25 PA Code 245.313 and other applicable statutes, regulations, and guidance and shall be signed and sealed by a Professional Geologist **and** Professional Engineer registered in the Commonwealth of Pennsylvania. The RACR shall request a Relief of Liability (ROL) relative to soil and groundwater for the petroleum release identified in PAUSTIF Claim #2010-0131(F) by demonstrating compliance with the PADEP Act 2 SHS MSCs for a used aquifer in a residential setting (excluding the need for any activity or use limitations or institutional / engineering controls). The RACR shall be of sufficient quality and content to reasonably expect PADEP approval and issuance of a ROL.

The project schedule shall allow two (2) weeks for Solicitor and PAUSTIF review of the draft RACR before a final version is submitted to the PADEP. Following Solicitor / PAUSTIF review of the draft document, the selected consultant shall address any comments before the final report is issued. Additionally, bids shall include time to address any PADEP comments received on the RACR since Milestone H (Site Closure / Site Restoration) will be performed following PADEP approval of the report.

Milestone H – Site Closure / Restoration. Under this milestone, bidders shall provide a firm fixed-price for: i) proper abandonment of all site groundwater monitoring wells; ii) proper abandonment of all site extraction wells and injection wells; iii) proper abandonment of all site vapor monitoring points; iv) removal and proper disposal of all remedial equipment, disconnection of all utilities, and removal of all materials including proper abandonment of below grade piping; v) removal and proper disposal of the remediation building / compound; vi) as-needed grading of all ground surface areas that have been disturbed by site characterization or remedial action activities; and vii) in-kind restoration (pavement or vegetation) of all ground surface areas that have been disturbed by site characterization or remedial action activities.

[41] Each bidder's approach to implementing Milestone F shall clearly identify the number of sampling events, number of sampling points / samples per event, purging and sampling method(s), QA/QC measures, analytes, analytical method, and other key assumptions affecting the bid price.

[42] Should one or more target unleaded gasoline constituent(s) be detected in the soil gas samples above the applicable standard, other actions may need to be considered such as J&E modeling to assist with eliminating potential inhalation risk. If necessary, such work would be addressed via a site-specific assumption embodied in the Remediation Agreement executed with the selected bidder.

Work under Milestone H shall be completed within 60 days of RACR approval by the PADEP and shall be conducted in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives including abandonment of all monitoring / remediation wells and vapor monitoring points consistent with the PADEP's 2001 Groundwater Monitoring Guidance Manual. Well abandonment and site restoration activities shall be coordinated with the Solicitor.

The selected consultant shall determine whether the Solicitor wishes to maintain any components of the remedial system (e.g. remediation building) before removing them from the property. All debris and waste materials generated during well abandonment and site restoration activities shall be properly disposed per the PADEP SWRO guidance as directed earlier in this section.

Work and bid pricing for this milestone shall include all associated documentation required by PADEP, PAUSTIF or the Solicitor. This includes, but is not limited to, daily photo-documentation of all site restoration and well abandonment activities and submitting copies of the completed Groundwater Monitoring Well Abandonment Forms to the PADEP so that the Department may close its files on this facility. Copies of the photographs and well abandonment forms shall also be provided to the Solicitor and PAUSTIF.

Milestone I – Additional Remediation System O&M and Quarterly Groundwater Monitoring, Sampling & Reporting (Cost Adder Milestone). Under this milestone, bidders shall provide a firm quarterly fixed-price unit cost for routine O&M of the AS / SVE remedial system; quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells; and reporting beyond the timeframe of 12 quarters specified in Milestone C. The SOW for this unit cost adder milestone shall follow all Milestone C protocols and requirements. Consistent with Milestone C, a 10% holdback will also be applied to each Milestone I payment. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Milestone J – Replace CatOx Unit with Vapor-Phase Granular Activated Carbon (Cost Adder Milestone). Under this milestone, bidders shall provide a firm fixed-price cost for replacing the CatOx unit with two 600-pound VGAC vessels as specified in the RAP. Each bidder shall describe its scope of work for this milestone, and the fixed-price cost shall be inclusive of all labor, subcontractor, VGAC and waste handling / disposal items. Bidders shall also assume costs for packaging and shipping the CatOx unit back to Falmouth Products, Inc.

Milestone K – Vapor-Phase Granular Activated Carbon Change-Out (Cost Adder Milestone). Under this milestone, bidders shall provide a firm fixed-price unit cost for each VGAC change-out event. Each bidder shall detail its scope of work and provide the criteria or "trigger(s)" that would be used in determining when the VGAC needs to be replaced. The fixed-price cost shall be inclusive of all labor, subcontractor, VGAC and waste handling / disposal items.

Milestone L – Per Well Monitoring and Sampling (Cost Adder Milestone). Under this milestone, bidders shall provide a firm all-inclusive fixed-price unit cost per well for gauging, purging, sample collection, sample management and analysis.

Additional Information

In order to facilitate PAUSTIF's review and reimbursement of invoices submitted under this claim, the Solicitor requires that project costs be invoiced by the milestones identified in the executed Remediation Agreement. Actual milestone payments will occur only after successful and documented completion of the work defined for each milestone. The selected consultant will perform only those tasks/milestones that are necessary to reach the Objective identified in this RFB. Selected consultant will not perform, invoice, or be reimbursed for any unnecessary work completed under a milestone.

Any "new conditions", as defined in Attachment 1, arising during the execution of the SOW for any of the milestones may result in termination of or amendments to the Remediation Agreement. Modifications to the executed Remediation Agreement will require the written approval of the Solicitor and the PAUSTIF. PADEP approval may also be required.

List of Attachments

1. Remediation Agreement
2. Bid Cost Spreadsheet
3. Site Information/Historic Documents
    a. Attachment 3A – Figures 1, 2 and 3
    b. Attachment 3B – Site Photographs
    c. Attachment 3C - 3/2/12 UST Closure Report
    d. Attachments 3D1, 3D2 and 3D3 – August 2013 SCR
    e. Attachment 3E - November 2013 RAP
    f. Attachment 3F - PADEP 1/9/14 SCR / RAP approval letter
    g. Attachment 3G - Chapter 26, Part 2A of the Aspinwall Borough Ordinances
    h. Attachment 3H - SB-18 through SB-21 soil boring logs
    i. Attachment 3I – Second Quarter 2014 RAPR
    j. Attachment 3J – Construction detail for soil gas monitoring point VP-2
    k. Attachment 3K – Remediation System Figures
    l. Attachment 3L - Current Newterra Telemetery Services Agreement
    m. Attachment 3M – Photographs of AS / SVE remediation system
    n. Attachment 3N – ACHD vapor discharge permit for CatOx unit
    o. Attachment 3O – ACHD vapor discharge permit for VGAC