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June 28, 2017

Mr. Randy Bayliss
New Mexico Oil Conservation Division
1220 S. St. Francis Street
Santa Fe, New Mexico 88210

RE: Air Sparge and Soil Vapor Extraction Feasibility Test Work Plan – State Gas Com N#1 Site
El Paso CGP Company – Pit Groundwater Remediation Sites
NMOCD Order Number: 3RP-239-0

Dear Mr. Bayliss:

MWH now part of Stantec Consulting Services Inc. (Stantec) , on behalf of El Paso CGP Company, LLC (EPCGP), is submitting the enclosed air sparge (AS) and soil vapor extraction (SVE) feasibility test Work Plan (Work Plan) for the State Gas Com Site N#1 (Site). The enclosed document contains the proposed methodology for installing three vertical air sparge test wells and conducting AS and SVE feasibility testing activities to as a remedy to address the Site. The procedures outlined in this Work Plan meet or exceed the requirements established in EPCGP's "Remediation Plan for Groundwater Encountered during Pit Closure Activities" document approved by the New Mexico Oil Conservation Division (NMOCD) on November 30, 1995. Pending receipt of a water easement from the New Mexico State Land Office, the scope of work contained herein is scheduled to be implemented the week of June 26, 2017.

Please contact Mr. Joseph Wiley of EPCGP at (713) 420-3475, or me if you have any questions or comments concerning the enclosed Work Plan.

Sincerely,

Stantec Consulting Services Inc.

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cc: Joseph Wiley, EPCGP (via electronic mail)
Brandon Powell, NMOCD District 3 – Aztec Office

El Paso CGP Company, LLC
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Houston, Texas 77002

STATE GAS COM N#1SITE
NMOCD Order Number: 3RP-239-0
AIR SPARGE AND SOIL VAPOR EXTRACTION FEASIBILITY TEST WORK PLAN
SAN JUAN COUNTY, NEW MEXICO

June 2017

Prepared by:

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SECTION 1 INTRODUCTION

This Air Sparge (AS) and Soil Vapor Extraction (SVE) Feasibility Testing Work Plan (Work Plan) presents the scope of work to be completed to perform AS well installations and subsequent AS and SVE feasibility testing at the State Gas Com N#1 site (Site), located in the San Juan River Basin near Farmington, New Mexico. There are currently seventeen monitoring wells at the Site, of which fourteen exceed applicable New Mexico Water Quality Control Commission standards. AS via horizontal wells, combined with soil vapor extraction in the source area, is being considered as potential remedy for the Site. Installation and step-testing of three vertical AS wells, and step SVE testing of two existing monitoring wells, is proposed. Aquifer slug testing will also be completed in the air sparge test wells and selected monitoring wells to better understand the variability in hydraulic conductivity across the Site.

The purpose of this Work Plan is to provide the field methods and an implementation schedule for the AS and SVE feasibility testing activities. Section 2 describes the Site and the purpose behind the proposed feasibility test. Section 3 provides details on the field methods to be used. Section 4 presents the anticipated implementation schedule.

SECTION 2 SCOPE OF WORK

The AS and SVE feasibility testing activities are intended to provide site-specific data to evaluate the feasibility of implementing an AS and SVE remedy at the Site. Details of the proposed test wells are provided below.

Air sparge feasibility testing will be completed at three locations. The AS test locations were selected to evaluate areas where different lithologies and differences in saturated zone soil textures have been logged during advancement of monitoring wells. AS test well TW-1, to be installed near monitoring MW-1 and soil boring SB-1, is an area logged as having saturated clayey and silty sands. AS test well TW-2, to be installed near monitoring wells MW-3 and MW-4, is in an area logged as having saturated sandy and silty clay. AS test well TW-3 is to be installed near monitoring well MW-5, where saturated soils were logged as being "mud and clay". These locations represent the portions of the Site where an active remedy would be applied, and in areas suspected of both being more conducive (TW-1) and less conducive (TW-2 and TW-3) to an air sparge approach.

SVE feasibility testing is to be completed on existing MW-1 and MW-4. Soil boring logs for MW-1 and MW-4, and nearby soil boring SB-1, indicate hydrocarbons are present above the saturated zone, and an AS remedy of the Site could benefit from SVE in these areas. The existing monitoring well locations and proposed vertical AS well locations are depicted in Figure 1.

To assist in understanding the hydraulic properties of the different lithologies across the Site, aquifer slug testing will also be completed on the three test wells and existing monitoring wells that do not contain measureable free product.

SECTION 3 FIELD METHODS

The following subsections describe field procedures to be followed during the Site activities.

3.1 AIR SPARGE TEST WELL INSTALLATION

A truck-mounted, hollow-stem auger drill rig will be mobilized to the Site after underground utility and line locates have been completed. The drill rig will be used to advance soil borings to an anticipated depth of up to 95 feet below ground surface (bgs) for installation of vertical AS test wells TW-1 to TW-3. Prior to advancing each soil boring, soft digging utilizing vacuum excavation or similar methods will be utilized to a depth of at least eight feet bgs to confirm no unmarked subsurface utilities or other obstructions are present.

Once vacuum excavation activities have been completed, soil sampling and screening will be conducted from the soft-digging termination depth to the base of the borehole using hollow-stem auger and continuous-core sampling methods. Borehole logging will include Unified Soil Classification System (USCS) soil descriptions for the entire depth of the boring. In addition to the USCS descriptions, the field geologist will provide a detailed description of each discrete lithologic unit. In order to quantify the hardness of the soils during drilling activities, standard penetrometer testing (SPT) will be completed at approximately 10 foot intervals during advancement of the final borings for the first 60 feet, and then continuously to the termination depth of each soil boring.

Soil samples will be collected from the 2-foot or 5-foot continuous sample barrel at 1 foot intervals, where recovery is possible, for field screening and potential laboratory analysis. After the sample core is collected, the field personnel will field screen using a pre-calibrated photoionization detector (PID) and record the readings. The field screening will be conducted by notching the soil in the core with a hand trowel or other pre-cleaned hand tools, and briefly placing the PID in the notch to measure impacts. The screening, in addition to visual and olfactory observations (e.g., observing apparent hydrocarbon staining), will aid in identifying the portion of the sample interval to retain for potential laboratory analysis (i.e., the portion with the greatest suspected hydrocarbon impact). Other than lithologic descriptions, detailed soil screening will not be conducted on intervals drilled via air rotary.

Based on the field screening, a soil sample will be collected from the core representing the greatest suspected hydrocarbon impact at each soil boring. No soil samples will be collected below the field-apparent water table. If the current core section being screened does not appear to be impacted to a level equal to or greater than a preceding core section, one soil sample will be collected immediately above the field-interpreted and/or gauged water table for laboratory analysis. The sample(s) retained for potential laboratory analysis will be placed in a laboratory-provided 4-ounce glass jar(s), sealed, labeled, and stored on ice. After the boring and soil screening are completed, the collected sample associated with the highest PID reading will be retained and shipped in an ice-filled cooler under standard chain-of-custody to TestAmerica Laboratories, Inc. in Pensacola, Florida. Samples not retained for analysis will be disposed of with the soil cuttings.

Samples will be analyzed per the guidance established by Attachment A to Order No. R-13506-D, New Mexico Administrative Code (NMAC) Section 19.15.17.13, Table 1, for the presence of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method SW846 8021B; gasoline-range organics, diesel-range organics, and oil-range organics by EPA Method 8015 M; and chlorides by EPA Method 300.

Each air sparge test well will be constructed of 2-inch-diameter, Schedule 40, 0.010-slot polyvinyl chloride (PVC) screen and 2-inch-diameter, Schedule 40 PVC riser casing. The well screen, having a screen length of 5 feet, will be installed to a depth of approximately 90 to 95 feet bgs, or approximately 20 feet below the groundwater surface, as determined by adjacent monitoring wells. The riser casing will extend from the top of the screen to approximately 2.5 feet above the ground surface. The annular space adjacent to the well screen will be filled with 10-20 mesh gradation silica sand from the bottom of the borehole to 1 feet above the top of the screen. Five (5) feet of bentonite chips or coated pellets will be placed above the silica sand to provide a seal prior to placing the grout. Bentonite grout will be placed above the bentonite chips to 6 inches below the bottom of the well vault.

For each test well, a locking, protective steel well vault will be installed within a concrete pad on the ground surface from 3 feet above ground surface to 2 feet bgs. Silica sand will be placed from 6 inches below the bottom of the well vault (approximately 2.5 feet bgs) to within approximately 1 foot of the ground surface, or to a field-determined depth based on concrete pad placement. A female treaded bushing will be placed at the top of the well to connect air sparge testing equipment in the future, and sealed with a male end-plug. Four concrete-filled steel bollards will be placed around each concrete pad to protect the well vault.

Based on the anticipated low yields of the groundwater formation, test well development will be performed using a well swab and disposable bailer until sediment has been removed and visibly clear water is observed or the well runs dry. The well swab will be decontaminated between holes and a new disposable bailer will be used at each hole.

Development and decontamination water and soil cuttings will be stored in labeled 55-gallon drums and staged on site.

After construction, ground surfaces and top-of-casing elevations will be surveyed by a licensed surveyor using State plane coordinates and the existing site benchmark.

3.2 AQUIFER SLUG TESTING

To allow the newly-installed test wells to stabilize, Stantec will return to the Site at least two weeks following completion of the test wells to complete AS and SVE pilot testing activities. Due to the variability in the saturated soil types logged at the Site, Stantec will first conduct aquifer slug testing on monitoring wells not containing free product, and the three test wells, to better understand the variability of saturated soil conductivities across the Site.

Slug tests will be performed using datalogging pressure transducers installed below the water surface to record water level changes during the slug test and a slug tool lowered below the water surface to displace a known volume of water. Falling head “slug-in” and rising head “slug-out” tests will be performed. The pressure transducer will be positioned several feet below the anticipated submerged depth of the slug tool, and allowed time to equilibrate in the well before running the slug test. The slug tool be lowered below the water surface to fully submerge the slug tool to run the falling head test followed by removing the slug tool to run the rising head test. Slug test information for each well will be recorded in the field book including initial static water elevation, pressure transducer installation, equilibration, and removal times; slug-in and slug-out test durations. New cording will be tied to the slug tool and replaced between wells. Wire cable will be connected to the pressure transducer and cleaned or replaced between wells. Slug testing equipment reused between wells including slug tool and pressure transducers will be cleaned between wells.

Recovery data (rising and falling head) from the pressure transducers will be processed to isolate elapsed time and head displacement of each test and analyzed with AQTESOLV® or an equivalent commercially available computer program to calculate estimated hydraulic conductivities for the tested wells. The hydraulic conductivity values will be compared to the lithologies logged in the screened interval of each tested well.

3.3 AIR SPARGE AND SOIL VAPOR EXTRACTION FEASIBILITY TESTING

A remediation contractor will be used to conduct the AS and SVE feasibility testing activities. Based on previous discussions with the NMOCD, the AS testing will not trigger Underground Injection Control issues. Furthermore, the remediation contractor will utilize an internal combustion engine which reduces emissions over 99%, and therefore the New Mexico Environmental Department has confirmed short term soil vapor extraction activities due not trigger air emission concerns.

The AS testing will be completed using a compressor capable of generating flows of up 15 cubic feet per minute and a pressure of up to 80 pounds per square inch. The SVE feasibility testing will be completed using a SVE test rig equipped with a Roots 22 Blower capable of a vacuum of 15 inches of mercury at 60 cubic feet per minute. Testing manifolds equipped with vacuum/pressure gauges and flow measuring and sampling ports will be utilized, and metering equipment (i.e., organic vapor analyzer, flow meters, magnehelic gauges, etc.) will be used to monitor the testing.

The AS feasibility testing will be completed on test wells TW-1 through TW-3 by incrementally stepping up pressures to monitor for changes in air flow into the test well. The duration of each test will be approximately 5 hours each. In addition to monitoring the AS injection pressure and flow rate, the resulting pressure and groundwater upwelling, if any, will be monitored in nearby monitoring wells.

The SVE feasibility testing will be completed on monitoring wells MW-1 and MW-4, where elevated concentrations of hydrocarbons in the vadose zone have been detected. One or more alternative monitoring wells (i.e., MW-2, MW-3, or MW-10) may be selected for testing if it is determined in the field there is insufficient unsaturated screen length to complete a meaningful test on MW-1 and/or MW-4. Each test will be operated for approximately 2 hours, with vacuum rates incrementally increased during the test. Extraction well flow and vacuums are collected in addition to off-gas concentration data to evaluate potential emission rates. To aid in evaluating potential off-gas emissions for a full-scale system, one off-gas sample will be collected from the MW-1 SVE manifold via Summa canister prior to completion of the feasibility test at that location. The Summa sample will be submitted to TestAmerica for analysis of BTEX constituents using Method TO-3, and Total Petroleum Hydrocarbons using Method TO-15. Vacuum influence data will also be collected from nearby monitoring wells to evaluate SVE influence away from the extraction well.

3.4 GENERAL PROTOCOLS

This subsection presents a discussion of health and safety, documentation procedures, buried piping or utility identification, waste handling, and other procedures to be performed as part of the investigation.

3.4.1 Health and Safety

A Site-Specific Health and Safety Plan (HASP) will be prepared which covers the scope of work, including groundwater monitoring, operations, maintenance, and drilling activities. The HASP includes guidance on the personal protective equipment (PPE) necessary for field activities, identified hazards associated with the field activities, and directions to the nearest medical facility. Flame-resistant clothing and Level D protective equipment will be worn, as required. A copy of the HASP will be on site at all times while work is being performed. The HASP will apply to Stantec employees, Stantec's subcontractors, and visitors at the Site. Typically, subcontractors will operate under their own HASP, which will be reviewed and referenced by Stantec prior to the start of the project.

3.4.2 Documentation Procedures

Data generated during the field investigation will be recorded on boring and well construction logs. The boring logs will include USCS descriptions, detailed lithologic descriptions, PID readings, length/percent recovery, sample collection intervals, and drilling method employed. The well construction logs will include screen, sand pack, wellbore seal, and surface completion details. During the AS pilot testing activities AS injection pressure and flow rate will be recorded, as well as the resulting pressure and groundwater upwelling, if any, in nearby monitoring wells, on field forms provided by the remediation contractor. Extraction well flow and vacuums will be recorded in addition to off-gas concentration data, during the SVE pilot testing. Off-gas sampling data and aquifer slug test data will also be recorded on standard field forms.

The Stantec field geologist will maintain a field log book. At the end of each day of field activities, the notes will be dated and signed by the field geologist.

The daily field log book will contain information such as:

- Date
- Name, location, and objective of the work activities
- Weather conditions
- Equipment calibration information
- Personnel and visitors on site
- Photograph numbers and descriptions (if applicable)
- Description of decontamination activities (if applicable)
- Any deviations from the Work Plan
- Other relevant observations as the fieldwork progresses
- Sample collection intervals and times
- Problems and corrective actions

3.4.3 Boring Locations and Utility Identification

Prior to any drilling or excavation, a call will be made to the New Mexico 811 "One Call" to verify utility clearance and to notify the operator. "One Call" will be notified that the boring locations are staked or flagged and that the entire well pad and areas surrounding the borings should be marked. The clearance call must be made at least two working days prior to drilling, and site work must be completed within five days of the clearance. In addition, access will be coordinated with the current operator of the Site prior to any drilling activities to allow location of any underground infrastructure and to comply with operator safety guidance.

3.4.4 Equipment Decontamination

Prior to drilling and AS and SVE feasibility testing, down-hole equipment will be steam cleaned or scrubbed with a non-phosphate detergent (e.g., Alconox®). Where feasible, equipment to be decontaminated will be disassembled to permit adequate cleaning of the internal portions of the equipment. Equipment to be steam cleaned will be placed into a self-contained decontamination trailer with metal cleaning racks that support the equipment for cleaning, rinsing, and air drying. Heavy waterproof gloves will be worn during steam cleaning to protect against skin contact with steam and potential contaminants and to reduce the potential for cross-contamination between samples. Slug testing equipment that is reused between wells will be cleaned with a distilled water and non-phosphate detergent (e.g., Alconox®) wash and distilled water rinse.

3.4.5 Investigation-Derived Waste

Soil cuttings generated from drilling activities will be containerized in labeled 55-gallon drums and staged on site for removal by a contracted transport and disposal company.

Decontamination water, and purge water generated through the development of the AS test wells, will be containerized in labeled 55-gallon drums and staged on site for removal with the soil cuttings.

Other investigation-derived wastes (i.e., excess well materials, bags, buckets, gloves), and monitoring well abandonment debris (protective casing and bollards), will be removed from the Site by the waste hauler for disposal as general construction/demolition debris.

Disposable equipment and PPE waste generated during field activities, including scrap PVC, concrete, steel, rope, disposable bailers, nitrile gloves, and Tyvek® suits, will be disposed in standard industrial dumpsters. In the event the waste is grossly contaminated, it will be containerized for proper disposal along with the other investigation-derived waste.

3.4.6 Field Equipment Calibration Procedures

With regard to organic vapor meters, field personnel will use a 10.6 electron volt (eV) PID or organic vapor analyzer for screening soil samples during advancement of soil borings and monitoring off-gas from the SVE pilot test. This instrument will be calibrated prior to use according to the manufacturer's specifications. The instrument calibration will be checked at the beginning of each day of use and any time meter drift is suspected. All calibration information will be recorded in the field log book.

SECTION 4 SCHEDULE

Pending receipt of applicable permits, it is anticipated that air sparge test well installation activities will commence the week of June 26, 2017. Utility locates must be verified prior to the work. The AS and SVE feasibility testing activities will commence a minimum of two weeks following the test well installations. Soil analytical results from the test well installations, and the results of the aquifer testing and AS and SVE feasibility testing activities will be provided in the 2017 Annual Report, anticipated to be submitted by March 2018.