Request for Bid

Fixed-Price Bid to Result

Site Remediation through Closure

Solicitor

JBRL Development Corporation

Valley Village

10243 State Route 85
Kittanning, PA 16201-8165

PADEP Facility ID #: 03-06500 PAUSTIF Claim #: 20140036(I)

Date of Issuance

December 3, 2018

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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 https://ustif.pa.gov.

Calendar of Events

Activity	Date and Time
Notification of Intent to Attend Site Visit	**December 14, 2018 by 5 p.m.**
Mandatory Pre-Bid Site Visit	**December 18, 2018 at 11 a.m.**
Deadline to Submit Questions	**January 18, 2019 by 5 p.m.**
Bid Due Date and Time	**January 25, 2019 by 3 p.m.**

Contact Information

Technical Contact
Mr. Robert 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 **"Valley Village, Claim #20140036(I) – RFB QUESTION".** Bidders must neither contact nor discuss this RFB with the Solicitor, PAUSTIF, the Pennsylvania Department of Environmental Protection (PADEP), or 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 will 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 "Valley Village, Claim #20140036(I) – 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 #20140036(I)".** 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 bid unit cost rates for each expected labor category, subcontractors, other direct costs, and equipment;

2. The bid markup on other direct costs and subcontractors (if any);

3. The bid total cost by task consistent with the proposed SOW identifying all level-of-effort and costing assumptions; and

4. The bid 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 unless otherwise noted. 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. Bids should include enough original language

conveying bidder's thought such that the understanding of site conditions, closure approach (if applicable), and approach to addressing the scope of work can be evaluated. Since bidders are not prequalified, the bid response must provide the Bid Evaluation Committee and Solicitor enough information to complete a thorough review of the bid and bidder.

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 of 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”.

11. The name and contact information of the person who is to be contacted in the event the bid is selected by the Solicitor and/or a Right to Know request is received by PAUSTIF.

Bid Review and Evaluation

1. Bid Review and Scoring

   Bidders' submissions that are administratively qualified (i.e., attended the mandatory pre-bid site meeting and submitted the bid in strict accordance with instructions by the designated due date and time) will be evaluated.

   Technical Scoring

   Bids are evaluated for technical viability before bid cost is considered. Bids that have technical scores that fall within 75% of the highest technical score will advance to cost scoring. Bids with technical scores below 75% of the highest technical score are eliminated from further consideration.

   Numerical values will be assigned to each of three categories to derive the technical score for this bid-to-result solicitation:

   - Problem Understanding
   - Technical and Regulatory Approach to Remediation
   - Qualifications and Experience

   Cost Scoring

   Cost scores are determined by a cost formula. The bid(s) with the lowest total cost receives the maximum cost points available. The remaining bids are scored by applying the following cost formula: (1-((B-A)/A)) x C = D

   A = the lowest bid cost
   B = the bidder's cost being scored
   C = the maximum number of cost points available
   D = bidder's cost score (points)

   If a bid cost is equal to, or greater than, twice the amount of the lowest bid cost, the formula calculation will result in a negative number and the bid will be assigned zero cost points.

2. Evaluation of Bids

   A committee comprised of at least two members of the USTIF staff, two members of ICF staff, and the TPR who assisted in developing the bid package will score all bids that are administratively qualified based on the above criteria. USTIF recognizes that several bids may be acceptable and receive similar numerical scores. At the conclusion of the scoring process, Solicitor will receive those bids with numerical scores placing them in the

category of meeting Reasonable and Necessary criteria and acceptable for USTIF funding. Solicitor may select any of the consulting firms that submitted a qualified bid package to implement the tasks described in the bid; however, USTIF will only provide funding up to the highest fixed price of those bids determined to be Reasonable and Necessary for USTIF funding.

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.

Summary of Site Background and Features

The Valley Village facility is located at 10243 State Route 85 in Kittanning, Armstrong County, Pennsylvania, and is currently operated as a retail gasoline service station and convenience store (c-store). The facility was purchased from the Solicitor in June 2015 and is currently owned and operated by Shiv Ram Properties, LLC. However, the Solicitor retains responsibility for the environmental cleanup.

Existing features on this approximate 0.82-acre triangular-shaped parcel primarily consist of a single story c-store building with a basement located near the southwest property corner, a fuel dispensing island located northeast of the c-store building with two product dispensers and canopy cover, and three underground storage tanks (UST) installed in a common cavity east of the c-store building. Additional information regarding the current and historical facility UST systems is provided in the next subsection of this RFB. Most of the ground surface at the Valley Village facility is paved with either asphalt or concrete with other portions covered in grass or gravel. The general facility layout, site features and surrounding parcels are depicted in Figure 1 provided in Attachment 3a. Photographs of the Valley Village facility and surrounding properties are contained in Attachment 3b.

A total of fifteen groundwater monitoring wells and three piezometers are used to monitor groundwater quality. The monitoring well network consists of: (a) on-property wells MW-1R, MW-2, MW-3R, MW-5, MW-6, MW-7 and MW-15 and piezometers P-1, P-2R, and PT-1; and (b) off-property wells MW-4R and MW-8 through MW-14.[1] Additionally, as part of the historical site remediation efforts (discussed in more detail below), there are two UST field extraction wells (EW-1R and EW-2) and seven UST field injection / extraction points (CP-1 through CP-7). Also, there are six monitoring / remediation points (SL-1 through SL-6) installed within the trench backfill of the main sanitary sewer line located beyond the southern property boundary. Finally, there are four soil vapor monitoring points that are located adjacent to the c-store building (VM-1 and VM-4) and near the UST field source area (VM-2R and VM-3R).

[1] Wells MW-1, MW-3 and MW-4 and piezometer P-2 were destroyed during remedial soil excavation conducted in September / October 2016 and were subsequently reinstalled at or near their original location. Piezometers P-1 and PT-1 were also destroyed during the soil excavation but were not replaced. The soil excavation work is summarized in a later section of this RFB.

In general, land use in the vicinity of the Valley Village site consists of commercial and residential properties and undeveloped / wooded land. A former railroad corridor also borders the southern property boundary. Overhead and buried utilities are present on and near the Valley Village property and include municipal water and sewage, storm sewer, natural gas and electric. The c-store building is heated by propane and the tanks are located along the south side of the building. Additionally, a solid PVC storm water conveyance line extends from the dispenser canopy to a discharge point located slightly beyond the southern property boundary. Locations of overhead and subsurface utilities are depicted on Figure 1 provided in Attachment 3a.

Historical Petroleum Storage and Dispensing Operations, Release History and UST System Closure

Based on available historical information, the Valley Village property has been used as a gasoline retail facility and c-store since 1985. The facility operates three unleaded gasoline USTs located in a single cavity east of the c-store. Two of the tanks have a capacity of 6,000 gallons and the other holds 4,000 gallons. These tanks appear to be the original generation of USTs installed in 1985.[2]

A release of unleaded gasoline was reported in March 2014 during tank top upgrade activities when strong odors were noted in the area of the sump on unleaded gasoline UST #003 (easternmost tank of the three USTs) and free-phase hydrocarbons (FPH) were observed on the water surface in the tank cavity. A Notification of Reportable Release form (NORR) was subsequently prepared and submitted to the PADEP in April 2014. Absorbent pads were used to collect the FPH and approximately 8 tons of visibly impacted soil were excavated and disposed off-property.[3] Additionally, about 50 gallons of groundwater/product mixture were pumped from the excavation and transported off-property for disposal.

The PADEP field inspector requested that two soil samples be collected and analyzed including one from the northern wall of the excavation and another from the eastern wall. The field inspector also requested collection of a water sample from the tank cavity. Analytical results from these post-excavation soil and groundwater samples revealed concentrations of benzene and 1,2,4-TMB in soil above the applicable SHS Medium Specific Concentrations (MSCs), and concentrations of benzene, naphthalene, 1,2,4-TMB, 1,3,5-TMB and toluene in tank pit water above the applicable SHS MSCs. The source of the unleaded gasoline release was believed to be related to a cracked sump (spill bucket) on UST #003 and/or customer overfills at the dispensers that gradually migrated to a low point in deteriorated concrete near the cracked sump.[4]

[2] One diesel fuel UST was removed from the property in 1998 due to diminishing product sales. This tank was located in the same common cavity as the other USTs. Reportedly, no petroleum contamination was observed during the tank removal. No UST Closure Report is available.
[3] The depth of the excavation was approximately four feet below grade (ft-bg) and extended to the north and east of Tank #003.
[4] The damaged sump was replaced on Tank #003 which was hydraulically tested with passing results.

In June 2014, Insite Group, Inc. (IGI) initiated site characterization work to further investigate the subsurface contamination discovered during the March 2014 tank top upgrades. Following several phases of soil and groundwater investigations, IGI submitted a combined Site Characterization Report (SCR) / Remedial Action Plan (RAP) to the PADEP in March 2015 (Attachment 3c). As discussed in more detail below, the RAP remedial approach proposed: i) excavation of impacted soil; ii) chemical oxidation in the UST cavity source and in deeper soil below the proposed vertical extent of excavation; and iii) installation of a barrier wall using an activated carbon-based product (CBP) combined with an oxygen-releasing compound (ORC) to intercept any residual post-excavation shallow groundwater contamination near the property boundary. The SCR / RAP was approved by the PADEP with modifications in a letter dated 6/11/15 (Attachment 3d).

IGI subsequently submitted a SCR / RAP Addendum in July 2016 (Attachment 3e) after additional site characterization activities and feasibility studies were completed. Modifications to the RAP remedial approach included: i) increasing the lateral and vertical extent of the soil excavation to remove all accessible adsorbed-phase contaminant mass; ii) placement of a clay barrier along the eastern and southern edges of the UST cavity; iii) eliminating the chemical oxidation in deeper soil (and instead excavating this soil); iv) expanding the CBP barrier wall; and v) adding two horizontal injection galleries downgradient of the excavation footprint for future post-excavation groundwater treatment, if necessary.[5] The SCR / RAP Addendum was unconditionally approved by the PADEP in a letter issued on 8/26/16 (Attachment 3f).

A second RAP Addendum was submitted by IGI in August 2017 (Attachment 3g). This addendum proposed including surfactant flushing of the UST cavity, treatment of the sanitary sewer line trench backfill using surfactant, and treatment of the downgradient contaminant plume using a carbon-based injectant. This second RAP Addendum was unconditionally approved by the PADEP in a letter dated 8/24/17 (Attachment 3h).

Overview of Site Characterization Activities and Results

Several phases of site characterization were completed by IGI following the March 2014 release. Key results from the site investigations are summarized below. Bidders are directed to the March 2015 SCR / RAP (Attachment 3c) and the July 2016 SCR / RAP Addendum (Attachment 3e) for additional site characterization information.

<u>Site Geology, Hydrogeology and Hydrology</u>

[5] Available site information indicates that these horizontal injection galleries were never installed.

Geologic characterization of the site subsurface was determined through advancing numerous on- and off-property soil borings, and borings for monitoring wells, extraction wells, piezometers, and other remediation points as previously described. Based on available drilling / logging data, unconsolidated materials underlying the Valley Village property and vicinity generally consist of a near-surface layer of fill materials that extends to depths ranging from approximately 1 to 5 feet below grade (ft-bg). Fill materials were encountered in most of the borings advanced in the area of the UST field and dispenser island although fill was also encountered in some borings completed within the former railroad corridor beyond the southern facility property boundary. Below the fill materials are natural soils comprised of silty to silty-sandy clay with increasing rock fragments at depth.[6] Bedrock was encountered within the boring for monitoring well MW-1 from a depth of about 12 ft-bg to the total boring depth of approximately 27 ft-bg. The bedrock at this location consists of interbedded weathered sandstone and shale. Within the UST cavity, the backfill materials reportedly consist of silt-rich river sand and crushed shale with pea gravel placed around the tops of the USTs. Drilling logs are provided in the March 2015 SCR / RAP and in the July 2016 SCR / RAP Addendum. The locations of all soil borings, monitoring and extraction wells, piezometers and other remediation points are provided in Figure 1 (Attachment 3a).

Hydrogeologic data for the site has been provided through gauging and testing of the previously identified network of monitoring wells, extraction wells and piezometers. The depth to the shallow unconfined water table aquifer beneath the Valley Village property averages about 4.3 ft-bg. It appears that localized zones of perched groundwater may also be present at the fill / clay soil interface.[7] The depth to the water table at off-property monitoring locations averages about 6.3 ft-bg. Additionally, water levels measured in the UST cavity injection / extraction points have ranged from approximately 2.5 to 4 ft-bg. Historical groundwater gauging data is tabulated in the most recent second quarter 2018 Remedial Action Progress Report (RAPR) provided in Attachment 3i. Groundwater movement within the overburden has generally been toward the south-southwest to south-southeast in the general direction of Cowanshannock Creek which appears to be a local groundwater divide located approximately 210 feet beyond the Valley Village southern property boundary. The average horizontal hydraulic gradient appears to be on the order of approximately 0.1 ft/ft. Aquifer testing (slug testing) was conducted in monitoring wells MW-1, MW-8 and MW-10 with widely differing estimated hydraulic conductivity values ranging two orders of magnitude from 0.004 ft/day in MW-8 to 0.4 ft/day in MW-1.[8] Additional details regarding site geology and hydrogeology can be found in the documents provided in Attachment 3 including general hydraulic properties of the UST cavity backfill materials and hydraulic connection between

[6] The clay was mainly described as moderately dense to dense.

[7] Piezometers P-1 and P-2R were installed as vertical delineation points within the clay overburden and were constructed with shorter screen sections installed from 12 to 15 ft-bg to isolate a deeper zone of the water table aquifer. The average depth to groundwater at these two locations was slightly greater than the other on-property monitoring points (averaging about 6.3 ft-bg) which may reflect a vertical hydraulic gradient.

[8] The significant difference in hydraulic conductivity can probably be attributed to MW-1 communicating with more permeable weathered sandstone and sand from ~12 to 19 ft-bg versus the predominance of silty clay at the locations of MW-8 and MW-10.

the UST backfill and surrounding wells derived from historical vacuum extraction events and dye tracer studies.

Soil Quality

A total of 46 soil samples have historically been collected from on- and off-property locations and submitted for laboratory analysis during the various phases of site characterization conducted in 2014 and 2015. All soil samples were analyzed for the current PADEP short-list of unleaded gasoline parameters including benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene, 1,2,4-trimethylbenzene (TMB) and 1,3,5-TMB. Based on the sample depths and historical depth to groundwater gauging data, it appears that soil samples were primarily collected from periodically and permanently saturated soils with only a limited number of samples obtained from the unsaturated zone. Historical soil sampling locations are depicted in the figure provided in Attachment 3a, and the results from soil sample analyses are provided in the March 2015 SCR / RAP (Attachment 3c) and the July 2016 SCR / RAP Addendum (Attachment 3e).

Prior to the excavation of impacted soil in September and October 2016 (described in more detail below), the historical analytical dataset reveals that the primary constituents of concern (COC) in soil were benzene and 1,2,4-TMB. Pre-excavation levels of benzene and 1,2,4-TMB in soil were reported at concentrations up to 15 and 21.4 milligrams per kilogram (mg/kg), respectively. All other target unleaded gasoline compounds in soil were detected, but at concentrations below the applicable PADEP Act 2 SHS MSCs for a used aquifer in a residential setting. Contaminant concentrations in soil exceeding applicable standards were primarily identified surrounding and hydraulically downgradient of the UST cavity source area. Considering the chemical / physical properties of fuels, bidders should note that excessively impacted saturated soil was identified at depths up to 17 ft-bg (e.g., soil boring B-2 located near the eastern perimeter of the UST cavity).

The 2016 soil excavation remedial action appears to have removed the bulk of the adsorbed-phase contaminant mass. Post-excavation confirmation soil sampling performed using systematic random sampling methods demonstrated attainment of the applicable SHS standard through application of the PADEP's 75%/10x Ad Hoc Rule. However, it appears that residual adsorbed-phase contaminant mass likely persists outside the excavated area within and below the UST field backfill and beyond the southern facility property boundary. The elevated post-excavation dissolved-phase contaminant concentrations remaining in off-property wells MW-8 and MW-13 signal residual soil impacts in this area.

Groundwater Quality

Groundwater quality has been assessed through a quarterly compliance sampling network consisting of 15 on- and off-property overburden monitoring wells including MW-1 (MW-1R), MW-2, MW-3 (MW-3R), MW-4 (MW-4R) and MW-5 through MW-15. However, quarterly sampling of monitoring wells MW-2, MW-5, MW-6, MW-7 and MW-12 was discontinued following the December 2016 sampling event as warranted by more than eight consecutive quarters of

analytical results that were either non-detect or below the residential used-aquifer SHS MSCs. Of these wells, MW-3R and MW-4R are considered points of compliance (POCs) and off-property attainment wells consist of MW-8, MW-13 and MW-14 as defined in the PADEP-approved July 2016 SCR / RAP Addendum.

Groundwater samples have also been collected from other on- and off-property monitoring locations including two recovery wells (EW-1 [EW-1R] and EW-2), three piezometers (PT-1, P-1 and P-2 [P-2R]), and 6 monitoring points (SL-1 through SL-6) installed in the backfill of a buried sanitary sewer trench. Groundwater sampling locations are depicted in the figure provided in Attachment 3a. Historical groundwater analytical results are provided in the second quarter 2018 RAPR in Attachment 3i and the more recent third quarter 2018 groundwater analytical data are summarized in Attachment 3j. Boring logs and construction details for the site monitoring wells and other groundwater sampling points are provided in the March 2015 SCR / RAP (Attachment 3c), July 2016 SCR / RAP Addendum (Attachment 3e), and the fourth quarter 2016 RAPR (Attachment 3k).

Groundwater samples have historically been analyzed for the current PADEP 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 data available, collected during the third quarter 2018, indicate that the constituents of concern (COCs) in site groundwater (i.e., compounds exceeding the applicable standard) currently consist of benzene, 1,2,4-TMB and MTBE. During the third quarter 2018, benzene concentrations exceeding the residential used aquifer SHS MSC were reported for samples collected from on-property wells MW-3R and MW-15 and from off-property well MW-8. Concentrations of benzene in these wells ranged from ~6 µg/l (MW-15) to 1,440 µg/l (MW-8). MTBE concentrations exceeded the applicable standard in off-property wells MW-8 (~36 µg/l) and MW-13 (~69 µg/l), and the concentration 1,2,4-TMB exceeded the applicable standard in MW-3R (433 µg/l) during the third quarter 2018. Concentrations of all other target unleaded gasoline compounds were either not detected or were below the applicable standard for the third quarter 2018 sampling event. Of most concern are the residual post-remedial dissolved-phase concentrations currently observed in POC well MW-3R and off-property attainment wells MW-8 and MW-13, including an increasing trend for 1,2,4-TMB in MW-3R and a recent increasing trend for benzene in MW-8.

Regarding other groundwater monitoring locations, elevated levels of benzene (62 µg/l) and 1,2,4-TMB (214 µg/l) were detected in extraction well EW-1R during the third quarter 2018 sampling event.[9] Note that the concentrations of target unleaded gasoline compounds identified in EW-1R during the third quarter 2018 were unusually low and have historically been more substantial with a greater number of compounds exceeding the SHS MSCs. Groundwater monitoring points SL-3 and SL-4 installed within the off-property sanitary sewer line backfill have also been problematic, most recently due to persistent detections of benzene exceeding the SHS at the SL-3 location.

[9] Extraction well EW-1R is reportedly in direct hydraulic communication with the UST cavity backfill.

Soil Vapor Sampling

As mentioned earlier, there are four soil vapor sampling points on the Valley Village property (VM-1, VM-2R, VM-3R and VM-4). Soil vapor samples were collected from the original sampling points VM-1, former VM-2 and former VM-3 during two events conducted between September 2014 and January 2015. Analytical results for the target unleaded gasoline compounds indicated that benzene and possibly naphthalene[10] levels in soil vapor exceeded the residential soil gas screening values at the location of former VM-3 (previously installed between monitoring wells MW-3R and MW-4R).

Additional soil vapor sampling was proposed following the September-October 2016 soil excavation, but was not conducted. Therefore, no subsequent data is available for original sampling point VM-1, replacement points VM-2R and VM-3R, or sampling point VM-4 which was added in October 2015. Historical soil vapor analytical results can be found in the March 2015 SCR / RAP.

Free-Phase Hydrocarbons

While measurable FPH has not been found anywhere at this Site, there historically have been indications of FPH and source material, particularly in and around the UST field. According to the fourth quarter 2016 RAPR (Attachment 3k), *measureable* free-phase hydrocarbons (FPH) have not been present on the groundwater surface in any of the site wells. However, FPH "globules" (i.e., an emulsion) were identified in late 2014 during excavation of a chemical oxidation pilot study trench south of the UST field and installations of UST cavity injection point CP-4 and former extraction well EW-1, and in late 2015 during installation of extraction well EW-2. A strong hydrocarbon sheen had also been observed on the groundwater surface in former well MW-1 and FPH was observed on the groundwater surface in the UST cavity during the March 2014 tank top upgrades as mentioned above. In addition, the March 2015 SCR / RAP (Attachment 3c) mentions that ~338 gallons of a groundwater and FPH mix were removed from the UST cavity during a December 2014 vacuum extraction event. Source material likely continues to reside in the UST cavity despite remedial efforts to date (discussed more below).

Overview of Key Historical Remedial Feasibility Testing and Remedial Actions

In Situ Chemical Oxidation and Vacuum Extraction Pilot Testing – Late 2014

In situ chemical oxidation (ISCO) feasibility testing was performed to evaluate the possible treatment of saturated zone soil and groundwater beyond the UST cavity. In general, a chemical oxidant (PersulfOx®) was mixed with 2B limestone and an oxygen releasing compound (ORC)

[10] The laboratory method detection limit for naphthalene exceeded the residential soil gas screening value.

and placed into a shallow excavation located south (hydraulically downgradient) of the UST cavity.[11] Soil and groundwater samples were subsequently collected and analyzed to assess the remedial effects of the ISCO application. Pilot testing conclusions reached by IGI included: 1) there was little effect on contaminant concentrations downgradient of the test pit which IGI attributed to the significant adsorbed-phase contaminant mass; 2) the ISCO application resulted in the formation of a sulfate plume which raised concern that the plume could expand off-property if the application volume was increased; and 3) the residual contaminant mass was too substantial for a primary remedy involving ISCO, but that ISCO could possibly be used as a polishing step to treat residual impacts following excavation of impacted soil.

Pilot tests involving multi-phase vacuum extraction and ORC injection were planned to evaluate treatment of the UST cavity source area. To facilitate the testing, four shallow injection points were installed in the shallow pea gravel backfill of the UST cavity (CP-1 through CP-4) that range in depth from ~ 3.2 to 3.8 ft-bg. One extraction well (EW-1) was also installed adjacent to the tank cavity. IGI completed vacuum extraction from monitoring / remediation points EW-1, MW-1, CP-4 and PT-1 to enhance the recovery of FPH and dissolved-phase contaminant mass within and surrounding the UST cavity. A total of 338 gallons of groundwater and FPH (as "globules") was extracted. No other information is available regarding the testing methods or results (e.g., level of applied vacuum, air flow rate, duration of the vacuum extraction, groundwater / vapor analytical results, etc.). Injection of ORC into the UST cavity via injection points CP-1 through CP-4 was not performed due to the significant amount of contaminant mass present in the cavity. Additional details on the 2014 pilot testing can be found in the March 2015 SCR / RAP provided in Attachment 3c.

<u>UST Field Multi-phase Vacuum Extraction Pilot Study – December 2015</u>

A multi-phase vacuum extraction pilot study was conducted on EW-2 in December 2015 to evaluate whether the approach might be used to dewater and cleanup the UST cavity. In general, a vacuum truck applied a high vacuum to well EW-2 for a period of approximately 29 hours for this test.

This testing found that the UST field could not be readily dewatered using EW-2 alone. The initial aqueous extraction rate from EW-2 was just ~0.3 gpm. While this increased over the first 8 hours to a maximum of ~1.4 gpm, the extraction rate then decreased over the next 16 hrs. After about 24 hours of extraction, several intervals were recorded during which no groundwater was removed possibly suggesting that the UST cavity was dewatered to the extent possible. However, the total volume of groundwater removed during the pilot study was only about 787 gallons, which was a small fraction of the water estimated to have been contained in the UST backfill.[12] Because the water level in tank field monitoring point CP-4 declined ~0.5 ft during the pilot study before

[11] The mixture was placed in the saturated zone from approximately 3 to 5.5 ft-bg and the remainder of the excavation was backfilled.
[12] The volume of groundwater contained in the UST cavity backfill was previously estimated at roughly 12,000 gallons.

becoming dry, it is difficult to estimate the amount of water still ponded in the UST backfill at the conclusion of the testing. Although the technology struggled to dewater the UST backfill, hydraulic and pneumatic influences were observed. The greatest influence from the vacuum extraction was reportedly observed in monitoring points MW-1, EW-1, EW-2 and CP-4. Groundwater samples were also collected from EW-2 and analyzed during the pilot study.[13] Additional details for the vacuum extraction pilot study can be found in the July 2016 SCR / RAP Addendum provided in Attachment 3e.

Dye Tracer Study – December 2015

A dye tracer study was performed during July 2016 to evaluate the hydraulic connection between the UST cavity and the surrounding monitoring / extraction wells. In general, fluorescent dye was injected into UST cavity injection points CP-2, CP-3 and CP-4. Soon after injection, notable fluorescence was observed in extraction well EW-2 with trace fluorescence also detected in MW-1, MW-3 and EW-1. Approximately seven months after the dye injection, fluorescence continued to be observed in MW-1, MW-3, EW-1, EW-2 and CP-4. Trace fluorescence was not observed in well MW-15 west of the UST cavity until about 4 months after the injection. Three additional UST cavity injection points, CP-5, CP-6 and CP-7, were therefore installed in the western portion of the cavity to further assess the hydraulic connection between the UST cavity and MW-15. Dye injection into these points revealed an increase in fluorescence in EW-1 and EW-2, although no additional fluorescence was observed in MW-15.[14] Based on results produced from the dye tracer study, IGI verified some degree of hydraulic connection between the UST cavity and nearby wells, most notably EW-1, EW-2 and MW-1. Additional details regarding the dye tracer study are provided in the July 2016 SCR / RAP Addendum (Attachment 3e.)

Bench Top Surfactant Study – Early 2016

Surfactant flushing of the UST cavity to desorb and remove contaminant mass was also considered as a means of addressing residual source material in this area. A bench-scale study was completed to initially evaluate the feasibility of this potential approach. The goal of the bench top surfactant study was to: 1) determine if a middle-phase microemulsion could be formed; and 2) determine the optimal salt concentration for forming a middle-phase microemulsion. Results from the study generally indicated that a middle-phase microemulsion could be formed and that a salt concentration between 0.9 and 1.1 wt. % sodium chloride may be optimal for microemulsion formation. Additional information on this study is provided in the July 2016 SCR / RAP Addendum (Attachment 3e). This approach was subsequently pilot tested at the site (see below).

Soil Excavation – September and October 2016

[13] EW-2 does not appear to have been the most suitable candidate for assessing the potential for UST cavity dewatering since it is not installed in direct contact with the cavity backfill materials. Since that time, extraction well EW-1R has been installed within the UST cavity backfill.
[14] Based on groundwater samples collected up to 7-days following the dye injection.

During September and October 2016, a total of approximately 2,054 cubic yards of soil was removed via excavation. Approximately 1,920 tons of excavated soil was determined to be excessively impacted and transported off-property for disposal whereas the remaining soil was determined to be suitable for reuse and returned to the excavation as backfill.[15] The soil excavation was completed by incrementally removing soil from 22 sections (Sections A through V) that ranged in depth from approximately 5 to 17.5 ft-bg depending on soil analytical data. About 10,800 gallons of groundwater were removed from the excavation and transported off property for disposal.[16] During the excavation work, the following activities were also completed:

- A mixture of ~4,000 pounds of carbon-based product (CBP), sand and ~495 pounds of ORC was applied to a trench located near the downgradient southern property boundary to form a permeable reactive treatment wall. The mixture was emplaced between 3 and 17 ft-bg followed by backfilling to grade with 2A modified gravel.
- A broken canopy drain pipe was reinstalled / relocated away from the UST field.
- The main sanitary sewer line beyond the southern property boundary was repaired after it was damaged during the excavation work.
- The backfill material surrounding the main sanitary sewer line was found to be impacted and six sampling / injection points (Sl-1 through SL-6) were installed in the trench backfill.
- Pilot testing including vacuum extraction was completed in sewer line trench monitoring point SL-4.
- Following the soil excavation, the disturbed area of asphalt was resurfaced and the grass / gravel areas were restored.

Additional details describing the soil excavation activities are contained in the fourth quarter 2016 RAPR (Attachment 3k).

<u>UST Cavity Surfactant Flushing – September through November 2017</u>

Surfactant flushing of the UST cavity using a nonionic / biodegradable surfactant was pilot tested between September 19 and November 29, 2017. The surfactant flushing consisted of five injection / extraction cycles during which a total of approximately 3,120 gallons of surfactant solution was injected into the UST cavity via remediation points CP-1 through CP-7. During each injection cycle, the surfactant solution was recirculated via extraction / reinjection to assist with increasing distribution and maximizing contaminant desorption. Groundwater and surfactant solution was extracted from the UST cavity within one to eight days following the injection events to recover

[15] The clay-rich soil determined to be acceptable for reuse was preferentially used as backfill along the southern and eastern perimeter of the UST cavity to form a barrier. The remainder of the excavation was backfilled with reuse soil and 2A modified gravel.

[16] Before implementing the soil excavation, ~160 pounds of chemical oxidant was injected into the UST cavity via injection points CP-1 through CP-7 and extracted approximately three weeks later. After the soil excavation and backfilling activities were completed, an additional ~160 pounds of chemical oxidant was injected into the UST cavity and extracted about one month later.

desorbed contaminants.[17] A cumulative total of about 7,760 gallons of groundwater and surfactant solution was removed from the UST cavity. Groundwater / surfactant recovery from the UST cavity was accomplished via extraction from EW-1R which is installed in direct contact with the cavity backfill materials. Several other wells outside the UST field were also used for extraction during the surfactant flushing including EW-2, MW-1R, MW-3R, MW-4R, MW-8, MW-10, MW-13, MW-14 and MW-15.

Monitoring activities conducted during the surfactant flushing consisted of measuring depths to groundwater before and after the injection / extraction events and collecting groundwater samples from select wells on a routine basis to test for fugitive / migrating surfactant and for analysis of the target unleaded gasoline parameters. During monitoring activities, surfactant was identified in EW-1R, MW-1R, MW-3R, SL-4 and MW-15. Because surfactant was detected in several monitoring points outside the UST cavity, including one location beyond the southern property boundary (monitoring point SL-4), the groundwater extraction program was expanded to capture surfactant in these areas. In the fourth quarter 2017 RAPR (Attachment 3l), IGI reported that the injected surfactant was sufficiently recovered from the subsurface and that no surfactant remained in the site monitoring wells or other monitoring points following the expanded groundwater extraction. Additional information regarding the UST cavity surfactant flushing is provided in the fourth quarter 2017 RAPR (Attachment 3l).

Solicitor's Selected Site Closure Standard

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.

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.

[17] During some extraction events a vacuum truck was used to extract groundwater *and* vapors. Based on air-flow rates and volatile compound concentrations in the extracted air-stream (field-measured with a photoionization device), IGI had estimated that approximately 518 pounds of vapor-phase contaminant mass was removed from the UST cavity. However, correcting for a calculation error puts the value on the order of only about 2 pounds.

Scope of Work (SOW)

This RFB seeks competitive bids from qualified contractors to perform the activities in the SOW specified herein. The PADEP case manager reviewed the SOW presented in this RFB and had no comment.

Objective

Remedial efforts to date have not adequately addressed the site contamination. The soil excavation appears to have significantly reduced adsorbed contaminant mass and improved groundwater quality around and downgradient of the UST cavity. However, surfactant flushing of the UST field and construction of the downgradient CBP permeable reactive treatment zone do not seem to have been particularly effective. Adsorbed-phase contaminant mass remaining in and around the UST cavity and in downgradient areas that were not excavated appears to be fueling downgradient groundwater contamination resulting in SHS exceedances at the POC and beyond. Therefore, the goal of the work outlined in this RFB is to target and cost effectively address the residual contaminant mass to achieve a SHS site closure.

The site remedial activities proposed in the PADEP-approved RAP and two subsequent RAP Addendums have been implemented as described above, yet petroleum contamination remains within and around the UST cavity and in downgradient areas outside the past remedial excavation perimeter. Consequently, additional remediation is necessary to demonstrate attainment of the PADEP Act 2 SHS for a used aquifer in a residential setting and achieve regulatory closure within a reasonable timeframe.

The PADEP, the Technical Contact, and the PAUSTIF have agreed that one of the following offers a reasonable prospect of completing the remaining cleanup to achieve SHS within a reasonable timeframe:

1) **Approach #1 - Three-zone air sparge (AS) / soil vapor extraction (SVE)**. Air sparging / SVE will be applied to three hydraulically/pneumatically separate zones: (“Zone 1”) inside the UST cavity (e.g., sparge wells primarily positioned where the diesel fuel UST was located and low vacuum SVE from numerous existing shallow UST field CP points); (“Zone 2”) inside the remedial excavation gravel backfill in the vicinity of MW-3R; and (“Zone 3”) in off-site native clay soil in the vicinity of MW-8 and MW-13.; or

2) **Approach #2 - Two-zone AS / SVE plus limited soil excavation.** AS/SVE will be applied to Zones 1 and 2 as described for Approach #1. However, the impacted native material off-property in Zone 3 will be treated using a combination of AS/SVE to address the area around MW-13 and a limited soil excavation will be conducted to remove residually contaminated soil around MW-8 which is currently causing unacceptable groundwater quality to persist off-property; or

3) **Approach #3 – Three-zone, multi-technology remediation**. Either dual-phase extraction (DPE) or vacuum enhanced groundwater extraction (VEGE) will be used to address residual contamination in the UST field backfill Zone 1 (e.g., DPE / VEGE wells primarily positioned where the diesel fuel UST was located). Residual impacts in the Zone 2 excavation backfill around MW-3R will be addressed using ISCO and / or ORCs. Dissolved- and adsorbed-phase impacts in off-property Zone 3 will be treated using ISCO and / or ORCs in the area of MW-13, and the vicinity of off-property MW-8 will be addressed through a limited soil excavation.

Bidders shall propose one of these three remedial approaches in their bid response. Locations of the three remedial treatment zones are illustrated in the site plan figure provided in Attachment 3a.

Solicitor seeks competitive, fixed-price bids for this Bid to Result RFB to complete the twelve (12) milestones outlined below intended to take this Site to closure. To be deemed responsive, each bid *must* respond *in detail* to each of the milestones, including describing the bidder's understanding of the conceptual site model and how that model relates to the bidder's proposed approach to executing the SOW. "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). As mentioned above, the Solicitor has elected to pursue environmental closure based on demonstrating attainment of the PADEP Act 2 Used Aquifer SHS MSCs in a Residential setting for soil and groundwater.

Selecting one of the remedial approaches defined above shall be the basis for preparing a SOW and presenting a competitive fixed-price bid. The selected bidder shall perform pilot testing to confirm the bid remedial technologies can feasibly meet the remedial goals for this site in general accordance with bidder's assumptions.

Constituents of Concern (COCs)

Soil, groundwater and soil gas samples collected at the Valley Village site have been analyzed for the current PADEP Act 2 short-list of unleaded gasoline compounds (benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene, 1,2,4-TMB and 1,3,5-TMB). Based on these analyses, the COCs present in site environmental media include the following:

Soil – As mentioned above, post-excavation confirmation soil sampling conducted in 2016 appears to have demonstrated attainment of the applicable standard through application of the PADEP's 75%/10x Ad Hoc Rule. However, persistent elevated dissolved-phase concentrations exceeding the SHS in off-property wells MW-8 and MW-

13 suggest that excessive adsorbed-phase contamination remains beyond the southern facility property boundary and footprint of the 2016 soil excavation. Sustained dissolved contamination downgradient of the UST field suggests the UST backfill remains an ongoing secondary source of groundwater impacts.

Groundwater – benzene, MTBE and 1,2,4-TMB (compounds exceeding the applicable standard during the most recent third quarter 2018 groundwater sampling event) persist downgradient of the UST field, along the downgradient property line and off-property. Dissolved contamination precluding SHS closure is sustained by residually impacted soil.

Soil gas – Historical soil gas analyses for the samples collected between September 2014 and January 2015 identified concentrations of benzene and possibly naphthalene exceeding the residential soil gas MSCs. Supplemental soil gas sampling was not performed by IGI following the 2016 and 2017 site remediation activities.

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:[18]

- 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

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

(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.[19] 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.

- 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 owner with adequate advance notice prior to each visit to the property. The purpose of this notification is to coordinate with the Solicitor and facility owner 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. Although the Valley Village facility operates on a relatively large parcel, maneuverability could be challenging 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. Should it be necessary to temporarily close or restrict access to the dispenser island to complete any of the milestones within this RFB, the Solicitor & property owner require at least two (2) weeks advance notice and coordination with site personnel.

[19] IGI had previously entered into an access agreement with the Cowanshannock Creek Watershed Association (CCWA) for advancement of soil borings, installation of monitoring wells and excavation of impacted soil on its parcel located adjacent to the Valley Village southern property boundary. Consol Energy denied IGI's request for an access agreement for its property located immediately south of the CCWA property.

Off-Property Access. Selected consultant will be responsible for securing off-property access where needed to implement the remedial approach. Work required to negotiate and secure off-property access shall be included within the fixed price for Milestone C. It is reasonable to assume that Solicitor will assist, as needed, with this effort.

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 Valley Village property or surrounding properties.

Responsibility. The selected consultant will be the consultant of record for the site. The selected consultant will be required to take ownership of the project and will be responsible for representing the interests of the Solicitor, property owner and ICF/PAUSTIF with respect to the project. This includes utilizing 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 its 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 its 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 investigation derived waste (including, but not limited to, soil/rock cuttings, used carbon, well development / purging liquids, and groundwater removed during pilot testing activities) shall be disposed 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 the Valley Village property at a location approved by the property owner, but should be removed from the property as quickly as possible. Each bidder should estimate

the volume of waste using its professional opinion, experience and the data provided. **ICF and 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. This milestone provides bidders the opportunity to identify which additional site characterization work that will be completed in advance of finalizing the remedial approach design and moving ahead with its implementation. Conducting supplemental investigative activities under this milestone is mandatory. PAUSTIF will be reimbursing up to $10,000 for supplemental site characterization and documentation 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 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 a previous consultant; 2) address any perceived data gaps in the existing site characterization work; 3) assist in the evaluation and determination of remedial technologies and system design that are characterization-type activities (e.g. analysis for C_4-C_{12}); 4) assist with refining the cleanup timeframe estimate and/or other reasons related to validating the bidder's remedial approach and design (e.g. additional sampling to better determine contaminant mass in place). Note that all tasks and costs related to pilot testing and reporting must be captured under the Pilot Testing and Reporting Milestone, not Supplemental Site Characterization Activities. If pilot testing tasks and costs are included in this Site Characterization Milestone, the bidder's technical score will be negatively impacted.

<u>Milestone A activities shall be conducted as soon as possible following execution of the Fixed-Price Remediation Agreement.</u>

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 IGI's March 2015 SCR / RAP (Attachment 3c), July 2016 SCR / RAP Addendum (Attachment 3e) and the other documents provided in Attachment 3, rather than relying solely on the summary information presented in this RFB.

Example potential activities for bidders to consider may include tasks such as: i) advancing and sampling additional soil borings to delineate the extent of suspected impacted soil / groundwater in the area of wells MW-8 and MW-13 beyond the southern facility property boundary and 2016 soil excavation footprint; ii) sampling and laboratory analysis of iron and manganese to determine the potential for remedial system fouling; iii) conducting additional well gauging to determine the extent to which FPH and/or a FPH emulsion may still exist in monitoring points surrounding the UST cavity source area; and iv) conducting geotechnical sampling / analysis for grain size distribution, bulk density and porosity to assist with remedial system design including proper screening / filter pack selection for recovery wells, etc. 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; and
- A description of the anticipated results of each activity and how such results may impact your proposed conceptual remedial action plan.

Following completion of the additional site characterization activities, these Milestone A activities shall be documented as discussed in Milestone C.[20]

Milestone B – Pilot Testing and Reporting. Pilot testing shall be proposed to support the feasibility and appropriateness of the bidder's proposed remedial technology and approach. More specifically, the purpose of the pilot test is to:

- Confirm that bidder's proposed technology is technically viable;
- Confirm that bidder's proposed remedial approach can be expected to be efficient & cost-effective;
- Confirm that bidder's proposed technology will achieve the remedial objective within a reasonable timeframe; and
- Confirm bid assumed remedial design criteria.

The bidder shall provide a detailed description of the proposed pilot testing, objectives and rationale including any concerns with project file pilot testing data, perceived existing data gaps,

[20] In order to receive reimbursement under this task, thorough documentation of the additional site characterization activities must be provided to PAUSTIF.

proposed methods, the use of existing or installation of new data monitoring/collection points, proposed equipment to be used, and the data that is proposed to be collected. Each bid shall also describe how the data/information would be evaluated. In formulating its pilot testing proposal, bidders shall also consider the following:

- During the 2016 remedial soil excavation, the clay-rich natural soil that was removed and determined to be suitable for reuse was preferentially placed as backfill along the eastern and southern perimeters of the UST cavity to form a barrier. Consequently, the pilot testing design will need to consider placement of the AS, DPE or VEGE pilot test well(s) inside this barrier to prevent preferential communication (i.e. "short-circuiting") with the permeable reuse soil / 2A modified gravel used to backfill the remainder of the excavation. Based on available information, the clay barrier may be between ~3 to 5 feet wide and range in depth from near surface to ~12 to 17 feet below grade (averaging about ~14 feet deep). Caution must be exercised when installing pilot test wells in this area where the diesel UST was formerly located due to the age of the single-wall steel tanks (over 30 years old); use of low vibration / impact drilling methods (e.g., appropriate diameter hollow-stem augers) shall be considered.

- Pilot testing at more than one test well location to account for differences in subsurface permeability (e.g., natural silty clay soil, gravel / reuse clay excavation backfill, UST field backfill).

- Emulsified FPH may be encountered close to the UST field.

- Testing for the feasibility / efficacy of ISCO and/or ORC products and / or injection methods (as applicable depending on the remedial alternative selected), shall be in the area where they would be used to remediate (e.g., sufficiently hydraulically downgradient of the UST cavity such that injected reagents do not reach / affect the existing chemistry in the UST cavity).

For the Milestone B proposal, bidders shall also specify up to five key pilot test outcome criteria that establish whether the bidder's proposed remedial action is feasible. These "critical criteria" shall be listed with an upper and lower limit that will define the range of acceptable results (i.e., pilot testing results) relevant to the bidder's proposed remedial approach. These critical criteria must be tightly-controlled measurements or calculations that could be independently measured or verified by others during the pilot test.

For example, bids shall include language such as, "For our proposed remedial action approach to be successful and for the technology(ies) used thereby to operate as planned and meet our proposed clean up schedule, the Milestone B pilot testing must show:

1. A hydraulic conductivity greater than A ft/day, but not more than B ft/day;
2. A pumping rate exceeding AA gpm at the end of BB hours of vacuum-enhanced pumping;
3. The capacity to generate a soil vapor extraction vacuum of at least X in. Hg while not exceeding an air flow rate of Y scfm;
4. The ability to inject sparge air at a pressure of at least XX psi and a flow rate of at least YY scfm;
5. An injection rate of at least X gpm in the natural clay soil beyond the UST cavity and excavation footprint; and
6. Iron and manganese hardness within groundwater at or below Z milligrams per liter (mg/L)."

This is only an example. Actual bid language and the associated critical criteria will vary by bidder.

The critical criteria identified in each bid and their associated acceptable range of testing results will be evaluated as part of the bid review. Unrealistic critical criteria or critical criteria that are unreasonably narrow will reduce the favorability of the bid. Please note that all bidders shall propose to perform pilot testing covering the applicable technologies prescribed under either remedial Alternative 1, 2 or 3 to confirm that the remedial approach to be proposed in the selected bidder's Revised RAP will be feasible, safe and effective.

The Milestone B proposal shall reflect an understanding that selected bidder will prepare a Pilot Test Report and submit it to the Solicitor and PAUSTIF. The Pilot Test Report shall show that the pilot test was conducted according to the selected consultant's bid and shall constitute documentation for payment of Milestone B regardless of the result. If the results of the pilot testing show that the proposed remedial action is feasible based on the specified critical criteria and ranges, and is safe and effective, then the selected consultant shall be expected to move forward with the project under the contract. The Milestone B activities shall also be included in the reporting for Milestone C.

"Pilot Test Off-Ramp" – The selected consultant and the Solicitor are protected from being obligated to move forward with a remedial action under the executed Remediation Agreement if the proposed remedial approach cannot be safely or efficiently implemented as proposed in the conceptual design based on critical criteria outside the bidder's defined ranges from the pilot test data from Milestone B. Exhibit A of the Remediation Agreement (Attachment 1) will contain a provision that if the selected consultant's proposed remedial approach is not reasonable based solely on pilot test results indicating that it cannot be implemented as proposed in the conceptual design based on critical criteria outside the bidders defined ranges from the pilot test data from Milestone B, then one of the following conditions will apply:

1) With advance Solicitor and PAUSTIF approval, the selected bidder may elect to modify the remediation plan and continue with the project at no additional cost; that is, for the same total fixed price found in the bid response or a lesser fixed-cost. If selected consultant's modified plan is approved by Solicitor and by PAUSTIF for funding, the executed Remediation Agreement may be amended, if necessary, to agree with the modified remediation plan and costs; however, the total fixed price of the Remediation Agreement shall not be increased.
2) If the Solicitor or PAUSTIF choose not to approve the selected consultant's revised remediation plan adjusting to the new data, the Remediation Agreement for the project will terminate.
3) If the selected consultant adequately demonstrates the site conditions revealed by the results of pilot testing performed under Milestone B could not have reasonably been expected prior to conducting the Milestone B activities, the selected consultant may elect to not proceed and to terminate the Remediation Agreement for the project.

If either party elects to cancel the Remediation Agreement, the PAUSTIF will have complete discretion with regard to the use of the information obtained during Milestone B activities and/or in the Pilot Test Report. The PAUSTIF may use the data as the basis for rebidding the project; however, it will be specified that any use that a third party makes of the supplemental site characterization data and/or Pilot Test Report will be at the sole risk of the third party. End of "Pilot Test Off-Ramp" language.

For consistency, bidders shall budget a maximum of 10% of the total bid cost for this Milestone, with a maximum of $50,000. For example, if the total proposed cost for Milestones A through L (excluding B) is determined to be $300,000, the fixed-price cost of Milestone B specified in the bid cost spreadsheet shall be up to, but not exceed $30,000. However, if the total proposed cost for Milestones A through L (excluding B) is determined to be $550,000, the fixed-price cost of Milestone B specified on the bid cost spreadsheet shall be up to, but not exceed $50,000.

Milestone C – Documentation of Findings: Preparation, Submittal and PADEP Approval of a Revised RAP. Upon completing Milestones A and B described above, the selected bidder shall prepare a Revised RAP under Milestone C to implement one of the three alternative remedial approaches specified above for this site. In general, the Revised RAP shall: i) document the supplemental site characterization and pilot testing activities / findings; ii) discuss the details of the alternative remedial approach; iii) contain all necessary information required under 25 PA Code §245.311; and iv) be of sufficient quality and content to reasonably expect PADEP approval. The Revised RAP shall first be submitted in draft form to the Solicitor and PAUSTIF for review and comment before being finalized and submitted to the PADEP. Each bidder's project schedule shall provide two (2) weeks for Solicitor and PAUSTIF review of the draft document. The final

report shall address comments received from the Solicitor and PAUSTIF on the draft report before it is submitted to the PADEP for its review.

The Revised RAP shall describe and provide an evaluation of all findings generated under Milestones A and B above, updating the conceptual site model (CSM) for the Site and its vicinity based on evaluating the results from the additional site characterization and pilot testing tasks outlined above, and detailing the proposed alternative remedial approach. The applicable report shall incorporate information and relevant findings from the previous site documentation (as necessary), and contain all necessary and appropriate figures, tabulated data, and appendices to comply with the regulatory requirements for and to obtain PADEP approval of the report.

The Revised RAP shall be signed and sealed by a Professional Geologist licensed in the Commonwealth of Pennsylvania, and may also require the signature and seal of a Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall refer to state licensing laws to determine if the Professional Engineer seal is required based on the work performed for and documented in the combined report). The fixed-price cost shall also include addressing any PADEP comments on the Revised RAP.[21]

Milestone D – Pre-Remediation Quarterly Groundwater Monitoring, Sampling & Reporting. Under this task, bidders shall provide a firm fixed-price to continue with quarterly groundwater monitoring, sampling, and reporting events while performing the supplemental site characterization activities (Milestone A), pilot testing (Milestone B), revised RAP preparation and PADEP approval (Milestone C), and preparations leading up to implementation of the RAP (e.g., equipment procurement / installation). For the purposes of this RFB, it is assumed the Milestone D activities will be required for two (2) quarters. However, each bid must specify the number of quarterly events that will be needed prior to implementation of the remedial approach (Milestone E) along with supporting rationale. Any additional quarterly monitoring and reporting events, beyond the two quarters specified in this RFB, shall be defined on the Bid Cost Spreadsheet and shall be incorporated in the Remediation Agreement as per event Optional Cost Adder Milestone D3.[22]

Each groundwater monitoring and sampling event shall include the on-and off-property shallow overburden groundwater monitoring / extraction well network currently sampled consisting of MW-1R, MW-3R, MW-4R, MW-8 through MW-11, MW-13, MW-14, MW-15, EW-1R and EW-2 (twelve wells total).[23] Also during each quarterly groundwater sampling event, groundwater samples shall

[21] All figures included in the Revised RAP (e.g., site plan, etc.) shall be available in electronic format to the Solicitor upon request.

[22] The Remediation Agreement includes a Provision that the pre-remedial quarterly site monitoring, sampling & reporting events will be limited to the two quarters under Milestone D plus the number of additional events under Optional Cost Adder Milestone D3 as defined in the selected bid. If additional events are required under Milestone D3, pre-approval from Client and PAUSTIF (for funding) is required.

[23] The fixed price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestones A and B (if any).

also be collected from piezometer P-2R and sanitary sewer trench backfill monitoring locations SL-3 and SL-4. The conduct and results of each event shall be documented in quarterly Remedial Action Progress Reports (RAPRs). During each quarterly groundwater monitoring and sampling event, the depth to groundwater shall be gauged in all existing available monitoring points and before purging any of the monitoring points designated above for sample collection. Groundwater level measurements obtained from the monitoring points shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient.

Each of the monitoring points designated for sample collection shall be purged and sampled in accordance with the PADEP Groundwater Monitoring Guidance Manual and standard industry practices. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with PADEP SWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short-list of unleaded gasoline parameters (benzene, toluene, ethylbenzene, xylenes, MTBE, cumene, naphthalene, 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 same parameters.[24] In addition, each event shall include field measurements for the following parameters: pH, temperature, specific conductance, dissolved oxygen (measured in-situ), oxidation/reduction potential, and total dissolved solids (TDS).

The RAPRs describing the sampling methods and results will be provided to the PADEP on a quarterly basis and within 30 days of the end of the current quarter. At a minimum, each RAPR shall contain the following:

- A summary of site operations and remedial progress made during the reporting period;
- Narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored points documenting the depth to groundwater, thickness of any free product or presence of any free product emulsion encountered. This data shall be presented on the same table as the historical quantitative groundwater analytical results;
- Groundwater elevation contour maps depicting groundwater flow direction;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);

[24] Each bidder's approach to implementing Milestone D 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.

- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[25]
- 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;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, shrinking, or expanding plume;
- 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.

PAUSTIF will only reimburse for the necessary quarterly groundwater sampling / reporting events actually completed under this milestone (e.g., this milestone shall be considered completed with the initiation of Milestone E). Each RAPR shall be 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 quarterly RAPRs).

Milestone E – Revised RAP Implementation. Under this milestone, bidders shall provide a fixed-price cost inclusive of all the manpower, machinery, materials, and other costs needed to fully implement the remedial solution for the Valley Village site as described in the bidder's Revised RAP, once approved by the PADEP. The cost breakdown for implementing the Revised RAP shall follow the format prescribed by sub-Milestones E1 through E7. Provided below are brief conceptual descriptions for remedial Alternatives 1, 2 and 3 that the bidder may choose from for inclusion in its Revised RAP.

Approach #1 - Three-zone air sparge (AS) / soil vapor extraction (SVE). In order to remediate the UST cavity contaminant source (Zone 1), this remedial approach shall consist of installing and operating a network of AS wells generally located along / inside the eastern and southern perimeters of the UST cavity (primarily former diesel fuel UST location) and utilizing existing shallow remediation points CP-1 through CP-7 already installed in the cavity for low vacuum vapor extraction. AS / SVE wells will also be installed in excavation backfill material at the southern (hydraulically downgradient) property

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

boundary (Zone 2 - MW-3R vicinity), and beyond the southern facility property boundary in Zone 3 native soil (MW-8 and MW-13 vicinity) to address residual secondary source material sustaining unacceptable levels of groundwater contamination.

Approach #2 - Two-zone AS / SVE plus limited soil excavation. This remedial alternative is similar to Alternative 1 in the approach to addressing Zones 1 and 2. However, Zone 3 will be addressed by a combination AS / SVE applied to the area of MW-13 and limited soil excavation in the area surrounding off-property well MW-8 in lieu of AS / SVE.

Approach #3 – Three-zone, multi-technology remediation. To address the UST cavity contaminant source, this remedial solution shall consist of installing and operating a network of DPE or VEGE wells (as shall be determined and described by bidder) to be installed inside and along the eastern and southern perimeters of the UST cavity (primarily former diesel UST location). Zone 3 (vicinity of off-property well MW-8) will be remediated via excavation similarly to Alternative 2. POC well MW-3R vicinity and off-property well MW-13 (as necessary) will be addressed via ISCO and/or ORC injections (as shall be determined and described by bidder).

Additional information regarding remedial Alternatives 1, 2 and 3 and related bid details for implementation of the Revised RAP are provided in sub-Milestones E1 through E7 below.

Milestone E1 - Installation of AS / SVE, DPE or VEGE Remediation Wells. Under this task, bidders shall provide a firm fixed-price cost for installing a network of AS / SVE, DPE or VEGE remediation wells depending on whether the bidder selects remedial Alternative 1, 2 or 3. For the purpose of this RFB, each bidder shall base its bid response on the following:

Alternative 1: Combination AS / SVE: Each bidder shall specify the number of air-sparge wells anticipated to be needed in Zone 1 and number of AS/SVE well pairs in Zones 2 and 3, and shall provide preliminary well construction details. As mentioned above, existing shallow remediation points CP-1 through CP-7 will be used to extract vapors from the UST cavity.

Alternative 2: Combination AS / SVE and Limited Soil Excavation: Each bidder shall specify the number of air-sparge wells anticipated to be needed in Zone 1 and number of AS/SVE well pairs in Zone 2 and in the area of MW-13 (Zone 3). Preliminary well construction details shall also be provided. Existing shallow remediation points CP-1 through CP-7 will be used to extract vapors from the UST cavity.

Alternative 3: Combination DPE or VEGE, Limited Soil Excavation, and ISCO and/or ORC Application: Each bidder shall specify the number of DPE or VEGE wells anticipated to be needed in Zone 1 and shall provide preliminary well construction details.

The borings for the remediation wells shall be advanced using appropriate diameter hollow-stem augers. During drilling activities, bidders shall examine and described the drill cuttings for lithology, groundwater occurrence and potential staining / odor indicative of hydrocarbon contamination.[26] The remediation wells shall be constructed in general accordance with the PADEP Groundwater Monitoring Guidance Manual. Each bid response shall state the drilling methods used to advance the boreholes, the total depth for each well, and well construction details (i.e. well casing diameter, screened interval, sand pack, etc.). Final construction of the remediation wells must ensure that placement of the screened interval will facilitate remediation of the target horizons. When considering the locations and construction of the remediation wells, bidders must also take precautions to ensure that no short-circuiting will occur to atmospheric air or more permeable backfill materials (where applicable).

Each bid response shall describe and account for the following in the fixed-price: (i) identifying subsurface utilities and other buried features of concern including, but not necessarily limited to, contacting PA One Call and clearing the borehole locations to a minimum depth of 5 feet using vacuum excavation or hand auger, as necessary; (ii) well development activities; (iii) management of IDW; and (iv) professional surveying of the new well locations and ground surface / top-of-casing elevations. Well drilling / installation and development along with supporting documentation (e.g., waste manifests, boring logs and construction details, etc.) shall be documented in a quarterly RAPR (Milestone D).

The SOW and fixed-price cost for Milestone E1 shall also state / provide the following:

- Remediation wells installed at the eastern and southern perimeters of the UST field shall be positioned to intersect the UST cavity backfill materials inside the wall of the surrounding clay barrier (former diesel fuel UST area) to: 1) directly address the impacted backfill materials; and 2) limit “short-circuiting” with the clean backfill emplaced outside the clay barrier during the 2016 remedial soil excavation.

- The method(s) proposed to accurately locate the footprints of the USTs and related UST systems infrastructure before installing any wells along the perimeter of the UST cavity (former diesel UST area).[27] The figure in Attachment 3A depicts only the general location / orientation of the three USTs. **Note that extreme caution must be exercised during any intrusive work near the existing USTs.**

- A site plan depicting the proposed locations for the remediation wells.

[26] The collection of soil samples for laboratory analysis will not be required during the drilling activities. Any additional soil sampling shall be completed under Milestone A.
[27] Installation details for the UST systems are not available from the property owner or Solicitor.

Milestone E2 – In-situ Remedial System Final Design, Equipment Purchase, and Assembly. Any equipment[28] that has moving parts or is part of the electronic control system (e.g. pumps, blowers, gauges, electrical sensors & switches) necessary to implement the Revised RAP shall be purchased new, and other equipment (e.g. holding tanks, trailer/shed) is not required to be purchased new provided that such used equipment is guaranteed to properly function for the life of the contract. The remedial system (AS / SVE, DPE or VEGE) shall be pre-assembled and tested as much as possible as a turn-key prefabricated system prior to site deployment. Under this approach, the purchased equipment is to be fully integrated and tested electrically and mechanically inside an enclosure (properly insulated with appropriate lighting, heating & ventilation systems) before being shipped to the site. After delivery and setting in place, final connections shall be made to the electrical service and subsurface piping / conduits installed as part of the Site Preparation Work (see below). Electrical equipment shall meet NEC classification requirements (e.g., Class I, Div 2, where appropriate). Bidders shall determine the type of electrical power service available to the facility area during the mandatory site visit, other observations and / or inquiries of the power company. Clear and legible copies of all equipment manuals and warranties shall be provided to Solicitor.

Bidders shall assume that groundwater treatment will not require an oil-water separator (OWS) or components for metals sequestration. However, should the need for installing an OWS and/or items for metals sequestration potentially become evident during pilot testing under Milestone B or during system operation, this would represent a new condition under an amendment to the Remediation Agreement requiring supporting documentation and Solicitor / PAUSTIF pre-approval. Bidders are encouraged to monitor for free product / emulsion and analyze for metals under Milestone B. The magnitude of vapor-phase contaminant mass that will initially be extracted from the UST cavity is somewhat unclear and shall be estimated under Milestone B above. For the purpose of this RFB, bidders shall assume that two ~300 pound vapor-phase granular activated carbon (VGAC) vessels will be sufficient for treating system off-gas. However, should it be demonstrated that temporary use of a catalytic oxidizer (CatOx) unit may be more efficient / economical to treat system off-gas during the first few months of remedial system operation, based on the vapor-phase contaminant mass being extracted, related costs will be covered under Optional Cost Adder Milestone UC1.

Please note that the proposed remedial system shall be equipped with telemetry. The selected consultant shall coordinate with the telephone, cable or internet service provider to bring and provide appropriate service to the location of the remediation equipment to allow remote communications and document up-time. Payment of the service connection shall be the responsibility of the selected consultant and shall be accounted for in the quoted fixed-price bid.

[28] All equipment purchased under this contract will become the property of the Solicitor. The selected consultant shall be responsible for operating and maintaining the equipment for the duration of the Remediation Agreement.

Milestone E3 - Site Preparation Work. The selected consultant shall obtain all necessary construction and operational permits and/or permit exemptions and post same as required. Solicitor shall be provided copies of all permits / permit exemptions before field construction activities commence. On-site mark-out of buried utilities shall be completed in advance of any drilling or trenching activities. PA One Call notification shall be made and documented prior to drilling or trenching activities.

The selected consultant shall coordinate with the electrical service provider to bring and provide appropriate electrical service to the location of the remediation equipment. Payment of the electrical service connection shall be the responsibility of the selected consultant and accounted for in the fixed-price bid.

Milestone E4 – In-situ Remediation Equipment Shed / Trailer Location, Trenching, Subsurface Piping, Mechanical, and Electrical. Under this task, the selected consultant shall coordinate with the property owner to agree on a suitable area on-property for locating the remedial system shed / trailer, external off-gas treatment equipment, etc. For the purpose of this RFB, bidders shall assume that the remediation shed / trailer will be positioned near the southern property boundary to avoid business disruption. On the figure requested under Milestone E1 above, bidders shall also depict the proposed location for the remediation equipment compound.

Required and appropriately sized piping and electrical conduit/wiring shall be trenched and buried (below the frost line for water conduits) extending between the remediation equipment location and the injection and/or extraction wells, as applicable based on the selected remedial alternative. Buried piping shall be installed with tracer wire to facilitate locating the subsurface lines after the trenches have been backfilled. Buried piping shall be tested for integrity and documented before trench backfilling. Buried piping and conduit stub-ups shall be terminated and secured in the remediation equipment area to facilitate final connections to remediation equipment. Above-grade piping designed to carry or having the potential to carry water shall be properly winterized to prevent freezing and pipe breakage. Surface restoration from all trenching and well head completions shall be similar to current conditions. The figure referenced above shall also depict the proposed piping / trenching configuration.

To the extent possible, the remedial design shall consider keeping trenching / subsurface piping away from existing UST system infrastructure in the event that the owner / operator may need to perform work or upgrades to the existing UST systems.[29] UST field CP points used for low vacuum venting may be manifolded via shallow piping placed immediately beneath saw-cut / re-paved trench through the concrete UST pad.

[29] Based on the figure provided in Attachment 3a, the product lines appear to extend from the northern end of the UST cavity toward the dispenser island in an area beyond any expected remedial activities. Note that vent lines extend from the southern end of the cavity.

Milestone E5 – Final Connections and Startup / Trouble-Shooting of the In-situ Remediation System. The selected consultant shall make the final connections between piping / conduit stub ups, power drop / meter and the manifold(s) / conduits on the interior of the pre-assembled and tested treatment system. Any sections of above-grade water piping (as applicable to the type of remedial system) located outside of the equipment enclosure will need to be freeze-protected (e.g., by insulation and heat tracing).

The selected consultant shall start up and demonstrate proper operation of the remediation system equipment, and each bid response shall describe start-up / trouble-shooting procedures. At a minimum, such demonstration shall include documentation that: (a) all below- and above-grade equipment is operational; (b) the design parameters are achievable at the treatment system and at the well heads; (c) all safety and control switches function properly; and (d) the system can operate automatically (without manual intervention). The successful bidder shall provide the Solicitor and ICF/PAUSTIF with startup documentation demonstrating proper operation of the system. To the extent problems are identified during the site work preparation and/or remediation system installation and start-up phases, the successful bidder shall repair these problems and repeat the proper system operation demonstration.

Also as part of this task, the selected consultant shall prepare an operations and maintenance (O&M) Plan, and as part of the O&M Plan, the selected consultant shall also be responsible for developing a checklist to be completed by field technicians during subsequent O&M visits that will provide key information deemed necessary to evaluate remediation performance, permit compliance, and system maintenance on a continuing basis. Each bid response shall include an appropriate example of an O&M checklist that identifies typical minimum data requirements to be recorded during each O&M site visit.

The selected consultant will provide the Solicitor with a copy of the O&M Plan prior to remediation system startup, and a hard copy of as-built drawings for the remediation system upon completion of the successful system startup.

Bidders shall assume that Solicitor and the PAUSTIF will inspect and confirm that the system has been installed as described in the fixed-price agreement and in the remedial system final design, and is in daily operation as described in the remedial system final design. The selected bidder shall contact ICF/PAUSTIF immediately following completion of start-up / trouble-shooting and when the system is fully operational to schedule an independent inspection visit by PAUSTIF or its agents.

Milestone E6 – Limited Soil Excavation, Transport & Disposal of Impacted Soil and Backfilling - Remedial Alternatives 2 and 3. Each bidder proposing a Revised RAP solution that will involve implementing either remedial Alternative 2 or remedial Alternative 3 shall provide a firm fixed-price cost to complete limited excavation of residual source soil in the area of off-property well MW-8 along with associated backfilling and surface restoration per original. As discussed above,

the elevated post-excavation dissolved-phase contaminant concentrations remaining in off-property well MW-8 indicate that residual adsorbed-phase contaminant mass still exists beyond the southern facility property boundary and footprint of the 2016 soil excavation.

For the purpose of this RFB, the bidder's fixed-price cost for Milestone E6 shall assume an excavation with the following dimensions: 16' L x 20' W x 13' D with MW-8 roughly positioned in the center of the excavation. Based on these dimensions, approximately 155 in-place cubic yards (i.e., ~250 tons) of soil will require excavation, management, and segregation either for reuse as "clean" backfill or off-property disposal. Should the excavation boundaries need to be expanded based on field observations and after written consultation with USTIF / ICF, the costs of the added digging, backfilling, surface restoration and management will be addressed via a bid optional unit cost adder (discussed below).

Bidders should note that natural gas and sanitary sewer pipelines are present approximately 10 feet south and 10 to 15 feet north of MW-8, respectively. Bidders should also note that overhead power lines extend about 5 feet north of MW-8. Utilities are depicted on the figure provided in Attachment 3a.

The SOW and fixed-price cost for Milestone E6 shall state / provide the following:

- Only excessively impacted soil shall be transported and disposed off-site (excavated soil shall be screened with a PID to determine degree of contamination);
- Monitoring well MW-8, that will be destroyed during the excavation work, shall be replaced at, or as close as possible to its original location;
- A detailed discussion regarding the excavation approach; groundwater management; soil screening and segregation techniques (including the screening threshold for determining "clean" versus excessively impacted soil); clean fill sampling and plans for reuse; waste management and profiling; plans for soil staging; the possibility for direct loading of excessively impacted soil; type of backfill; backfilling / compaction methods; plans for surface restoration; records keeping, etc. (Note that the post-excavation soil attainment demonstration is addressed under Milestone H);
- **A comprehensive and complete fixed-price bid for Milestone E6 that shall *only* <u>exclude</u> the costs for (1) contaminated soil transportation and disposal ($/ton); (2) clean fill importation ($/ton); (3) contaminated water transportation and disposal ($/gal); and (4) expanding the excavation ($/in-place cubic yard).** Bidders shall provide fixed-cost unit rates for these tasks under Optional Cost Adder Milestones UC4, UC5, UC6 and UC7, respectively; and
- A schedule for implementing and completing the excavation work.

The methods and results for Milestone E6 shall be described in a concurrent quarterly RAPR and in the RACR.

Milestone E7 – ISCO / ORC Injection - Remedial Alternative 3. Bidders proposing a site remedy consistent with remedial Alternative 3 shall provide a firm fixed-price cost to complete remediation of the POC well MW-3R and off-site MW-13 area using subsurface injections of ISCO and / or ORC. As mentioned above, elevated concentrations of target unleaded gasoline compounds exceeding the SHS remain in these wells and the contamination currently precludes a demonstration of attainment / site closure.

Bids shall provide a figure depicting the injection area and injection point grid that clearly identifies the number and locations of the proposed injection points. The rationale, composition and mass of the reagent(s) proposed to be injected along with the number of anticipated injection events and application methods shall be specified to provide a clear understanding of the technical basis for the bid. Bids shall also provide details such as the total depth of each injection point and construction design. Commercial ISCO / ORC product vendor design specification submittals may be used to support bidder's approach.

The SOW and fixed-price cost for Milestone E7 shall state / provide the following:

- A USEPA underground injection permit will be secured prior to initiating the injection program;
- The bidder's proposed injection increments / intervals and whether injections will be performed from "bottom-up" or "top-down";
- Estimated injection pressures given that subsurface materials in the area surrounding well MW-3R consist of permeable excavation backfill (gravel and re-use clay soil) whereas MW-13 is installed in natural silty clay soil;
- Nature of any proposed ISCO / ORC activator products and other components of the injection solution (e.g., dechlorinated potable water), and the anticipated solution mix ratio;
- How injectant daylighting will be minimized and proposed methods for managing any injectant that surfaces;
- The proposed total volume of solution to be applied at each injection point (considering the differences in subsurface materials and permeability noted above), that shall be supported in the bid with vendor calculations based on stoichiometric methods;
- Methods and frequency for assessing injectant subsurface distribution and effectiveness (e.g., laboratory groundwater analysis, field measurements, colorimetric test kits, etc.); and
- A comprehensive fixed-price unit cost for any additional injection point(s) under Optional Cost Adder Milestone UC8.

As described under Milestone F below, the bidder's quarterly groundwater monitoring program shall include additional ISCO and/or ORC performance verification testing parameters, as

appropriate. The methods and results for Milestone E7 shall be described in a concurrent quarterly RAPR and in the RACR.

Milestone F – Remediation System O&M and Groundwater Monitoring, Sampling & Reporting. For this milestone, bidders shall provide the Solicitor and PAUSTIF with firm quarterly fixed-price unit costs that would include routine O&M of the AS / SVE, DPE or VEGE remedial system,[30] quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells, and reporting. The quarterly fixed price cost shall also include responding to any unexpected telemetry-triggered O&M visits.

For the purpose of this RFB, it is assumed the Milestone F remedial system O&M activities will be required for:

Alternative 1: 12 quarters (3 years);
Alternative 2: 8 quarters (2 years); and
Alternative 3: 8 quarter (2 years)

However, each bid *must* specify the remediation timeframe (i.e., number of O&M quarters) that the bidder's proposed remedial approach will need in order to achieve the project goal of reducing soil and groundwater contaminant concentrations to below residential SHS, enabling initiation of groundwater and soil attainment demonstrations.[31, 32] The bidder's realistic assessment of remediation timeframe (total number of operating quarters) shall be defined on the Bid Cost Spreadsheet and shall include the additional number of remediation quarters, beyond assumed quarters specified in this RFB (e.g., if a bidder believes it can complete the remediation in a total of 12 quarters of O&M when the RFB assumed quarters is 8, then the additional number of quarters to be included on the Bid Cost Spreadsheet is four (4) quarters). If the bidder's O&M remediation timeframe exceeds the RFB assumed quarters, the number of quarters exceeding the RFB assumption will be incorporated in the Remediation Agreement as Optional Cost Adder Milestone F9 through F*n* (Alternatives 2 and 3) or F13 through F*n* (Alternative 1). Bidders shall assume that the remediation will need to continue until the contaminant concentrations in all of the POC and off-property attainment wells (as defined in Milestone I) are either below the PADEP SHS or "non-detect" for at least two consecutive quarterly monitoring and sampling events. Under these conditions, it is deemed reasonable to initiate the groundwater attainment demonstration.

[30] Electric usage; telephone, cable, internet service; and any discharge to the local treatment facility will be reimbursed as time-and-material cost adders to the Remediation Agreement.
[31] During the bidder's specified timeframe of site operations, maintenance, and monitoring subsequent to remediation system startup, the selected consultant, at its own expense, including **all** associated labor, shall be responsible for repairing or replacing equipment purchased for the Revised RAP implementation that becomes damaged, destroyed, or defective.
[32] If the groundwater data allows for discontinuing remedial activities prior to reaching the bidders specified timeframe for remedial system operation, the selected consultant will only be reimbursed for O&M events that are necessary and have been completed.

Each bid must explicitly state bidder's understanding of the project goal for when O&M of the remedial system would be discontinued and attainment sampling shall begin.

If the Consultant decides to discontinue O&M activities before all 8 (Alternatives 2 and 3) or 12 (Alternative 1) Milestone F quarterly events are completed in order to initiate groundwater attainment early, the Consultant will bear some risk if groundwater contaminant concentrations rebound during subsequent attainment monitoring. More specifically, if the remedial system is shut down before all of the Milestone F quarterly events are completed, the Consultant will be required to wait a minimum of two months before initiating groundwater attainment activities (Milestone I). If during the first quarter of groundwater attainment, concentrations of contamination rebound above SHS in any POC or off-property attainment well, the Consultant shall be obligated to restart the system within 7 days and continue with the residual quarterly Milestone F activities. Then, **when all the RFB assumed O&M quarters of the Milestone F activities have been completed (plus any or all of the Cost Adder Milestone F quarters) 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 RFB assumed quarters of O&M under Milestone F.

Each bid must specify the number of site visits to occur each quarter. O&M tasks will be primarily focused on data collection and evaluations to: (1) determine, demonstrate, and document remediation performance; (2) properly maintain the system equipment; and (3) demonstrate compliance with permits and other applicable regulatory requirements.

- *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. As applicable, depending on the type of remediation system installed, performance monitoring activities are to include, but not necessarily be limited to, measurements that: i) show the design vacuum, air pressure and vapor flow rate is achieved at the injection / extraction well heads; ii) demonstrate the target zone of contamination is being pneumatically and hydraulically influenced; and iii) provide for contaminant mass recovery quantification. The selected consultant shall report quarterly concerning its evaluations of system performance and system optimizations performed.

  Should a bidder's selected remedial alternative include ISCO and/or ORC application (remedial Alternative 3 defined above), performance monitoring shall also include field measurements and/or laboratory analyses of groundwater samples for appropriate parameters (e.g., dissolved oxygen, oxidation / reduction potential, sodium persulfate, etc.) to determine whether the volume of ISCO and/or

ORC product(s) injected is sufficient to meet target concentrations estimated in the bidder's Revised RAP, to verify distribution of the product(s) in the subsurface, and to assess the effectiveness of the injections. Each bid shall identify the specific parameters to be measured / analyzed and the select groundwater monitoring / sampling points.

- *System maintenance & related 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 quarterly to the Solicitor. 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 permits and other applicable regulatory requirements. Documentation of compliance shall be provided to the Solicitor in quarterly RAPRs and in any other reporting required by permitting agencies (i.e. local POTW).

The quarterly groundwater sampling events shall include the fifteen on- and off-property monitoring points previously identified under Milestone D (MW-1R, MW-3R, MW-4R, MW-8 through MW-11, MW-13, MW-14, MW-15, EW-1R, EW-2, P-2R, SL-3 and SL-4) and any additional monitoring well(s) the bidder may have proposed to install under Milestones A and B. Note, however, that the depth to groundwater shall continue to be gauged in all existing and available on- and off-property monitoring points during each quarterly event.

During each event, the depth to groundwater and any potential FPH shall be gauged in all available monitoring points prior to purging and sampling. Groundwater level measurements obtained from the monitoring points 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 RAPRs. Bidders shall manage purged groundwater and other derived IDW generated by the purging and sampling activities in accordance with the PADEP SWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short-list of unleaded gasoline parameters (benzene, toluene, ethylbenzene, xylenes, MTBE, cumene, naphthalene, 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 same parameters.[33] In addition, each event shall include field measurements for these water quality parameters: pH, temperature, specific conductance, dissolved oxygen (measured in-situ), oxidation / reduction potential, and TDS. As described above, should a bidder propose to implement remedial Alternative 3, additional ISCO and/or ORC performance verification testing parameters shall be included, as appropriate.

The RAPRs describing the sampling methods and results will be provided to the PADEP on a quarterly basis and within 30 days of the end of the current quarter. At a minimum, each RAPR shall contain the following:

- A summary of site operations and remedial progress made during the reporting period, including vapor- and dissolved-phase contaminant mass recovery estimates (as applicable depending on the type of remediation system installed;
- Narrative description of the sampling procedures and results;
- Tabulated data collected from the monitored points documenting the depth to groundwater, thickness of any free product or presence of any free product emulsion encountered. This data shall be presented on the same table as the historical quantitative groundwater analytical results;
- Groundwater elevation contour maps depicting groundwater flow direction;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[34]
- 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;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, shrinking, or expanding plume;
- Evaluation of system performance including contaminant mass recovery

[33] Each bidder's approach to implementing Milestone F 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.
[34] All figures included in each RAPR (e.g., site plan, groundwater elevation maps, dissolved plume maps, etc.) shall be available in electronic format to the Solicitor upon request.

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;
- 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.

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 completed with the initiation of Milestone I). If, in order to achieve the cleanup goals, it is necessary to extend the period of O&M beyond the RFB-specified 8 (or 12) quarters, each additional quarter, up to the total number of Consultant's bid O&M remedial timeframe, will be addressed via Optional Cost Adder Milestone F9 (or F13) through F*n*. Consultant shall seek and obtain written approval from Solicitor and PAUSTIF to continue operation of the remedial system (Milestone F9 or F13 through F*n*).[35]

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).

To provide added incentive for the successful bidder to regularly scrutinize remedial system performance and optimize system operations for maximal 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 Optional Cost Adder Milestone F9 through F*n*, if implemented) will be withheld and accumulated pending successful completion of remediation and initiation of soil and groundwater attainment activities (Milestones H and I).** 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.[36] The 10% hold-back milestone will not be paid for an in-situ remediation system that has not attained the cleanup goal within the Consultant's bid remediation timeframe.

Milestone G - Performance Evaluation of RAP Remedial Approach. Under this milestone, the selected bidder shall complete a performance evaluation of the remedial approach proposed in

[35] The Remediation Agreement includes a Site Specific Assumption that remediation will be complete and soil and groundwater attainment activities will be initiated within the O&M timeframe Consultant has bid.
[36] Lump sum payment request shall be made prior to the on-set of initiating Milestones H and I.

its PADEP-approved RAP. The performance evaluation shall determine if the remedial approach is efficiently and effectively remediating residual adsorbed- and dissolved-phase contamination and achieving the intent of the RAP design. The remedial performance evaluation shall be conducted within 6 to 9 months (i.e., two to three quarters) after the selected bidder has fully implemented the proposed site remedy. Milestone G shall culminate in a written report presenting the testing performed, conclusions reached and recommendations to address all discovered deficiencies and to improve remediation effectiveness. Recommendations may include both changes to operations and modifications / augmentations to the remedial design. All recommendations shall include estimated costs to implement and Solicitor may decide to accept or reject any or all recommendations. Should the selected consultant identify deficiencies and recommend actions to optimize remedial effectiveness, and the stakeholders agree with the necessity and appropriateness of one or more of the recommendations, then enabling contracting mechanisms will be explored at that time.

More specifically, the purposes of the performance evaluation shall include a critical analysis of:

- Hydraulic and pneumatic influence measurements, as applicable, for the operating in-situ remediation system to ensure the RAP design is being achieved;

- Quantified dissolved- and vapor-phase contaminant mass recovery estimates, as applicable;

- Horizontal and vertical distribution of injected reagents in the subsurface, as applicable;

- Groundwater quality and chemistry; and

- How the remedial approach is working relative to the plan and any deficiencies / planned corrective measures.

The bidder shall provide a detailed description of the: i) proposed performance evaluation and rationale for testing; ii) proposed methods; iii) use of existing or installation of new data monitoring/collection points; iv) proposed equipment to be used; and v) data that is proposed to be collected. Each bid shall also describe how the data/information would be evaluated.
<u>Please note that all bidders shall propose conduct of a remedial performance evaluation for the selected site remedy.</u>

The Milestone G proposal shall reflect an understanding that the selected bidder will prepare a draft and final version of the Remedial Performance Evaluation Report (RPER) for Solicitor and ICF / its technical agent review and comment. The final RPER shall show that the performance evaluation testing was conducted according to the selected consultant's bid and shall constitute documentation for payment of Milestone G. As previously discussed, the RPER shall include recommended actions to address any operational deficiencies or remedial ineffectiveness /

inefficiencies along with implementation capital and operational cost addition or reduction estimates. The written report shall be provided to Solicitor and PAUSTIF for review within three months of completing the remedial performance evaluation and shall serve as the basis for making decisions on the need for optimization of the remedial approach. Again, if the stakeholders agree that one or more of the recommendations are reasonable, necessary and appropriate, enabling contracting mechanisms will then be considered. The Milestone G activities shall also be reported in a concurrent RAPR.

Milestone H – Soil Attainment Demonstration. Under this task, bidders shall develop and implement a program for systematic random soil sampling to demonstrate attainment of the SHS for unsaturated and periodically saturated soils. There are two possible options under Milestone H as described below:

> Option 1 (remedial Alternative 1): After completing the specified quarters of AS/SVE treatment, soil borings shall be completed within the area of MW-8. Three dimensional attainment sampling shall be completed to demonstrate attainment of this area and each bidder ***must*** describe in detail its approach to addressing soil attainment, and include the depth interval and a drawing showing the location where the sampling grid would be applied to demonstrate soil attainment.
>
> The location / depth of the soil samples shall be determined using PADEP's systematic random sampling (SRSS) procedures, assuming a total of twelve (12) soil samples with one soil sample per boring submitted for laboratory analysis. Alternate SRSS points shall be selected for any primary SRSS sample location that may encounter any existing below grade utilities.
>
> Option 2 (remedial Alternatives 2 and 3): Following the remedial soil excavation conducted under Milestone E6, random sampling grids shall be developed for the sidewalls of the excavation assuming the floor of the excavation will be submerged. Each bidder ***must*** describe in detail its approach to addressing soil attainment, and include the estimated depth interval to be used for random grid development and from which random samples will be collected to demonstrate soil attainment.
>
> The locations / depths of the soil samples along the excavation sidewalls shall be determined using PADEP's systematic random soil sampling (SRSS) procedures, assuming that a total of twelve (12) soil samples will need to be collected and submitted for laboratory analysis to demonstrate attainment.

For soil attainment Options 1 and 2, soil samples shall be analyzed for the current PADEP short list of unleaded gasoline parameters (benzene, toluene, ethylbenzene, xylenes, 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 quality assurance/quality

control (QA/QC) samples shall also be obtained for laboratory analysis of the same parameters. The soil sampling results shall be analyzed using PADEP's 75%/10x Ad Hoc Rule, which shall be documented in detail in the RACR[37].

Milestone I – Groundwater Attainment Demonstration. Under this task, bidders shall provide a firm fixed-price to complete up to eight quarters of groundwater attainment monitoring, sampling and reporting.[38] Each attainment groundwater monitoring and sampling event shall include the on-property POC wells MW-3R and MW-4R and off-property attainment wells MW-8, MW-13 and MW-14 as defined in the PADEP-approved July 2016 SCR / RAP Addendum. The conduct and results of each event shall be documented in quarterly RAPRs.[39] Any additional quarterly attainment monitoring and reporting events, beyond the eight quarters specified in this RFB, shall be defined on the Bid Cost Spreadsheet and shall be incorporated in the Remediation Agreement as Optional Cost Adder Milestone I9 through I12.

During each quarterly groundwater attainment monitoring and sampling event, the depth to groundwater shall be gauged in all existing available monitoring points and prior to purging any of the designated monitoring wells for sampling. Groundwater level measurements obtained from the monitoring points shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient.

Each of the monitoring wells designated for sample collection shall be purged and sampled in accordance with the PADEP Groundwater Monitoring Guidance Manual and standard industry practices. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with the PADEP SWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short list of unleaded gasoline parameters (benzene, toluene, ethylbenzene, xylenes, 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 same parameters.[40] In addition, each event shall include field measurements for the following parameters: pH, temperature, specific conductance, dissolved oxygen (measured

[37] If the soil data do not allow for attainment of the selected standard, a new condition would exist under the Remediation Agreement.
[38] Bidders shall include language in their bid that if groundwater data in the POC and off-property attainment wells have been either non-detect or below SHS for four consecutive quarters, the PADEP will be petitioned to approve a reduction in the number of groundwater attainment sampling events.
[39] If it becomes evident anytime during the groundwater attainment demonstration (initiated subsequent to completing at least the eight [8] or twelve [12] Milestone F quarters of remedial O&M) that the attainment demonstration will not be successful within the allotted 8 quarters (plus any additional quarters under Optional Cost Adder Milestone I) in one or more of the POC wells (e.g., a greater than 10X result or more than two SHS exceedances, etc.), this will represent a New Condition under the contract.
[40] Each bidder's approach to implementing Milestone I 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.

in-situ), oxidation / reduction potential, and TDS.

The groundwater attainment demonstration reports describing the sampling methods and results will be provided to the PADEP on a quarterly basis and within 30 days of the end of the current quarter. At a minimum, each attainment demonstration report shall contain the following:

- A summary of site operations and remedial progress made during the reporting period;
- 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 or any free product emulsion encountered. This data shall be presented on the same table as the historical quantitative groundwater analytical results;
- Groundwater elevation contour maps depicting groundwater flow direction;
- Tabulated historical quantitative groundwater analytical results including results from the current quarter;
- Current quarter laboratory analytical report(s);
- One site-wide iso-concentration contour map for each compound detected in any one well above the SHS during the quarter;[41]
- 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 qualitative and quantitative analysis;
- Discussion of the data to offer an updated assessment whether these data are consistent with a stable, shrinking, or expanding plume;
- 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 groundwater attainment demonstration report shall be sealed by a Professional Geologist and / or Professional Engineer registered in the Commonwealth of Pennsylvania (bidders shall

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

refer to state licensing laws to determine which seals are required based on the work performed for and documented in the groundwater attainment demonstration report).

Milestone J – Post-Remedial Vapor Intrusion Study. In the General Site Background and Description section of this RFB provided above, a brief discussion was included regarding the historical soil vapor sampling conducted during September 2014 through January 2015. However, in order to comply with the requirements of the revised PADEP Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil Under Act 2 (effective 1/18/17), a post-remedial vapor intrusion study shall be conducted.

Under this milestone, bidders shall describe and provide a firm fixed-price cost for conducting a supplemental vapor intrusion study upon completing the site remediation activities that shall adhere to the new PADEP guidance. The study may include modifying the locations and/or depths of the existing four soil vapor sampling points (VP-1, VP-2R, VP-3R and VP-4) or adding additional sampling points. Each bidder shall provide a detailed description of its proposed methods, sampling techniques, number of sampling points, and number / timing of sampling events along with a site plan depicting the locations of any new soil vapor monitoring point locations, as applicable.

Vapor samples shall be submitted to a PADEP-accredited laboratory for analysis of the current PADEP short-list of unleaded gasoline parameters using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and analyzed for the same parameters (e.g., trip blank, blind duplicate). Results from the supplemental vapor intrusion study shall be incorporated into the RACR to be prepared under Milestone K.

Milestone K – Preparation, Submittal and PADEP Approval of Remedial Action Completion Report (RACR). Under this milestone, the bidder will provide a fixed-price cost to prepare a draft and final RACR following the completion of Milestones E through L and related optional cost adder milestones, as necessary. The RACR shall be prepared in accordance with Section 245.313. At a minimum, the RACR shall provide the details for Milestones A through L, and any optional cost adder milestones. The RACR shall also discuss the selected closure criteria for the site, provide proof of soil and groundwater attainment, and request permanent closure for the site for the current release under an Act 2 Relief of Liability (ROL). The project schedule should allow two (2) weeks for Solicitor and PAUSTIF review and comment on the draft RACR before a final version is submitted to the PADEP. The selected consultant shall then prepare and submit the final RACR to the PADEP in accordance with Section 245.313, and the report shall be 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 RACR). The fixed-price cost shall also include addressing any PADEP comments on the RACR.

Milestone L – Site Closure / Restoration Activities. Under this milestone, the bidder shall describe and provide a fixed-price bid for properly closing the site, including: removal of the remedial system and proper disposal of any remaining wastes; in-place abandonment of remedial system below grade piping; in-place abandonment of monitoring wells, piezometers, remediation wells, and soil vapor sampling points consistent with PADEP guidelines; well head removals; and surface re-vegetation and concrete / asphalt repairs, as applicable, for areas that have been disturbed by site characterization or remedial action activities. This milestone shall also include photo–documenting the site restoration work and completing well abandonment forms to be submitted to the appropriate regulatory agencies. Copies of these photographs and forms shall also be provided for the Solicitor's files.

Each bid shall specify the estimated number of days between PADEP approval of the RACR and initiating the Milestone L site restoration work. Site restoration activities shall be conducted in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Conduct of all site closure / restoration activities shall be coordinated with the Solicitor and property owner.

The selected consultant shall determine whether the Solicitor wishes to maintain any components of the remedial system, as applicable, before removing them from the Site.

Optional Cost Adder Milestones

A number of optional cost adders may come into play at this site. Therefore, bidders shall provide unit pricing for these contingencies outside the base RFB scope. Note that before any work associated with these unit cost adders is conducted, the selected consultant shall provide a written request and detailed technical explanation for ICF / its technical agent review and consideration ahead of any written authorization to proceed.

Optional Cost Adder Milestone D3 – Additional Pre-Remediation Quarterly Groundwater Monitoring, Sampling & Reporting. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include the quarterly groundwater monitoring, sampling and analysis of the fifteen (15) locations identified in Milestone D (MW-1R, MW-3R, MW-4R, MW-8 through MW-11, MW-13, MW-14, MW-15, EW-1R, EW-2, P-2R, SL-3 and SL-4)[42] and reporting beyond the two quarters specified in Milestone D. The SOW for this unit cost adder milestone shall follow Milestone D guidelines. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone F9 through F*n* or F13 through F*n* – Additional Remediation System O&M and Groundwater Monitoring, Sampling, & Reporting. Under this milestone,

[42] The fixed price cost shall also include any additional monitoring well(s) that the bidder may propose to install under Milestones A and B (if any).

bidders shall provide the Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include routine O&M of the remedial system, quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells, and reporting beyond the timeframe specified in Milestone F. The SOW for this unit cost adder milestone shall follow Milestone F guidelines. As described in Milestone F, a 10% holdback will be applied to each Optional Cost Adder Milestone F payment. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone I9 through I12 – Additional Groundwater Attainment Demonstration. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm quarterly fixed-price unit cost that would include the quarterly groundwater monitoring, sampling and analysis of the on-property POC wells MW-3R and MW-4R and off-property attainment wells MW-8, MW-13 and MW-14 and reporting beyond the eight quarters specified in Milestone I. The SOW for this unit cost adder milestone shall follow Milestone I guidelines. Technical justification will be required by the selected consultant prior to implementing this optional cost adder milestone.

Optional Cost Adder Milestone CA1 through CA*n* – Monthly Utilities & Discharge Fees. Bidders shall utilize this optional cost adder milestone for invoicing "as-billed" time and materials costs incurred for utilities (e.g., electric, telephone) or POTW discharge fees on either a monthly or quarterly basis, as appropriate.

Optional Cost Adder Milestone UC1 – Temporary Operation of CatOx Unit. Under this milestone, bidders shall provide a firm fixed-price unit cost incorporating charges for delivery and subsequent return of a CatOx unit, installation and removal of the CatOx unit from the remedial system, and CatOx unit rental and operational charges (e.g., electric usage) for a period of three months. Before implementing this optional milestone, Consultant must provide system data to PAUSTIF and Solicitor demonstrating the need for a CatOx unit and shall secure PAUSTIF/Solicitor approval. The fixed-price unit cost shall be inclusive of all labor, subcontractor costs, any permitting fees, and waste handling / disposal items. Bidder's shall also identify the mass recovery rate threshold / criterion for switching from CatOx treatment to VGAC (e.g., once TPH as gasoline mass recovery rates decrease to below X pounds per day, the CatOx unit will be replaced with VGAC).

Optional Cost Adder Milestone UC1A – Additional Months of CatOx Unit Rental. Bidders shall utilize this optional cost adder milestone for invoicing monthly rental of the CatOx unit beyond the period of three months specified under Optional Cost Adder Milestone UC1 above. Any additional months of CatOx rental beyond the three months specified under Milestone UC1 will require PAUSTIF/Solicitor approval and shall adhere to the unit costs specified for Milestone UC1 in the Remediation Agreement. Note that charges for delivery and subsequent return of the CatOx unit, and installation / removal of the CatOx unit from the remedial system, will be fully captured under Milestone UC1.

Optional Cost Adder Milestone UC2 – LGAC Change-Out. Under this milestone, bidders shall provide a firm fixed-price unit cost for each LGAC change-out event of the "primary" LGAC vessel, placing the vessel with the fresh virgin GAC in the secondary position. Bidders shall detail the size of the LGAC units (pounds / type of GAC), scope of work and provide the criteria or "trigger(s)" that would be used in determining when the LGAC needs to be replaced (e.g., once the carbon in the LGAC unit has adsorbed 15% of its weight in TPH as gasoline contamination determined by mass recovery calculations). The fixed-price cost shall be inclusive of all labor, subcontractor costs, LGAC replacement, and waste handling / disposal items.

Optional Cost Adder Milestone UC3 – VGAC Change-Out. Under this milestone, bidders shall provide a firm fixed-price unit cost for each VGAC change-out event of the "primary" VGAC vessel, placing the vessel with the fresh virgin GAC in the secondary position. Bidders shall detail the size of the VGAC units (pounds / type of GAC), scope of work and provide the criteria or "trigger(s)" that would be used in determining when the VGAC needs to be replaced (e.g., once the carbon in the VGAC unit has adsorbed 15% of its weight in TPH as gasoline contamination determined by mass recovery calculations). The fixed-price cost shall be inclusive of all labor, subcontractor costs, VGAC replacement, and waste handling / disposal items.

Optional Cost Adder Milestone UC4 – Contaminated Soil Transportation and Disposal. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/ton) for transporting and disposing excessively contaminated soil at a facility approved for accepting this waste stream.

Optional Cost Adder Milestone UC5 – Clean Fill Importation. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/ton) for importing clean fill material for use in backfilling the excavation. The imported clean fill will be used to supplement any excavated soil that is determined to be suitable for reuse based on sampling and laboratory analysis.

Optional Cost Adder Milestone UC6 – Contaminated Water Transportation and Disposal. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/gallon) for transporting and disposing excessively contaminated water at a facility approved for treating this waste stream.

Optional Cost Adder Milestone UC7 - Expansion of Soil Excavation. Under this milestone, bidders shall provide a firm fixed-price unit cost ($/in-place cubic yard) should expansion of the soil excavation beyond the dimensions / volume assumed in this RFB become necessary as warranted by field screening and other appropriate observations.

Optional Cost Adder Milestone UC8 – Additional ISCO / ORC Injection Point. Under this milestone, bidders shall provide a firm fixed-price comprehensive unit cost for each additional ISCO / ORC injection point inclusive of all labor, equipment and materials.

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 milestone 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 (for funding consideration). PADEP approval may also be required.

List of Attachments

1. Remediation Agreement
2. Bid Cost Spreadsheet
3. Site Information / Historic Documents

    a. Figure 1 - Site Plan
    b. Site Photographs
    c. March 2015 SCR / RAP
    d. PADEP 6/11/15 SCR / RAP Approval Letter
    e. July 2016 SCR / RAP Addendum
    f. PADEP 8/26/16 SCR / RAP Addendum Approval Letter
    g. August 2017 RAP Addendum No. 2
    h. PADEP 8/24/17 RAP Addendum No. 2 Approval Letter
    i. Second Quarter 2018 RAPR
    j. Third Quarter 2018 Groundwater Gauging and Analytical Data
    k. Fourth Quarter 2016 RAPR
    l. Fourth Quarter 2017 RAPR