Request for Bid

Fixed-Price Bid to Result

Site Remediation through Closure

Solicitor

United Refining Company

Kwik Fill M-061

227 East Main Street
Bradford, PA 16701

PADEP Facility ID #: 42-14809 PAUSTIF Claim #: 2013-0035(F)

Date of Issuance

July 31, 2017

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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 current 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 subject to 80% proration. Solicitor is responsible to pay any applicable deductible and/or proration (Claimant is responsible to pay 20% of each milestone cost).

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	August 9, 2017 by 5 p.m.
Mandatory Pre-Bid Site Visit	August 11, 2017 at 1 p.m.
Deadline to Submit Questions	September 5, 2017 by 5 p.m.
Bid Due Date and Time	September 12, 2017 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 **"Kwik Fill M-061, Claim #2013-0035(F) – 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 "Kwik Fill M-061, Claim #2013-0035(F) – SITE MEETING ATTENDANCE NOTIFICATION".** The name and contact information of the company participant should be included in the body of the email. Notification of intent to attend is appreciated; however, it is not required. Attendance at the Pre-Bid Site Meeting is mandatory.

Submission of Bids

To be considered for selection, **one (1) hard copy of the signed bid package and one (1) electronic copy (one (1) PDF file on a compact disk (CD) included with the hard copy) must be provided directly to the PAUSTIF's third party administrator, ICF, to the attention of the Contracts Administrator.** The Contracts Administrator will be responsible for opening the bids and providing copies to the Technical Contact and the Solicitor. Bid responses will only be accepted from those companies that attended the Mandatory Pre-Bid Site Meeting. **The ground address for overnight/next-day deliveries is ICF, 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 #2013-0035(F)".** Please note that the use of U.S. Mail, FedEx, UPS, or other delivery method does not guarantee delivery to this address by the due date and time listed in the Calendar of Events for submission. Companies mailing bids should allow adequate delivery time to ensure timely receipt of their bid.

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

Bid Requirements

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

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

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

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

In addition, the bidder shall provide:

1. The bidder's proposed unit cost rates for each expected labor category, subcontractors, other direct costs, and equipment;

2. The bidder's proposed markup on other direct costs and subcontractors (if any);

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

4. A unit rate schedule that will be used for any out of scope work on this project.

Each bid will be assumed to be valid for a period of up to 120 days after receipt 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 from Liability from the PADEP) using any standard?
    d. Has your firm ever been a party to a terminated PAUSTIF-funded Fixed-Price (FP) or Pay-for-Performance (PFP) contract without attaining all of the milestones? If so, please explain.

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

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

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

9. A description of your approach to working with the PADEP. Describe how the PADEP would be involved proactively in the resolution of technical issues and how the PADEP case team will be kept informed of activities at the Site.

10. Key exceptions, assumptions, or special conditions applicable to the proposed SOW and/or used in formulating the proposed cost estimate. Please note that referencing extremely narrow or unreasonable assumptions, special conditions, and exceptions may result in the bid response being deemed “unresponsive”.

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

Bid Review and Scoring

Bidders' submissions that are administratively qualified (attend the mandatory pre-bid site meeting, submission of the bid by the designated due date and time) will be evaluated.

Technical Scoring

Bids are evaluated for technical viability before 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 for defined SOW bids for two categories:

- Understanding the problem and demonstrating knowledge of how to perform the work
- Qualifications and Experience

Numerical values will be assigned to three categories in those cases where there is a bid-to-result request:

- Understanding of the problem
- 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: $(1-((B-A)/A)) \times C = D$

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.

Evaluation of Bids

A committee comprised of at least two members of the USTIF staff, two members of ICF staff, and the TPR company 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, the claimant will receive those bids whose numerical scores place them in the category of meeting Reasonable and Necessary criteria and acceptable for USTIF funding. The claimant 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 Kwik Fill Station #M-061 (referred to as the "KFM-61" facility, property or site) is located at 227 East Main Street in the town of Bradford, McKean County, Pennsylvania. The KFM-61 facility is owned and operated by the Solicitor (United Refining Company of PA) as a retail gasoline service station and convenience store (c-store).

The KFM-61 facility occupies two rectangular-shaped parcels that form one irregular-shaped parcel encompassing approximately 0.31 acre. Existing facility features generally consist of a one story slab-on-grade c-store building located in the northern part of the property, three 12,000-gallon capacity unleaded gasoline underground storage tanks (USTs) located in a common cavity near the southwest property boundary, and a fuel-dispensing island with four product dispensers and canopy south of the c-store building. Additional information regarding the current and historical facility UST systems is provided in the next subsection of this RFB. A retaining wall is located along the southwest and northwest property boundaries and is estimated to be installed to a depth of approximately 12 feet below grade (ft-bg). Most of the ground surface at the KFM-61 facility is paved with concrete or asphalt. As part of the previous site characterization activities conducted at the KFM-61 site, a total of 23 groundwater monitoring wells were installed including MW-1R, MW-3R, MW-4 through MW-7, MW-12 through MW-16, MW-22 and MW-23 located on-property, and MW-8 through MW-11, MW-17 through MW-21 and MW-24 positioned off-property. Also, as part of the remedial actions currently underway, as discussed in more detail below, three vapor enhanced groundwater extraction (VEGE) recovery wells have been installed on-property (RW-1, RW-2, and RW-3)[1] and 15 oxygen injection points have been installed on- and off-property (IP-1S/D, IP-2, IP-3S/D, IP-4S/D, IP-5 and IP-6S/D through IP-15S/D). Additionally, four soil vapor sampling points, VP-1 through VP-4, have been installed on the KFM-61 property.

The KFM-61 facility is located in a mixed commercial and residential area. Overhead and buried utilities are present on and near the KFM-61 property and include electric service, municipal water, natural gas, fiber optic, sanitary sewer and storm sewer. Additionally, note that a six-foot storm sewer easement bisects the northern portion of facility.

[1] Existing monitoring wells MW-4, MW-6 and MW-7 are also used as VEGE recovery wells.

The general facility layout, site features (including the trenching configurations for the two active remediation systems), surrounding parcels, and the locations of overhead and subsurface utilities are depicted in the figure provided in Attachment 3a. Photographs of the KFM-61 facility and surrounding properties are contained in Attachment 3b.

Historical Petroleum Storage / Dispensing Operations and Release History

Records maintained by the McKean County Recorder of Deeds indicate that the property is owned by Solicitor who has conducted retail unleaded gasoline sales and c-store operations on the property since December 1989. Prior to Solicitor purchasing the property in December 1989, the facility had reportedly operated as a retail petroleum station since at least 1960.

A leaking product line was discovered in June 1990. The location of the product line release is unknown based on a review of the available site record. Following line closure activities, three groundwater monitoring wells were installed (MW-1, MW-2 and MW-3) in June 1990 to assist with determining the nature and extent of subsurface impacts. In March 1992, Solicitor installed a soil vapor extraction (SVE) remediation system which was operated until sometime in 2003 when it was deactivated. In general, dissolved-phase contaminant concentrations reportedly decreased during (and after) operation of the SVE system, although elevated contaminant concentrations were still present in monitoring well MW-1 at the time of the most recent 2013 unleaded gasoline release (discussed below). Groundwater analytical data from these investigations are not available. Soil samples were not collected and analyzed to investigate this release.

Based on a PADEP file review conducted on 1/8/14 by the current consultant of record, Groundwater & Environmental Services, Inc. (GES), it appears the Department considered the June 1990 release discovery to be adequately characterized and remediated in accordance with the PADEP corrective action policies that prevailed at the time. Reportedly, there was nothing in the PADEP file indicating “No Further Action” status or that a Relief of Liability was ever granted for the 1990 unleaded gasoline release. However, the facility may have achieved a *de facto* “No Further Action” status in 2003 based on the reported absence of any corrective action directives in the PADEP file, and given that the facility was never listed in the PADEP Leaking Underground Storage Tank database.

On 2/25/13, Solicitor’s contractor was preparing to conduct routine UST systems tightness testing when elevated vapor levels were detected in the sump for the regular grade unleaded gasoline submersible turbine pump. Further investigation revealed a small product leak from a threaded pipe fitting which connected a metallic hose to steel product piping. The affected UST system was removed from service, repaired and returned to service on 2/26/13. To investigate the suspected unleaded gasoline release, GES conducted site characterization activities from June 2013 through early 2015 which generally involved several phases of soil, groundwater and soil vapor sampling coupled with remedial feasibility testing. GES subsequently submitted a Site

Characterization Report (SCR) to the PADEP in March 2015 (Attachment 3c). The Department appears to have postponed its review / comment on the SCR until requested supplemental site characterization activities had been completed and the Remedial Action Plan (RAP) was submitted for review. The PADEP-requested supplemental site investigations consisted of determining the outfall location for the storm sewer beneath the northern portion of the site, collecting storm water samples from the sewer to assess if perched groundwater beneath the KFM-61 property could be infiltrating the sewer conduit, and completing a professional site and well elevation survey. Once this additional work was completed, GES submitted a combination SCR Addendum / RAP to the PADEP in October 2015 (Attachment 3d) which the Department approved via letter issued on 12/23/15.

Overview of Site Characterization Activities and Results

Following the discovery of an unleaded gasoline release in February 2013, several phases of site characterization were completed by GES. The following sections summarize the results obtained from key site investigation activities. Bidders are directed to the March 2015 SCR (Attachment 3c) and October 2015 SCR Addendum / RAP (Attachment 3d) for additional site characterization information.

Site Geology, Hydrogeology and Hydrology

Geologic and hydrogeologic characterization of the site subsurface was determined through advancing numerous on- and off-property soil borings and monitoring / remediation well borings. Beneath the asphalt and concrete surface covering the KFM-61 facility, unconsolidated materials generally consist of fill composed of varying amounts of clay, silt, sand and gravel to depths ranging from 1 to 12 ft-bg. The fill material is underlain by natural clay soil containing lenses of clayey silt, clayey sand, silty sand, or sandy gravel. Beyond the KFM-61 facility to the west (hydraulically downgradient), unconsolidated deposits consist of surficial fill material composed of varying amounts of clay, silt, sand and gravel to depths of about 5 ft-bg which is underlain by clay with clayey sand, silty sand or clayey gravel lenses to a depth of over 30 ft-bg. The clay lithology appears to become less predominant and the clayey sand and silty sand layers appear to increase in thickness west of the facility.[2] Lithologic logs for soil borings and monitoring / remediation well borings, and figures depicting the boring locations are provided in the March 2015 SCR and October 2015 SCR Addendum / RAP provided in Attachments 3c and 3d, respectively.

Hydrogeologic data for the site has been provided through the previously mentioned network of monitoring and remediation wells. Investigative data has revealed two distinct groundwater-bearing zones including: i) perched groundwater in shallow overburden beneath the KFM-61

[2] Bedrock was not encountered in any of the on- and off-property environmental borings advanced to a maximum depth of approximately 35 ft-bg.

facility; and ii) the regional unconfined water table aquifer in deeper overburden. The depth to shallow perched groundwater beneath the KFM-61 facility averages approximately 7.5 ft-bg. The average depth to groundwater in the underlying water table aquifer on- and off-property is about 17.1 ft-bg. Historical groundwater gauging data is tabulated in the most recent fourth quarter 2016 Remedial Action Progress Report (RAPR) provided in Attachment 3e. The average horizontal hydraulic gradient for the shallow perched groundwater zone has been reported within the range of 0.05 to 0.55 ft/ft, and within the range of 0.12 to 0.23 ft/ft for the deeper water table aquifer based on information contained in recent RAPRs. Overall groundwater flow within the perched groundwater zone beneath the KFM-61 property appears to vary from northwest to northeast. Local groundwater movement within the regional water table aquifer is toward the northwest to north-northwest in the general direction of Tunungwant Creek located approximately 475 feet west of the KFM-61 facility.

Limited aquifer testing was performed in April 2014 to assist with evaluating remedial alternatives. In general, a pumping test was completed in on-property well MW-1R which intercepts the shallow perched groundwater zone. Analysis of the testing data indicated that following deactivation of the pump, groundwater recharged to within 95% of the static water level after about 28 minutes. A hydraulic conductivity value of approximately 85 feet per day (ft/day) was estimated for monitoring well MW-1R. A pumping test was also conducted within off-property well MW-9 which communicates with the deeper water table aquifer. Following deactivation of the pump, groundwater recharged to within 6% of the static water level after about 16 minutes. A hydraulic conductivity value of approximately 24 ft/day was estimated for monitoring well MW-9. Additional details regarding the April 2014 remedial feasibility testing and data analyses are provided in the October 2015 SCR Addendum / RAP (Attachment 3d).

Soil Quality

Based on available site data, 54 soil samples have been collected from 25 on- and off-property soil borings and monitoring well / soil vapor sampling point borings advanced during the various phases of site characterization work. All samples were submitted for laboratory analysis of the current PADEP Act 2 short list of unleaded gasoline compounds (benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene, 1,2,4-trimethylbenzene [TMB] and 1,3,5-TMB).

Four of the soil samples exhibited contaminant concentrations exceeding the applicable regulatory standards. In general, these samples were primarily collected from periodically saturated (smear zone) and permanently saturated soils near the UST field and product dispenser pad. The historical analytical dataset reveals that the primary constituents of concern (COC) in site soil appear to be benzene and 1,2,4-TMB and, to a lesser extent, toluene, ethylbenzene, naphthalene and 1,3,5-TMB. Based on the number and locations of soil borings advanced and sampled, soil impacts exceeding applicable regulatory standards appear to have been reasonably delineated both vertically and horizontally. Also, based on the distribution of

soil impacts and site characteristics, it does not appear that adsorbed-phase contamination exceeding regulatory standards extends beyond the KFM-61 facility property boundary.

Maximum concentrations for the COCs identified in site soil were reported at the following locations and depths:

- benzene: 11.4 milligrams per kilogram (mg/kg); soil boring SB-2/MW-4 advanced near western corner of UST field; saturated soil sample (8 to 10 ft-bg).
- 1,2,4-TMB: 445 mg/kg; soil boring MW-12 advanced between c-store building and dispenser pad; saturated soil sample (9 to 11 ft-bg).
- toluene: 104 mg/kg; soil boring MW-12 advanced between c-store building and dispenser pad; saturated soil sample (9 to 11 ft-bg).
- ethylbenzene: 93.4 mg/kg; soil boring MW-12 advanced between c-store building and dispenser pad; saturated soil sample (9 to 11 ft-bg).
- naphthalene: 28.5 mg/kg; soil boring MW-12 advanced between c-store building and dispenser pad; saturated soil sample (9 to 11 ft-bg).
- 1,3,5-TMB: 54.3 milligrams per kilogram (mg/kg); soil boring SB-2/MW-4 advanced near western corner of UST field; saturated soil sample (8 to 10 ft-bg).

Historical soil sampling locations, soil boring logs and analytical results are contained in the March 2015 SCR (Attachment 3c) and October 2015 SCR Addendum / RAP (Attachment 3d).

Groundwater Quality

Shallow on-property perched water table: Historically, groundwater quality in the perched water zone has been assessed through a quarterly compliance sampling network consisting of ten shallow monitoring wells located on-property (MW-1R, MW-3R, MW-4 through MW-7, MW-12, MW-14, MW-15, and MW-16).[3] Wells monitoring the perched groundwater beneath the KFM-61 property range in depth from approximately 8 to 16 ft-bg. Based on the most recent fourth quarter 2016 groundwater analytical data, the COCs in shallow perched groundwater currently consist of benzene and 1,2,4-TMB. During the fourth quarter 2016, benzene concentrations exceeding the residential used aquifer SHS MSC were reported for samples collected from on-property wells MW-1R, MW-4, MW-6 and MW-7. Concentrations of benzene in these wells ranged from 263 (MW-7) to 605 (MW-1R) micrograms per liter (µg/l). Levels of 1,2,4-TMB exceeded the applicable standard in on-property wells MW-4 (42.9 µg/l), MW-6 (57.6 µg/l), and MW-7 (147 µg/l) during the fourth quarter 2016. Concentrations of all other target unleaded gasoline compounds within the shallow perched groundwater zone were either not detected or were below the applicable standards for the fourth quarter 2016 sampling event.[4] Key

[3] Well MW-2 has been abandoned. This was an older installation that was sampled to investigate the 1990 unleaded gasoline release.

[4] Given the average depth to groundwater on-property of approximately 7.5 ft-bg and the nature of off-property groundwater impacts, the March 2015 SCR concluded that the facility retaining wall, as mentioned earlier, likely

observations regarding contaminant concentration trends through the fourth quarter 2016 include overall increasing trends for benzene in wells MW-1R, MW-4 and MW-6, and very shallow downward trends (i.e., almost no discernable trend) for benzene in wells MW-7 and MW-14. These wells are located adjacent to the UST field source area except for MW-7 which is installed between the c-store and UST field. Concentration trends for 1,2,4-TMB have been steadily decreasing except for recent concentration spikes in wells MW-6 and MW-14.

Deeper on- and off-property regional water table: Groundwater quality in the deeper water table aquifer has been evaluated through a quarterly compliance sampling network comprised of three monitoring wells located on-property (MW-13, MW-22 and MW-23) and ten wells installed off-property (MW-8 through MW-11, MW-17 through MW-21 and MW-24). Wells communicating with the regional water table range in depth from approximately 20 to 35 ft-bg. Currently, the COCs identified in the deeper water table aquifer consist of MTBE and, to a lesser extent, benzene. During the fourth quarter 2016, MTBE concentrations exceeding the residential used aquifer SHS MSC were reported for samples collected from on-property well MW-13 and off-property wells MW-8 through MW-11 and MW-19. Concentrations of MTBE in these wells ranged from 24.5 (MW-8) to 1,590 (MW-13) µg/l. It is important to note that the off-property dissolved-phase MTBE plume is widespread and extends beyond monitoring well MW-19 located approximately 230 feet downgradient (northwest) of the KFM-61 facility. An overall increasing trend in MTBE concentrations is observed for on-property source area well MW-13 through the fourth quarter 2016. Also, although MTBE trends for other wells installed in the deeper water table aquifer are decreasing, the natural rate of decline / attenuation is very slow in some wells (e.g., MW-10 and MW-11). Benzene concentrations did not exceed the applicable standard in any deeper water table wells during the fourth quarter 2016, although benzene levels in off-property wells MW-9 (14.8 µg/l) and MW-10 (46.2 µg/l) were reported above the standard during the previous third quarter 2016 sampling event. With the exception of MTBE and benzene, no other target unleaded gasoline analytes exceeded the applicable standards within the deeper water table wells for the third or fourth quarters 2016.

Groundwater samples have been analyzed for the current PADEP Act 2 short list of unleaded gasoline compounds. The most recent groundwater gauging and analytical data available, including tabulated historical data, are contained in the fourth quarter 2016 RAPR provided in Attachment 3e. Boring logs / construction details for the site wells, and figures depicting the well locations, are contained in the March 2015 SCR (Attachment 3c). Groundwater samples collected from select shallow and deep on- and off-property wells have also been analyzed for total suspended solids, iron and manganese, and for other parameters to assess biological activity including total alkalinity, ferrous iron, sulfate, nitrite, nitrate, methane and microbial populations. These analytical data are contained in the laboratory reports provided in Attachment 3f.

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serves as a barrier which horizontally confines dissolved-phase impacts in the perched groundwater zone to the KFM-61 property.

Soil Vapor Sampling

As mentioned earlier, four soil vapor sampling points exist on the KFM-61 property (VP-1 through VP-4). Soil vapor samples were collected from all sampling points in November 2013 and from VP-1, VP-3 and VP-4 in January 2014.[5]

Soil vapor analytical results indicate that only the sample collected from VP-2 in November 2013 contained a target unleaded gasoline compound that exceeded the residential and non-residential indoor air screening value. More specifically, benzene was detected at a concentration of 23.5 mg/m^3 in VP-2 which is located near the UST field source area. Because VP-2 was sampled only once, benzene vapor levels at this location were never confirmed. Note, however, that no target vapor-phase analytes exceeded the applicable indoor air screening values in soil vapor sampling point VP-1, located between VP-2 and the c-store building, indicating that the vapor exposure pathway may be incomplete relative to the building. A follow-up post-remediation vapor intrusion study is included as part of this RFB SOW.

Free Phase Hydrocarbons

Based on the available record for the KFM-61 site, free phase hydrocarbons (FPH) have never been detected in any of the groundwater monitoring or remediation wells.

Previous Remedial Actions

As mentioned earlier, a SVE remediation system was installed and operated from early 1992 until sometime in 2003 to address the unleaded gasoline release discovered in June 1990. The SVE system reportedly consisted of seven extraction wells connected to a 1.5 horsepower regenerative blower. Apparently, the Solicitor searched its internal project file and was unable to locate any further documentation regarding installation of the SVE system. Locations of the historical SVE wells are depicted in the figures contained in the March 2015 SCR (Attachment 3c). However, whether or not these wells have been decommissioned is unclear, and the configuration of the subsurface piping, or whether it remains in-place, is unknown.

Solicitor's Selected Site Closure Standard

Solicitor intends to pursue site closure for unleaded gasoline constituents in soil and groundwater by demonstrating attainment of the PADEP SHS Medium Specific Concentrations (MSCs) for a used aquifer in a nonresidential setting for on property soil, and in a residential setting for on- and off-property groundwater with a TDS concentration of less than or equal to 2,500 mg/l.

[5] Soil vapor samples were not collected from VP-2 in January 2014 due to malfunctioning sampling equipment.

Selected Remedial Approach and Pilot Testing

Based on the nature of this active retail facility, subsurface characteristics, the magnitude and distribution of adsorbed- and dissolved-phase impacts, and the results provided from pilot testing, the October 2015 SCR Addendum / RAP (Attachment 3d) proposed *in-situ* remediation via installation and operation of: 1) an on-property vacuum enhanced groundwater extraction (VEGE) system to address shallow soil and groundwater impacts in the perched groundwater zone; and 2) an on- and off-property oxygen injection system (enhanced bioremediation) to address groundwater impacts in the deeper overburden. As mentioned earlier, the SCR Addendum / RAP was approved by the PADEP in late December 2015.

VEGE Remediation System

Pilot testing for the proposed VEGE remedial technology was performed in April 2014 using shallow on-property well MW-1R (screened from 3 to 16 ft-bg) and deeper off-property well MW-9 (screened from 10 to 30 ft-bg). The VEGE pilot testing was conducted in several stages (at varying applied vacuum) and the results obtained from each stage of testing are briefly summarized below.

- VEGE at MW-1R

    - *Average applied vacuum of 40 inches water column (in wc)*: Testing was completed over a period of ~52 minutes during which groundwater was extracted at a rate of ~0.3 gallons per minute (gpm), soil vapors were recovered at an average vapor flow rate of ~31.4 standard cubic feet per minute (scfm), and influent PID concentrations averaged approximately 45.6 parts per million volume (ppmv). The hydraulic radius of influence (ROI) was estimated to be 14 feet, although notable pneumatic influence was not observed.[6]

    - *Average applied vacuum of 80 in wc*: Testing was completed over a period of ~41 minutes during which groundwater was extracted at a rate of ~0.6 gpm, soil vapors were recovered at an average vapor flow rate of ~34.6 scfm, and influent PID concentrations averaged approximately 129.4 ppmv. The hydraulic ROI was estimated to be 15 feet, although notable pneumatic influence was not observed.[5]

    - *Average applied vacuum of 121.5 in wc*: Testing was completed over a period of ~58 minutes during which groundwater was extracted at a rate of ~1.1 gpm, soil vapors were recovered at an average vapor flow rate of ~44.1 scfm, and influent PID concentrations averaged approximately 167.1 ppmv. The hydraulic ROI was

[6] A pneumatic ROI of less than 9 feet was assumed.

estimated to be 18 feet and a pneumatic ROI of less than 25 feet was assumed based on notable vacuum influence in MW-6.

- VEGE at MW-9

    - *Average applied vacuum of 40 in wc*: Testing was completed over a period of ~53 minutes during which groundwater was extracted at a rate of ~0.1 gpm, soil vapors were recovered at an average vapor flow rate of ~6.5 scfm, and influent PID concentrations averaged approximately 1.3 ppmv. The hydraulic ROI was estimated to be 23 feet, although notable pneumatic influence was not observed.[7]

    - *Average applied vacuum of 90 in wc*: Testing was completed over a period of ~50 minutes during which groundwater was extracted at a rate of ~0.04 gpm, soil vapors were recovered at an average vapor flow rate of ~7.8 scfm, and influent PID concentrations averaged approximately 1.5 ppmv. The hydraulic ROI was estimated to be 23 feet, although notable pneumatic influence was not observed.[7]

    - *Average applied vacuum of 283.5 in wc*: Testing was completed over a period of ~63 minutes during which groundwater was extracted at a rate of ~0.05 gpm, soil vapors were recovered at an average vapor flow rate of ~10.3 scfm, and influent PID concentrations averaged approximately 0.0 ppmv. The hydraulic ROI was estimated to be 24 feet, although notable pneumatic influence was not observed.[7]

Based on results from the pilot testing completed within MW-1R, which is located on-property where the VEGE treatment will be applied, the RAP proposed installation of a high-vacuum extraction system.

Passive Oxygen Injection Remediation System

Pilot testing for the proposed oxygen injection remedial technology was performed in August 2015 via individual low-flow injection tests completed at on-property injection points IP-1S/D and IP-2, and at off-property injection points IP-3S/D, IP-4S/D and IP-5. The testing was conducted using compressed air to determine if subsurface permeability was compatible with the low flow (i.e., “passive”) injection of oxygen.

The air-injection pilot testing collectively included 24 individual tests (three tests completed within each shallow and deep injection point) at applied air flow rates ranging from 1 to 8 scfm.

[7] A pneumatic ROI of less than 30 feet was assumed.

During the testing, field observations included monitoring injection pressures and groundwater level fluctuations (hydraulic response), measuring changes in aquifer parameters[8], and estimating ROI. Given the large number of tests and significant amount of data generated during the air-injection pilot testing, summarizing this information is beyond the scope of this background section. However, it is expected that each bidder shall carefully review and consider the air-injection pilot study results contained in the SCR Addendum / RAP (Attachment 3d) when developing its program of supplemental pilot testing included in the scope of work for this RFB.

Overall, GES concluded from the air-injection pilot testing that the pneumatic ROI was highly variable and ranged from less than 7 feet up to 48 feet, and that inconsistency in the ROI was likely due to varying lithology beneath the site and adjacent residential property to the north. As stated in the RAP, the oxygen system remedial design (i.e., injection well spacing) was based on what GES considered to be a conservative pneumatic ROI of 25 feet.

Other possibly relevant observations from the pilot testing included:

- DNA-based genomic analyses of bacterial populations in deeper overburden groundwater provided for samples collected from on-property well MW-13 and off-property well MW-11 indicate low (MW-11) and low-to moderate (MW-13) populations of MTBE degrading bacteria.

- **Limited DO influence nearby.** For example, when injecting air at up to 6 scfm in IP-2 for about 3 hours, there was no significant increase in DO in MW-23, located just 7 feet away (DO before / after was 2.6 ppm / 2.75 ppm, respectively). Similarly, when injecting into IP-4D, there was no significant change to DO in MW-10, located approximately 10 feet away (3 ppm to 3.1 ppm). Also, when injecting into IP-4S, DO reportedly decreased 13 feet away at MW-10 (3.3 ppm to 1.55 ppm). If injected air had reached these close wells, the DO should have risen sharply and consistently.[9]

- **No ORP increase nearby.** For example, ORP actually decreased (indicating more anaerobic conditions) at MW-23, located ~7 feet away from IP-2 (ORP went from -20 to -123). Similarly, ORP decreased rather than increased at MW-11, located ~11 feet from IP-5 (ORP went from -22.6 to -230.7). Also, when injecting at IP-3S, ORP dropped significantly at MW-8 and MW-9, located ~14 and ~19 feet away, respectively. If sparge air had reached these close wells, the ORP should have increased.

[8] Monitored aquifer parameters included well head VOC levels, temperature, pH, oxidation / reduction potential (ORP), specific conductance and dissolved oxygen (DO).

[9] Note also that some DO measurements were outside of established limits. More specifically, there appears to have been a problem with the DO field instrument as multiple DO measurements were well outside of the 7ppm saturation level. For example, DO at well MW-9 after the IP-3D and prior to the IP-4D injection test was recorded at 115 ppm, and there were other measurements between 8 and 10ppm.

Additional detailed information regarding the VEGE and oxygen injection remedial pilot testing can be found in the SCR Addendum / RAP provided in Attachment 3d.[10] Note that the RFB scope of work defined below affords the bidder the opportunity to develop and conduct its own remedial pilot testing to either verify the above results, or to evaluate whether modifications to one or both of these currently active remediation systems may be warranted.

Summary Description of Operating VEGE and Passive Oxygen Injection Remediation Systems

This section briefly describes the VEGE and oxygen injection remediation system components and identifies known modifications to the design of these remediation systems that were incorporated subsequent to PADEP approval of the October 2015 SCR Addendum / RAP.[11] Most remediation systems have limitations that may need to be addressed as remediation progresses. Accordingly, this section also discusses potential limitations each bidder is encouraged to consider when preparing its bid response. Additional details for the two active remediation systems, including design operating parameters, system monitoring requirements, P&ID diagrams, early operation / performance data, etc. can be found in the SCR Addendum / RAP and fourth quarter 2016 RAPR attached to this RFB. Trenching / piping layouts for the remediation systems are depicted in the figure provided in Attachment 3a.

According to the fourth quarter 2016 RAPR, the groundwater extraction component of the VEGE system was activated on 12/6/16. Based on recent correspondence received from GES, the SVE component of the VEGE system and the oxygen injection system were likely placed into operation sometime in January or February 2017.

<u>VEGE Remediation System</u>

General System Components (as specified in the RAP and 4Q16 RAPR)

- Six recovery wells (RW-1, RW-2, RW-3, MW-4, MW-6 and MW-7)
- Rotary claw vacuum pump
- Vapor liquid separator
- Equalization tank
- Air compressor

[10] Pilot testing was also completed to assess the potential viability of remedial approaches involving groundwater extraction and total phase extraction (TPE) utilizing a drop tube. However, soil vapor recovery rates from the on-property perched groundwater zone averaged ~29.7 scfm, which was deemed by GES to be above the typical range of TPE systems, and groundwater pump & treat was considered inefficient. Therefore, TPE and groundwater extraction were removed from consideration as viable remedial technologies. The methods and results from this pilot testing are provided in the October 2015 SCR Addendum / RAP.

[11] In the event that additional system(s) modifications have been made that PAUSTIF, ICF and Excalibur are unaware of, note that bidders will be provided with an opportunity to observe the remediation systems during the mandatory pre-bid site visit as mentioned earlier in this RFB.

- Pneumatic pumps
- Transfer pumps
- Sediment filters
- Two 600-pound vapor-phase carbon units
- Two 200-pound liquid phase carbon units[12]
- Telemetry

Known System Design Changes

- The VEGE system design as specified in the RAP included a catalytic oxidizer (CatOx) unit to be used at system start-up, and later replaced with vapor carbon units when the carbon consumption rate was less than one pound per day. However, the 600-pound vapor carbon vessels were used at system start-up in lieu of a CatOx unit.

- The RAP specified the use of five VEGE recovery wells (RW-1, RW-2, MW-4, MW-6 and MW-7) and one SVE-only well (SVE-1). However, the system design was modified to convert SVE-1 into a VEGE recovery well (RW-3).

Possible Limitations

- Given that shallow VEGE wells RW-2, MW-4 and MW-6 are located very close to the UST field source area, the potential exists for loss of system vacuum through the tank field backfill materials (i.e., short-circuiting). Consequently, bidders are encouraged to consider periodically testing individual recovery wells in the area of the UST field to make sure design vacuum / flow is being maintained.

General

- Bidders are encouraged to propose cycled operation of the VEGE remediation system to keep flow patterns in flux and stimulate / improve subsurface dynamics for a more aggressive means of remediating soil and groundwater impacts.

<u>Oxygen Injection Remediation System</u>

General System Components (as specified in the RAP and 4Q16 RAPR)

[12] Treated groundwater is discharged to the POTW sanitary sewer system under permit with the City of Bradford, PA.

- Fifteen on- and off-property oxygen injection points (IP-1S/D, IP-2, IP-3S/D, IP-4S/D, IP-5 and IP-6S/D through IP-15S/D).
- Inlet air filters (2)
- Sparge Compressors (2)
- Adsorber (oxygen generator)
- Telemetry

Known System Design Changes

- The RAP proposed the installation of 10 oxygen injection points. However, to better address the on- and off-property contaminant plumes, five additional points were added including IP-11S/D, IP-12S/D and IP-13S/D located near the UST field source area, and IP-14S/D and IP-15S/D installed on the adjacent residential property to the north (Carlough property).

Possible Limitations

- Effecting the distribution of DO throughout the off-site MTBE contaminated area and monitoring DO distribution performance with current infrastructure limited by the owners of the adjacent residential property to the north reportedly who would not agree to the installation of any additional oxygen injection points or trenching / piping on their property.

- Each bidder shall describe its approach to monitoring system performance.

- The RAP does not appear to specify the design operating parameters for the passive oxygen injection system including injection pressures and flow rates. Bids shall consider regular monitoring of injection pressures and flow rates on an individual injection point basis, and making appropriate adjustments to optimize the influence and effectiveness of the oxygen injection system.

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 the scope of work for their bid in response to this RFB.

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 at the Department's Northwest Regional Office (NWRO) did not choose to review / comment on the SOW provided within this RFB.

Objective

The PADEP-approved RAP specifies installation and operation of a VEGE remediation system to address residual contamination in shallow overburden soil and perched groundwater beneath the KFM-61 property, and a passive oxygen injection system to address groundwater impacts in deeper overburden on-and off-property. The Solicitor intends to demonstrate attainment of the PADEP SHS MSCs for a used aquifer in a nonresidential setting for on-property soil, and in a residential setting for on- and off-property groundwater.

Solicitor seeks competitive, fixed-price bids for this Bid to Result RFB to complete the nine (9) 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 for soil and groundwater.

Continued operation and maintenance of the VEGE and oxygen injection remediation systems through obtaining a PADEP Relief of Liability and site closure / restoration shall represent the basis for preparing a SOW and presenting a competitive fixed-price bid. The selected consultant shall perform a remedial systems performance evaluation to ensure that the remedial systems are effectively designed and performing to meet the milestone objectives and remedial goal for this site.

Constituents of Concern (COCs)

Soil, groundwater and soil gas samples collected at the KFM-61 site have been analyzed for the current PADEP Act 2 short-list of unleaded gasoline compounds. Based on these analyses, the current COCs in site environmental media include the following:

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

Groundwater – On-property perched zone: benzene and 1,2,4-TMB.

Deeper overburden water table aquifer: benzene and MTBE.

Soil gas – benzene.

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:[13]

- Conduct necessary, reasonable, and appropriate project planning and management activities until the project (i.e., Remediation Agreement) is completed. Such activities may include Solicitor communications/updates, meetings, record keeping, subcontracting, personnel and subcontractor management, quality assurance/quality control, scheduling, and other activities (e.g., utility location). Project planning and management activities shall 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 including activities related to establishing any necessary access agreements. Project planning and management shall include identifying and taking appropriate safety precautions to not disturb Site utilities including, but not limited to, contacting Pennsylvania One Call as required prior

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

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 operator with adequate advance notice prior to each visit to the property. The purpose of this notification is to coordinate with the Solicitor and facility operator to ensure that appropriate areas of the property are accessible. Return visits to the Site will not constitute a change in the selected consultant's SOW or result in additional compensation under the Remediation Agreement.

Site-Specific Guidelines

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

On-Property Access. Given that the KFM-61 property covers an area of only about 0.3 acre and is bordered on two sides by roadways, maneuverability can be challenging especially during peak business hours. As such, safety precautions should be carefully considered prior to and during any field activities along with an elevated level of attentiveness. Additionally, due to space constraints on the property, any waste drums or other non-essential items will need to be removed as quickly as possible. 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 requires at least two (2) weeks advance notice and coordination with site personnel.

Off-Property Access. Selected consultant will be responsible for securing off-property access 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 Claimant 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 KFM-61 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 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 this 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 KFM-61 property, but should be removed from the property as quickly as possible due to the space constraints mentioned above. Each bidder should estimate the volume of waste using its professional opinion, experience and the data provided. **PAUSTIF will not entertain any assumptions from the selected bidder in the Remediation Agreement with regards to a volume of waste. Invoices submitted by the selected bidder to cover additional waste disposal costs as part of activities included under the fixed-price Remediation Agreement for this site will not be paid.**

Site-Specific Milestones

Milestone A – Supplemental Site Characterization Activities and Reporting. This milestone provides bidders the opportunity to identify which additional site characterization work will be completed to further assess site conditions and ensure the design of the active VEGE and oxygen injection remediation systems is adequate for effectively and efficiently addressing residual adsorbed- and dissolved-phase contamination, including the widespread off-property MTBE plume. Conducting supplemental investigative activities under this milestone is mandatory. PAUSTIF will be reimbursing up to $10,000 for supplemental site characterization and reporting costs under this milestone. Bidders are to describe what supplemental site characterization will be completed, the rationale for the work and how the derived data will be used. For purposes of bidding, and to ensure consistent cost scoring of bids, each bidder will enter exactly $10,000 as the bid price for Milestone A in the Bid Cost Spreadsheet. PAUSTIF will only reimburse up to $10,000 of reasonable and necessary costs for those tasks actually performed. The selected bidder must provide time and material documentation in addition to supporting documentation required (in Exhibit B of the executed Remediation Agreement) to support the requested reimbursement and completion of this milestone.

Bidders may use this opportunity to: 1) confirm any elements of the site characterization completed by the previous consultant; 2) address any perceived data gaps in the existing site characterization work; 3) assist in evaluating the design of the operating VEGE and oxygen injection remediation systems provided they qualify as characterization-type activities (e.g. analysis for geochemical parameters); and 4) assist with refining the cleanup timeframe estimate and/or other reasons related to assessing whether or not system modifications are needed (e.g. additional sampling to better determine extent and magnitude of contaminant mass currently in place). Note that all tasks and costs related to pilot testing and reporting must be captured under the Pilot Testing and Reporting Milestone (Milestone B), not Supplemental Site Characterization Activities and Reporting. If pilot testing tasks and costs are included in this Site Characterization Milestone, the bidder's technical score will be negatively impacted.

Milestone A activities shall be scheduled and conducted in consultation with the Solicitor and will be completed no later than 12 months following execution of the Fixed-Price Agreement.

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 GES' March 2015 SCR (Attachment 3c), October 2015 SCR Addendum / RAP (Attachment 3d), 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 on-property soil borings in historical hot spots to verify current soil quality

given that the majority of previous soil sampling in site source areas was completed nearly four years ago; ii) conducting sampling and analysis to verify populations of MTBE-degrading bacteria at various locations in deeper overburden groundwater; iii) conducting additional geochemical sampling and analyses of deeper overburden groundwater at various locations in support of a possible oxygen sink assessment; and iv) completing additional off-property soil borings, if access can be secured, to better define preferential migration pathways for dissolved-phase contaminants and injected oxygen (given the varying lithologies / permeability of the overburden). 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 for each activity and how such results may impact the need for any proposed system(s) modifications, if any, or proposed changes in operation of the active remediation systems, as appropriate.

Following completion of the additional site characterization activities, these Milestone A activities shall be documented as discussed in Milestone C.[14]

Milestone B – Remedial Systems Performance Evaluation. An engineering evaluation of remedial systems performance shall be proposed. The performance evaluation shall determine if the two existing remedial systems are efficiently and effectively remediating contaminated soil and groundwater and achieving the intent of the RAP design. The remedial systems performance evaluation shall be conducted after the selected consultant has operated the VEGE and oxygen injection systems for a period of nine (9) months (i.e., three quarters). Milestone B 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 systems. All recommendations shall include estimated costs to implement and Solicitor may decide to accept or reject any or all recommendations. Should the selected consultant find operational 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.

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

More specifically, the purposes of the engineering performance evaluation include:

- Confirming that the VEGE remedial system has the capacity to achieve the RAP design vacuum at the VEGE well heads simultaneously;
- Verifying that the VEGE system is achieving the design radius of influence over the target contaminated area (e.g., via vacuum influence data at observation wells);
- Confirming that the VEGE remedial system has the capacity to simultaneously maintain the VEGE wells in dewatered condition;
- Verifying that the degree of dewatering of the contaminated zone targeted by the VEGE system meets the RAP design requirements to efficiently and effectively remediate the site;
- Confirming that the oxygen injection system has the oxygen delivery capacity of the RAP design;
- Verifying that the oxygen injection system is achieving the RAP design area of influence (e.g., via dissolved oxygen measurement at temporary or existing observation wells) and as necessary to achieve the enhanced aerobic biodegradation of MTBE objective.

The bidder shall provide a detailed description of the proposed engineering performance evaluation and rationale for testing approach including any concerns with available operational testing data, perceived data gaps, 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 engineering performance evaluation proposal, bidders shall also consider the observations and possible limitations previously discussed in the General Site Background and Description section under the subheadings “Selected Remedial Approach and Pilot Testing” and “Summary Description of Operating VEGE and Passive Oxygen Injection Remediation Systems”.

<u>Please note that all bidders shall propose performing a system performance evaluation for the VEGE and oxygen injection remedial systems currently in operation.</u>

The Milestone B proposal shall reflect an understanding that selected bidder will prepare a draft and final version of the Engineering Performance Evaluation Report (EPER) for Solicitor and PAUSTIF review and comment. The final EPER shall show that the performance evaluation testing was conducted according to the selected consultant’s bid and shall constitute documentation for payment of Milestone B. As previously discussed, the EPER shall include recommended actions to address system 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 systems performance evaluation and shall serve as the basis for making decisions on the need for optimization of one or both remediation systems (e.g., implementing one or more of Optional Cost Adder Milestones B1 through B6). 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 B activities shall also be included in the reporting for Milestone C.

Milestone C – Documentation of Findings: Augmented RAPR. Upon completing Milestones A and B described above, the selected bidder shall share the new information / findings with the Solicitor and ICF/USTIF in a stand-alone Data Transmittal. After appropriate discussions and Solicitor's concurrence, the data will be shared with PADEP in an augmented RAPR with the minimum required components summarized as follows:

> **Augmented RAPR.** The supplemental site characterization conducted under Milestone A shall be documented and reported to the PADEP in a concurrent quarterly RAPR that shall be supplemented to describe the Milestone A activities, methods and results. The EPER shall also be attached to an augmented RAPR that spans the quarter during which the engineering performance evaluation was completed. The augmented RAPR(s) shall first be submitted in draft form to the Solicitor and PAUSTIF for review and comment. At Solicitor's sole discretion, the augmented RAPR will be 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 augmented RAPR(s) shall describe and provide evaluations of all findings generated under Milestones A and B above, updating the conceptual site model (CSM) for the Site and its vicinity. The report(s) 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(s), as appropriate.

The augmented RAPR(s) shall be signed and sealed by the appropriate environmental professional (i.e., a Professional Geologist and / or Professional Engineer, licensed in the Commonwealth of Pennsylvania). The fixed-price cost shall also include addressing any PADEP comments on the augmented RAPR(s).[15]

Milestone D – Continued O&M of Active Remediation Systems 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 two

[15] All figures included in the augmented RAPR (e.g., site plan, remedial design layout, etc.) shall be available in electronic format to the Solicitor upon request.

operating remedial systems,[16] 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 D activities will be required for 12 quarters (3 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 the selected standards as defined above, enabling initiation of groundwater and soil attainment demonstrations.[17,18] The bidders 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 the 12 quarters specified in this RFB (i.e., if a bidder believes it can complete the remediation in a total of 16 quarters of O&M, the additional number of quarters to be included on the Bid Cost Spreadsheet is four (4) quarters). If the bidder's O&M remediation timeframe exceeds the RFB-specified 12 quarters, the number of quarters exceeding 12 will be incorporated in the Remediation Agreement as Optional Cost Adder Milestone D13 through D*n*. 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 F) 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. Each bid must explicitly state bidder's understanding of the project goal for when the remedial systems operation would be discontinued and attainment sampling shall begin.

If the Consultant decides to discontinue O&M activities before all 12 Milestone D 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 systems are shut down before all of Milestone D quarterly events are completed, the Consultant will be required to wait a minimum of two months before initiating groundwater attainment activities (Milestone F). 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 systems within 7 days and continue with the residual quarterly Milestone D activities. Then, **when all 12 quarters of the Milestone D activities have been completed (plus any or all of the Cost Adder Milestone D quarters) and groundwater attainment activities are re-initiated, the**

[16] Electric usage; telephone, cable, internet service; and discharge to the local treatment facility will be reimbursed as time and material cost adders to the Remediation Agreement.

[17] During the bidder's specified timeframe of site operations, maintenance, and monitoring, the selected consultant, at its own expense (including **all** associated labor), shall be responsible for repairing or replacing equipment purchased for the remedial system installations that becomes damaged, destroyed, or defective.

[18] If the groundwater data allows for discontinuing remedial activities prior to reaching the bidders specified timeframe for remedial systems operation, the selected consultant will only be reimbursed for O&M events that have been completed.

Consultant who initially pre-maturely idled the remediation system will be obligated to perform the first of the restarted series of quarterly attainment events at no cost. Responsive bids will explicitly state an understanding of the possible consequences of early termination of the 12 quarters of O&M under Milestone D.

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 equipment for both remediation systems; 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 systems and strategies are working and making necessary adjustments to the operational configuration of the remediation systems to optimize systems performance. Performance monitoring activities are to include, but not necessarily be limited to, measurements documenting that: 1) the oxygen injection system is capable of maintaining injection pressures, flow rates and dissolved oxygen levels / distribution across the target area of MTBE-contaminated deeper overburden sufficient for effective enhanced biodegradation of MTBE and that MTBE biodegradation is occurring; and 2) the VEGE system design vacuum and water table drawdown is achieved at the extraction well heads, the target zone of contamination is being pneumatically and hydraulically influenced, and the data provide for contaminant mass recovery quantification. The selected consultant shall report quarterly concerning its evaluations of systems performance and systems optimizations performed.

  In addition to the above, for evaluating performance of the oxygen injection remediation system, dissolved oxygen shall be measured (*in-situ*) within appropriate monitoring and remediation wells during each O&M site visit along with other field-measured parameters typically monitored to assess biological activity (e.g., pH, temperature, ORP, etc.). Also, geochemical / biologic samples shall be collected from appropriate wells on a semiannual basis to assist with assessing biological activity. These samples shall be analyzed for populations of petroleum and MTBE degrading bacteria, total alkalinity, ferrous iron, manganese, sulfate, nitrite, nitrate, and methane. Samples shall be collected from impacted wells MW-9 and MW-13 (within plume core), MW-11 (downgradient of plume core), and MW-19 (distal downgradient of plume core).

- *Systems maintenance & monitoring* shall include monitoring and routine maintenance as specified by the equipment manufacturer(s) to ensure warranties are not voided and the equipment is kept in good working order. Operational time

shall be logged by systems instrumentation and reported quarterly to the Solicitor. The selected consultant is expected to maintain at least an 85% uptime on the systems 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 systems 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).

Each quarterly groundwater monitoring and sampling event shall include the on-and off-property monitoring well network currently sampled consisting of MW-1R, MW-3R, MW-4 through MW-7, MW-12 through MW-16, MW-22 and MW-23 located on-property, and MW-8 through MW-11, MW-17 through MW-21 and MW-24 installed off-property (23 wells total).[19] 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 wells and prior to purging any of the wells for sampling. Groundwater level measurements obtained from the monitoring wells shall be converted to groundwater elevations for assessing groundwater flow direction and hydraulic gradient.

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.[20] Any well exhibiting a measurable thickness of FPH shall not be purged and sampled.[21] Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with PADEP NWRO guidance.

Groundwater samples shall be analyzed for the PADEP current 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

[19] 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).
[20] The PADEP-approved RAP specified that quarterly groundwater sampling during the remediation phase will be conducted via no-purge techniques using HYDRAsleeve® devices, or an equivalent, to minimize waste water. Also, the collection of a split-sample was proposed at one well location during each quarterly event following traditional three-volume well purging to ensure data quality objectives are met. However, bidders may specify alternate purging / sampling methods so long as they comply with PADEP guidance and accepted industry standards.
[21] As mentioned above, the available site record indicates that FPH have never been detected in any of the groundwater monitoring or remediation wells.

analyzed for the same parameters.[22] 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 receipt of analytical results for each 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 wells documenting the depth to groundwater and thickness of any free product encountered;
- Groundwater elevation contour / drawdown maps depicting groundwater flow direction;
- Contoured map of vacuum influence measured at on-property shallow overburden observation wells;
- Contoured map of dissolved oxygen concentrations measured at on- and off-property deeper overburden observation wells and any temporary well points;
- 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;[23]
- 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, contracting, or expanding plume;

[22] 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.

[23] 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.

- 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 F). If, in order to achieve the cleanup goals, it is necessary to extend the period of O&M beyond the RFB-specified 12 quarters, each additional quarter, up to the total number of Consultant's bid O&M remedial timeframe, will be addressed via Optional Cost Adder Milestone D13 through D*n*. Consultant shall seek and obtain written approval from Solicitor and PAUSTIF to continue operation of the remedial system (Milestone D13 through D*n*).[24]

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).

Milestone E – Soil Attainment Demonstration. Under this task, bidders shall develop and implement a soil boring program for systematic random soil sampling to demonstrate attainment of the SHS for the unsaturated to periodically saturated soils in the vicinity of the UST field and dispenser pad. Three dimensional attainment sampling shall be completed to demonstrate attainment of these areas and each bidder ***must*** describe in detail its approach to addressing soil attainment, and include the depth interval and a drawing showing the locations where the sampling grid, or grids, would be applied to demonstrate soil attainment.

The location / depth of the soil samples shall be determined using PADEP's systematic random sampling (SRS) procedures, assuming one soil sample per boring shall be submitted for laboratory analysis. Alternate SRS points shall be selected for any primary SRS location that may be positioned within the existing UST systems infrastructure and/or that may encounter any existing below grade utilities (e.g., on-property sanitary sewer line). Soil samples shall be analyzed for the current PADEP short list of unleaded gasoline parameters (benzene, toluene, ethylbenzene, xylenes, MTBE, naphthalene, cumene and TMBs) 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

[24] 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.

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[25].

Milestone F – 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.[26] The POC and off-property attainment monitoring wells that shall be included in each groundwater monitoring and sampling event are identified in the PADEP-approved SCR (Attachment 3c) and include:

- *Shallow on-property perched water table*: MW-1R, MW- 3R, MW-4, MW-5, MW-7, MW-12, MW-15 and MW-16; and

- *Deeper on- and off-property regional water table*: MW-8 through MW-11, MW-13 and MW-17 through MW-24.

The conduct and results of each event shall be documented in quarterly RAPRs.[27]

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

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. Any well exhibiting a measurable thickness of FPH shall not be purged and sampled. Bidders shall manage purged groundwater and other derived IDW generated by the well purging and sampling activities in accordance with the PADEP NWRO guidance.

Groundwater samples shall be analyzed for the current PADEP short list of unleaded gasoline parameters by a PADEP-accredited laboratory using appropriate analytical methods and detection levels. Appropriate QA/QC samples shall also be collected during each event and

[25] The Remediation Agreement contains a site-specific assumption that the soil sampling data will allow for attainment of the selected standard.

[26] Bidders shall include language in their bid that if groundwater data in the POC and off-property attainment wells has 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.

[27] If it becomes evident anytime during the groundwater attainment demonstration (initiated subsequent to completing at least the twelve (12) Milestone D quarters of remedial O&M) that the attainment demonstration will not be successful within the allotted 8 quarters in one or more of the POC or off-property attainment wells (e.g., a greater than 10X result or more than two SHS exceedances, etc.), this will represent a New Condition under the contract.

analyzed for the same parameters.[28] 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 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 receipt of analytical results for each 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 encountered;
- 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;[29]
- 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, contracting, 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.

[28] 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.

[29] 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.

Each groundwater attainment demonstration 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 groundwater attainment demonstration report).

Milestone G – Follow-up Vapor Intrusion Study. In the General Site Background and Description section of this RFB provided above, a brief discussion was included regarding historical soil vapor sampling conducted in November 2013 and January 2014. However, a follow-up vapor intrusion study shall be performed that complies with the requirements of the revised PADEP Technical Guidance Manual for Vapor Intrusion into Buildings from Groundwater and Soil Under Act 2 that became effective on 1/18/17. The vapor intrusion study shall be implemented post-remediation.

Under this milestone, bidders shall describe and provide a firm fixed-price cost for conducting a supplemental vapor intrusion study consistent with the new PADEP guidance that may include modifying the locations and/or depths of the existing four soil vapor sampling points (VP-1 through VP-4) or possibly 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., blind duplicate, field blank). Results from the supplemental vapor intrusion study shall be incorporated into the RACR to be prepared under Milestone H.

Milestone H – 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 D through G, 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 G, 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 I – 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 systems and proper disposal of any remaining wastes; in-place abandonment of remedial systems below grade piping; in-place abandonment of monitoring wells, 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 I site restoration work. Site restoration activities shall be conducted in accordance with standard industry practices and applicable laws, regulations, guidance, and PADEP directives. Well and vapor monitoring point abandonment, remedial system removal, and restoration activities will be coordinated with the Solicitor.

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

Optional Cost Adder Milestone B1 - Installation of Each Additional Off-Property Oxygen Injection Point. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for drilling, installing, developing and professionally surveying each additional off-property oxygen injection point. Each additional oxygen injection point shall be constructed according to RAP specifications. The fixed-price unit cost shall also include connecting each additional oxygen injection point to the remediation system based on an evaluation of the most efficient trenching and piping configuration. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone B2 – Replacing Existing or Adding Another Sparge Compressor. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for purchasing and installing a new sparge compressor based on RAP specifications in the event the existing unit fails, or to supplement the existing compressor if additional air-flow capacity is needed (i.e., two units operating in parallel). Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone B3 – Replacing Existing or Adding an Additional Oxygen Generator. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for purchasing and installing a new oxygen generator based on RAP

specifications in the event the existing unit fails, or to supplement the existing generator if additional oxygen generating capacity is needed (i.e., two units operating in parallel). Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone B4 – Installation of Each Additional Off-Property Oxygen Injection System Observation Well. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for drilling, installing, developing and professionally surveying each additional off-property observation well. Each additional observation well shall be constructed according to specifications for the existing off-property 2-inch diameter monitoring wells. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone B5 – Installation of Each Additional VEGE Remediation Well. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for drilling, installing, developing and professionally surveying each additional VEGE remediation well. Each additional VEGE well shall be constructed according to RAP specifications. The fixed-price unit cost shall also include connecting each additional VEGE well to the remediation system based on an evaluation of the most efficient trenching and piping configuration. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone B6 – Replacing Existing or Addition of Another Vacuum Pump. Under this milestone, bidders shall provide the Solicitor and PAUSTIF with a firm fixed-price unit cost for purchasing and installing a new vacuum pump based on RAP specifications in the event the existing unit fails, or to supplement the existing vacuum pump if additional vacuum capacity is needed (i.e., two units operating in parallel). Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone D13 through D*n* – Additional Remediation Systems O&M and 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 routine O&M of the two remedial systems, quarterly groundwater monitoring and sampling of the on- and off-property monitoring wells, and reporting beyond the timeframe specified in Milestone D. The SOW for this unit cost adder milestone should follow Milestone D guidelines. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone F9 through F12 – 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 and off-property attainment wells identified under Milestone F, and reporting beyond the eight quarters specified in Milestone F. The SOW

for this unit cost adder milestone shall follow Milestone F guidelines. Each bid must include the rationale for needing to implement this optional cost adder milestone.

Optional Cost Adder Milestone UD1 through UD*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 – 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 UC2 – 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.

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. Site Plan
    b. Site Photographs
    c. March 20, 2015 Site Characterization Report
    d. October 27, 2015 Site Characterization Report Addendum / Remedial Action Plan
    e. Fourth Quarter 2016 RAPR
    f. Additional Groundwater Analytical Data