Remedial Action for the Santa Fe County Judicial Complex State Lead Site

New Mexico Environment Department Petroleum Storage Tank Bureau

RFP #19 667 3200 0004

Technical Proposal

December 28, 2018 | 3:00 PM

Submitted by
Souder, Miller & Associates
2904 Rodeo Park Drive East, Building 100
Santa Fe, NM 87505

Letter of Transmittal Form

RFP#: 19 667 3200 0004
Offeror Name: Miller Engineers Inc. dba Souder, Miller and Associates

Items #1 to #7 EACH MUST BE COMPLETED IN FULL Failure to respond to all seven items WILL RESULT IN THE DISQUALIFICATION OF THE PROPOSAL!

1. **Identity (Name) and Mailing Address** of the submitting organization:
Miller Engineers Inc. dba Souder, Miller and Associates
2904 Rodeo Park Drive, Building 100
Santa Fe, NM 87505

2. For the person authorized by the organization to contractually obligate on behalf of this Offer:
Name Reid S. Allan, P.G.
Title Senior Vice President
E-Mail Address reid.allan@soudermiller.com
Telephone Number 505-325-7535

3. For the person authorized by the organization to negotiate on behalf of this Offer:
Name Reid S. Allan, P.G.
Title Senior Vice President
E-Mail Address reid.allan@soudermiller.com
Telephone Number 505-325-7535

4. For the person authorized by the organization to clarify/respond to queries regarding this Offer:
Name Scott A. McKitrick, P.G.
Title Senior Scientist / Environmental Services Manager
E-Mail Address scott.mckitrick@soudermiller.com
Telephone Number 505-299-0942

5. Use of Sub-Contractors (Select one)
____ No sub-contractors will be used in the performance of any resultant contract OR
__X__ The following sub-contractors will be used in the performance of any resultant contract:
Please see attached sheet
(Attach extra sheets, as needed)

6. Please describe any relationship with any entity (other than Subcontractors listed in (5) above) which will be used in the performance of any resultant contract.
none
(Attach extra sheets, as needed)

7. __xx__ On behalf of the submitting organization named in item #1, above, I accept the Conditions Governing the Procurement as required in Section II, Paragraph C.1.
__xx__ I concur that submission of our proposal constitutes acceptance of the Evaluation Factors contained in Section V of this RFP.
__xx__ I acknowledge receipt of all amendments to this RFP (if any).

December 28, 2018
Authorized Signature and Date (Must be signed by the person identified in item #2, above.)

5. Use of Sub-Contractors (continued)

Potential Well Drilling Contractors:

JR Drilling LLC
Geomechanics Southwest, Inc.

Potential Excavation and Construction Contractors:

Sub Surface Contracting Inc
Enviroworks LLC

Controls and Telemetry Contractor:

Transmission & Distribution Services, LLC

Analytical Laboratory Contractor:

Hall Environmental Analysis Laboratory

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Tab 3 – Technical Proposal Summary

Overview of Technical Features

The New Mexico Environment Department (NMED) has requested proposals for procuring remediation activities and related corrective action at the Santa Fe County Judicial Complex (RID: 4597), a leaking petroleum storage tank site where threats to the public health or the environment exist. The following proposal describes SMA's approach to scope of work and specifications (technical and business), as described in the Request for Proposals (RFP) document No. 19-667-3200-0004, dated November 29, 2018. All work described here will be performed in accordance with the requirements of the New Mexico Petroleum Storage Tank Regulations, 20.5 NMAC.

The Santa Fe County Judicial Complex site consists of multiple release sites. During initial investigations, a substantial plume of non-aqueous phase petroleum liquid (NAPL) was identified in a long, narrow configuration over 400 feet in length. Remediation activities were performed under the NMED PSTB State Lead site program and by Santa Fe County under the NMED GWQB Voluntary Remediation Program. The remediation at the site included: NAPL skimming and bailing, petroleum contaminated soil excavation, site dewatering, soil vapor extraction (SVE) with hot air and ozone injection, hydrogen peroxide injection and episodic dual-phase extraction.

Previous remediation efforts have effectively segmented the original co-mingled contaminant plume into four areas of residual soil and groundwater contamination. The delineated soil contamination is primarily located in soil below the water table. These contaminated soils are likely due to smearing of contamination during construction dewatering followed by groundwater rebound and entrapment. These areas require further remediation in order to achieve target concentrations in groundwater within a timeframe of four years. SMA proposes recurring air sparging / SVE events be conducted in three of the four areas to further remediate the two lesser contaminated areas and the current area of highest volatile organic compound (VOC) contaminant concentrations near the Design Center. Air sparging volatilizes VOCs in the saturated zone and oxygenates groundwater to boost biodegradation. The relatively large are of predominantly naphthalene contamination near Montezuma Avenue will be remediated using a biosparging remediation system installed in existing and proposed wells. Biosparging is a lower flow variant of air sparging that is used primarily to boost biodegradation.

Overview of SMA Business Features

Souder, Miller & Associates (SMA) is a 200-person, New Mexico-based professional engineering, environmental and surveying consulting firm with 30 years of experience dedicated to serving clients throughout New Mexico, the Southwest and the Rocky Mountain region. SMA's New Mexico offices include Albuquerque, Santa Fe, Farmington, Las Cruces and Roswell. SMA's professional resources include numerous Registered Professional Engineers, Registered Professional Geologists, Certified Hazardous Materials Managers, Professional Land Surveyors, and other engineers, hydrologists, biologists and other technical support staff.

SMA's experience includes over 25 years of corporate experience providing the NMED Petroleum Storage Tank Bureau (PSTB) with remedial action services related to leaking petroleum storage tank (LPST) sites. SMA's specific remedial action experience includes providing site investigation and well sampling services, mitigation of potential hazardous and explosive vapors, installation of drinking water point source remediation systems, remediation of highly contaminated subsurface soil, optimization of remediation systems, and remediation system decommissioning. ***All of SMA's technical staff directly involved with LPST investigation and remediation services are 40-hour OSHA HAZWOPER certified in compliance with SMA's Corporate Health & Safety Plan and SMA's commitment to safety. Further, SMA employs 12 geoscientists with specific PSTB remediation and monitoring experience in New Mexico, with a total in excess of 100 years of combined applied experience.***

Tab 4 – Response to Specifications

1.0 Statement of Capabilities and Available Resources

1.1 Remediation Activities Where Threats Exist to Public Health, the Environment and/or Public or Private Water Supplies

SMA has completed numerous remediation projects for NMED since its incorporation of Karl Souder & Associates in 1993. For each of these projects, SMA has worked with both NMED and the immediately affected parties to arrive at a plan of action that provided the greatest environmental and public health protection benefits in the shortest practicable time. While the conditions at the Santa Fe County Judicial Complex Site have been relatively stable for many years, if an emergency situation such as identification of petroleum hydrocarbon vapors, petroleum product, or water supply impacts were to occur, SMA will immediately notify the PSTB and the local fire authorities. Notification of the New Mexico State Police is also required in situations immediately dangerous to human health to activate the State Hazardous Materials Emergency Plan. The Department of Public Safety is the lead agency for implementation of the state plan.

Example of SMA's Remedial Action to Impacted Private Water Well Experience:
SMA investigated a vapor and private water well impact at the **Guacamole's Restaurant** in Fairacres, New Mexico. With NMED approval, SMA coordinated a response to perform sampling and oversee the disconnection of the private water well from the restaurant and connection to the city water supply.

Public contact is also very important in routine operation as well as emergency situations. At this point in the progression of remediation of the Santa Fe County Judicial Complex, property owners and interested parties have been identified, although some may change over the life of the contract due to changes in land ownership. In an emergency circumstance, which is not anticipated, the most direct way to disseminate emergency information is door-to-door. For larger impacted populations, SMA has typically coordinated with local and state agencies (and municipalities, such as the City of Santa Fe) to provide the necessary door-to-door coverage. Resumes for key SMA personnel are provided in Tab 4 of this proposal. Available equipment is listed in Tab 4, Section 1.4.2 of this proposal.

1.2 Options and Approaches for Site Monitoring and System Operation

1.2.1 Groundwater Monitoring

Effective groundwater monitoring activities center around the proper location, installation, development and purging of monitoring wells. At the Santa Fe County Judicial Complex Site, monitoring wells have been adequately located in the source areas as well as delineation wells located in down-gradient, up-gradient, and cross-gradient directions. Additional wells will likely be needed to further delineate and remediate residual soil and groundwater contamination. SMA has several New Mexico registered land surveyors (R.L.S.) on-staff to perform, oversee and verify monitoring well survey information used to calculate the groundwater flow direction. Groundwater monitoring well purging is performed through utilization of new disposable bailers (hand-bailing) or down-hole pumps, of which SMA has several types, any of which are available for monitoring and remediation activities. Pumps used for monitoring well purging are properly decontaminated between wells. SMA uses new disposable bailers, string and nitrile gloves to collect groundwater samples. Groundwater samples are then custody sealed, immediately placed on ice in a hard plastic cooler, and shipped to an off-site certified analytical laboratory under standard chain-of-custody documentation.

Example of SMA's Groundwater Monitoring Experience:
At the direction of NMED PSTB, SMA performed groundwater monitoring services under the previous emergency response contract at the **Lovington Highway** site in Hobbs, New Mexico when a public water supply was found to be contaminated with MTBE.

1.2.2 NAPL Containment and Removal

Accumulations of phase-separated hydrocarbon product (non-aqueous phase hydrocarbon liquid; NAPL), may be removed from monitoring wells through the use, active skimming pumps, passive recovery canisters, "petrobelt"-type skimmers, pneumatic operated skimmers, hand bailing and from surface water with adsorbent material (booms & socks). SMA has experience with all of these technologies. Prior to implementing a petroleum product removal technology, NAPL baildown or recovery tests may be conducted to determine the expected rate of NAPL recovery. Recovered NAPL is either containerized on site in 55-gallon drums or is removed from the site. In either case, NAPL is picked-up by an oil and gas recycler for proper disposal.

Example of SMA's Removal of NAPL:
SMA completed NAPL baildown and recovery tests, and utilized hand bailing, passive skimmer canisters, and pneumatic skimmers at the Santa Fe County Judicial Complex site. SMA recovered 723 gallons of NAPL from six wells between July 2009 and January 2010.

1.2.3 Remediation System Operation and Maintenance

SMA has operated and maintained numerous remediation systems throughout New Mexico. System types include **Soil Vapor Extraction** (Ritter Distributing Twin Texaco, Fairacres Postoffice), **Sparge and Vent** (Town and Country Roswell #140, Chevron Red River, City Market San Miguel), **Pneumatic NAPL Recovery** (Santa Fe County Judicial Complex, , Midtown Chevron Las Cruces), **In-Situ Air Sparging** (S&L Service Station Site, Wallace Chevrolet Las Cruces, Ritter Distributing University Texaco), and **Pump and Treat** with air stripping and reinjection (Reese Drive Texaco Ruidoso, Sandia Fina Roswell). SMA's philosophy in operation and maintenance of remediation systems is to conduct preventative maintenance in order to minimize system down-time. SMA staff have extensive experience restarting systems after temporary shutdowns and understand the importance of conducting system repair and maintenance prior to startup.

Example of SMA's Remediation System Operation and Maintenance:
SMA successfully designed, constructed, operated and maintained (and decommissioned) the Reese Drive Texaco remediation system over several years following award of the project through an NMED State Lead RFP process. This site combined air sparging, soil vapor extraction and groundwater pump/treat/re-injection. During the operational period SMA performed maintenance on the air stripper, discharge pump, discharge meters, sparging compressor and SVE blower and filters.

1.2.4 Remediation System Optimization and Documentation of System Effectiveness

SMA has provided remediation system operations to NMED for over 24 years. As noted above, SMA is familiar with many types of active remediation systems and their reactions to typical subsurface geology and hydrology within New Mexico. SMA routinely modifies operational patterns of remediation systems to accommodate changes in subsurface conditions and contaminant extraction rates. Typical examples include alternating air sparging patterns to target specific groundwater hot spots, pulsed soil vapor extraction operation when effluent contaminant concentrations have decreased, plumbing around oxidation units when effluent concentrations are significantly decreased and modification of NAPL skimmer depth to compensate for fluctuation in potentiometric surface elevation. Depending on the specific site and equipment conditions and how recently the system entered operation, SMA schedules site visits varying from daily (during initial startup), to weekly (typical for the first month) to monthly or even quarterly during extended, routine operation. During each of these visits SMA staff (often the same staff involved with system construction) collect and record all available system data such as flows, pressure and vacuum gauges, totalizing meters, utility meters, depth to water and other parameters. This data is then charted and reviewed by multiple staff to identify patterns of operation and effectiveness, after which NMED is consulted prior to implementing any recommended improvements.

1.3 Expert Testimony

SMA staff members have provided expert witness testimony on a number of environmental issues. In all expert witness testimony, it is vital to prepare jointly with the attorneys as well as technical advisors. This joint preparation permits the attorney to lead the technical witness logically through the testimony. Mr. Peter Fant, P.E., President and Principal Engineer of SMA, Mr. Reid Allan, P.G., C.P.G., Senior Vice President and Senior Hydrogeologist of SMA, and Mr. Scott McKitrick, P.G., Senior Geoscientist of SMA, all have experience in the specific areas of LPST investigation, hydrogeology, petroleum contaminant transport, remediation system design and implementation, and expert witness testimony. In one particular case, Mr. Reid Allan provided expert witness services on behalf of NMED. The site in question involved disputed responsibility for groundwater and soil contamination at a PST site. The contaminant plume was commingled with a second plume from an off-site source. Mr. Allan was called as a witness during discovery proceedings in the case. Mr. Allan also provided expert testimony at a hearing process regarding the potential for private well contamination from nearby septic systems and in other instances involving pesticide contamination and water resource development.

1.4 Related Pertinent Services

1.4.1 Groundwater Monitoring Well and/or Remediation System Abandonment

Over the past several years, SMA has conducted numerous LPST site drilling and remediation system construction/decommissioning projects. As a matter of site maintenance or closure, SMA has repaired and/or abandoned numerous monitoring wells. Some abandonments have required "drilling out" the existing monitoring well or abandonment in place while others involved pulling casing and pressure grouting the resulting annulus. Below-grade piping to be abandoned is typically pressure-grouted in place and cut-off below grade. SMA employs the use of licensed, qualified drilling subcontractors to complete these activities per New Mexico Office of the State Engineer (OSE) requirements. Abandonment of groundwater monitoring wells requires submittal to and approval of a plugging plan from the New Mexico OSE. As a licensed remediation system construction contractor in the State of New Mexico, SMA has installed modified, and decommissioned numerous remediation systems. All remediation system projects, from design to construction implementation, are overseen by one of SMA's licensed professional engineers. To complete larger projects, SMA may team with additional subcontractors with heavy equipment resources, electrical equipment services, and commercial waste disposal services.

> ***Example of SMA's Well & System Abandonment Experience:***
> SMA has overseen the abandonment of monitoring wells, extraction wells and remediation systems at **Bar F Gas** in Socorro, New Mexico, **North Main Self-Serve** in Las Cruces, New Mexico, and **Black Gold** in Reserve, New Mexico through pressure grouting and tremmie piping.

1.4.2 Additional Resources & Availability

SMA maintains a wide variety of field sampling equipment in-house and in each of SMA's New Mexico offices (Farmington, Santa Fe, Albuquerque, Las Cruces, Roswell, and Carlsbad). Such equipment includes surveying equipment (total stations, construction levels, GPS units, theodilites, etc.); field organic vapor analyzers equipped with PIDs; explosimeters; product/water level probes; peristaltic and other low-flow pumps; submersible pumps; variable speed submersible pumps; mechanical pumps; new disposable bailers; NAPL skimmer pumps; passive NAPL canisters; steel drums; nutrient test kits; hand augers; portable generators; portable air compressors; personal protective equipment; traffic cones and barriers; digital and video cameras; laptop computers with wireless access; and general hand tools. Each office also has high-speed internet, fax machines, cellular telephones, and field vehicles (with a total of more than 40 vehicles available in the state). Office resources available on emergency response projects for the services described in the above sections include numerous networked high-speed personal computers and high-quality color plotters and printers. SMA's software resources are expansive and include multiple licenses of industry

standard drafting software such as AutoCAD Design Suite (release 2019) as well as word processing, spreadsheet, GIS and database programs, and groundwater contaminant fate and transport modeling software.

In addition to the wide variety of equipment mentioned above, SMA also owns a trailer mounted mobile SVE pilot testing unit with granular activated carbon (GAC) canisters used for on-site treatment and effluent control of hydrocarbons to the atmosphere. The pilot testing unit can be expanded with air sparging equipment to perform SVE/AS pilot tests and short-term treatments. The mobile SVE pilot testing unit is easy to set-up on sites for either pilot testing activities or in some cases, for use as an emergency response interim SVE system.

2.0 Site Strategy

2.1 Site Background

The Santa Fe County Judicial Complex Site is located at the intersection of Montezuma Avenue and Sandoval Street in Santa Fe, New Mexico. The site consists of multiple historic petroleum storage tank sites including: Capital 66 (Release ID # 324), 210 & 218 Montezuma Avenue (Release ID # 3604) , and a former Texaco station (Journal Santa Fe property), shown in Figure 1. Other properties in the immediate vicinity may also have historically dispensed petroleum products. A Phase II Environmental Site Assessment conducted by R.T. Hicks Consultants for the Santa Fe County Judicial Complex Site identified dissolved phase petroleum contamination in groundwater on the site of the new courthouse. Santa Fe County issued a request for proposals for treatment of groundwater generated during construction dewatering activities. SMA proposed and won the contract and began work on the project for Santa Fe County in January 2009. In February 2009, NAPL was discovered during excavation on the eastern portion of the Judicial Complex property. This discovery postponed construction of the courthouse and initiated installation of monitoring wells on the Judicial Complex property by the County.

The site soils underlying the site consist of Quaternary alluvium to approximately 30 feet below ground which is underlain by the Tesuque Formation. The Quaternary alluvium consists of poorly sorted sand, silty sand and gravel. The Tesuque Formation at the site consists of fine- to medium-grained sand with silt and clay. The Tesuque Formation is consolidated and has hydraulic conductivity values ranging from approximately 10^{-5} to 10^{-3} cm/s.

Depth to groundwater prior to dewatering was typically 27 to 32 feet below ground surface across much of the site. The area east of Cerrillos Road has a depth to groundwater of approximately 20 to 23 feet below ground surface. An apparent groundwater divide is present below Cerrillos Road. The nature of this divide is not known, but has persisted during the site investigations and groundwater monitoring events. There appears to be some flow across the divide from east to west. In particular, the water east of the divide has had elevated nitrate concentrations. During construction dewatering the nitrate concentration of the water entering the excavation increased during the first six months of pumping and remained elevated afterwards. Groundwater generally flows towards the north-northwest with a gradient of 0.001 to 0.002 feet/foot. Groundwater flow direction east of the groundwater divide is typically more towards the west and southwest. The groundwater gradient is steepest nearest the groundwater divide and becomes relatively flat to the north.

Initially, the NAPL plume extended from the intersection of Montezuma Avenue and Cerrillos Road to the De Vargas Condominiums parking lot. The NAPL plume was relatively narrow and extended primarily in the north-south direction. Initial estimates of NAPL quantity at the site ranged from 12,600 to 67,300 gallons. The dissolved phase contaminant plume extended a short distance from the NAPL plume. Dissolved phase contamination extended approximately 150 west of the NAPL plume and 200 feet south of the NAPL plume

(up-gradient direction). Dissolved phase contamination extended a very short distance from the NAPL plume to the east and north.

In July 2009, SMA performed NAPL baildown and recovery tests on monitoring wells containing NAPL on the Judicial Complex property. SMA then installed pneumatic NAPL skimmers in monitoring wells SFCMW-1 and SFCMW-5 and passive skimmer canisters in monitoring wells SFCMW-2, SFCMW-4, SFCMW-6, and SFCMW-7. Between July 2009 and January 2010, SMA recovered 723 gallons of NAPL from these wells. This NAPL recovery was an initial abatement initiated by the County during the construction hiatus.

In September 2009, the site became a NMED PSTB State Lead site. Daniel B. Stevens & Associates (DBSA) performed remediation at the site under a State Lead contract. DBSA's remediation activities initially included an injection-grout barrier around the perimeter of the parking garage structure for the Judicial Complex and soil vapor extraction systems to the north and east of the Judicial Complex structures. The SVE systems included horizontal wells installed beneath the District Attorney's Office building and vertical wells across the site on several properties. Late in the SVE operation period, DBSA installed an ozone injection system. Also, following SVE operation DBSA performed several rounds of hydrogen peroxide injection in various wells across the site.

Construction dewatering began at the site in June 2010. SMA installed, operated and maintained the water treatment system for the hydrocarbon contaminated water generated by dewatering. During the project, six million gallons of contaminated groundwater were treated. Of that volume, 3.9 million gallons were discharged to the Santa Fe River and 2.1 million gallons were discharged to the City of Santa Fe wastewater treatment plant. The project included design, operation and maintenance of the treatment system, discharge permitting, and reporting to city, state, and federal regulatory agencies. The treatment system included: dewatering pumps installed in French drains, a coalescing oil-water separator, settling tanks for solids separation, redundant treatment system pumps, bag filter skids, three 15,000 lb. granular activated carbon filter vessels, a zeolite filter vessel for lead removal, flow meters, auto-sampler, storage tanks, and auto-dialer telemetry. The treatment system operated continuously during building construction (13 months) and no petroleum contaminants were ever detected in the treated discharge water.

The construction dewatering not only facilitated construction of the buildings and excavation of petroleum contaminated soil, but also lowered the water table in the area allowing the SVE systems to remediate contaminated soil previously submerged below the water table. Dewatering lowered the water table across much of the site and resulted in water table depression to approximately 40 feet below ground surface. Construction dewatering ended July 20, 2011. Full rebound of the water table took approximately two years. The water table decline and subsequent rebound caused smearing and submergence of contaminated soil in areas where remediation was not complete.

During excavation of the Judicial Complex parking structures, Intera Inc. completed excavation of 27,400 tons of petroleum contaminated soil (PCS). Intera estimated the PCS contained approximately 15,000 gallons of NAPL. Backfill placed in the over excavated portion of the foundation excavation was amended with 8,160 pounds of Oxygen Release Compound (ORC) Advanced™. Both Intera Inc. and DBSA performed hand bailing of NAPL from various wells in 2010. Intera's NAPL bailing efforts removed 142 gallons of NAPL and DBSA removed 13.3 gallons.

The SVE systems including hot air and ozone injection systems were successful in removing the majority of the volatile contamination observed outside of the Judicial Complex foot print. There were multiple phases of SVE system operation and configuration. Overall, the SVE system was operated from May 2010 to August 2013. Approximately, 128,500 pounds (21,400 gallons of gasoline) were removed by the SVE systems during that time frame. The approximate amount of gasoline removed from all remediation activities including SVE, NAPL recovery, PCS excavation, and dewatering is 37,340 gallons. The remediation efforts likely

caused destruction of significant amount of hydrocarbons indirectly through chemical oxidation and bioattenuation/hydrocarbon mineralization as well.

In October 2017, SMA conducted 3, 48-hour mobile dual-phase extraction (MDPE) events in three plume areas (South Plume / Design, DeVargas Condominiums, and Montezuma Avenue) followed by installation of Oxygen Release Compound-Advanced (ORC-A) socks in selected wells. The MDPE events included simultaneous removal of soil vapor and groundwater via 'stingers' installed within the treated wells. The MDPE and ORC-A treatments resulted in a significant decrease in dissolved phase contaminant concentrations in the Devargas Condominiums plume area, however, there was no significant decrease in contamination in the Montezuma Avenue and South Plume / Design center areas. The effectiveness of the MDPE events was likely limited by the larger areal extent of contamination in these areas and the relatively deep smear zone caused by dewatering during construction of the Judicial Complex. MDPE effectiveness was further limited by the small amount of groundwater that could be extracted from the South Plume / Design Center wells.

Currently, NAPL is not observed in any wells and dissolved-phase contamination at the site is present in three general areas. The highest dissolved phase contaminant concentrations are found in the area between the Capital 66 site and the Design Center (beneath Cerrillos Road). The second area includes the area between 210 & 218 Montezuma Avenue and the eastern portion of the Judicial Complex property. The third area is in the De Vargas Condominiums parking lot. The fourth area includes the Capitol 66 site east of Cerrillos Road. Monitoring well installations in these areas indicate that soil contamination is present below the water table. This suggests that contamination that was not removed by remediation was smeared across the soil column during the construction dewatering and subsequently submerged during groundwater rebound. The southernmost area near the Design Center was subjected to limited SVE and MDPE remediation and also was affected by dewatering and groundwater rebound.

Dissolved phase contaminants that are above New Mexico Water Quality Control Commission Regulation (NMWQCCR) standards at the site are primarily benzene, total xylenes, 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC) and total naphthalenes. Toluene and ethylbenzene have also been present above NMWQCCR standards near the Design Center at the southern extent of the contaminant plume during recent monitoring events. Recent dissolved phase benzene and total naphthalene maps are included as Figures 2 and 3, respectively.

Site-specific conditions that require abatement, in accordance with the New Mexico Petroleum Storage Tank Regulations (20.5 NMAC) include only:

- Concentrations of contaminants of concern exceed site-specific target levels (SSTLs) in soil or WQCC or EIB standards in groundwater or surface water (20.5.119.1922.A.3)

Potential exposure pathways were evaluated in order to confirm that the current remediation strategy is appropriate. Natural pathways include only groundwater. The Santa Fe River is located north of the site, approximately 200 feet from the nearest contamination. Monitoring well data near the river and the river elevation relative to groundwater indicates the groundwater contamination is not likely to impact the river. Municipal water is supplied to the site and surrounding properties.

2.2 Remediation Strategy

The site conditions and remediation activities conducted to date including the MDPE events indicate the residual contamination at the site is largely in the smear zone submerged beneath the water table. Furthermore, the four contaminant plume areas vary in contaminants present and concentrations. Based on SMA's evaluation of the site conditions discussed above, SMA's proposed remedial approach is tailored to the contaminants (and concentrations), existing wells and infrastructure, and space/property owner

limitations present in each area. SMA proposes to employ air sparging or biosparging in each of the four plume areas either continuously or as recurring events.

Air sparging involves injection of air into the saturated zone enabling volatile organic compounds to transfer from dissolved and adsorbed phases to the vapor phase where they are vented through the unsaturated zone. The venting of the contaminants is usually accomplished using SVE. An additional effect of air sparging is oxygenating the contaminated groundwater and thereby boosting activity of indigenous bacteria to breakdown the contaminants. Typically air sparging is used to remediate VOCs due to the phase transfer effect. Where contaminants are non-volatile such as naphthalenes, biosparging is often used. Biosparging is a type of air sparging that utilizes lower flows of air injection in order to enhance biodegradation. Generally, biosparging in contaminant plumes with low VOC concentrations does not require venting of vapors by SVE.

The recent concentrations of total benzene, toluene, ethylbenzene, and total xylenes (BTEX) and total naphthalenes are summarized by plume area in Table 1 below. Both the Capitol 66 and DeVargas Condominium plumes are relatively small in lateral extent and have low concentrations of volatile (BTEX, EDB, EDC) and nonvolatile (naphthalenes) contaminants. For these reasons, SMA proposes to conduct quarterly 48-hour air sparging/SVE treatments using mobile equipment in these areas. The South Plume / Design Center area has moderate volatile and nonvolatile contaminant concentrations. In addition, this area is mostly occupied by Cerrillos Road, the Design Center building, 210 & 218 Montezuma Avenue building, and the alley between these buildings. There is very little room for a permanent remediation system. Therefore, SMA proposes to conduct monthly air sparging/SVE treatments in this area using mobile equipment. The Montezuma Avenue plume is relatively large in extent and consists primarily of naphthalenes. Only two wells (SVE-3 and MW-6) have somewhat elevated VOCs. We propose to install a continuously operating biosparging system in this area mostly utilizing existing wells and infrastructure with a few additional wells. Existing wells at Montezuma Avenue and DeVargas Condominiums will be used by installing air injection piping and screens into four and five-inch diameter wells and air sparging within the well screens.

Table 1. Summary of August 2018 Dissolved Phase BTEX and Naphthalenes Data by Plume Area

	Total BTEX	Total Naphthalenes		Total BTEX	Total Naphthalenes		Total BTEX	Total Naphthalenes
Capitol 66			**Montezuma Avenue**			**DeVargas Condominium**		
CMW-1	344	7.7	MW-6	528	473	MW-11	814	442
CMW-3R	1,602	550	SFCMW-01	83	560	TWN-2	6	5.7
CMW-4	1,333	145	SFCMW-02	2.4	391	TWN-3	1,436	100
South Plume / Design Center			SFCMW-03	2.9	204			
MW-1R	11,470	920	SFCMW-10	68	4,200			
MW-4R	9,470	200	SVE-3	1,272	640			
TWS-4	1,040	98	SVE-11D	6.1	201			
Total BTEX - sum of benzene, toluene, ethylbenzene, & total xylenes concentrations in µg/L								
Total Naphthalenes - sum of naphthalene and mono-methyl naphthalene monomer concentrations in µg/L								

SMA believes that air sparging / biosparging treatments will meet the objective indicated in the RFP of reaching target goals within the State Lead contract period. Air sparging is effective in volatilizing dissolved and adsorbed contamination present below the water table and oxygenating groundwater to enhance biodegradation. Furthermore, air sparging / biosparging induces mixing of the oxygenated groundwater to affect a larger area of the contaminated aquifer. This is particularly import at the site as the overall contaminant plume is long with a shallow groundwater gradient resulting in stagnant contaminant plumes with little capacity for natural attenuation.

The proposed approach to remediation includes installation of twelve air sparging wells and four SVE wells. SMA will utilize a direct-push (Geoprobe) rig to collect continuous soil samples and install steel drive point wells in the bore holes for use as sparging wells. The Geoprobe rig is capable of installing the wells in tight locations and in close proximity to buildings. In addition, drive point wells are cost-effective for shallow remediation wells as they are quick to install and do not require filterpacks in sandy soils. The soil sampling is particularly important in the South Plume / Design Center area where the full extent of soil contamination is not well defined.

All of the proposed activities have been designed with the affected property owners and businesses in mind. Much of the well installation and air sparging events will be conducted during the weekend to satisfy concerns about impacts to businesses. In addition, the biosparging system design includes particular attention to minimizing noise to satisfy expressed concerns by the Old Santa Fe Inn. SMA has worked with most of the property owners and businesses in the vicinity of the releases and understands how the disruptions caused by past remediation efforts have impacted the tolerance for future work at the site. Detailed discussions of the proposed tasks are provided below:

Task 1: Air Sparging and SVE Well Installation

SMA anticipates installing twelve, 2-inch air sparging wells and four SVE wells at the site to implement the remedial approach. The air sparging well locations are planned to be in the areas of observed dissolved phase contamination and are shown on Figure 4. The SVE well locations are intended to monitor and mitigate vapor migration near adjacent buildings. SMA will consult with the PSTB project manager to finalize the number of wells and well locations prior to mobilization. Where well locations are close to buried utilities, SMA will subcontract with Santa Fe Vacuum Excavation to vacuum potholes below the expected depth of buried utilities. John Brown, the owner of Santa Fe Vacuum Excavation, was the Safety Supervisor for the construction of the Judicial Complex and is familiar with the utilities and contamination present at the site. The well bores will be initially drilled and sampled using a direct-push Geoprobe rig. Then steel drive point wells will be advanced with the Geoprobe rig down the soil boring. The wells will be constructed of two-inch diameter galvanized steel well casing and stainless steel drive point screens. The drive point screens have a galvanized steel pipe body with a perforated stainless steel outer sheath and a stainless steel mesh inner lining (0.010" slot equivalent). Air sparging wells will use screens three feet long and SVE wells will use ten foot long screens. Air sparging wells are anticipated to be approximately 40 feet deep such that the top of the screened interval is five feet below the potentiometric surface. The SVE wells will be installed using the same direct-push method, and are anticipated to be 32 feet in depth. Actual well depths and screen intervals will be designed in accordance with the above specification and modified based on field conditions encountered during drilling.

Field headspace screening of soil samples will be completed to evaluate soil contamination. Wells will be developed prior to use as air sparging wells. SMA anticipates two soil samples from each well boring will be submitted for laboratory analysis by EPA Methods 8015 and 8260.

SMA plans to use JR Drilling LLC to perform the well installation. SMA will obtain all applicable New Mexico Office of the State Engineer (NMOSE) permits prior to well installation. In addition, permits and access agreements will be obtained from City of Santa Fe and the three privately owned properties where wells will be installed. **The performance based criterion for this task will be met with submittal of the well installation letter report.**

Task 2: Air Sparging Pilot Tests

SMA will complete short duration air sparging tests on wells following development to establish the pressure and flow characteristics of the formation. The air sparge test information will be used to evaluate the blower requirements and size flow meters for the recurrent events and continuous biosparging system. An air compressor or blower will be utilized to inject air into each air sparge well to determine air flow at

increasing preasures. Each well is anticipated to be tested for approximately 30 minutes. **The performance based criterion for this task will be met with submittal of the air sparging test report.**

Task 3: Evaluation of SVE Piping for Re-Use & Biosparging System Design

The SVE wells within the Montezuma Avenue plume still have SVE piping remaining from the previous remediation system. SMA will evaluate and test the former SVE piping to determine if it may be re-used as biosparging piping. The piping trench will be excavated in the greenspace along the east side of the Judicial Complex property and expose the former piping. Each pipe will be tested to determine if there is a free flow of air to the respective wellheads and pressure tested to find leaks.

The air sparging pilot test data and SVE piping evaluation information will be incorporated into plans and specifications for construction of a biosparging system. SMA anticipates most of the existing SVE piping runs will be reusable. However, several wells including SFCMW-01 to SFCMW-03, AS-9 and AS-10 will require plumbing. The plumbing is likely to include 1.5-inch diameter PVC piping installed in shallow trenches from the equipment location in the Judicial Complex greenspace to the individual wells. Additional biosparge system information is included in Task 5 below. **The performance based criterion for this task will be met with submittal of the piping evaluation and biosparging system plans and specifications report.**

Task 4: Recurring Air Sparging / SVE Events

We propose to treat the Capitol 66 and DeVargas Condominium with 48-hour air sparging / SVE events on a quarterly basis. At Capitol 66, air will be injected into air sparging wells AS-7 and AS-8 and injected into a drop pipe installed in CMW-4 while SVE will extract soil vapor from CMW-1 and CMW-3R. At the DeVargas Condos / District Attorney's office parking lot, air will be injected into AS-11, AS-12, SVE-9 and TWN-2 while SVE is extracting from MW-11, TWN-3, SVE-14, and SFCMW-07. The primary purpose of the SVE is a safety precaution to ensure there will be no vapor migration to the nearby buildings. Vapor concentrations from the SVE wells and nearby monitoring wells will be periodically tested by photo-ionization detector (PID). The secondary benefit of SVE is to draw more oxygenated air into the vadose zone. SMA anticipates these events will be conducted on weekends due to the sensitivity of the build occupants/workers to disruption and noise. Two quarterly events are planned for each location. Any further events would be dependant on results of the semi-annual groundwater monitoring results.

Monthly 48-hour air sparging / SVE events will be conducted at the the South Plume / Design Center. The higher VOC concentrations in this area and the proximity of the contamination to a building basement (210/218 Montezuma) make the SVE component important. Soil vapors will be extracted from three existing monitoring wells (MW-1R, MW-4R and TWS-4) and two proposed wells (SVE-12 and SVE-13). Vapor concentrations will be monitored in SVE-15 adjacent to the Bardacke Attorney General Complex and may be used for SVE if elevated vapor concentrations are observed. Air will be injected into six proposed air sparge wells installed in the median and west side of Cerrillos Road. The treatment effectiveness will be evaluated after six events. **The performance based criterion for this task will be met with submittal of air sparging event letter reports.**

Task 5: Biosparging System Installation

The biosparging system planned for the Montezuma Avenue plume area is anticipated to utilize two air sparging wells described in Task 1 and seven existing wells (SFCMW-01, SFCMW-02, SFCMW-03, SVE-3, SVE-5, SVE-6, SVE-11D). The existing wells will be plumbed for in-well air sparging which entails installing a 1-inch diameter flush thread PVC drop pipe and screen with a well seal in each well. Wells will be plumbed individually to the system manifold using either existing SVE piping or new 1.5-inch PVC pipe. Each well/line will have a gate valve and flow meter for flow balancing. The system manifold is likely to be installed within a below grade vault. Each line will be controlled by solenoid valves and a timer/controller to allow for

continuous blower operation with biosparging cycled between groups of wells during the course of each day. The biosparging blower will be a regenerative blower sized according to the pilot test data. Regenerative blowers are the quietest option which is important to the Old Santa Fe Inn owners and guests. The blower will be housed in a fiberglass blower enclosure for security, weather proofing and additional sound dampening. SMA plans to use Sub Surface Contracting Inc. for construction and plumbing of the biosparging system. Sub Surface is based in Santa Fe and routinely works in and for the City of Santa Fe and is accustom to working in tight quarters with conflicting utilities. SMA will use Transmission & Distribution Services, LLC to provide and program the solenoid timer/controller. SMA has a good working relationship with Santa Fe County, the City of Santa Fe and the affected property owners at the site and understands the concerns of these parties. **The performance based criterion for this task will be met with submittal of the biosparging system as-built and start-up testing document.**

Task 6: Biosparging System Operation and Maintenance (O&M)

Prior to starting of the biosparging system, SMA will collect baseline soil vapor data from selected monitoring wells (MW-6, MW-7, MW-8, TWS-1), the three sub-slab soil vapor sample ports in the District Attorney's office, and selected perimeter monitoring wells around the foundation of the Judicial Complex. The soil vapor from these sample locations will be field screened using a PID for VOC concentrations and a 4-gas meter for oxygen, carbon monoxide and lower explosive limit (LEL). The biosparging system will then be turned on and operated continuously. Soil vapor from the sample points indicated above will then be tested weekly for the first month of operation and monthly thereafter. O&M site visits will also include: verification of blower operation and solenoid cycling, flow balancing, cleaning/replacing air intake filter. The evaluation of system performance will be determined by semi-annual groundwater monitoring including laboratory analyses and dissolved oxygen concentrations in site monitoring wells. This information will be used to optimize system effectiveness as groundwater concentrations decrease. System optimization may include changing the solenoid cycle to focus on recalcitrant areas and cycling operation from continuous to pulsed operation. **The performance based criterion for this task will be met with submittal of quarterly biosparging system O&M reports.**

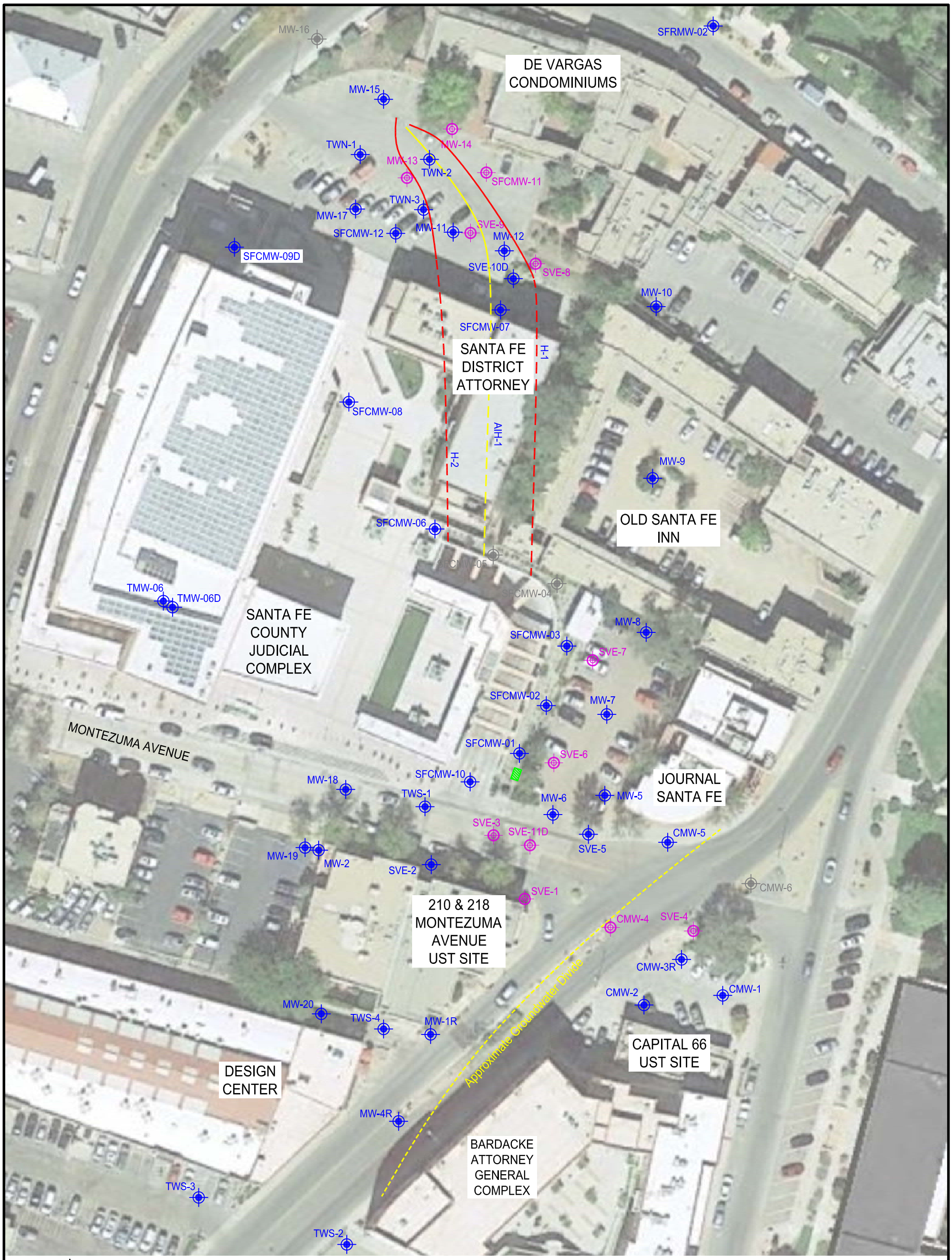
Task 7: Semi-Annual Groundwater Monitoring

Semi-annual groundwater monitoring will continue at the site. Each sampling event will include measurement of depth to water and NAPL thickness in thirty (30) site monitoring wells. Laboratory analysis of samples collected from thirty (30) site wells during each quarter by EPA Methods 8260B and 504.1. SMA will also test wells for dissolved oxygen to further evaluate air sparging/biosparging effectiveness. Samples will be collected using new disposable bailers or dedicated Waterra™ tubing and check valves and will be labeled, custody sealed and immediately placed on ice for shipment to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico under standard chain of custody procedures.

For each event, SMA will prepare a report using the appropriate NMED standard monitoring report form. This report will include all data gathered during monitoring activities as well as any general site observations or recommendations. This report will include a discussion of any known horizontal and vertical extents of groundwater impact; characteristics, extent and thickness of NAPL; elevation, gradient, and direction of the potentiometric surface and any nearby surface water; rate and direction of contaminant migration; aquifer properties; and known impacts to underground utilities. Annually, this report will also include an evaluation of the effectiveness of the overall remedial approach (20.5.119.1927 NMAC). SMA's drafting technician will prepare site maps and contaminant contour maps for the report. **The performance based criterion for this task will be met with submittal of the Semi-Annual Monitoring Reports.**

Project Schedule

The project schedule for the proposed work is included as Figure 5.



N

0 30 60

SCALE: 1"= 60 FT.

LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- HORIZONTAL SOIL VAPOR EXTRACTION WELL (DASHED WHERE SCREENED)
- HORIZONTAL HOT AIR INJECTION WELL (DASHED WHERE SCREENED)

SITE MAP
SANTA FE COUNTY JUDICIAL COMPLEX STATE LEAD SITE
SANTA FE, NEW MEXICO

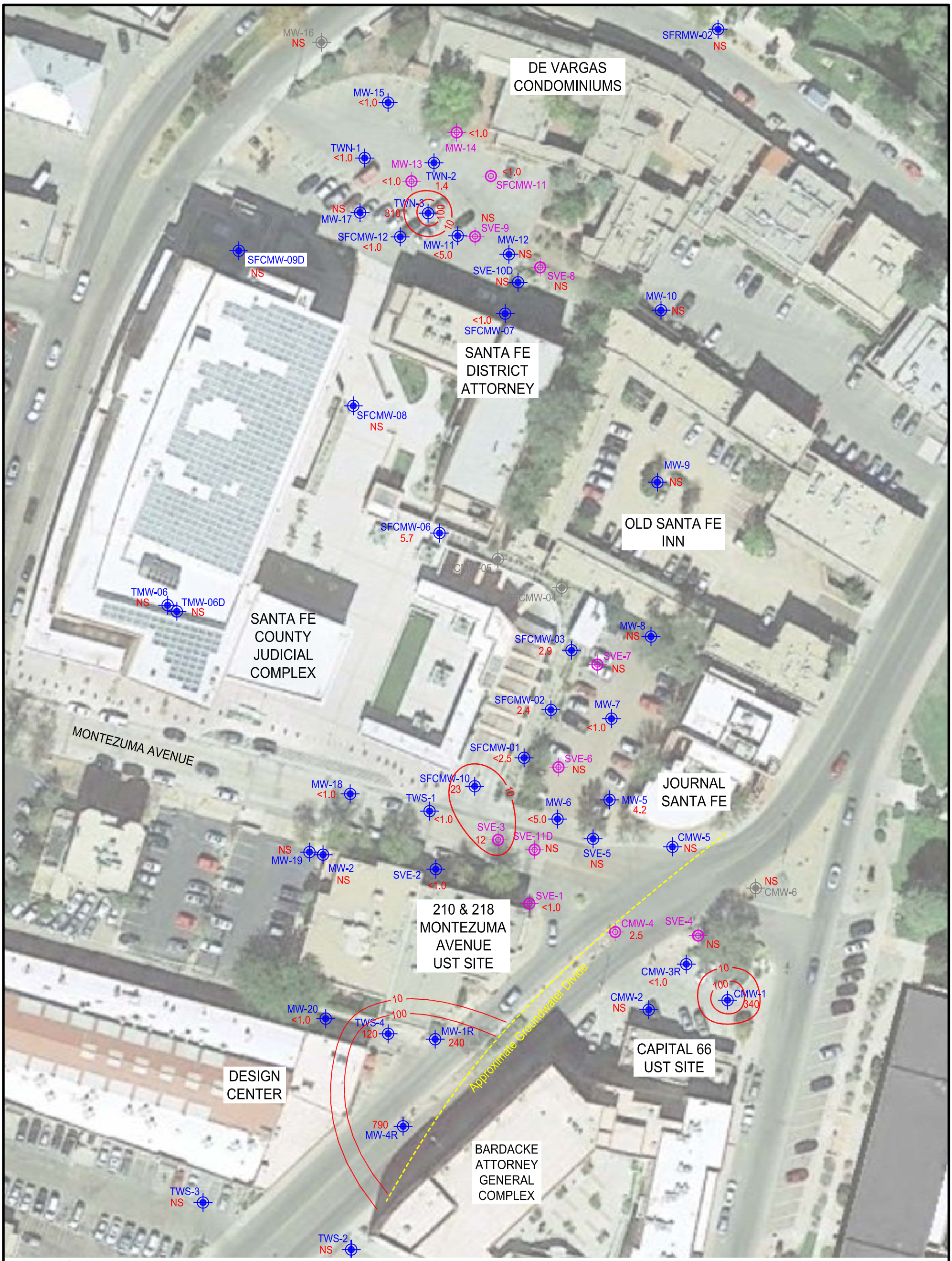
FIGURE 1

3223767
2/6/15

REVISIONS
BY _____ DATE _____ DESCR. _____
BY _____ DATE _____ DESCR. _____

DRAWN AJE
CHECKED SAM
APPROVED RSA

SMA
2904 RODEO PARK DRIVE, BUILDING 100
SANTA FE, NEW MEXICO, 87105
505-473-9211



LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- 10 — DISSOLVED PHASE BENZENE CONCENTRATION (ug/L)
- NS — NOT SAMPLED
- —10— DISSOLVED PHASE BENZENE CONCENTRATION CONTOUR (ug/L)

N

0 30 60

SCALE: 1"= 60 FT.

DISSOLVED PHASE BENZENE CONCENTRATIONS – AUGUST 2018
SANTA FE COUNTY JUDICIAL COMPLEX STATE LEAD SITE
SANTA FE, NEW MEXICO

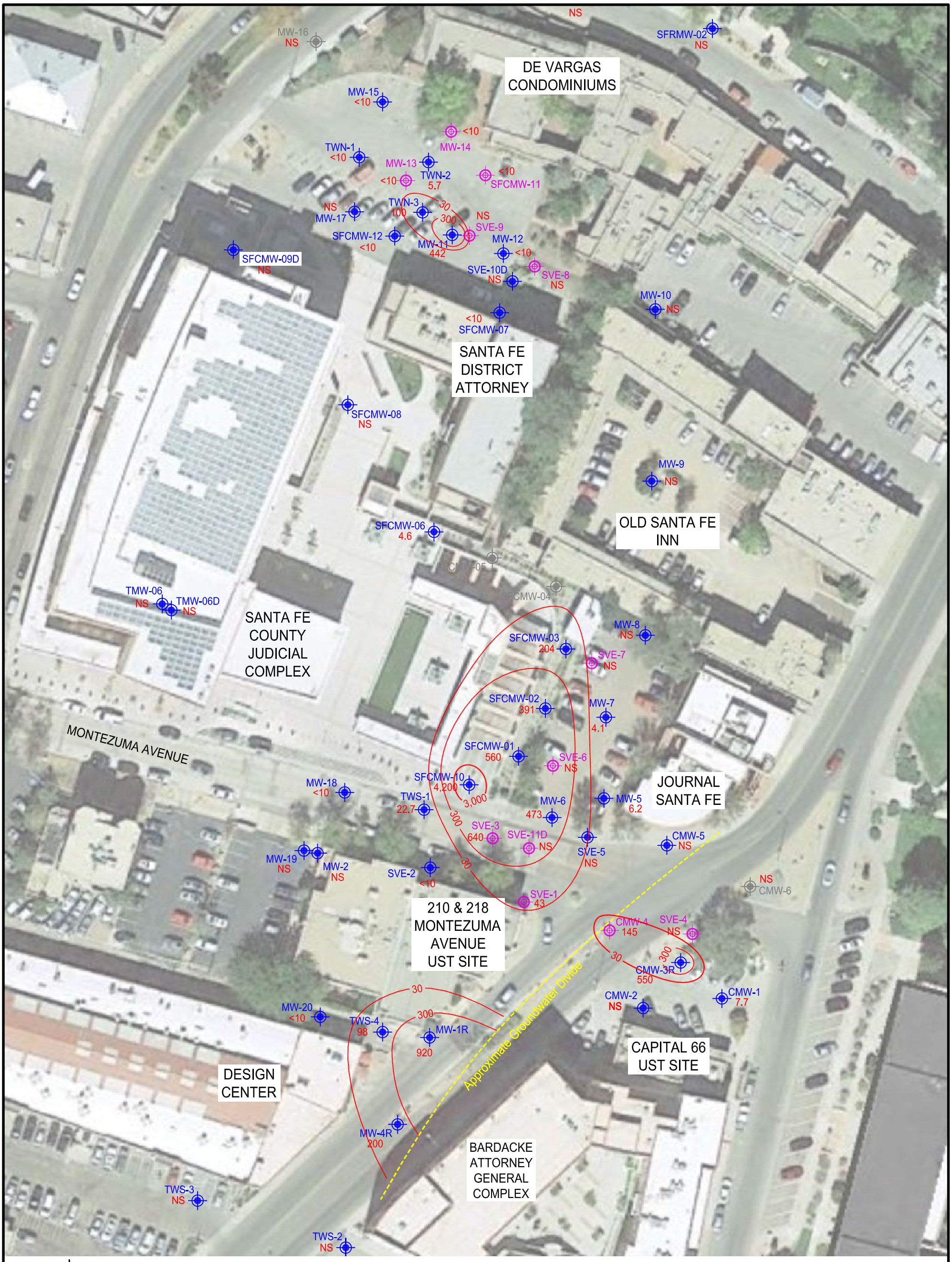
FIGURE 2

3223767
08/27/18

REVISIONS
BY _____ DATE _____ DESCR. _____
BY _____ DATE _____ DESCR. _____

DRAWN AJE
CHECKED SAM
APPROVED RSA

SMA
2904 RODEO PARK DRIVE, BUILDING 100
SANTA FE, NEW MEXICO, 87105
505-473-9211



LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- 147 — DISSOLVED PHASE TOTAL NAPHTHALENES CONCENTRATION (ug/L)
- NS — NOT SAMPLED
- —30— DISSOLVED PHASE TOTAL NAPHTHALENES CONCENTRATION CONTOUR (ug/L)

N

0 30 60

SCALE: 1"= 60 FT.

DISSOLVED PHASE TOTAL NAPHTHALENES CONCENTRATIONS – AUGUST 2018
SANTA FE COUNTY JUDICIAL COMPLEX STATE LEAD SITE
SANTA FE, NEW MEXICO

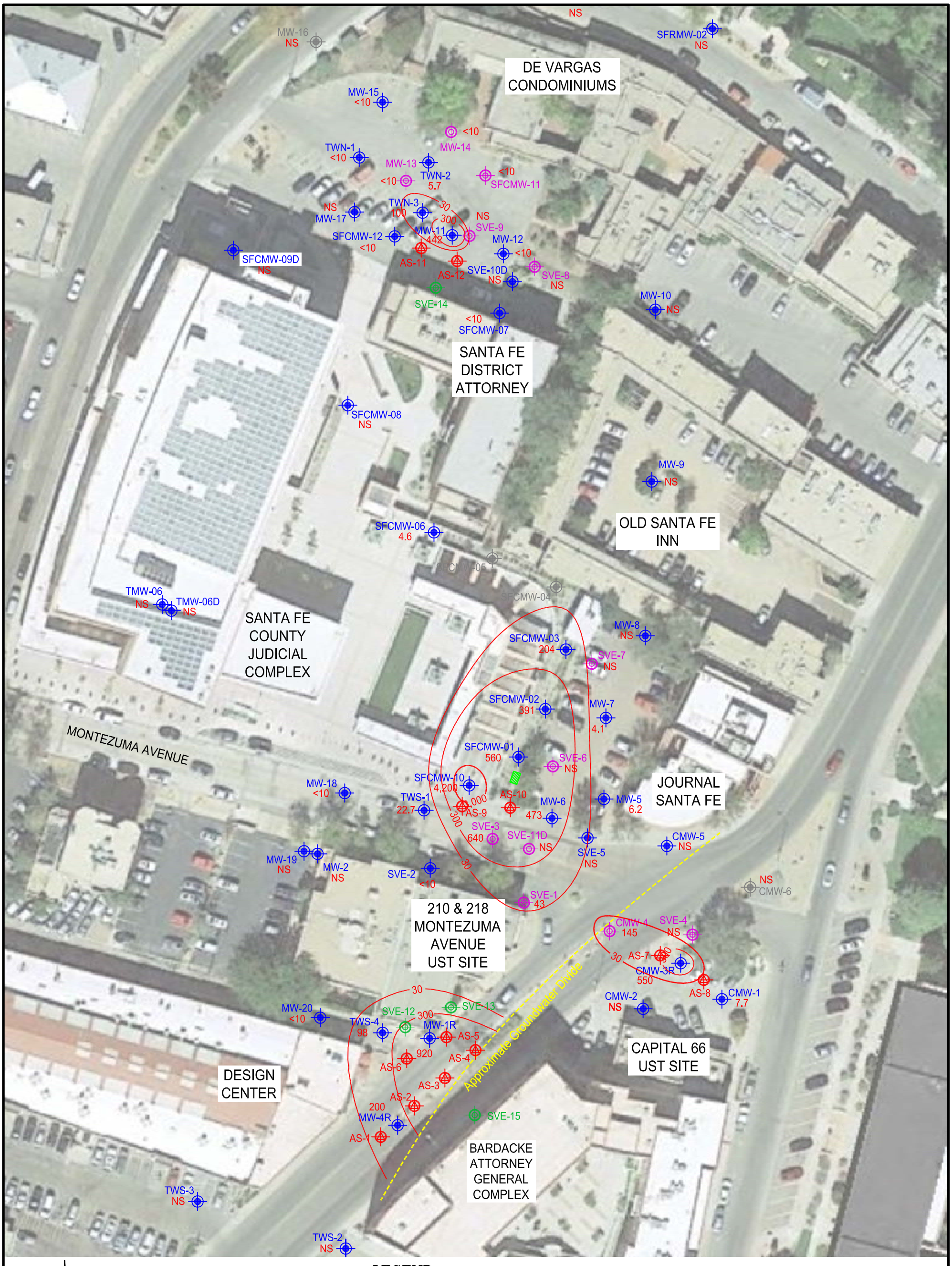
FIGURE 3

REVISIONS
BY _____ DATE _____ DESCR. _____
BY _____ DATE _____ DESCR. _____

3223767
8/27/18

DRAWN AJE
CHECKED SAM
APPROVED RSA

SMA
2904 RODEO PARK DRIVE, BUILDING 100
SANTA FE, NEW MEXICO, 87105
505-473-9211



LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- PROPOSED SOIL VAPOR EXTRACTION WELL
- PROPOSED AIR SPARGING WELL
- APPROXIMATE BIOSPARGING BLOWER ENCLOSURE LOCATION
- 147 — 8/2018 DISSOLVED TOTAL NAPHTHALENES CONCENTRATION (ug/L)
- —30— 8/2018 DISSOLVED TOTAL NAPHTHALENES CONCENTRATION CONTOUR (ug/L)

N

0 30 60

SCALE: 1"= 60 FT.

PROPOSED SOIL VAPOR EXTRACTION AND AIR SPARGING WELL LOCATIONS
SANTA FE COUNTY JUDICIAL COMPLEX STATE LEAD SITE
SANTA FE, NEW MEXICO

FIGURE 4

3223767
8/27/18

REVISIONS
BY _____ DATE _____ DESCR. _____
BY _____ DATE _____ DESCR. _____

DRAWN AJE
CHECKED SAM
APPROVED RSA

SMA
2904 RODEO PARK DRIVE, BUILDING 100
SANTA FE, NEW MEXICO, 87105
505-473-9211

Figure 5 - Proposed Timeline
Santa Fe County Judicial Complex
Santa Fe, New Mexico

Phase	Task	Description	2019				2020				2021			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
5	1	Air Sparging and SVE Well Installation												
	2	Air Sparging Pilot Testing												
	3	Evaluation of SVE Piping for Re-Use & Biosparging System Design												
	4a	Recurring Air Sparging / SVE Events - Capitol 66			1	1								
	4b	Recurring Air Sparging / SVE Events - DeVargas Condos/DA			1	1								
	4c	Recurring Air Sparging / SVE Events - Design Center			3	3								
	5	Install Biosparging System - Montezuma Avenue												
	6	Biosparging System Operation and Maintenance												
	7	Semi-Annual Groundwater Monitoring												

Additional Air Sparging Events - as needed

3.0 STATEMENT OF QUALIFICATIONS (20.122.2201 NMAC)

For ease of reference, please note that this section follows the exact outline presented in Section IV.A.3, found in the NMED RFP # 19-667-3200-004 dated November 29, 2018.

3.1 Corporate Experience

SMA has guided many clients through various stages of remediation activities, including complete site contamination investigation, hydrogeologic characterization, design of both extensive and small-scale remediation systems, pilot testing, system construction, development of long-term monitoring programs, and site closure following successful remediation. SMA is certified to conduct PST investigation and remediation work in New Mexico, Texas, Colorado, and Arizona, and presently has contracts for PST-related environmental services with several state and private clients including the Texas Commission on Environmental Quality (TCEQ) and the New Mexico Department of Transportation (NMDOT).

SMA is also pleased to have acted as a remedial action contractor to NMED since 1995. During this time, SMA has participated in a number of remedial action projects, including but not limited to:

- Hatch Exxon groundwater monitoring and NAPL removal in Hatch, NM
- Sandoval Dodge site assessment well plugging and abandonment in Las Cruces, NM
- Big Chief Fina site assessment in Albuquerque, NM
- Circle W soil removal project in Socorro, NM
- City Market vapor impact investigation in San Miguel, NM
- Downtown Truth or Consequences soil and groundwater investigation in Truth or Consequences, NM (two separate investigations: 1999 and 2002)
- Española monitoring well repair in Española, NM
- Española soil and groundwater investigation and remediation system testing in Española, NM
- Highway 549 CERCLIS point source remediation project for NMED Ground Water Quality Bureau (GWQB) in Deming, NM
- Milan soil and groundwater investigation in Milan, NM
- Reese Drive Texaco remediation system operation in Ruidoso, NM
- Ritter/Hillger groundwater sampling project in Truth or Consequences, NM
- State Lead sampling project at various locations in southern NM
- Stuckey's Deming/Savoy Truck Stop supply well sampling and subsequent groundwater monitoring west of Deming, NM
- Capitan Estates Mobile Home Park potable water delivery in Capitan, NM
- South Main Street excavation of contaminated soil in Belen, NM
- Downtown Gallup sewer vapor investigation and abatement project in Gallup, NM
- Watrous UST closure, soil and groundwater investigation in Watrous, NM
- Former Criswell Grocery Store soil disposal and vapor investigation/abatement project in Garfield, NM
- Guacamole's Restaurant private water well impact and abatement project in Fairacres, NM
- Lovington Highway soil and groundwater investigation in Hobbs, NM
- Four Corners Glass (NICO Miller Ave. Bulk Plant) water supply impact in Farmington, NM

3.2 Key Personnel Credentials

The Environmental Business Line of SMA employs more than 30 dedicated, full-time technical personnel, comprised of field and drafting technicians, staff, project, senior and principal level resources. These personnel represent more than 100 years of combined, specific experience in PST investigation and abatement experience and over the past two (2) years have performed environmental site investigations and remediation at over 40 sites. Over 30% of SMA's Environmental Business Line revenue is derived from site investigations and remediation activities.

A listing of key SMA personnel who are anticipated to be directly involved in the Santa Fe County Judicial Complex contract, as well as their fields of expertise directly related to the expected needs, is presented in the table below. Additional senior, project, staff and field level personnel are available as needed. In total, SMA's professional resources include more than thirty Registered Professional Engineers, eight Registered Professional Geologists, six Registered Land Surveyors, and a diverse compliment of support staff. Resumes that provide further details regarding experience and education for key personnel are provided in the pages following the table.

		Project Experience								
SMA Team Member	Education	Vapor Impact Investigation	Soil & Groundwater Investigation & Monitoring	Saturated Soil Mitigation	NAPL Mitigation	Remediation System Design	Remediation System Installation/Decommissioning	Monitoring Well Abandonment	Report Construction	Expert Witness Testimony
Reid S. Allan, P.G., C.P.G. Senior Vice-President/ Principal Hydrogeologist	M.S.-Geology B.S.-Geology	•	•	•	•	•	•	•	•	•
Karl E. Tonander, P.E., P.G. Senior Vice-President/ Principal Engineer	M.S.-Mineral Engineering B.S.-Geological Engineering	•	•	•	•	•	•	•	•	•
Scott A. McKitrick, P.G. Senior Geoscientist	M.S.-Geology B.S.-Geological Engineering	•	•	•	•	•	•	•	•	•
Alan J. Eschenbacher, P.G. Senior Geoscientist	M.S.-Geochemistry B.S.-Geology	•	•	•	•	•	•	•	•	
Emme M. Mayle Project Geoscientist	M.S.-Geospacial Sciences B.S.-Geology		•	•	•			•	•	

3.3 Key Personnel Resumes

Resumes for the key personnel identified above follows this page:

Reid S. Allan, P.G.

Senior Vice President/Environmental Business Line Manager

YEARS OF EXPERIENCE

Total 26
With Firm 23

EDUCATION

M.S.-Geology
New Mexico Institute of Mining and Technology
Socorro, NM
1988

B.S.-Geology (Computer Science Minor)
Dickinson College
Carlisle, PA
1985

LICENSES AND REGISTRATIONS

Professional Geologist-Utah (5554617-2250)
Professional Geologist-Wyoming (PG-2732)
American Institute of Professional Geologists (10331)
Former New Mexico Certified Scientist (007)
-active throughout NMED Certified Scientist program
Colorado Registered Consultant (5788)
Arizona Qualified Consultant

PROFESSIONAL AFFILIATIONS/ORGANIZATIONS

National Water Well Association, AGWSE Division
Society of Mining, Metallurgy and Exploration, Environmental Division
National Ground Water Association

SPECIALIZED TRAINING

Numerous short courses on hydrogeology, contaminant fate and transport, etc.
40-Hour HAZWOPER
8-Hour HAZWOPER Manager/Supervisor

BACKGROUND

Mr. Allan is Souder, Miller & Associates' (SMA) Environmental Business Line Manager as well as Health & Safety Officer. As the Environmental Business Line Manager, Mr. Allan supervises Project Managers at SMA for petroleum storage tank, mining, oil and gas, and other contaminant hydrogeology projects. His responsibilities include interaction with regulatory agencies; budget and work plan preparation; design of monitoring plans and monitoring well networks; design of remediation systems; and interpretation of geologic, hydrologic, analytical, and system operational data. Mr. Allan also oversees the work of staff personnel on mine tailings leachate reclamation sites, environmental audits, landfill hydrogeology, surface contaminant spill, liquid waste, and computer ground water modeling projects. As the corporate Health & Safety Officer, Mr. Allan supervises the corporate Safety Manager, develops and implements SMA's safety protocols, and is responsible for the health of all employees.

AREAS OF SPECIALTY

Project Management
Health & Safety
Petroleum Storage Tank Regulatory Compliance
Contaminant Hydrogeology
Hydrogeologic Investigations
Groundwater Treatment Operations
Remediation Technologies
Water Well Design & Water Resource Planning

NEW MEXICO PETROLEUM STORAGE TANK (PST) PROGRAM EXPERIENCE

Investigation (GWPA Phase MSA & Phase 1)

Example New Mexico PST Investigation Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Circle K #469	Define horizontal extent of dissolved phase plume		▪
Graves Oil Quince St. Bulk Plant	Define horizontal and vertical extent of soil contamination and dissolved phase ground water plume		▪
City Market	Define horizontal and vertical extent of soil contamination and dissolved phase ground water plume, assess potentially hazardous vapor impacts	▪	▪

W&C Contracting	**Define horizontal and vertical extent of soil contamination and dissolved phase ground water plume**	■	■
Graves Oil #1	**Define horizontal and vertical extent of soil contamination and dissolved phase ground water plume**	■	■
Graves Oil #9	**Define horizontal and vertical extent of soil contamination and dissolved phase ground water plume**	■	■

Non-Aqueous Phase Petroleum Hydrocarbon Liquid (NAPL) and Petroleum Saturated Soil Removal (GWPA Phase 2)

Example New Mexico PST NAPL & Petroleum Saturated Soil Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Elwell Site	Petroleum saturated soil removal	■	■
Thriftway 183	NAPL and saturated soil removal	■	■
Sullivan Stables	NAPL recovery system design and implementation	■	■
Graves Oil Miller Avenue Bulk Plant	NAPL and saturated soil removal	■	■
Graves Oil #1	NAPL removal		■
BJ Services	NAPL removal		■

Reclamation System Design and Implementation (GWPA Phase 3 & Phase 4)

Example New Mexico PST Remediation Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Peerless Tyre 4th St.	Air sparging/soil vapor extraction system design, implementation, O&M	■	■
Fina Truckstop	SVE pilot testing, NAPL recovery testing, full scale system design, implementation oversight		■
Texaco Ruidoso	Air sparging/soil vapor extraction /pump and treat system design, implementation, O&M	■	■
Graves Oil Miller Avenue Bulk Plant	Contaminated soil excavation, oxidant treatment	■	■
Tucumcari City Yard	Bioremediation system design, implementation, O&M	■	■

Site & Remediation System Monitoring (GWPA Phase 5)

Sample New Mexico PST Site & Remediation Monitoring Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Peerless Tyre Cerrillos Rd.	Dissolved phase plume monitoring	■	■
NMDOT Maintenance Yard, Encino	Dissolved phase plume monitoring, air sparging/soil vapor extraction system operation	■	■

Texaco Ruidoso	Dissolved phase plume monitoring, air sparging/soil vapor extraction system and pumping/air stripping system operation	▪	▪
NMDOT Yard, Farmington	Dissolved phase plume monitoring		▪
Alliance Monument Well Service	Dissolved phase plume monitoring		▪

Expert Witness Testimony

Mr. Allan has given depositions and been an expert technical witness on several occasions. He has provided testimony during discovery proceedings for two petroleum storage tank release cases and one case involving chlorinated pesticide contamination. He has also provided expert witness testimony in a hearing addressing hydrogeologic concerns and the setback of a liquid waste disposal system from a nearby domestic supply well. Mr. Allan has prepared detailed hydrogeologic reports documenting regional and local ground water flow patterns, subsurface geologic conditions, and local meteorological conditions in conjunction with his expert testimony.

Karl E. Tonander, P.G., P.E., C.P.G.

Senior Vice President/Chief Operations Officer/Principal Geoscientist

YEARS OF EXPERIENCE

Total 23
With Firm 21

EDUCATION

M.S.-Mineral Engineering
New Mexico Institute of Mining and Technology
Socorro, NM
1993

B.S.-Geological Engineering
New Mexico Institute of Mining and Technology
Socorro, NM
1991

LICENSES AND REGISTRATIONS

Professional Geologist-Alaska (PG-487)
Professional Geologist-Louisiana (PG-443)
Professional Geologist-Texas (PG-563)
Professional Geologist-Utah (5355949-2250)
Professional Geologist-Washington (PG-1509)
Professional Geologist-Wyoming (PG-2606)
Professional Engineer-Colorado (48460)
Professional Engineer-New Mexico (18742)
Professional Engineer-Texas (102725)
Professional Engineer, Civil-Arizona (49014)
American Institute of Professional Geologists-Certified Professional Geologist (CPG-10220)
(Former) New Mexico Certified Scientist (008)
-active throughout NMED Certified Scientist program

PROFESSIONAL AFFILIATIONS/ORGANIZATIONS

Member, New Mexico Board of Licensure for Professional Engineers & Professional Surveyors 2014–present
Professional Engineers Committee 2014-present
Rules Committee 2015-present
Society for Mining, Metallurgy and Exploration
American Institute of Professional Geologists
(NM Section Vice President 2002, President 2003-2004, Acting President 2012)
National Ground Water Association
Hydrologist, Santa Fe County Mine Plan Review Board 1994-1996
Member, New Mexico Institute of Mining and Technology, Mineral Engineering Department Industry Advisory Board 2000–present
Member, New Mexico Institute of Mining and Technology, Environmental/Civil Engineering Department Industry Advisory Board 2014–present

SPECIALIZED TRAINING

24-Hour MSHA Surface Mine Site Worker Training
40-Hour OSHA Hazardous Waste Site Worker Training
8-Hour OSHA Hazardous Waste Site Supervisor Training
Arizona Qualified (Petroleum Storage Tank) Consultant
Colorado Petroleum Storage Tank Listed Consultant #5789
Texas Commission on Environmental Quality LPST Project Manager #PM0000245
Mine and Mill Closure 2-Day Short Course (Society for Mining, Metallurgy and Exploration)
Construction Inspection 4-Hour Short Course (Miller Engineers & Scientists)
Surface Mine Driver Safety Course (Phelps Dodge Mining Co.)

BACKGROUND

Mr. Tonander, a Professional Engineer in three states and a Registered Professional Geologist in six states, has been with Souder, Miller & Associates (SMA) since 1993, and is the Vice-President of SMA's environmental services division. He has a successful track record of working with both public and private clients to manage engineering and environmental issues in the development of a variety of infrastructure issues. Mr. Tonander provides engineering and regulatory oversight for road design, wastewater and water management projects including project scoping, design review, renewable resource evaluation, permitting, regulatory agency interaction and permitting, monitoring plan development, remedial action development, public meeting support and NEPA documentation development. He is a past president of the New Mexico Chapter of the American Institute of Professional Geologists and has taught technical classes for the New Mexico Water and Wastewater Association and New Mexico Rural Water Association.

AREAS OF SPECIALTY

Reclamation System Design and Implementation
Environmental/Geotechnical Site Assessment and Field Methods
Groundwater Hydrology
Geophysical Site Characterization
Project Management

NEW MEXICO PETROLEUM STORAGE TANK (PST) PROGRAM EXPERIENCE

Investigation (GWPA Phase MSA & Phase 1)

While with Souder, Miller & Associates (SMA), Mr. Tonander has conducted, managed or provided senior and/or principal oversight on over 250 soil and groundwater investigations involving potential and identified underground storage tanks, aboveground storage tanks, hazardous, and solid waste contamination in Arizona, Colorado, New Mexico, and Texas. His investigative experience involves analysis and interpretation of field and laboratory data, report construction and review, and supervision of personnel during the installation of exploratory soil borings and monitoring wells, and subsequent testing activities. Clients have ranged from small private clients and individuals to municipalities, state and federal governments, and Fortune 500 companies.

Mr. Tonander is familiar with and has successfully employed several drilling methods on various projects, including:

- Hollow Stem Auger
- Sonic (dry or with fluid)
- Air Rotary (coring and tri-cone)
- Mud Rotary
- Cable Tool
- Percussion with Casing Advance
- Direct Push/Geoprobe

Borings (and wells) completed under his direction have varied from just a few feet in depth to over 1,000 feet and have been completed in a variety of well diameters from two to twelve inches. He has designed and installed nested wells and has worked in a wide range of lithologies including unconsolidated sediments, volcaniclastic sediment, competent strata, cobbles, fault zones and fractured rock.

In addition to these typical investigations, Mr. Tonander has also completed several soil vapor investigations, surface water sampling investigations, and geophysical investigations including a variety of geophysical equipment such as seismographs, magnetometers, and gravitometers as well as various computer software used in the reduction of geophysical field data. He has used several in-situ soil sampling techniques including split spoon sampling, continuous sampling, slide-hammer and shelby tube. He has completed soil sampling and groundwater sampling involving a variety of EPA approved methodologies as well as aquifer characterization using pump tests and slug tests. He has used a variety of computer programs in the review of these tests including Aqtesolv and Modflow.

Mr. Tonander has completed extensive course and field work in soil mechanics, rock mechanics, foundation design, slope stability and underground excavation design. While a student at New Mexico Institute of Mining and Technology he spent three years as the field instructor for engineering surveying, providing instruction on data reduction and proper use of steel tape, dumpy levels, auto levels, transits, theodolites, electronic distance measuring devices (EDMs), and total stations. He has experience collecting and reducing data for topographic studies, level loops, structural surveys, and system layouts pertaining to PST release sites.

Following completion of the investigation, Mr. Tonander has authored and reviewed reports from simple initial investigations to complex secondary investigations involving several commingled contaminant plumes. His investigative experience involves analysis and interpretation of field and laboratory data, map development, and client management. He has also completed and overseen many access agreements for private and public lands, including city, county, state and federal properties. He has developed health & safety plans to reflect site-specific conditions, traffic control plans as required by the New Mexico Department of Transportation (NMDOT), and utility clearances through New Mexico One-Call, private companies and local municipalities.

Sample New Mexico PST Investigation Projects

Site	Activity	Support Level		
		Field (Implementation)	Project (Design)	Senior/Principal (Oversight)
ABC Automotive, Las Cruces	MSA, Groundwater Monitoring		■	■
AB Garage, Artesia	MSA, Secondary Investigation (Soil), Groundwater Monitoring, Slug Testing		■	■
Adobe Ranch, Catron County	MSA	■	■	■
Akela Flats, Akela	MSA, Secondary Investigation (Soil), Groundwater Monitoring		■	■

Alvarez Garage, Mesilla	Secondary Investigation (Soil), Groundwater Monitoring			■
Amador Bulk Plant	MSA, Groundwater Monitoring			■
Arkansas Junction, Hobbs	MSA, Groundwater Monitoring			■
Badger Welding, Hobbs	Groundwater Monitoring			■
Binns Construction, Las Cruces	MSA	■	■	■
Boone Transportation, Anthony	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Border Cowboy, Anthony	MSA, Secondary Investigation (Soil), Groundwater Monitoring		■	■
Brewer Holiday Chevron, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring		■	■
Brewer Palms Shell, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring		■	■
Brewer Self Serve #1, Carlsbad	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Brewer Self Serve #6, Roswell	Secondary Investigation (Soil), Groundwater Monitoring			■
Broadway Texaco, Truth or Consequences	Secondary Investigation (Soil), Groundwater Monitoring			■
Capitan Estates MHP, Capitan	Emergency Response Groundwater Sampling & Water Supply	■	■	■
Chevron Red River, Red River	Groundwater Monitoring	■		
Chevron Self Serve, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring, Tier 2		■	■
Chucky's Diamond Shamrock, Doña Ana	MSA			■
City Market, San Miguel	Groundwater Monitoring	■	■	■
Cliff's Exxon, Carlsbad	Groundwater Monitoring			■
Columbus Fina, Columbus	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Contract Carriers, Albuquerque	Groundwater Monitoring	■		
Criswell Grocery, Garfield	MSA, Secondary Investigation (Soil), Groundwater Monitoring	■	■	■
Doña Ana County Transportation Yard, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring	■	■	■
Downtown T or C, Truth or Consequences	Soil & Groundwater Investigation, Geoprobe	■	■	■
Eagle Quik Mart, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring			■
Elwell Property, Bernalillo	Groundwater Monitoring	■		
Evans Texaco, Artesia	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Fairacres Post Office, Fairacres	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Farm & Ranch, Truth or Consequences	Secondary Investigation (Soil), Groundwater Monitoring			■
Fuel Center Plus, Silver City	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Gila Mill Works, North Hurley	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Gonzales Self Serve, Deming	Secondary Investigation, Groundwater Monitoring			■

Halliburton Services, Artesia	Groundwater Monitoring	■	■	■
Helweg & Farmer Transportation, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring	■	■	■
Highway Texaco, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring		■	■
Hobbs Fire Station #3, Hobbs	MSA, Groundwater Monitoring			■
Hobbs Garage Complex, Hobbs	Secondary Investigation (Soil), Groundwater Monitoring			■
Hooter Brown's Truckstop, Raton	MSA, Secondary Investigation (Soil), Groundwater Monitoring	■	■	
Holloman Fina, Alamogordo	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Housley Silver City Bulk Plant, Silver City	Groundwater Monitoring			■
L & P Property, Las Cruces	MSA, Groundwater Monitoring	■	■	■
Little Giant, Artesia	MSA, Groundwater Monitoring			■
Loera's Texaco, Hanover	MSA	■	■	■
Lohman 66, Las Cruces	MSA			■
Lovelace Property, Fairacres	MSA, Secondary Investigation (Soil), Groundwater Monitoring, Vapor Monitoring			■
Martinez 66, Reserve	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Midtown Chevron, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Mimbres Store, Mimbres	MSA, Groundwater Monitoring			■
Mesilla 66, Mesilla	MSA, Secondary Investigation (Soil), Groundwater Monitoring	■	■	■
Peerless Isleta, Albuquerque	Groundwater Monitoring	■		
Petro/Piggy Bank, Carlsbad	Groundwater Monitoring	■	■	■
Poplar Fina, Deming	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Prince Street 66, Clovis	MSA			■
QVS Mobile Homes, Las Cruces	Secondary Investigation, Groundwater Monitoring			■
R. C. Sander's Trucking, Las Cruces	Secondary Investigation, Groundwater Monitoring	■	■	■
Reese Drive Texaco, Ruidoso	Secondary Investigation (Soil), Groundwater Monitoring	■	■	
Ritter Hatch Bulk Plant, Hatch	MSA, Groundwater Monitoring	■	■	■
Roswell Industrial Air Center, Roswell	Secondary Investigation, Groundwater Monitoring			■
Ross Bell Estate Sales, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring			■
Running Indian, Alamogordo	MSA	■	■	■
Savoy Truck Stop, Deming	MSA, Secondary Investigation (Soil)			■
Sharp Hatch Bulk Plant, Hatch	MSA, Secondary Investigation (Soil), Groundwater Monitoring		■	■
Shook Gas Card, Las Cruces	MSA, Groundwater Monitoring		■	■
Siesta RV Park, Mesilla	Secondary Investigation (Soil), Groundwater Monitoring		■	■
Snappy Mart #19, Silver City	MSA, Secondary Investigation (Soil),	■	■	■

	Groundwater Monitoring			
Speedy's Lohman, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring			▪
Stuckey's Deming, Deming	MSA, Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	▪
Sullivan Stables, Albuquerque	Groundwater Monitoring	▪		
SWIG Cotton, Deming	MSA, Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	
Town & Country Food Store #125, Lovington	MSA, Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	▪
Town & Country Food Store #138, Roswell	MSA		▪	
Town & Country Food Store #140, Roswell	MSA, Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	▪
Town & Country Food Store, Hobbs	MSA		▪	
Town & Country Food Store, Tucumcari	Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	
Triangle Truck Stop, Deming	MSA, Secondary Investigation (Soil), Groundwater Monitoring		▪	▪
Tucumcari City Yard, Tucumcari	Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	
Twin Tex Texaco, Las Cruces	MSA, Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	▪
University Texaco, Las Cruces	Secondary Investigation (Soil), Groundwater Monitoring, Soil Vapor Investigation, Geoprobe		▪	▪
U-Pump-It Belen, Belen	Groundwater Monitoring	▪		
U-Pump-It Central, Albuquerque	Secondary Investigation (Soil), Groundwater Monitoring	▪	▪	
US West, Santa Fe	MSA	▪		
Village of Ruidoso, Ruidoso	MSA, Secondary Investigation (Soil), Groundwater Monitoring			▪
Wallace Westwind, Las Cruces	MSA, Groundwater Monitoring		▪	▪
Westside Texaco, Lordsburg	MSA, Secondary Investigation (Soil), Groundwater Monitoring		▪	▪

Non-Aqueous Phase Petroleum Hydrocarbon Liquid (NAPL) and Petroleum Saturated Soil Removal (GWPA Phase 2)

Mr. Tonander has field support and project and/or senior oversight of NAPL characterization and recovery programs at over 25 petroleum storage tank release sites throughout the state. NAPL recovery programs have utilized hand bailing, passive recovery canisters, pneumatic recovery pumps (with and without vacuum enhancement), and soil vapor extraction. Choice of removal method has often been preceded by completion of formal NAPL bail down tests ranging from hours to weeks in duration.

On limited occasions, initial investigations have revealed significant quantities of petroleum saturated soil or have otherwise been viewed as appropriate for initial abatement activities. Mr. Tonander has provided all levels of oversight for projects involving initial excavation utilizing either on site treatment (e.g. thin spreading), or haulage and disposal at permitted facilities.

Sample New Mexico PST NAPL & Petroleum Saturated Soil Projects				
Site	Activity	Support Level		
		Field (Implementation)	Project (Design)	Senior/Principal (Oversight)
Boone Transportation, Anthony	Bail down Testing			■
Brewer Self Serve #1, Carlsbad	Bail down Testing, Hand Bailing, Passive Collection Canister	■		■
Brewer Self Serve #6, Roswell	Bail down Testing, Hand Bailing, Passive Collection Canister			■
Cliff's Exxon, Carlsbad	Bail down Testing, Hand Bailing, Passive Collection Canister			■
Fairacres Post Office, Fairacres	Bail down Testing, Hand Bailing, Passive Collection Canister	■		■
Gonzales Self Serve, Deming	Bail down Testing, Hand Bailing, Passive Collection Canister			■
Halliburton Services, Artesia	Bail down Testing, Hand Bailing, Belt Skimmer	■	■	
Holloman Fina, Alamogordo	Bail down Testing, Hand Bailing, Passive Collection Canister			■
Lovelace Property, Fairacres	Hand Bailing			■
Martinez 66, Reserve	Hand Bailing		■	■
Midtown Chevron, Las Cruces	Bail down Testing, Hand Bailing, Passive Collection Canister, Pneumatic Skimmer Pumps	■		■
L & P Property, Las Cruces	Initial Abatement Excavation	■	■	■
QVS Mobile Homes, Las Cruces	Bail down Testing			■
R. C. Sander's Trucking, Las Cruces	Bail down Testing, Hand Bailing, Passive Collection Canister	■	■	■
Roswell Industrial Air Center, Roswell	Bail down Testing, Hand Bailing, Pneumatic Skimmer Pumps			■
Ross Bell Estate Sales, Las Cruces	Bail down Testing			■
Snappy Mart #19, Silver City	Bail down Testing, Hand Bailing, Passive Collection Canister	■	■	■
Stuckey's Deming, Deming	Hand Bailing, NAPL Fingerprinting	■	■	■
SWIG Cotton, Deming	Bail down Testing, Hand Bailing, Passive Collection Canister	■	■	
Town & Country Food Store #125, Lovington	Hand Bailing	■	■	
Town & Country Food Store #140, Roswell	Bail down Testing, Hand Bailing, Passive Collection Canister	■	■	■
Twin Tex Texaco, Las Cruces	Hand Bailing, Passive Collection Canister	■	■	■
University Texaco, Las Cruces	Hand Bailing, Passive Collection Canister			■

Reclamation System Design and Implementation (GWPA Phase 3 & Phase 4)

In the past fifteen years, Mr. Tonander has provided project and/or senior level conceptual design, engineering, and implementation of over 30 soil and groundwater reclamation systems. His systems have employed various combinations of bioremediation, nutrient injection, excavation (transport & disposal and on-site thin spreading), total fluids recover, air sparging, soil vapor extraction (SVE), in-situ air stripping (ISAS), and pump & treat

technologies. Mr. Tonander bases design not only on available technology and engineering criteria, but also relies heavily on cost-effectiveness.

Mr. Tonander is familiar with a broad range of remediation equipment, including:

- Regenerative blowers
- Positive displacement blowers
- Fan blowers
- Liquid ring pumps
- Oil-less and oil-free compressors
- Pneumatic pumps
- Centrifugal pumps
- Metering pumps
- Air strippers
- Granular activated carbon filtration
- Thermal oxidation

Mr. Tonander has designed SVE systems for operation in a variety of soil types from silty clay through gravel and fractured rock, requiring vacuums of between 1 and 16 inches of mercury and flows of between 80 and 500 cubic feet per minute. Often he has also directed SVE pilot testing prior to final design. Recent pilot testing events have been completed using the SMA SVE pilot test unit that was constructed under his direction. System automation has ranged from simple systems requiring only a single mechanical time clock to complex systems utilizing PLUs, computers, and modem based telemetry.

He has successfully completed negotiations with numerous subcontractors for system implementation. In addition, he has handled and overseen permit development through the NMED Air Quality Bureau, NMED Ground Water Quality Bureau, NMED Solid Waste Bureau, New Mexico Office of the State Engineer, and NMDOT, as well as local municipalities and utilities.

Sample New Mexico PST Remediation Projects

Site	Activity	Support Level		
		Field (Implementation)	Project (Design)	Senior/Principal (Oversight)
AB Garage, Artesia	SVE & Air Sparging	■		■
Belen Emergency Response, Belen	Excavation & Total Fluids Recovery	■	■	■
Big Chief, Mescalero	Excavation & Total Fluids Recovery	■	■	■
Black Gold, Reserve	SVE with ISAS option			■
Chevron Red River, Red River	SVE & Air Sparging	■		
City Market, San Miguel	SVE & Air Sparging	■	■	■
Encino Patrol Yard, Encino	SVE & Air Sparging		■	■
Halliburton Services, Artesia	SVE & Air Sparging	■	■	
Highway Texaco & Foodmart, Bayard	SVE with ISAS option			■
Levi's Texaco, Wagon Mound	Groundwater Pump & Treat		■	
Lovelace Property, Fairacres	Excavation & Total Fluids Recovery	■		■
Reese Drive Texaco, Ruidoso	SVE & Air Sparging, Groundwater Pump & Treat, Nutrient Injection	■	■	■
Sullivan Stables, Albuquerque	SVE & Air Sparging	■		
SWIG Cotton, Deming	SVE		■	■
Town & Country, Tucumcari	Oxygen Releasing Compound		■	
Town & Country Food Store #125, Lovington	SVE & Air Sparging	■	■	■
Town & Country Food Store #140, Roswell	SVE & Air Sparging	■	■	■

Thriftway #183, Española	Excavation & Total Fluids Recovery			▪
Twin Tex Texaco, Las Cruces	Oxygen Releasing Compound, SVE with ISAS option	▪	▪	▪
University Texaco, Las Cruces	ISAS			▪
U-Pump-It Belen, Belen	Excavation with On-Site Treatment		▪	
U-Pump-It Central, Albuquerque	SVE		▪	
Wallace Westwind, Las Cruces	ISAS	▪		▪

Site & Remediation System Monitoring (GWPA Phase 5)

Mr. Tonander has directed and participated in monitoring plans ranging from single annual sampling events to complex monitoring involving numerous monitoring wells, private water supply wells, and remediation system sources. At the conclusion of compliance monitoring activities, he has developed and overseen workplans to complete final (confirmation) soil boring installation, monitoring well abandonment, and site restoration.

In addition to basic site monitoring, he has directed and participated in monitoring system operation and maintenance activities involving both the systems he has designed and those designed by others. He has developed remediation system startup plans involving frequent water and air quality sampling and long-term operational plans for sites requiring equipment replacement, expendable supplies (such as hydrogen peroxide and filtration), and regular mechanical part lubrication. At the conclusion of active remediation, Mr. Tonander has provided all levels of support for projects including system decommissioning, transmission line abandonment and removal, system well abandonment and removal, and equipment recovery and reuse.

Scott A. McKitrick, P.G.

Senior Geoscientist/Regional Environmental Services Manager

YEARS OF EXPERIENCE

Total 27
With Firm 13

EDUCATION

M.S.-Geology
New Mexico Institute of Mining and Technology
Socorro, NM
1996

B.S.-Geological Engineering
Colorado School of Mines
Golden, CO
1986

LICENSES AND REGISTRATIONS

Professional Geologist-UT (5554599-2250)
Colorado PST Listed Environmental Consultant (5976)

PROFESSIONAL AFFILIATIONS/ORGANIZATIONS

National Groundwater Association
Society for Mining, Metallurgy and Exploration

SPECIALIZED TRAINING

40-Hour OSHA HAZWOPER
8-Hour OSHA HAZWOPER Manager/Supervisor

BACKGROUND

Mr. McKitrick has more than twenty-five years of experience in geology, hydrogeology, and environmental engineering. Mr. McKitrick's role as a Senior Geoscientist at SMA includes overseeing a wide range of water supply and environmental projects throughout New Mexico. These projects have included hydrology studies, well siting, pilot and production well design, bidding, contract management, and supervision of well drilling and construction. Mr. McKitrick has spent time with the NMED Ground Water Quality Bureau (GWQB) with the responsibility of overseeing discharge plan requirements for many mine sites throughout New Mexico. He has worked as a mine geologist and geological engineer at several facilities in the southwest and is familiar with common reclamation techniques.

AREAS OF SPECIALTY

Geology
Remediation Technologies
Geochemistry
Petroleum Storage Tank Regulatory Compliance
Hydrogeologic Investigations
Contaminant Hydrogeology
Water Resource Planning and Water Well Design
Mining and Mining Environmental Issues
Project Management

Mr. McKitrick provides senior management of a variety of additional project types, including environmental assessments consistent with National Environmental Policy Act (NEPA) requirements, overseeing soil and groundwater remediation projects, solid waste projects, petroleum storage tank, and other contaminant hydrogeology projects, Phase I, II and III Environmental Site Assessments, soil and groundwater investigations, and environmental permitting. Mr. McKitrick supervises, provides project management, quality assurance and quality control for all aspects of environmental projects in the Central Region of SMA. Mr. McKitrick routinely works with New Mexico Environment Department (NMED), New Mexico Energy, Minerals and Natural Resources Department (EMNRD), New Mexico Office of the State Engineer (NMOSE), New Mexico Department of Transportation (NMDOT), and the United States Environmental Protection Agency (EPA). He is familiar with the interpretation of numerous state and federal environmental regulations and permitting requirements.

NEW MEXICO PETROLEUM STORAGE TANK (PST) PROGRAM EXPERIENCE

Investigation (GWPA Phase MSA & Phase 1)

While with Souder, Miller & Associates (SMA) and the Ground Water Quality Bureau of the New Mexico Environment Department, Mr. McKitrick has supervised and conducted numerous soil and ground water investigations involving potential and confirmed underground and above ground storage tank releases as well as other contaminants. He has completed field drilling and hand auger projects at numerous sites in New Mexico

including Fina Truck Stop (Albuquerque), Thriftway #220 (Farmington), Edgewood Dairy Queen (Edgewood), Gallup Emergency Response 2003 (Gallup), and numerous others. During his employment at SMA, Mr. McKitrick has provided project or senior level oversight at investigations at approximately 45 petroleum storage tank release sites throughout the state, as well as in surrounding states.

Mr. McKitrick is familiar with and has successfully employed several drilling methods on various projects, including:	
▪ Hollow Stem Auger	▪ Mud Rotary
▪ Direct-Push/Geoprobe	▪ Air Rotary (traditional and reverse-circulation)
▪ Percussion with Casing Advance	

Borings have varied from just a few feet in depth to over 200 feet and have been completed in a variety of well diameters. He has designed and installed nested wells and has worked in a wide range of lithologies including unconsolidated sediments, volcaniclastic sediment, competent strata, cobbles, fault zones and fractured rock.

In addition to these typical investigations, Mr. McKitrick is also well versed in soil vapor investigations, surface water sampling investigations, and geophysical investigations including a variety of geophysical equipment such as magnetometers, gravitometers, VLF equipment as well as various computer software used in the reduction of geophysical field data. He has used several in-situ soil sampling techniques including split spoon sampling, continuous sampling, slide-hammer and shelby tube. He has completed soil sampling and groundwater sampling involving a variety of EPA approved methodologies as well as aquifer characterization using pump tests and slug tests. Additionally he was designed and conducted investigations into hydrocarbon impacts to sewer systems.

Following completion of investigations, Mr. McKitrick has authored and reviewed reports from simple initial investigations to complex secondary investigations. His investigative experience involves analysis and interpretation of field and laboratory data, map development, and client and regulatory management. He has also completed and overseen many access agreements for private lands. He has developed health & safety plans to reflect site-specific conditions, and utility clearances through New Mexico One-Call, private companies and local municipalities.

Sample New Mexico PST Investigation Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Giant #295, Milan	Secondary investigation – Monitoring Well and SVE Well Installation, Groundwater Monitoring	▪	▪
Thriftway #220, Farmington	Secondary Investigation – Monitoring Well Installation, Groundwater Monitoring	▪	▪
Edgewood Dairy Queen, Edgewood	Secondary Investigation – Monitoring Well Installation, Groundwater Monitoring, Well Abandonment	▪	▪
Gallup Emergency Response, Gallup	Sewer vapor investigation, direct push boring installation, sewer camera investigation, development of GIS layer	▪	▪
Herrera Site, Pojoaque	MSA – Soil Boring and Monitoring Well Installation, Groundwater Monitoring		▪
Mustang #7557, Gallup	MSA – Soil Boring Installation	▪	▪

Bowlin Edgewood Travel Center, Edgewood	MSA – Monitoring Well Installation, Groundwater Monitoring	▪	▪
Arroyo Hondo Site, Santa Fe	Monitoring Well and SVE Well Installation, Groundwater Monitoring		▪
Gallup-McKinley School District Sites, Gallup	MSA – Soil Boring and Monitoring Well Installation, Groundwater Monitoring		▪
Gilliam Property, Belen	MSA – Soil Boring and Monitoring Well Installation, Groundwater Monitoring, additional monitoring wells after remediation		▪
La Linda Texaco, Gallup	Secondary Investigation – Monitoring Well and Remediation Well Installation, Groundwater Monitoring		▪
S&L Service Station, Belen	MSA, Secondary Investigation – Monitoring Well and ISAS Well Installation, Groundwater Monitoring		▪

Non-Aqueous Phase Petroleum Hydrocarbon Liquid (NAPL) and Petroleum Saturated Soil Removal (GWPA Phase 2)

Mr. McKitrick has conducted field support, project and/or senior oversight of NAPL characterization and recovery programs at numerous petroleum storage tank release sites throughout the state. NAPL recovery programs have utilized hand bailing, passive recovery canisters, pneumatic recovery pumps, and soil vapor extraction. Choice of removal method has often been preceded by completion of pilot testing, including NAPL bail down testing and SVE pilot testing.

Sample New Mexico PST NAPL & Petroleum Saturated Soil Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Fina Truck Stop, Albuquerque	Bail Down Testing, Design, Installation and Operation of Pneumatic NAPL Recovery Pumps		▪
Thriftway #220 Site, Farmington	SVE Pilot Testing for NAPL Removal, Bail Down Testing	▪	▪
Thriftway #290 Site, Gallup	Operation of Pneumatic NAPL Recovery Pump, Installation of Passive Collection Canisters	▪	▪
Thriftway #209 Site, Kirtland	Bail Down Testing, Installation of Passive Collection Canisters		▪
Giant #295 Site, Milan	SVE Pilot Testing for NAPL Removal	▪	▪
Sky Chief Texaco, Springer	Hand Bailing		▪
Bob Dalton Site, Las Vegas	Hand Bailing		▪
La Linda Texaco, Gallup	MPE Pilot Testing for NAPL Removal, Hand Bailing		▪

Reclamation System Design and Implementation (GWPA Phase 3 & Phase 4)

Mr. McKitrick has provided project and/or senior level conceptual design, engineering and operation and maintenance of several soil and groundwater reclamation systems. Systems have employed various combinations of bioremediation, air sparging, and soil vapor extraction (SVE).

Mr. McKitrick is familiar with a broad range of remediation equipment, including:

- Regenerative blowers
- Positive displacement blowers
- Fan blowers
- Liquid ring pumps
- Oil-less and oil-free compressors
- Thermal oxidation
- Pneumatic pumps
- Centrifugal pumps
- Metering pumps
- Air strippers
- Granular activated carbon filtration

Sample New Mexico PST Remediation Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Encino Patrol Yard, Encino	SVE, Air Sparging	■	
G & G Auto, Farmington	SVE		■
U-Pump-It Central, Albuquerque	SVE	■	■
Arroyo Hondo Site, Santa Fe	SVE		■
S&L Service Station, Belen	In-Situ Air Sparging	■	■
Gilliam Property, Belen	Contaminated soil excavation		■
Sunshine Station, Ribera	Contaminated soil excavation		■
Thriftway #183, Española	Contaminated soil excavation		■
Los Ranchos de Albuquerque Fire Station	Contaminated soil excavation		■

Site & Remediation System Monitoring (GWPA Phase 5)

Mr. McKitrick has directed and participated in monitoring plans ranging from single annual sampling events to complex monitoring involving numerous monitoring wells and private water supply wells. At the conclusion of compliance monitoring activities, he has developed and overseen workplans to complete final site closure including monitoring well abandonment, and site restoration.

Sample New Mexico PST Site & Remediation Monitoring Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Arroyo Hondo Site, Santa Fe	SVE System, Groundwater Monitoring		■
Bob Dalton Site, Las Vegas	Groundwater Monitoring		■
Bowlin Edgewood Travel Center, Edgewood	Groundwater Monitoring	■	■
Edgewood Dairy Queen, Edgewood	Groundwater Monitoring, Monitoring Well Abandonment	■	■
El Rancho Shell, Gallup	Groundwater Monitoring	■	■
Elwell Site, Bernalillo	Groundwater Monitoring		■
Encino Patrol Yard, Encino	SVE, Air Sparging System, Groundwater Monitoring		■
Fina Truck Stop, Albuquerque	Pneumatic NAPL Recovery System, Groundwater Monitoring	■	■
G & G Auto, Farmington	Groundwater Monitoring		■
Gas N Save, Gallup	Groundwater Monitoring		■
Giant #295, Milan	Groundwater Monitoring		■

Graves #1, Farmington	Groundwater Monitoring		▪
Graves #4, Farmington	Groundwater Monitoring		▪
Kears Exxon, Clayton	Groundwater Monitoring		▪
Kokoman Site, Pojoaque	Groundwater Monitoring		▪
Marshall's Texaco, Gallup	Groundwater Monitoring		▪
Martinez Country Store, Canjillon	Groundwater Monitoring		▪
Peerless Tyre Cerrillos Rd., Santa Fe	Groundwater Monitoring		▪
Peerless Tyre Isleta, Albuquerque	Groundwater Monitoring		▪
Russell's One Stop, Cimarron	Groundwater Monitoring		▪
Sky Chief Texaco, Springer	Groundwater Monitoring		▪
Town & Country, Tucumcari	Groundwater Monitoring		▪
Thriftway #183, Española	Groundwater Monitoring		▪
Thriftway #199, Farmington	Groundwater Monitoring		▪
Thriftway #209, Kirtland	Groundwater Monitoring		▪
Thriftway #217, Kirtland	Groundwater Monitoring		▪
Thriftway #220, Farmington	Groundwater Monitoring		▪
Thriftway #240, Farmington	Groundwater Monitoring		▪
Thriftway #290, Gallup	Groundwater Monitoring		▪
Tucumcari City Yard, Tucumcari	Groundwater Monitoring		▪
U-Pump-It Central	Groundwater Monitoring		▪
Vasile's Chevron, Albuquerque	Groundwater Monitoring		▪
Bar-F, Socorro	Groundwater Monitoring		▪
Bernalillo County Dead Man's Curve	Groundwater Monitoring		▪
Bernalillo County East Command Center	Groundwater Monitoring		▪
Bernalillo County Lee and Blakely Site	Groundwater Monitoring		▪
Conoco Mini-Mart, Chama	Groundwater Monitoring		▪
Gilliam Property, Belen	Groundwater Monitoring		▪
La Linda Texaco, Gallup	Groundwater Monitoring		▪
Las Vegas Warehouse, Las Vegas	Groundwater Monitoring		▪
Maxwell Gulf, Maxwell	Groundwater Monitoring		▪
NMBHI, Las Vegas	Groundwater Monitoring		▪
NMDOT Quemado Yard, Quemado	Groundwater Monitoring		▪
Ortiz Gulf, Pecos	Groundwater Monitoring		▪
Red River Chevron, Red River	Groundwater Monitoring		▪
Rigdon Texaco, Tucumcari	Groundwater Monitoring		▪
Ross Oil, Las Vegas	Groundwater Monitoring		▪
S&L Service Station, Belen	ISAS System, Groundwater Monitoring		▪
Sunshine Station, Ribera	Groundwater Monitoring		▪
Valencia County Road Dept., Los Lunas	Groundwater Monitoring		▪

Expert Witness Testimony

Mr. McKitrick has given depositions and been an expert technical witness on several occasions, both in District Court and at public hearings before the New Mexico Environment Department. He has prepared hydrologic and geochemical technical reports in support of his testimony.

Alan J. Eschenbacher, P.G.

Senior Geoscientist

YEARS OF EXPERIENCE

Total 18
With Firm 15

EDUCATION

M.S.-Geochemistry
New Mexico Institute of Mining and Technology
Socorro, NM
1999

B.S.-Geology
University of Minnesota
1996

LICENSES AND REGISTRATIONS

Professional Geologist-Minnesota (44604)
Professional Geologist-Texas (11497)

PROFESSIONAL AFFILIATIONS/ORGANIZATIONS

Geological Society of America
National Ground Water Association

SPECIALIZED TRAINING

24-Hour MSHA Open Pit Mine Safety Training
40-Hour OSHA HAZWOPER

BACKGROUND

Mr. Eschenbacher's role as a Senior Geoscientist at Souder, Miller & Associates (SMA) includes conducting and overseeing a wide range of environmental projects. These projects have included active and abandoned mine projects, solid waste, petroleum storage tank and other contaminant hydrogeology projects, Phases I, II, and III Environmental Site Assessments, soil and groundwater investigations, overseeing soil and groundwater remediation projects, and preparing discharge permits. Mr. Eschenbacher provides project management, quality assurance, and quality control for all aspects of environmental projects.

AREAS OF SPECIALTY

Geology
Hydrology
Geochemistry
Groundwater Contamination Investigation

NEW MEXICO PETROLEUM STORAGE TANK (PST) PROGRAM EXPERIENCE

Investigation (GWPA Phase MSA & Phase 1)

Mr. Eschenbacher has conducted and/or participated in nearly one hundred environmental investigations related to petroleum, mining, agricultural chemical, electronics manufacturing, and other sites. These investigations involved sampling, monitoring, analyses of soil, ground water, surface water, air, unknown materials and were conducted in New Mexico, Minnesota, Wisconsin, North Dakota, and Kansas. Typical sites involved in these investigations include: petroleum refining, pipeline, and retail facilities, mines, agricultural chemical distributors, and manufacturing. Satisfied clients include: U.S. Steel, Honeywell, DuPont, Marathon-Ashland, Unocal, Agriliance, Land-O-Lakes, Enbridge Energy, and Chevron-Texaco.

Mr. Eschenbacher is familiar with and has successfully employed several drilling methods on various projects, including:

- Direct-Push/Geoprobe
- Air and Mud Rotary (coring and tri-cone)
- Sonic (dry or with fluid)
- Dual-Tube Percussion
- Hollow Stem Auger

Sample New Mexico PST Investigation Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Arroyo Hondo Site, Santa Fe	Additional investigation, well installation, geophysics survey	■	■
Wilfred Padilla Fina, Santa Fe	MSA investigation	■	■
Sunshine Station, Ribera	Soil boring investigation	■	■
Milan Emergency Response, Milan	Well installation at suspect release sites	■	
Sharp Oil-Midtown Chevron, Las Cruces	MSA & Secondary Investigations	■	■
Lovelace Property, Fairacres	MSA & Secondary Investigations	■	■
Fairacres Post Office, Fairacres	MSA Investigation	■	■
Ross Bell Estate Sales, Las Cruces	MSA Investigation	■	■
Eagle Qwik Mart, Las Cruces	MSA & Secondary Investigations	■	■
Martinez 66, Reserve	Secondary Investigation		■
Westside Texaco, Lordsburg	Secondary Investigation	■	■
Savoy Truck Stop, Deming	Secondary Investigation		■
Snappy Mart #19, Silver City	Secondary Investigation	■	■
Sharp Oil-Border Cowboy, Anthony	MSA & Secondary Investigations	■	■
Ortiz Gulf, Pecos	Secondary Investigation	■	■

Non-Aqueous Phase Petroleum Hydrocarbon Liquid (NAPL) and Petroleum Saturated Soil Removal (GWPA Phase 2)

Mr. Eschenbacher has conducted field support, project and/or senior oversight of NAPL characterization and recovery programs at numerous petroleum storage tank release sites throughout the state. NAPL recovery programs have utilized hand bailing, passive recovery canisters, pneumatic recovery pumps, and soil vapor extraction. Choice of removal method has often been preceded by completion of pilot testing, including NAPL bail down testing and SVE pilot testing.

Sample New Mexico PST NAPL & Petroleum Saturated Soil Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Thriftway #220 Site, Farmington	SVE Pilot Testing for NAPL Removal	■	■
Santa Fe Judicial Complex, Santa Fe	Bail Down Testing, Design, Installation and Operation of Pneumatic NAPL Recovery Pumps, Installation of Passive Collection Canisters	■	■
Sharp Oil-Midtown Chevron, Las Cruces	Baildown Testing, Hand Bailing	■	■
Martinez 66, Reserve	Baildown Testing, Hand Bailing	■	■
Giant #295 Site, Milan	Bail Down Testing, Design, Installation and Operation of Pneumatic NAPL Recovery Pumps	■	■
Sunshine Station, Ribera	Installation of Passive Collection Canister	■	■
Arroyo Hondo Site, Santa Fe	Installation of Passive Collection Canister	■	■

Reclamation System Design and Implementation (GWPA Phase 3 & Phase 4)

Mr. Eschenbacher has provided assistance, supervision, oversight, and design for over twenty reclamation systems and their implementation. These systems were designed and built for remediation projects involving gasoline, crude oil, coal tar, polychlorinated biphenyls, pentachlorophenol, ammonia, pesticides and utilized various methodologies including bioremediation, nutrient injection, excavation, non-aqueous phase liquid (NAPL) recovery, air sparging, soil vapor extraction (SVE) including passive and active air injection, *in situ* air stripping (ISAS), and 'pump & treat' procedures. Components of remediation systems included programmable logic controllers (PLCs), vacuum pumps, submersible pumps, gas and/or liquid flow meters, on-board analyzers, computers, remote data transmission devices. Mr. Eschenbacher implemented these remediation systems in/at a variety of sites including petroleum storage tank sites, refineries, pipelines, rail yards, and chemical distribution facilities.

Mr. Eschenbacher is familiar with a broad range of remediation equipment, including:

- Regenerative blowers
- Positive displacement blowers
- Fan blowers
- Liquid ring pumps
- Oil-less and oil-free compressors
- Thermal oxidation
- Pneumatic pumps
- Centrifugal pumps
- Metering pumps
- Air strippers
- Granular activated carbon filtration

Sample New Mexico PST Remediation Projects

Site	Activity	Support Level	
		Field (Implementation)	Project/Senior (Design/Oversight)
Arroyo Hondo Site, Santa Fe	SVE system installation, O&M	■	■
City Market, San Miguel	SVE, Air Sparging O&M	■	■
S&L Service Station, Belen	SVE/ISAS system installation	■	■
Reese Drive Texaco, Ruidoso	SVE, Air Sparging, Air Stripping O&M	■	■
Graves Oil Miller Avenue Bulk Plant	SVE Pilot Testing	■	
Sunshine Station, Ribera	MPVE Pilot Testing, Excavation	■	■
La Linda Texaco, Gallup	SVE Pilot Testing	■	
Big Chief Store, Mescalero	Excavation	■	
Diamond Shamrock, Belen	Excavation	■	■
Highway Texaco Food Mart, Bayard	SVE system installation	■	■
Town & County, Roswell	SVE system installation, O&M	■	■

Site & Remediation System Monitoring (GWPA Phase 5)

Mr. Eschenbacher has directed and participated in monitoring plans ranging from single annual sampling events to complex monitoring involving numerous monitoring wells and private water supply wells. At the conclusion of compliance monitoring activities, he has developed and overseen workplans to complete final site closure including monitoring well abandonment, and site restoration. Site monitoring activities have also included vapor intrusion testing and monitoring associated with various types of sites. He has completed vapor intrusion monitoring at: Shoreham Yards (Former Lease Area), Minneapolis, MN, Hatch Public Schools, Hatch, NM, Lovelace LPST site, Fairacres, NM, and various brownfield remediation sites.

Sample New Mexico PST Site & Remediation Monitoring Projects			
Site	Activity	Support Level	
		Field (Implementation)	Project (Design/Oversight)
Arroyo Hondo Site, Santa Fe	SVE system O&M, monitoring	■	■
Ortiz Gulf, Pecos	Monitoring	■	■
Wilfred Padilla Fina, Santa Fe	Monitoring	■	■
Sunshine Station, Ribera	Monitoring	■	■
Porter Oil, Mesilla 66, Mesilla	Monitoring	■	■
Diamond Shamrock, Belen	Emergency Response Excavation	■	■
Santa Fe County Judicial Complex	Monitoring	■	■
Giant #295, Milan	Groundwater Monitoring	■	■
Lovelace Property, Fairacres	Over-excavation, groundwater monitoring	■	■
Peerless Tyre Cerrillos Rd., Santa Fe	Groundwater Monitoring		■
Sharp Oil, Midtown Chevron, Las Cruces	Groundwater Monitoring	■	■
Martinez 66, Reserve	Groundwater Monitoring	■	■
Sharp Oil-Border Cowboy, Anthony	Groundwater Monitoring	■	■
RC Sanders Trucking, Las Cruces	Groundwater Monitoring	■	
North Main Self Serve, Las Cruces	Groundwater Monitoring	■	
Ross Bell Estate Sales, Las Cruces	Groundwater Monitoring, Site Closure	■	■
Doña Ana County Transportation Yard, Las Cruces	Groundwater Monitoring	■	
Highway Texaco, Las Cruces	Groundwater Monitoring	■	■
University Chevron, Las Cruces	Groundwater Monitoring	■	
Alvarez Garage, Mesilla	Groundwater Monitoring	■	■
Gila Mill Works, Hurley	Groundwater Monitoring	■	■
Snappy Mart #19, Silver City	Groundwater Monitoring	■	■
Westside Texaco, Lordsburg	Groundwater Monitoring	■	■
Big Chief Store, Mescalero	Groundwater Monitoring	■	
Capital 66, Santa Fe	Groundwater Monitoring	■	■
210 and 218 Montezuma Avenue, Santa Fe	Groundwater Monitoring	■	■

Emme M. Mayle, R.G.
STAFF GEOSCIENTIST

AREAS OF SPECIALTY

- Soil and Groundwater Investigation and Remediation
- Petroleum Storage Tank (PST) Investigation and Remediation
- Geophysical Investigations
- Environmental Site Assessments
- Technical Report Preparation
- GIS Map Creation and Editing
- Solid Waste Services

YEARS OF EXPERIENCE: 4

EDUCATION
M.S.-Geospatial Sciences/Hydrogeology
Missouri State University
Springfield, MO
2014

B.S.-Geology
Missouri State University
Springfield, MO
2012

LICENSES AND REGISTRATIONS
Registered Geologist –Missouri (2018031062)

SPECIALIZED TRAINING
40-Hour OSHA Hazardous Waste Site Worker Training
8-Hour PEC SafeLandUSA Oil/Gas Safety Training
Hydrogen Sulfide Safety Training in Accordance with ANSI Z390.1-2009(R2017)

BACKGROUND

Ms. Mayle is a Staff Geoscientist with SMA and has over four years of professional experience covering a wide range of environmental and hydrogeological projects throughout New Mexico, Washington, and Missouri. These projects have included solid waste projects, petroleum storage tank and other contaminant hydrogeology projects, soil and groundwater investigations and soil and groundwater remediation projects. Ms. Mayle has provided staff support, quality assurance and quality control for all aspects of these projects.

SELECT EXPERIENCE

PST and Solid Waste Investigation

While with SMA, Ms. Mayle has conducted numerous soil and ground water investigations involving potential and confirmed underground storage tank release sites throughout New Mexico. She has completed field groundwater and soil monitoring at several sites in the area including PST release sites in Bernalillo County, Gallup, NM, and Reserve, NM. Ms. Mayle has been involved in many of these processes from the proposal or work plan phase through to final reporting.

Ms. Mayle has also been involved in groundwater monitoring and permit renewal/modification for Solid Waste Facilities such as the City of Las Vegas, NM, Transfer Station, the Roswell, NM, Municipal Landfill, and the Valencia County, NM, Landfill.

Borings and groundwater monitoring wells completed under her direction have varied from just a few feet in depth to over 100 feet in a wide range of lithologies including unconsolidated sediments, competent strata, and fractured rock. She has also completed soil and groundwater quality sampling involving a variety of EPA approved methodologies.

Ms. Mayle has experience in field soil sampling methods of volatile organic compounds (VOCs) using a photo-ionization detector (PID). Her groundwater sampling experience includes use of oil/water interface probes and water level meters and sampling methods involving hand bailer, submersible, dedicated low-flow, and Waterra pumps. Ms. Mayle also has experience sampling and analyzing surface water in Missouri streams.

Following completion of the field work associated with petroleum storage tank and solid waste facility investigations, Ms. Mayle has helped author and review numerous summary reports from simple initial investigations to complex secondary investigations. Her investigative experience involves analysis and interpretation of field and laboratory data, site map development, contaminant map development, potentiometric surface calculations, and interaction with state, county and municipal regulatory agencies.

Non-Aqueous Phase Petroleum Hydrocarbon Liquid (NAPL) and Petroleum Saturated Soil Removal
Ms. Mayle has field support experience of NAPL characterization and recovery programs at several petroleum storage tank release sites in the region. Her experience with NAPL removal activities includes removal by periodic hand-bailing and maintenance of passive recovery canisters.

Reclamation System Implementation
Ms. Mayle has provided field support for implementation of soil and groundwater reclamation systems. Her experience with reclamation systems includes direct oversight of excavation with off-site transport & disposal of contaminated soils, use of in-situ chemical oxidation methods, bioremediation techniques, requisition of state, county and municipal permits, data analysis and report preparation.

Site & Remediation System Monitoring
Ms. Mayle has participated in a variety of groundwater monitoring plans ranging from single annual sampling events to complex monitoring involving numerous monitoring wells, private water supply wells, low-flow sampling, no-purge sampling, and remediation system monitoring. At the conclusion of compliance groundwater monitoring activities, she has developed quarterly reports and overseen monitoring well abandonment and site restoration. In addition to basic groundwater and geological monitoring, Ms. Mayle has also worked on various geophysical projects, including Electrical Resistivity Tomography and Multichannel Analysis of Surface Waves evaluations to identify potential karst hazards in the Missouri subsurface at depths of up to 600 feet below ground surface.

Environmental Site Assessments (Phase I/II)
Ms. Mayle conducts environmental and historical record reviews for Phase I and limited Phase II Environmental Assessment Reports in accordance with ASTM E1527 and E1528, and has assisted in site investigations for both Phase I and II Environmental Assessment Reports. Ms. Mayle has evaluated properties ranging from single-use developments in small towns to complex commercial properties in central Albuquerque, NM.

SELECT PROJECTS

Bernalillo County Phase I and Limited Phase II Environmental Site Assessments, 500 Silver Ave. SW and 225 5th St. SW, Albuquerque, NM
Performed Phase I Environmental Assessment Reports for two properties located in central Albuquerque, New Mexico, including historical and environmental review and site walk-through investigation. Performed further soil boring investigation at 500 Silver Ave. SW site to confirm lack of Recognized Environmental Conditions.

Taos Waste Water Treatment Facility Groundwater Monitoring Well Assessment, Rancho de Taos, NM
Completed groundwater hydrological review and conducted downhole well camera investigation to determine appropriateness of an existing site monitoring well for use as upgradient/background water quality monitoring.

Confidential Client Karst Site Investigation, Missouri
Geophysical, geotechnical, and groundwater-related investigations for viability of auxiliary landfill location in karst terrain of southwestern Missouri. This project included geophysical investigations of multiple varieties, karst groundwater modeling, installation and monitoring of tens of groundwater wells, heavy use of ESRI ArcGIS suite, and significant coordination with local and state regulatory agencies.

Confidential Client Mine Remediations in Tri-State Mining Region of Missouri, Oklahoma, Kansas
RCRA Superfund Site cleanup of several historical mining sites in the area of Joplin, Webb City, and Oronogo, Missouri, and Galena, Kansas. Soil sampling, analysis, heavy use of GIS programs, and excavation oversight were employed, as well as continual contact with regional USEPA agency.

3.4 Availability and Equipment

SMA has teams of environmental scientists available to mobilize from our New Mexico offices: Farmington, Santa Fe, Albuquerque, Las Cruces, and Carlsbad. Additionally, SMA can draw on staff from surrounding states (Colorado, Texas, Arizona, Utah) as needed. With 36 staff in SMA's Environmental Business Line, we have the depth of trained, experienced staff to handle project assignments requiring both emergency or standard levels of response. The closest SMA office to a project location will be the project office. Based on project demands, SMA will build on the local project office staff with additional scientists and technicians to provide both manpower and specific expertise. Day in and day out, SMA environmental staff target 65% of their time to specific projects. This allocation of available time ensures adequate resource availability to respond to NMED project assignments.

SMA maintains a wide variety of field and health and safety equipment in-house in each of SMA's New Mexico offices. The SMA Field Equipment list below details available equipment. Such equipment includes surveying equipment (total stations, construction levels, GPS units, theodolites, etc.); field organic vapor analyzers equipped with PIDs; explosimeters; product/water level probes; peristaltic and other low-flow pumps; submersible pumps; variable speed submersible pumps; mechanical pumps; new disposable bailers; NAPL skimmer pumps; passive NAPL canisters; steel drums; nutrient test kits; hand augers; portable generators; portable air compressors; personal protective equipment; traffic cones and barriers; digital and video cameras; laptop computers with wireless access; and general hand tools. Four-wheel drive and two wheel drive field vehicles are available in each office, with a total of more than 40 vehicles available in the state.

Each office also has high-speed internet, fax machines, scanners (including large format capability), printers, plotters (up to 36-inch width capacity) and cellular telephones assigned to field staff. For remote areas, SMA also provides field staff with cell phone boosters to ensure communication. All offices and project files across New Mexico are connected through an SMA intranet system. Field computing power is provided by Microsoft Surface and Lenovo laptop computers. SMA routinely employs cell phone-based GIS applications to geo-locate soil and groundwater samples and record field screening data, particularly during initial site investigation work before surveyed maps are generated. SMA's software resources are expansive and include multiple licenses of industry standard drafting software such as AutoCAD Design Suite (release 2017) as well as word processing, spreadsheet, GIS and database programs, and groundwater flow modeling and contaminant fate and transport modeling software.

In addition to the wide variety of equipment mentioned above, SMA also owns a trailer mounted mobile SVE unit with granular activated carbon (GAC) canisters used for pilot testing or on-site treatment and effluent control of hydrocarbons to the atmosphere. The mobile SVE unit is easy to set-up on sites for either pilot testing activities or in some cases, for use as an emergency response interim SVE system.

SMA Field Equipment

Surveying Equipment

- High Precision GPS
- Quadcopter Drone
- High Precision Elevated Camera
- Level & Rod
- Robotic Total Station
- Total Station
- Terrestrial Laser Scanner
- Utility Locator *(Metrotech 810 or equal)*
- Handheld (Low-Precision) GPS

Soil Sampling Collecting Equipment

- Slide Hammer & Probe
- Soil Auger - Hand
- Soil Auger- Power
- Quart Mason Jars
- Disposable Bailer
- Tedlar Bags
- VOC Samplers
- 2" x 6" Soil Samplers

Health & Safety Equipment

- Respirator
- Respirator Cartridges
- Latex/Nitrile Gloves
- Tyvek Jumpsuit
- Tyvek Boot Covers
- Level D PPE *(alternative to itemization)*
- Level C PPE
- Level C PPE (Mercury Cleanup)
- Level B PPE
- Personal H_2S Monitor
- Personal 4-Gas Monitor
- Decibel Meter w/ Data Logger

Vapor Sampling/Treatment Equipment

- PID
- 3- or 4-Gas Meter
- Explosimeter
- MSA (Draeger) Detector Tubes
- Tedlar Bags
- SVE Unit

Water Sampling/Testing Equipment

- pH Meter
- eH Meter
- TDS Meter
- Conductivity Meter
- Multi-Parameter Water Meter
- D. O. Meter
- Chloride-4500 Titration Test

Hach DO Samples
Hach SO4 Samples
Hach Fe Samples
Hach NO3 Samples
Hach PO4 Samples
Product Interface Probe
Well Sounder
Hermit Data Logger
Transducer w/ 350' cable
Transducer w/ 500' cable
Grundfos Pump
Watera Pump
Geotech (Peristaltic) Geopump
Geopump Filters
DC Purge Pump (High Capacity)
DC Purge Pump (Low Capacity)
Flexible Tubing
Foot Valve (Nylon)
Foot Valve (Stainless Steel)

Miscellaneous Support Equipment

Generator
Magnehelic Gauges (set)
Padlock (P812)
Drums (55 Gallon)
HazCat Kit
HazCat Reagents
Mercury Recovery Kit
Mercury Vapor Monitor
PetroFlag Field TPH Kit
PetroFlag Reagents
Digital Camera
Reciprocating Saw
Steam Cleaner
Cordless Drill
Pipe Locator
All-Terrain Vehicle w/ Trailer
525 Gallon Tank
Equipment Trailer

STANDARD OPERATING PROCEDURE

SOUDER, MILLER & ASSOCIATES

Field Methodology
Rev. August 28, 2018

SMA
Engineering - Environmental
Surveying
www.soudermiller.com

STANDARD OPERATING PROCEDURE
SOUDER, MILLER & ASSOCIATES

Field Methodology
Rev. August 28, 2018

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STANDARD OPERATING PROCEDURE
SOUDER, MILLER & ASSOCIATES

Field Methodology
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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide instructions on the field methods to be employed by the staff of Souder, Miller & Associates (SMA). These methods have been developed to ensure that data collected in the field is accurate and reproducible, and to minimize the introduction of error into the data collection procedures.

2.0 SCOPE

These procedures apply to SMA employees for the various tasks undertaken in the field. The SOP lists the responsibilities of each employee, including: senior staff, project managers, and field staff. The methods described herein shall be followed by all employees of SMA.

3.0 GENERAL RESPONSIBILITIES

This section lists the general responsibilities of each staff member, regarding the procedures to be followed in preparing for, and completing, the field task. These general responsibilities are for all field work; specific responsibilities for drilling, sampling and remediation system start-up and/or operation and maintenance (O&M) are included in the applicable sections for those specific tasks.

3.1 Senior Scientist/Engineer

The senior scientist/engineer shall be responsible for determining if there are conflicts in the field schedule, and for resolution of scheduling conflicts. The senior scientist/engineer shall be responsible for reviewing the work scope, contract, site health and safety plan, and any other site specific information that is necessary for completion of the field work.

3.2 Project Manager

The project manager shall be responsible for determining the work scope, writing a site specific health and safety plan, and scheduling the site visit. Scheduling the site visit shall include:

- notifying the senior, field staff, clients, on-site personnel, and regulators, as necessary; field staff should be notified two weeks in advance, when possible
- arranging access when necessary
- reserving and/or ordering the necessary equipment and supplies

A field packet of information shall be provided for the field staff. The packet shall include:

- site name, location, and job/phase/task numbers

- information regarding the allotted time, or budgetary concerns such as per diem expenses
- a typewritten checklist of all work to be completed
- recommended sampling order
- checklist of all necessary equipment and supplies, including the obvious
- any pertinent telephone numbers
- Site Health and Safety Plan
- maps, including (as needed): site location, site map with well locations, ground water contour maps, contaminant distribution maps, “as built” maps indicating the location of remediation wells and lines
- historical data including: depths to water, well total depths, analytic concentrations, dissolved oxygen concentrations, nitrate and phosphate concentrations, and/or any other data that is pertinent to the site
- data recording sheets (if applicable)
- any additional site-specific information

In addition, the project manager shall meet with the field staff prior to the site visit to discuss the work scope and site-specific information. Also, the meeting shall provide any training or special instructions necessary for completing the work scope.

3.3 Field Staff

The field staff shall be responsible for arranging personal and work schedules to include upcoming field work and completing the field tasks according to the procedures of the SOP. If a conflict in scheduling arises, notify the appropriate project manager and senior scientist/engineer. Prior to departing for the field work the field staff shall:

- review the work scope
- review the SOP for the tasks to be performed
- review the Site Health and Safety Plan
- check all equipment for operability
- check the contents of field and tool boxes
- mobilize to arrive on site prior to any subcontractors for better preparedness, when possible; use the check list of necessary equipment provided by the project manager
- fuel vehicles the day prior to field work, when possible; if fueling on the day of field work, wash hands prior to beginning work
- when transporting a generator, compressor, or any gasoline/diesel powered device, isolate the device from all sampling equipment and sample containers

Standard field equipment should include:

- field and tool boxes
- necessary keys and lock combinations
- shovel
- buckets
- wash bottles (Alconox and distilled water)
- flashlight
- necessary personal protective equipment (PPE)
- mobile phone with camera capabilities
- extra expendable items; i.e. sample jars and vials, bailers, VOC samplers, etc.
- ask the project manager if there are questions regarding equipment that may be lacking or unnecessary

In the field it is the responsibility of the field staff to:

- notify the necessary personnel upon arrival as to your identity, job task, and length of time on site
- complete the work scope provided by the project manager
- call project manager with any questions or problems that may arise while on site

4.0 OVERVIEW OF DRILLING METHODS

The following discussion provides an overview of various common environmental drilling methods. The list of methods is not meant to be all-inclusive. Information on other drilling methods should be obtained from an SMA senior scientist/engineer prior to initiation of field work.

Monitoring wells shall be installed according to the latest versions of the New Mexico Environment Department's Monitoring Well Construction and Abandonment Policy, the New Mexico Underground (Petroleum) Storage Tank Bureau Guidelines for Corrective Action, the American Society for Testing Materials (ASTM) D5092-90 procedure, and NM Office of the State Engineer regulations, as appropriate.

4.1 Hollow Stem Auger

Hollow Stem Auger (HSA) is the preferred method for advancing bore holes at environmental drilling sites. The method permits collection of undisturbed soil samples ahead of the drill bit, does not introduce drilling fluid to the formation, and provides a self-cased hole to complete monitoring wells.

4.2 Air Rotary

The air rotary method is useful for penetrating hard, semi consolidated to consolidated formations. As no drilling fluid other than air or foam is introduced to the hole, bore holes

will not stand open for well completion unless the formation is adequately consolidated. As compressed air is used to clear the hole of cuttings, soil samples are not discrete. Soil samples are generally logged by examining cuttings. The drilling string may be pulled from the hole to permit collection of split spoon samples ahead of the drill bit, but this is time consuming and expensive.

4.3 Pneumatic Hammer

Pneumatic hammer rigs generally consist of a pile driver or rotary vibratory hammer to advance the hole. The hole is cased by driving a temporary steel casing behind the advancing drill bit. Various terms and variations of this method include ODEX, STRATEX, dual tube, and percussion hammer. The method is most useful in unconsolidated, caving formations. The method is useful for penetrating large cobbles, boulders, and lithified rock.

4.5 Sonic

The Sonic drilling method permits collection of undisturbed soil samples in a continuous core. The method can successfully penetrate alluvium, cobbles, and hard rock. Water must be introduced to the hole during drilling which can make identification of the water table difficult.

4.6 Direct-Push

A direct push machine "pushes" tools and sensors into the ground without the use of drilling to remove soil to make a borehole. Direct-push is also commonly referred to as Geoprobe®. Direct-push machines rely on a relatively small amount of static (vehicle) weight combined with percussion as the energy for advancing a tool string. Direct push tools do not remove cuttings from the probe hole but depend on compression of soil or rearrangement of soil particles to permit advancement for the tool string. This method permits collection of a small amount of soil volume in a continuous core and is generally only able to penetrate unconsolidated alluvial material.

5.0 MONITORING WELL INSTALLATION

Monitoring wells shall be installed according to the latest version of the New Mexico Environment Department's Monitoring Well Construction and Abandonment Guidelines and/or the latest version of the New Mexico Underground (Petroleum) Storage Tank Bureau Guidelines for Corrective Action, as appropriate. Always wear necessary PPE when drilling. All work must be conducted in accordance with the site-specific Health and Safety Plan.

5.1 Monitoring Well Casing

Monitoring wells shall be installed according to the latest versions of the New Mexico Environment Department's Monitoring Well Construction and Abandonment Policy, and the UST Bureau Soil and Water Sampling Guidelines. PVC is the most common casing material for monitoring wells. Steel casing may be specified for extreme conditions of depth, caving formation, or contaminant interaction with the casing material.

5.1.1 Casing Diameter
In general, for monitoring wells less than 100 feet deep, two-inch diameter casing is appropriate. For wells equal to or greater than 100 feet deep, four-inch diameter casing is appropriate.

5.1.2 Casing Joints
Casing joints shall be flush threaded and water tight. Solvent welded (glued) joints are not permissible. An end cap shall be installed at the end of the casing string.

5.1.3 Screen Specification
Monitoring well screen shall be constructed of the same material as the rest of the casing string. Screen must be manufactured with factory cut slots or wire wrapped construction. Field cut slots are not permissible. In general, a 0.01 inch slot size ("10 slot screen") is appropriate for monitoring wells, unless other slot size is specified.

5.2 Filter Pack
The purpose of the filter pack is to reduce or prevent fines from entering the monitoring well. The filter pack material shall be Colorado Silica Sand, or equivalent. 10-20 size sand is typically appropriate for use with the 10 slot screen. Filter pack is placed along the screened interval, so that the filter pack extends 1-2 feet above the top of the screened interval.

5.3 Grouting/Well Seals
Well seals prevent surficial contaminants from impacting the ground water by infiltrating along the well bore. Two or more feet of hydrated bentonite is placed above the filter pack. Cement grout is placed above the filter pack to within two feet of the surface. For wells greater than 30 feet deep, well seals should typically be placed with a pressure grouting technique such as a tremie pipe to prevent void spaces.

5.4 Surface Completion
Flush mounted, traffic rated manways with bolted lids are typically installed. The manways are installed in concrete, with a 2 foot minimum diameter, formed and poured, concrete pad. The pad is sloped away from the manway to promote drainage of surface water. Alternatively, a steel surface casing may be installed where traffic clearance is not an issue. All wells are equipped with locking, water tight well plugs.

5.5 Well Development
Following well construction, monitoring wells will be developed in order to repair damage done to the formation by the drilling operation so that natural hydraulic properties are restored, to remove any fluids introduced into the formation that might interfere with analysis of the ground water sample, and to allow ground water to flow freely through the well screen.

Monitoring wells should be developed until pH, temperature, and conductivity have stabilized, and turbidity has been reduced to the greatest extent possible. Development shall include an agitation technique and purging. Surge block use will not be allowed without approval of the regulatory agency. Development methods will include hand bailing, pumping, or low-pressure air-lifting.

Documentation of well development activities will be collected, including methodology and field parameter measurements through time (pH, temperature, conductivity, turbidity).

5.6 Waste Disposal

Contaminated drill cuttings (>100 ppm) will be containerized in 55-gallon drums. Following filling of a drum, the drum will be sealed and labeled with the boring number and interval contained. Drums will be stored on-site in a safe location pending receipt of laboratory analytical results. Any cuttings which exceed regulatory standards will be shipped to a NMED-approved disposal facility using waste manifest procedures. Following disposal, copies of all disposal manifests will be submitted to the regulatory agency. Clean cuttings will be thin-spread on-site if site conditions allow or disposed of off-site.

During monitoring well development and sampling, the small volume of purged water is defined in the NM UST Bureau Guidelines as “RCRA nonhazardous water”, and will be disposed of on a paved surface within the boundaries of the contaminant plume and allowed to volatilize. Purged water will be contained on the property and will not be allowed to enter any surface water or tributary.

6.0 GENERAL SAMPLING GUIDELINES

Always wear gloves and necessary PPE when sampling. Change gloves between sample collections. Collect samples prior to other field work that may introduce a contaminant into the sample, i.e. when sampling for benzene, collect samples before fueling a vehicle or generator. Samples shall be collected from areas of lower concentration to higher concentrations, when known. When sampling for both volatile compounds and non-volatile compounds, always collect volatile samples first. Double check sample containers for the proper preservative and size. Properly label sample containers immediately after collection. Place samples on ice, as necessary. Protect glass containers with bubble pack or other material.

7.0 SOIL SAMPLING

7.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) measures include trip blanks and collection of duplicate samples. Many laboratories analyze either trip or field blanks free of charge, one per job. Duplicate samples may be required for certain work scopes, specifically landfill sampling.

Trip blanks are supplied by the laboratory for volatile organic compounds (VOCs). A 40 ml VOA vial is filled with distilled water, included with the bottle order, and shipped from and returned to the laboratory. The vial is then analyzed for the same parameters as the submitted samples. Trip blanks are labeled as “Trip Blank”.

Duplicate samples are collected from a previously sampled location. The duplicate samples are analyzed for the same parameters as the original sample to provide assurance as to the accuracy of the analytical laboratory. Duplicate samples are labeled with a non-existent sampling location, with the actual sampling location recorded in the field record.

7.2 Soil Sampling Procedures

A minimum of two days prior to subsurface sampling, New Mexico One-Call will be notified to spot all utilities. Additionally, the property owner will be contacted to locate buried utilities on-site. All sampling and boring activities will be conducted outside of buried utility corridors. If possible, the upper four feet of each boring will be hand-augured to insure utilities are not damaged.

7.3 Split Spoon Sampling

Discreet interval sampling may be conducted using a split spoon sampling device. Continually, or at each target depth, the sampler will be advanced 18 inches using direct push sampling technique. The sampler holds three 2-inch diameter, 6-inch long brass tubes for the collection of soil samples for geotechnical properties. Upon removal of the tubes from the sampler, the middle brass tube will be screened for organic vapor using the Heated Headspace Method. The uppermost brass tube will be examined to determine lithology, after comparison with soil from the other tubes to ensure uniformity. Alternatively, the split spoon sampling device can be utilized without brass tubes if geotechnical sampling is not required. All split spoons will be properly decontaminated with Alconox followed by an initial rinse in clean water and final rinse in distilled water All pertinent field data will be recorded on the boring log.

7.4 Sampling Drilling Cuttings

When sampling during air drilling operations, discrete soil samples are not possible. Regular communication with the driller as well as careful observation and counting of the drill string as it is added is necessary to track the depth of the drill bit. Cuttings will exit the drill string through either a pipe or a velocity knock down funnel. Collect grab samples from the cuttings at intervals defined in the project work plan, or every five feet of depth if not defined. Observe the cuttings carefully for lithologic changes while logging the hole.

7.5 Sampling from Excavations

Never enter an excavation of any sort. Sampling must be completed remotely. A backhoe/excavator can be directed to dig a sample from the desired location. The backhoe bucket should be dumped in an area that is relatively undisturbed to permit collection of the soil sample from the bucket load.

7.6 Sample Analysis by Heated Headspace Method

After collection of an undisturbed soil sample using split-spoon or other method, field screening will be conducted using the Heated Headspace Method (HHM), in accordance with New Mexico Underground (Petroleum) Storage Tank Bureau Guidelines for Corrective Action (most recent edition).

Equipment for HHM includes clean 1-liter jars, aluminum foil and an organic vapor meter (OVM) typically equipped with a 10.6 electron Volt (eV) lamp, and able to detect total aromatic hydrocarbons between 0 and 10,000 parts per million. Additional equipment includes a water bath and thermometer (for temperatures below 60^{o} F), or heated vehicle interior for raising sample temperature.

Steps for the HHM are:

1. Fill the clean glass jar half full of soil sample.
2. Seal top of jar with clean aluminum foil and lid ring.
3. Ensure sample is at 15 to 25° C using a warm water bath or heated interior of a vehicle. Protect samples from direct sunlight to prevent photo-destruction of volatiles
4. Shake the sealed jar vigorously for one minute. Allow aromatic hydrocarbon vapor to develop in the headspace of the jar for 5 to 10 minutes.
5. Pierce the foil with the OVM probe, and immediately record the peak measurement.

7.7 Preservation of Samples

Samples to be analyzed for volatile constituents should be field extracted using methanol provided by the analytical laboratory. Work should be completed quickly to avoid loss of volatile compounds from the sample.

1. Collect the appropriate amount of soil using the provided open-ended syringe.
2. Unscrew the cap on the sample bottle and quickly push the sample into the bottle with the syringe plunger, being careful not to get soil particles on the rim of the bottle. Quickly replace the cap and tighten securely. Collect two methanol extracted samples per sample.
3. Complete sample analysis forms and store the sample on ice.
4. Collect one soil jar of dry sample (minimum 20 grams), with corresponding label for determination of moisture content.
5. Following chain-of-custody procedures, prep the sample for shipment or delivery to the analytical laboratory.

7.8 Preparation of Samples for Shipping

1. Coolers are used to ship soil samples to laboratory for analysis. These containers help to contain leaks and maintain temperature during transport. Keep samples out of direct sunlight.

2. Samples requiring refrigeration should be placed in a cooler containing ice. Glass containers should be carefully packed with bubble wrap to prevent breakage, and should not be packed against the outside walls of cooler. Void space in the cooler should be filled with packing material to avoid sample shifting and breakage.

3. Include one chain of custody form for each sample suite. Put these pages in a plastic zip-lock bag to prevent damage.

4. Notify laboratory of incomplete or priority samples for each sampling location.

5. Tape coolers with strapping tape and attach address labels.

8.0 WATER SAMPLING

In addition to the general responsibilities outlined in Section 3.2, the project manager shall complete the following prior to water sampling:

1. determine the locations to be sampled, number of samples per location, and parameters to be analyzed for from each location
2. prepare maps showing all sample locations
3. include the above information in the work scope given to the field staff
4. inform the analytical laboratory of: the approximate number of samples to be submitted, the parameters to be analyzed, the delivery date, the required turnaround time

8.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) measures include trip blanks, collection of field blanks, and collection of duplicate samples. Many laboratories analyze either trip or field blanks free of charge, one per job. Duplicate samples may be required for certain work scopes, specifically landfill sampling.

Trip blanks are supplied by the laboratory for volatile organic compounds (VOCs). A 40 ml VOA vial is filled with distilled water, included with the bottle order, and shipped from and returned to the laboratory. The vial is then analyzed for the same parameters as the submitted samples. Trip blanks are labeled as “Trip Blank”.

Field blanks are prepared in the field by the field staff. A 40 ml VOA vial is filled with distilled water and shipped to the laboratory. The vial is then analyzed for the same parameters as the submitted samples. Field blanks should be prepared prior to collecting water samples. Field blanks are labeled as “Field Blank”.

Duplicate samples are collected from a previously sampled location. The duplicate samples are analyzed for the same parameters as the original sample to provide assurance as to the accuracy of the analytical laboratory. Duplicate samples are labeled with a non-existent sampling location, with the actual sampling location recorded in the field record.

8.2 Ground Water Sampling Procedures

1. Identify measuring point on casing either visually or by review of well construction logs, survey data or other documentation. If the measuring point is not marked or indicated on well construction log, use the north side of the top of the well casing as the assumed measuring point.

2. If non-aqueous phase liquid (NAPL) is known or suspected to be present, measurements are to be performed using an incremented electronic hydrocarbon interface probe. Measure and record the static depth to NAPL and depth to ground water to the nearest 0.01 foot relative to the top of casing reference. If NAPL is present, do not sample the well for organic constituents; rather, remove NAPL free product from well via the direction provided in Section 14.0.

3. If NAPL is previously known to be absent at the site, measurements can be performed using an incremented electronic water level indicator. Measure and record the static depth to ground water to the nearest 0.01 foot relative to the top of casing reference point.

4. Measure depths to ground water in all wells before purging. Depths to water should be measured in all wells on the same day.

5. Gauge and collect sample first from wells which are likely to be uncontaminated. Then collect samples from wells which could be contaminated in sequence from least to worst contamination.

6. Whenever there is sufficient well water, pump or bail water from the well and purge at least three (3) bore volumes. Record in field notebook the quantity of water purged, or when this purging cannot be performed.

    a. If the well is a domestic or municipal well, sample as close to the well head as possible, before any filtration units, water softeners, holding tanks, etc. Do not sample from rubber or plastic hoses, as organics can adsorb to these materials. Purge the well long enough to clear stagnant water from piping. Either make a rough calculation of the volume required for this (best) or purge well for at least 5 minutes (not as reliable).

    b. If well is bailed or pumped dry, purge at least one bore volume from a well. If necessary, return to well at a later time to collect samples.

    c. Refer to project manager's directions for collection of samples when insufficient quantities of water are available.

7. Record any odors, colors, etc, present in the water sample in field notebook.

8. Indicate in field notebook if well is dry.

9. If filtration for those samples requiring filtration at a site is impossible, ALL samples from that site should be non-filtered.

10. Record any deviation(s) or modification(s) to these procedures and the rationale for these changes.

11. Keep all equipment clean to avoid cross-contamination between wells. Do not lay bailers on the ground, use a clean bucket.

12. The following procedures for monitor well sampling are followed in this order. Subsequent sections in this document provide further details to these procedures.

    a. Entry in field notebook: DATE, SITE NAME, TIME, MONITOR WELL LIST (with

space for appropriate entry).

b. Equipment is cleaned with distilled water if not done prior to field day.

c. Static water depth is measured and recorded on field notebook or data sheet.

d. Bore volume calculation is made showing work in field book.

e. Pump is assembled, meters are set up.

f. Labels for sample bottles are made.

g. Dissolved oxygen, nitrogen, and phosphate tests are performed from initial water drawn from well, if required.

h. Samples are collected, filtered (if required), and preserved; alkalinity measurements performed (if required) and recorded.

Notes and sample numbers recorded in field notebook

8.3 Monitor Well Purging and Sampling Techniques

1. Bladder Pump

The bladder pump is best used when at least ten feet (10') of water will remain above it during pumping. The bladder pump has three major components: the pump, logic unit, and air compressor.

a. The logic unit must be connected to a battery.

b. The air compressor runs on gasoline and is connected to the logic unit with a rubber tube found attached to the logic unit.

c. The logic unit forces a measured volume of air (adjustable) from the air compressor to the air-line attached to the pump. The air compression timing is also adjustable.

d. As the bladder inside the pump is filled with air, water is forced upward through the water-line. This water-line is connected to a flow-through cell apparatus, and field parameters are measured during pumping.

e. The bladder pump is placed two-to-five feet (2-5') from the bottom of the well (usually near the screened interval).

f. For decontamination procedures, see Section 8.1.

2. Electric Submersible Pump

The electric submersible pump is best used for wells that may draw down to pump level or

be pumped dry, or wells requiring low-flow pumping techniques. This type of pump is hooked up to a battery or gasoline generator.

a. Water is forced upward through the water-line by the electric motor.

b. The water-line is connected to the flow-through apparatus, and field parameters are measured and recorded during pumping.

c. The electric pump is placed 2-5 feet above the bottom of the well.

d. See Section 9.2 for decontamination.

3. Peristaltic Pump

The peristaltic pump (or larger model, the "Masterflex") is best used for wells that are less than 30 feet deep. It is hooked up to a battery or generator.

a. Water is pulled up the intake hose, through the pump, and is pushed out of the outlet hose.

b. The outlet hose is connected to the flow-through device and field parameters measured while pumping.

c. The hose is lowered to a depth 2-5 feet from the bottom of the well. It may require a weight to prevent sticking to the sides of the well.

d. Decontamination procedures are in Section 8.3.

4. Inertial Pump

The inertial pump (often the Waterra brand pump or equivalent) is most useful for pumping when potential for increased turbidity is not a concern. The inertial pump consists of tubing running through the well with a foot valve at the bottom and a pump actuator placed at the top of the well to pull the water to the surface via stroke motion.

a. Water is pulled upward as the stopper moves upward in the valve inertially and is contained at its level by the downward motion pulling the stopper back into the stop position.

b. Water is forced out of the tubing at the top and into the flow-through apparatus for field parameters to be recorded.

c. While the dedicated tubing is encased in the well for the duration of the use of inertial pumping in the well, the pump actuator is able to be moved from well to well with no need for decontamination.

5. Bailer

Gloves will be worn at all times during well sampling procedures, no matter what level of contamination is indicated for a given monitoring well. Bailers may commonly be 2 or 4 inches in diameter. New, disposable bailers will be used for each sampling event. Dedicated bailers are not allowed.

a. Assuming that a depth to water measurement has been obtained, collect a VOC sample using these procedures:

i) Attach new, clean bailer twine to new disposable bailer. Do not lay bailer on the ground during these procedures; place in a clean bucket or leave in plastic sleeve to prevent contamination by surface materials.

ii) Lower the bailer to just above the top of the water as measured in the well. SLOWLY lower the bailer into the water and allow to fill. Gently raising the twine will speed filling. Avoid overly vigorous raising and lowering of the bailer.

Raise the bailer to the surface and pour contents into a bucket in order to measure the volume of purged water. Purge the amount of water equivalent to three well bore volumes from the well. A well bore volume may be calculated by subtracting the measured depth to water from the total depth of the well and multiplying the result by:

- 0.163 for 2 inch well casing so that 3 well volumes = 0.489 * (total depth of well – depth to water)
- 0.653 for 4 inch well casing so that 3 well volumes = 1.959 * (total depth of well - depth to water)

b. After the required volume has been purged from the well, collect sample in a preserved VOC vial. Using a bottom emptying device, decant the sample directly into the vial.

i) Adjust the rate of water emitted from the sampling device so as not to create excessive turbulence in the vial. Direct this slow stream to the side of the vial. Fill until a rounded surface is achieved on the top of the vial. A small amount of water can run out of the vial but do not allow too much to run over as this dilutes the relative amount of preservative. The preservative contains mercury, wear gloves at all times during sample handing.

ii) Screw the cap tightly onto the vial and check for any air bubbles. Tap the vial lightly and invert. If air bubbles appear, uncap and add a few drops to the vial, recap and test again. There should be no headspace whatsoever in any samples.

c. Affix laboratory label to the sample vial immediately after the well is sampled. Place

the vial in a bubble bag and place in the cooler. Labels may be written up in the office before a sampling event.

Remove and dispose of used bailer and twine. Close the bolting lid.

8.4 Field Measurements of Temperature, Electroconductivity, pH, and Oxidation/Reduction Potential

1. At each well location, field parameters must be measured and recorded during the purging process.

2. SITE ID: This is the site name and/or SMA project number with applicable phase and task identified.

3. SAMPLE ID: Each well has a specific number assigned to it and this is typically utilized.

4. SAMPLING DATE, SAMPLING TIME: Enter the date and time of arrival to the well. Upon leaving the well, note the completion time.

5. STATIC WATER LEVEL (FT), TIME OF MEASUREMENT:

   a. A sounder probe works by emitting a high-pitched "beep" upon entry into water.

   b. Before using the sounder, check the battery and accuracy of the length of the probe.

   c. Rinse probe with distilled water prior to insertion into well.

   d. Measure and record static water level in accordance with Section 8.2. Record these measurements in field book.

   e. Workplan may require completion of a number of static measurements in a single day. Record these measurements in field book.

   f. Clean probe with Alconox solution, rinse with distilled water, and store.

   g. The volume of water in well (bore volume) can now be calculated and recorded in field book.

6. COMMENTS: Indicate here all deviations from SOP during purging or sampling, any odd colors or odors, well recharge, or other information pertinent to the sampling of this site.

7. LOCATION DESCRIPTION: For domestic water sampling, indicate exactly where sample is obtained (e.g. "north faucet", "kitchen sink").

8. FIELD REP(S): Include name(s) of sampler(s).

9. Record field parameters in field book during the purging operation. Field measurements to determine temperature, electroconductivity (Ec), pH, and Oxidation/Reduction Potential (ORP) or Total Dissolved Solids (TDS) may be performed regularly, usually at 2- or 4-gallon intervals.

    a. Assemble clean flow-through container, if used. It should be rinsed three times with distilled water.

    b. Attach clean tubing from pump water-line to the flow-through unit.

    c. Attach probes to meter.

    d. Rinse each probe with distilled water and pat dry. Always blot dry thermometer and electrodes with tissue. Water droplets remaining on these probes may dilute or otherwise affect measurement data. Rubbing probes with tissue may result in warming the thermometer or producing an electrostatic charge on the electrodes which may alter meter readings.

    e. As water is pumped from the well through the unit, the meter continuously measures temperature, pH, Ec, and ORP.

    f. The pH meter requires calibration during its operation. Refer to Section 8.6.

    g. Place a bucket under the discharge hose to measure pump rate, and record meter readings at regular intervals.

    h. Indicate the time of every reading, using 24-hour "military" time, and calculate the fraction of a bore volume withdrawn:

    i. Bore Volume = gallons withdrawn / one b.v.

    j. Keep the unit and discharge hose out of direct sunlight.

Refer to Section 9.5 for decontamination of the flow-through unit.

8.5 Preparation of an Equipment Blank

1. The purpose of an equipment blank is to test the quality of decontamination performed by the water samplers. The blank should be prepared half-way through a sample day, if required.

2. Pump approximately 2,000 ml distilled water through the hoses and tubes of the pump (this test will not be possible for bladder pump) until all water is expelled.

3. Rinse outside of hoses and pumps with distilled water and dry.

4. Collect, filter and preserve sample bottles with distilled water using the decontaminated

pump and hoses. Store sample bottles as required.

8.6 pH Measurement and Calibration

1. Specific instructions pertaining to the instrument should be used. The meter and electrode are easily adjusted to the temperature of the sample, and can be calibrated with pH buffer solutions with a pH range of 1-7 or 7-14. The following are general guidelines. Each meter is calibrated slightly differently.

    a. When not using the pH electrode, place it in a container of pH 4 buffer solution.

    b. Rinse pH electrode with distilled water and pat dry. Insert electrode into a fresh solution of pH 7 buffer solution.

    c. Adjust "pH" dial to 7.00. Remove electrode, rinse with distilled water and pat dry.

    d. To calibrate meter for pH 1-7 range, insert clean dry electrode into a fresh solution of pH 4 buffer solution. Adjust "slope" dial to 4.00. To calibrate meter for pH 7-14 range, insert clean dry electrode into a fresh solution of pH 10 buffer solution, and adjust "slope" dial to 10.00.

    e. Rinse and pat dry electrode before re-inserting it into sample water.

    f. Record the range of pH calibration, and the time, in field book.

2. Once the well is purged, the pH meter must be checked for accuracy, or "drift".

    a. Insert the clean dry electrode into pH 7 solution and record this value in field book. Do the same for either the pH 4 or 10 solution. Record the time.

    b. If the pH values are within ±0.10 units of 7.00 and either 4.00 or 10.00, then prepare pH meter for alkalinity test (see Section 8.8).

    c. If the pH is not within ±0.10 units, then the pH meter must be recalibrated, and at least two more readings of sample water must be made. pH should once again be checked against the known buffer solutions.

FINAL FIELD VALUE AT THE SURFACE: Record final values of pH, Ec, temperature and ORP into field book.

8.7 Electroconductivity and Temperature: Measurement and Calibration

1. Specific instructions pertaining to the instrument should be used. The Eh and temperature probes need no calibration in the field, but the temperature probe must be checked against a lab grade mercury thermometer once a month. Similarly, the Eh probe is tested using the following procedure.

2. Pour enough lab prepared KCl solution into a clean container. There should be enough

solution to immerse the Eh probe. Record the value of KCl concentration.

3. Place the container in an ice bath (add NaCl to the bath to reduce its temperature). Chill the solution to as near 0°C as possible.

4. Place clean, dry Eh probe, temperature probe, and mercury thermometer into the chilled KCl solution.

5. When the solution is below 3°C, read and record the temperature on both thermometers, and electroconductivity of the Eh probe.

6. Remove KCl solution from the ice bath and allow it to warm. Record temperature and conductivity every 2°C up to 25°C. Stir solution to avoid uneven cooling and erroneous readings.

7. Remove probes from KCl solution, rinse with distilled water, and dry them. Measure the Eh of two more known KCl solutions at room temperature. Record the known value of these solutions and the value given by the meter.

8. Clean, dry and store Eh and temperature probes.

9. Complete the three graphs using the following data.

   a. Lab thermometer temperature vs. meter temperature.

   b. Meter temperature vs. Meter conductivity.

   c. Known KCl concentration vs. meter conductivity.

10. Label the Eh/Temperature meter as "Calibrated", date and initial.

8.8 Alkalinity Test

1. Alkalinity test (total carbonate) is performed on an aliquot of the raw, unfiltered, and unpreserved water sample by titration of the sample with an acid and measured by a pH meter.

2. Rinse the 125 ml Erlenmeyer and 100 ml volumetric flasks to be used for this determination with distilled water three times.

3. Calibrate the pH meter to pH 7 and 4 buffer solutions.

4. Rinse Erlenmeyer and volumetric flasks with sample water three times. Remove remaining water droplets by shaking flasks vigorously.

5. Without too much splashing or vigorous agitation, measure 100 ml sample water into volumetric flask. Pour this measured sample into the Erlenmeyer flask down the side to

avoid agitation.

6. Insert clean, dry pH electrode into sample. Record initial pH at the top of chart in field book.

7. Place a 1.6 N H_2SO_4 cartridge in the digital titrator. Record the titrant lot number in field book. Eject a few drops of acid from the titrator tip, rinse with distilled water and dry. Reset the digital counter to "0000".

8. While gently stirring the sample, titrate with acid by turning the delivery knob on the titrator. As pH drops, record the counter number that corresponds with the pH value on the data table.

9. Repeat this procedure a second time.

10. Calculate the Relative Error at pH 4.50 as:

$$R.E. = \frac{(X1 - X2) \times 100\%}{Xs}$$

Where X1 is the first alkalinity value at pH 4.50, X2 is the second alkalinity value at pH 4.50, and Xs is the lesser of X1 or X2.

11. If the percentage error is greater than ten percent, repeat this procedure until two measurements are within 10% relative error.

12. The alkalinity value at the inflection point between pH 5 and pH 4 will be determined by the SH. The volume in ml equals digital titrator divided by 800.

    a. Alkalinity titration endpoints depend upon the total alkalinity concentration. The following endpoints will be used:

Alkalinity	End Point
0-3 mg/l	pH 5.1
31-150 mg/l	pH 4.8
150 mg/l	pH 4.5

13. When the titration is complete, check pH meter calibration for drift (as described in Section 7.6). If the meter is accurate to within 0.20 units of each buffer value, record the lowest value of titrant to pH 4.50 in field book.

    a. If the meter is not accurate to within 0.20 units of each buffer value, re-calibrate and repeat the alkalinity test.

14. At each site, perform the Alkalinity Test on three known solutions provided by the quality control laboratory.

a. Perform a single Alkalinity Test on each of the three solutions.

b. Record Requisition and Laboratory numbers of each solution in the appropriate space.

c. Indicate the titrator counter number at pH value of 4.50 corresponding to each known solution.

Record the site ID, meter ID numbers, name and date.

8.9 Filtration and Preservation of Inorganic Samples

1. After the well is purged and alkalinity test is complete (if required), sampling may begin. Whenever water samples are to be analyzed for soluble (or dissolved) analytes, insoluble matter must be removed. This material may interfere with the analysis(es).

   a. The soluble and insoluble analytes are separated by filtration: The soluble analytes pass through a 0.45 μm filter while the insolubles are retained by the filter.

   b. If required, the insoluble matter with the filter is saved and submitted for laboratory analysis(es).

   c. If filtration is impossible or extremely difficult, all samples must be non-filtered, and rationale for this change in SOP noted in field book.

2. Inorganic samples will generally be field filtered. Check workplan for any changes from standard policy.

3. Samples should be collected upstream of the flow-through apparatus.

4. Do not smoke or chew while sampling. Eye protection and gloves should be worn.

5. Attach filter to water-line. Before collecting any samples, run a few hundred ml of the water sample through the filter.

6. Fill the sample bottles. Allow no dirt or dust to blow into the bottles or onto the bottle caps. Rinse the inside of the bottle caps with filtered water and screw cap onto bottle. Shake bottle to mix the sample. Once sample is in bottle, do not allow it to touch anything but the bottle walls. Never stick anything into the bottle.

7. If required, preserved sample containers will be provided by the laboratory.

8. Store samples requiring refrigeration with ice, and store other samples out of direct sunlight. Refrigeration temperature should be 4ºC or less.

If insufficient sample volume, contact project manager for priority sample list, unless alternate priority list is specified in workplan.

8.10 Preparation of Samples for Shipping

1. Coolers are used to ship water samples to laboratory for analysis. These containers help to contain leaks and maintain temperature during transport. Keep samples out of direct sunlight.

2. Samples requiring refrigeration should be placed in a cooler containing ice or "blue ice". Glass containers should be spaced between plastic containers, and should not be packed against the outside walls of cooler.

3. Include one chain of custody form for each sample suite. Put these pages in a plastic zip-lock bag to prevent damage.

4. Notify laboratory of incomplete or priority samples for each well location. Also indicate if there is no sample from a dry well. The laboratory will not begin analysis until all samples from one lot are received or accounted for.

Tape coolers with strapping/custody seal tape and attach address labels.

9.0 DECONTAMINATION

All equipment that is in contact with samples and is recycled must be decontaminated with adequate amounts of distilled water. Additional cleaning procedures may be required, and are included here.

9.1 Bladder Pump Decontamination

1. Remove pump from well, disconnect pump from water and air-lines.

2. Drain pump by holding it upside down. Rinse outside of pump with Alconox solution, then rinse with distilled water, dry, and store.

3. Connect water-line to peristaltic pump, and pump at least one gallon of distilled water through the water line.

4. Use air pressure from the logic unit to force remaining distilled water through the water line.

5. Rinse the outside of the hoses with Alconox solution, rinse with distilled water, and store.

9.2 Electric Submersible Pump Decontamination

1. Remove pump from well, insert into PVC pipe (with cap on lower end).

2. Fill PVC with Alconox solution. Turn pump on, and continue filling PVC with clean water until the Alconox solution has been flushed entirely.

3. Fill PVC with distilled water. Turn pump on, and continue filling PVC until at least one gallon of distilled water has run completely through the hose.

4. Rinse the outside of pump and hose, dry pump, and store.

9.3 Peristaltic Pump Decontamination

1. Insert intake hose into distilled water.

2. Run approximately 2000 ml distilled water through the hose.

3. Rinse outside of hose with distilled water, dry and store unit.

9.4 Bailer Decontamination

Disposable bailers shall not be re-used. Discard disposable bailers after use. Dedicated bailers are not allowed.

9.5 Flow-Through and Hose Decontamination

1. Rinse flow-through apparatus thoroughly with Alconox solution and then rinse thoroughly with distilled water. Wrap in a clean plastic bag and store.

2. Pump distilled water through all hoses. Rinse outside of hoses, wrap in clean plastic bag and store.

At the end of each sample outing, wrap all clean equipment in a clean plastic bag, seal with tape, label "clean", date and initials.

10.0 SURFACE WATER SAMPLING

1. Surface water samples are collected by the "grab" method: random immersion of a clean sample container into a body of surface water to collect a full container.

    a. Criteria for exact location and number of grab samples should be based on the known tendency of wastes to mix slowly in surface water.

    b. Sample locations unlikely to be contaminated, located upstream from contaminated sites, or classified as "Background Samples" should be collected first in order to prevent cross-contamination of the water samples.

2. If possible, immerse the intake hose of the peristaltic pump into the surface water and sample directly. If the surface water is frozen and cannot be broken through, do not collect ice samples in lieu of water samples.

3. If peristaltic cannot be used for surface sample, use a clean 5-gallon or other closed container to collect sample. Immerse the container into the surface water and fill to 1/10 capacity. Swirl and rinse the container. Go downstream 5-10 feet to discard the water. Return upstream and collect sample.

    a. For a lake or other standing surface water, discard rinse at a site away from the sampling location.

4. Measure field parameters on surface water. Remember to calibrate pH meter before final pH value is recorded. Perform the Alkalinity Test.

Fill sample bottles as required, either filtered or non-filtered, preserve and store.

11.0 PRODUCTION AND DOMESTIC WELL SAMPLING

1. Raw samples from production or domestic wells are collected by the "grab" method from public, private, and TSC supply wells, or flowing monitor wells.

2. If possible, insert pump down well hole.

3. Connect one end of sampling hose(s) from the well to the flow-through unit. Measure field parameters, and perform alkalinity test.

4. As soon as parameter readings stabilize, collect unfiltered and filtered water samples upstream of flow-through unit and preserve and store as required.

If sample is collected from a faucet or hose, let water run to clear lines, indicate exact location of collection, and follow procedures for surface sampling.

12.0 SAMPLING SEEPS OR SPRINGS

1. When seeps or springs are present within a study area, a water sample may be obtained. If the discharge is small, it will be difficult to obtain a large sample. For large discharge springs, the sample is collected by the grab method, filling a container or using a peristaltic pump. The method of collection should be documented. The following are some general guidelines.

2. If the seep discharge is small, place a clean and unused bottle where the seep will drip into the container. If necessary, dig out the soil matrix to increase the flow (document this).

    a. Note the time it takes to collect sample.

    b. Follow sample priority list for a small volume of water.

Field parameters and alkalinity test take priority unless otherwise noted in the Work Order. If in doubt, consult the Water Sampling Manager or SH.

13.0 GENERAL FIELD PROCEDURES – EXCAVATION

The following procedures are used for collecting soil samples from test pits, trenches or excavations:

1. Contact New Mexico One-Call prior to performing any subsurface excavation or investigation. In addition, contact local utilities that may have underground services on or near the site.

2. Excavations will be conducted in accordance with OSHA 29 CFR 1926 Subpart P.

3. Persons are not allowed to enter a trench, excavation or similar cavity if it is more than four (4) feet deep.

4. Prior to any excavation with a backhoe, excavator, loader or similar heavy equipment, ensure that all sampling locations are clear of overhead and buried utilities.

5. General air quality will be measured continuously during excavation activities using a calibrated photoionization detector (PID) and multi-gas meter (lower explosive limit [LEL] and percent oxygen). These meters shall be set to issue an audible alarm at PID concentrations at or in excess of 100 instrument units, at 10% of the LEL, and at oxygen concentrations less than 19.5%. Periodic recording of the PID and LEL levels will be conducted by the on-site technician.

6. Using the backhoe, excavator, or other heavy equipment, excavate a trench approximately three feet wide and approximately one foot deep below the cleared sampling location. Place excavated soils on plastic sheets if the soil will be located off the contaminated site.

7. Trenches or excavations greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

8. Samples are typically collected directly from the equipment bucket. Discrete soil samples are to be collected from the bucket for evaluation of sidewall and bottom contaminant levels by directing the equipment operator to excavate soil from the desired depth or location within the excavation. Scrape the vertical face at the point of sampling to remove any soil that may have fallen from above and to expose fresh soil for sampling. Samples are collected directly into a new 4-ounce glass jar for submittal to an off-site laboratory, or into a clean jar for field heated headspace analysis.

9. Identify the soil samples with unique, descriptive names. Record the sample names (i.e. sample identification, location, depth, method, etc.) in a field notebook or other similar apparatus.

10. Excavated soil is either loaded directly into transport trucks or is temporarily stockpiled on-site within the known zone of existing contamination at the site.

11. If soil is to be temporarily stockpiled at an off-site or uncontaminated location, the soil must be placed on plastic sheeting.

12. Stockpile soil samples are obtained by scraping below the surface of the pile and collecting the soil sample directly into a new 4-ounce glass jar for submittal to an off-site analytical laboratory or into a clean jar for field heated headspace analysis.

13. Monitor the excavated soil with appropriate equipment such as a properly calibrated photoionization detector (PID).

14. A composite soil sample may be collected for disposal characterization purposes only.

15. Sketch a map of the trench showing the location (horizontally and vertically) of any stained soil layers, samples, buried wastes, etc. Sketch maps may be in plan and/or in profile views to adequate convey the sample location. Sketch the extent of the excavation with distances relative to permanent, identifiable landmarks.

16. Describe the material removed from the excavation. All contaminated soil removed from the excavation must be transported under non-hazardous waste manifests.

17. Record the presence or absence of water in the excavation cavity and the depth encountered.

18. Document on-site activities in a logbook, notes, or other similar fashion.

19. The excavation cavity must be properly secured with security fencing or other material to limit unauthorized entry into the excavation.

20. The excavation cavity must be backfilled as soon as possible upon completion of sampling activities.

14.0 NON-AQUEOUS PHASE LIQUID (NAPL) RECOVERY

The following procedures will be used to efficiently and safely recover, contain and dispose of NAPL from monitoring or remediation wells in accordance with all State and Federal regulations.

14.1 Hand-Bailing

1. Gauge and record depth to NAPL in well in accordance with gauging standard operating procedures previously provided.

2. After putting on appropriate PPE (nitrile gloves), slowly lower bailer into well until bottom of bailer contacts top of NAPL. Carefully lower bottom of bailer into NAPL column. Take care to minimize water removal.

3. Retrieve bailer from well and decant bailer into NMDOT approved drum or equivalent dedicated storage container or tank. Decant bailer by inserting decanting device into bottom of bailer to raise check ball and release contents.

4. Repeat as necessary until NAPL thickness is reduced to 1/8-inch or less.

5. Gauge and record final depth to NAPL, depth to ground water and volume of NAPL recovered. Allow bailer to air dry prior to disposal.

14.2 Passive Skimmers

1. Check retrieval line for slack or tightness to determine if passive skimmer is floating in well as designed, or has sunk into water column.

2. Retrieve passive skimmer from well and record volume of NAPL (and/or water) present in passive skimmer storage reservoir.

3. Decant passive skimmer into NMDOT approved drum or equivalent dedicated storage container or tank. Decant skimmer using drain valve on bottom of skimmer body.

4. Close drain valve and lower passive skimmer back into well and provide sufficient slack in retrieval line to accommodate water level fluctuations.

5. If skimmer was found to have sunk into water column, replace hydrophobic filter to prevent reservoir from filling with water. Inspect passive skimmer for cracks or leaks.

14.3 Absorbents

1. Check retrieval line for slack or tightness to determine if passive skimmer is floating in well as designed, has sunk into water column, or is suspended above water column.

2. Retrieve absorbent from well and record observations regarding degree of NAPL saturation, dryness, presence of water or other field observations.

3. Remove absorbent sock from steel screen assembly (if applicable).

4. Place absorbent into designated storage receptacle, NMDOT approved drum or other appropriate container.

5. Gauge and record depth to NAPL and depth to ground water.

6. Place new absorbent into steel screen assembly (if applicable).

7. Slowly lower absorbent into well and adjust retrieval line as needed to accommodate ground water level fluctuations.

14.4 NAPL Storage & Disposal

Only NMDOT approved storage drums, tanks, vessels or containers will be used for transportation and storage of NAPL and used absorbent socks. Unless NAPL removal quantities are such that on-site storage is utilized, NAPL is transported to the local SMA office for storage and eventual disposal. NAPL storage consists of a drum or tank placed inside a secondary containment vessel and subsequently placed on a pallet in a concrete or asphalt surfaced area. Periodic off-site transport for disposal and/or recycling is coordinated with a transporter that is licensed to transport ignitable and flammable substance and all disposed/recycled NAPL is accompanied by a signed waste disposal manifest.

15.0 TYPICAL REMEDIATION SYSTEM STARTUP, OPERATION & MAINTENANCE (O&M) & REPORTING

To provide guidance for remediation system startup, optimization, and maintenance of non-engineered and/or engineered remediation systems SMA has standard procedures as set forth in this document. However, the suggested procedures may not be applicable to particular sites based on site-specific considerations. To ensure the safety of all onsite personnel and subsurface structure integrity, consideration should be given to de-energizing and locking out selected site utilities or temporarily shutting down a portion of or the entire remediation system as needed to safely perform the work.

In addition to the general responsibilities outlined in Section 3.2, the project manager will also be responsible for making sure that appropriate site-specific requirements, discharge plans and notices of intent, if any, are followed. If safety or other site-specific considerations require a modified or different procedure, the project manager will review the modified procedure with the senior scientist/engineer.

15.1 Startup Testing

Following completion of remediation construction activities and after all remediation equipment is installed, connected, and operational, one week of startup testing is typical. All process flow rates, temperatures, and field response measured through well gauging, well vacuum, and temperatures will be monitored. Treatment efficiencies will be verified through sampling and analysis. Startup testing data will be documented in the As-Built report for the system construction. The As-Built Report will include (1) final site survey of remediation well coordinates to state plane coordinates and NAD 83, (2) survey of equipment placement, trench alignments, fencing, power pole, etc., (3) equipment on site including manufacturer's cut sheets and O&M manuals, and (4) all other As-Built requirements of 20.5.38 NMAC, appropriate drawings and tables, chronology of events, photographic documentation, startup testing data, etc.

15.2 System Operation & Maintenance (O&M)

The following operation and maintenance activities will be performed to keep the remediation system operating after startup.

Weekly O&M Activities

Record the following system operational parameters:

a. Thermal Oxidizers:

   i) Intake pressure
   ii) Temperature
   iii) Influent flow rate
   iv) Run time
   v) Furnace operating temperature
   vi) Gas supply pressure
   vii) LEL sensor readings
   viii) Visual observation of hot surface spots
   ix) Electric meter reading
   x) Gas meter reading / propane tank % full

b. All SVE/MPE Systems

   i) Extracted vapor vacuum and temperature at the SVE header
   ii) Extracted vapor flow rates and PID readings for each SVE manifold leg

c. Ground Water Extraction/MPE Systems

   i) Flow meter readings
   ii) Total volume of water extracted
   iii) Total volume of NAPL recovered
   iv) Operation of injection wells/infiltration galleries

d. All Remediation Systems

   i) Visual inspection of the remediation system
   ii) General cleanup and assessment of site security
   iii) Identification of issues and/or problems to be addressed
   iv) Monthly O&M activities

<u>Monthly O&M Activities</u>

a. All weekly activities listed in the section above

b. Gauging of fluid levels in remediation and monitoring wells

c. Measurement and recording of extraction wellhead vacuum

d. Collection of PID reading at the SVE manifold and header

e. Greasing of SVE blower gears

Quarterly O&M Activities

a. All weekly and monthly activities listed above

b. Changing of SVE blower oil

c. Draining of oxidizer pitot tubes

d. Collect quarterly monitoring and performance assessment samples

As-Needed Activities

a. Blowing out of SVE conveyances. Primarily during winter months, due to low vapor extraction flowrate/velocities limited by oxidizer processing capacity, condensate may form in the SVE conveyances.

b. Cleaning flow meters

c. Cleaning air strippers

d. Well rehabilitation

e. Check controllers, meters, electrical components

15.3 Remediation System Reporting

1. Quarterly monitoring and O&M reports will include, as appropriate, the following:

   a. Records of system operation, including but not limited to:

      i) Periods of shut-down and equipment malfunctions;

      ii) Maintenance procedures performed on the remediation system during the preceding quarter, including the names of the individuals performing the maintenance; and

      iii) Operation and maintenance schedule for the upcoming quarter.

   b. Summary of gauging and sampling activities;

c. Summary of O&M activities;
d. Summary of gauging and sampling results and system extraction/injection rates and vacuums/pressures;
e. Groundwater potentiometric surface map;
f. Apparent NAPL thickness map;
g. Distribution of dissolved contaminants map;
h. Contaminant mass removal calculations;
i. System performance assessment;
j. Conclusions and recommendations;
k. Field data collection forms; and
l. Laboratory reports.

2. Annual evaluation of system performance will include, as appropriate, the following:

a. All of the above tasks;
b. Verification that target concentrations are being achieved;
c. Preparation of Annual Report for Groundwater Discharge Permit if applicable;
d. Preparation of Annual Report for Air Quality Permit if applicable;
e. Preparation of Annual Report for Office of State Engineer if applicable; and
f. The Annual Performance Evaluation will be included in the 4th Quarterly Groundwater Monitoring and O&M Report.

Tab 5 – Response to Contract Terms and Conditions

As provided in the Letter of Transmittal Form, SMA accepts all terms and conditions as outlined in the Request for Proposal (RFP) No. 19-667-3200-0004, dated November 29, 2018.

Tab 6 – Offeror's Additional Terms and Conditions

SMA does not have any additional terms and conditions to add to those outlined and specified in Request for Proposal (RFP) No. 19-667-3200-0004, dated November 29, 2018.

Tab 7 – Acknowledgement of Pay Equity Reporting Terms

SMA acknowledges and accepts all terms and conditions of Pay Equity Reporting Requirements as outlined in Section II.C.30.A-D of the Request for Proposal (RFP) No. 19-667-3200-0004, dated November 29, 2018.

Tab 8 – Signed Campaign Contribution Form

Campaign Contribution Disclosure Form

Pursuant to NMSA 1978, § 13-1-191.1 (2006), any person seeking to enter into a contract with any state agency or local public body for professional services, a design and build project delivery system, or the design and installation of measures the primary purpose of which is to conserve natural resources must file this form with that state agency or local public body. This form must be filed even if the contract qualifies as a small purchase or a sole source contract. The prospective contractor must disclose whether they, a family member or a representative of the prospective contractor has made a campaign contribution to an applicable public official of the state or a local public body during the two years prior to the date on which the contractor submits a proposal or, in the case of a sole source or small purchase contract, the two years prior to the date the contractor signs the contract, if the aggregate total of contributions given by the prospective contractor, a family member or a representative of the prospective contractor to the public official exceeds two hundred and fifty dollars ($250) over the two year period.

Furthermore, the state agency or local public body shall void an executed contract or cancel a solicitation or proposed award for a proposed contract if: 1) a prospective contractor, a family member of the prospective contractor, or a representative of the prospective contractor gives a campaign contribution or other thing of value to an applicable public official or the applicable public official's employees during the pendency of the procurement process or 2) a prospective contractor fails to submit a fully completed disclosure statement pursuant to the law.

THIS FORM MUST BE FILED BY ANY PROSPECTIVE CONTRACTOR WHETHER OR NOT THEY, THEIR FAMILY MEMBER, OR THEIR REPRESENTATIVE HAS MADE ANY CONTRIBUTIONS SUBJECT TO DISCLOSURE.

The following definitions apply:

"**Applicable public official**" means a person elected to an office or a person appointed to complete a term of an elected office, who has the authority to award or influence the award of the contract for which the prospective contractor is submitting a competitive sealed proposal or who has the authority to negotiate a sole source or small purchase contract that may be awarded without submission of a sealed competitive proposal.

"**Campaign Contribution**" means a gift, subscription, loan, advance or deposit of money or other thing of value, including the estimated value of an in-kind contribution, that is made to or received by an applicable public official or any person authorized to raise, collect or expend contributions on that official's behalf for the purpose of electing the official to either statewide or local office. "Campaign Contribution" includes the payment of a debt incurred in an election campaign, but does not include the value of services provided without compensation or unreimbursed travel or other personal expenses of individuals who volunteer a portion or all of their time on behalf of a candidate or political committee, nor does it include the administrative or solicitation expenses of a political committee that are paid by an organization that sponsors the committee.

"**Contract**" means any agreement for the procurement of items of tangible personal property, services, professional services, or construction.

"**Family member**" means spouse, father, mother, child, father-in-law, mother-in-law, daughter-in-law or son-in-law.

"**Pendency of the procurement process**" means the time period commencing with the public notice of the request for proposals and ending with the award of the contract or the cancellation of the request for proposals.

"**Person**" means any corporation, partnership, individual, joint venture, association or any other private legal entity.

"**Prospective contractor**" means a person who is subject to the competitive sealed proposal process set forth in the Procurement Code or is not required to submit a competitive sealed proposal because that person qualifies for a sole source or a small purchase contract.

"**Representative of a prospective contractor**" means an officer or director of a corporation, a member, or manager of a limited liability corporation, a partner of a partnership or a trustee of a trust of the prospective contractor.

NO CONTRIBUTIONS IN THE AGGREGATE TOTAL OVER TWO HUNDRED FIFTY DOLLARS ($250) WERE MADE to an applicable public official by me, a family member or representative.

Signature	**December 28, 2018** Date
Karl E. Tonander, P.G., P.E. – Senior Vice President/Chief Operations Officer Title (Position)	

Tab 9 – Signed Employee Health Coverage Form

New Mexico Employees Health Coverage Form

1. For all contracts solicited and awarded on or after January 1, 2008: If the Offeror has, or grows to, six (6) or more employees who work, or who are expected to work, an average of at least 20 hours per week over a six (6) month period during the term of the contract, Offeror must agree to have in place, and agree to maintain for the term of the contract, health insurance for those employees and offer that health insurance to those employees no later than July 1, 2010 if the expected annual value in the aggregate of any and all contracts between Contractor and the State exceed $250,000 dollars.

2. Offeror must agree to maintain a record of the number of employees who have (a) accepted health insurance; (b) decline health insurance due to other health insurance coverage already in place; or (c) decline health insurance for other reasons. These records are subject to review and audit by a representative of the state.

3. Offeror must agree to advise all employees of the availability of State publicly financed health care coverage programs by providing each employee with, as a minimum, the following web site link to additional information http://insurenewmexico.state.nm.us/.

4. For Indefinite Quantity, Indefinite Delivery contracts (price agreements without specific limitations on quantity and providing for an indeterminate number of orders to be placed against it); these requirements shall apply the first day of the second month after the Offeror reports combined sales (from state and, if applicable, from local public bodies if from a state price agreement) of $250,000.

Signature of Offeror: _____ Date December 28, 2018

Tab 10 – Signed Affidavit Pursuant to Governmental Conduct Act

Certification Regarding Debarment, Suspension, and Other Responsibility Matters

Offeror certifies to the best of its knowledge and belief that it and its principals:

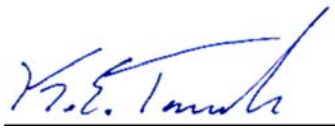
1) are not presently debarred, suspended proposed for debarment, declared ineligible, or voluntarily excluded from a covered transaction by any Federal department or agency

2) have not within a three year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state or local) transaction or contract under a public transaction; violation of Federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property

3) are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, State or local) with commission of any of the offenses enumerated in paragraph 2 of this certification

4) have not within a three year period preceding this proposal for bid had one or more public transactions (Federal, state or local) terminated for cause or default

I understand that a false statement on this certification may be ground for rejection of this proposal or termination of the award. Under 18USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 50 years, or both.



Signature of Authorized Representative

Karl E. Tonander, P.G., P.E. – Senior Vice President/Chief Operations Officer
Name and Title of Authorized Representative

December 28, 2018
Date

Tab 11 – Resident Business Certificate

Souder, Miller & Associates (SMA) is licensed to do business in New Mexico, and holds State of New Mexico Taxation and Revenue Department Resident Business Certificate Number L2012634688. A true copy of SMA's Resident Business Certificate is shown below.

STATE OF NEW MEXICO

TAXATION AND REVENUE DEPARTMENT

RESIDENT BUSINESS CERTIFICATE

Issued to: MILLER ENGINEERS, INC.

DBA: SOUDER, MILLER & ASSOCIATES
5454 VENICE AVENUE NE STE D
ALBUQUERQUE, NM 87113-1948

Expires: 01-Nov-2020

Certificate Number:

L1501172528

John Monforte, *Acting Cabinet Secretary*

THIS CERTIFICATE IS NOT TRANSFERABLE

Tab 12 – Resident Veterans Preference Certification (N/A)

Tab 13 – Anti-Collusion Notarized Affidavit

Souder, Miller & Associates (SMA) certifies under oath that SMA has participated and will continue to participate in the competitive contractor selection process as described in 20.5.17.15 NMAC and NMSA 1978, Section 74-6B-7C without misrepresentation and without collusion with other contractors during the entire solicitation, evaluation and selection process.

Peter G. Fant, P.E. –President/C.E.O.

12/28/2018
Date

The forgoing was made before me by Mr. Peter G. Fant

Notary Public

My commission expires on: 02/13/2020

Tab 14 – Subcontractor Information

For every project requiring the use of subcontractors, Souder, Miller & Associates (SMA) always strives to assemble a team with a large amount of leaking petroleum storage tank (LPST) experience that is capable of providing excellent service, expertise and professionalism at competitive costs. A brief description of each anticipated subcontractor's capabilities and LPST experience are as follows:

Drilling and Abandonment Subcontractor(s)

SMA uses numerous qualified and licensed drilling subcontractors and intends on using **JR Drilling, LLC** (direct push; based in Edgewood, New Mexico) or **Geomechanics Southwest, Inc.** (based in Albuquerque, New Mexico), for most drilling and abandonment projects completed under the state lead contract. These drilling contractors have completed numerous PST drilling projects over the past five years and each has OSHA 40-hour trained staff. Resources between these companies include direct push drill rigs and hollow stem auger drilling rigs (CME-75). These companies are also capable of providing angle drilling services, conversion to air rotary drilling services, conversion to casing advance drilling services, Tubex percussion drilling services, continuous and split-spoon sampling, pressure grouting and tremmie pipe services for abandonment and more. Should alternate drilling methods be necessary, SMA has worked with many other drilling contractors to provide sonic, mud rotary, and cable tool drilling methods.

Analytical Laboratory Subcontractor(s)

SMA intends on using **Hall Environmental Analysis Laboratory (HEAL)** in Albuquerque, New Mexico as the primary laboratory for soil water and vapor testing for projects completed under the emergency response contract. **HEAL** is a commercial full service analytical testing laboratory that SMA has used to perform laboratory testing at LPST states throughout New Mexico for a number of years. **HEAL** offers volatile organic, semi-volatile organic, and metals analysis in-house. HEAL is nationally certified through the National Environmental Laboratory Accreditation Program (NELAC), The State of New Mexico Drinking Water Bureau, and The State of Arizona. **HEAL** is a locally owned small business that was established in 1991 to serve the New Mexico environmental testing market. **HEAL** has since expanded its services into Texas, Colorado and Arizona and now supports all of these states from its Albuquerque location. **HEAL** is experienced in the analysis of air, soil water, oil, sludge, wastes and solid materials. HEAL's client base includes local, state and federal governmental agencies, private consultants, commercial and industrial business, as well as individual homeowners. **HEAL** has performed analysis for The National Laboratories, The Army Corps of Engineers, Kirtland Air Force Base, and the Air Force Committee on Environmental Excellence. For soil geotechnical analysis, SMA has used, and intends on using for emergency response projects, **Southwest Engineering, Inc**.

General / Remediation System Subcontractor(s)

SMA will subcontract plumbing and remediation system construction to **Sub Surface Contracting, Inc.** (Santa Fe, New Mexico) or **Enviroworks, LLC** (Edgewood, New Mexico). **Sub Surface Contracting, Inc.** currently performs utility repair and replacement for the City of Santa Fe and many private clients (including SMA) in Santa Fe. They are well versed in the commonly cramped working conditions in Santa Fe. **Enviroworks, LLC** has also performed remediation system construction activities in Santa Fe including the Santa Fe County Judicial Complex.

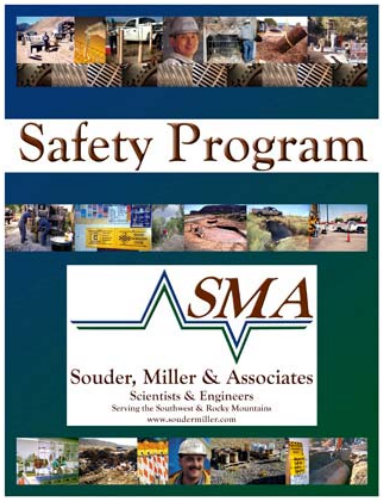
Controls and Telemetry Subcontractor

SMA will enlist **Transmission & Distribution Services, LLC (T&D)** for any necessary remediation system controls and SCADA system implementation for the Santa Fe County Judicial Complex contract. T&D works

with each client to develop a clear understanding of their needs, concerns and particular system challenges. Utilizing that knowledge, they design a solution to fit a project's specific needs. T&D's assistance with automation ranges from simple Remote Terminal Unit (RTU) additions and replacements to high performance substation Human Machine Interface (HMI) development and fully integrated substations. Their SCADA systems provide facility operators with in-depth, comprehensive system information to decrease incident reaction time and allow proactive responses to possible problems. Moreover, these systems store data to provide a historical record of past system performance and allow system and process improvement analysis. T&D offers comprehensive SCADA services for their clients, including system evaluation, design, integration, commissioning, training and design documentation and specifications.

Tab 15 – Organization Health and Safety Plan

(A complete copy of SMA's Corporate Health & Safety Plan is Available Upon Request)



The health and safety of Souder, Miller & Associates (SMA) employees, subcontractors, and the general public is of primary concern. As such, SMA continues to improve and add to our extensive Health & Safety Program, which meets or exceeds all applicable OSHA requirements, including 29 CR 1910.120—Hazardous Waste Operations and Emergency Response, 1910.1200—Hazard Communication, 1910.134—Respiratory Protection, and 1910.1030—Bloodborne Pathogens. In addition, the SMA safety program complies with all relevant EPA, CERCLA, and DOT guidance regarding safety standards for hazardous waste handling codified in 40 CFR—Protection of Environment and 49 CFR—Transportation. New employees are trained on all provisions of the entire safety program upon employment and all employees are re-trained on all aspects of the program at least annually. All field personnel are required to participate in SMA's Medical Surveillance Program and must complete the following training, pursuant to 29 CFR Part 1910.120 (e):

- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Health and Safety Training
- 8-Hour HAZWOPER Site Supervisor Training
- 8-Hour Hazardous Waste Operations Health and Safety Refresher Training (Annual)

Some of the pertinent aspects of SMA's safety program are summarized below.

Health & Safety Officer

For each project, a Health and Safety Officer will be designated to provide direct employee oversight and ensure that all aspects of SMA's Health & Safety Program are integrated into the project planning processes and into the site-specific health and safety plan. In addition, all SMA employees related to the project are informed of their safety expectations as outlined in SMA's Health & Safety Program Line Accountability Statement.

Site Specific Health and Safety Plan

A site specific Health and Safety Plan is designed by the SMA project manager for each task to be completed at a jobsite, and takes into account potential health and safety issues that are specific to that job. Example issues included in the site specific Health and Safety Plan include anticipated weather conditions at the site (as it relates to heat stress/heat stroke, cold stress, thunderstorms/lightning, potential visibility issues, etc.), anticipated vehicular traffic on-site, anticipated soil and/or groundwater contaminants that may be encountered, anticipated subsurface utilities, Personal Protective Equipment required specifically for the completion of that job task, and other potential hazards.

Upon mobilization to a jobsite, the site specific Health and Safety Plan is strictly followed and enforced by the project Health & Safety Officer. Daily safety meetings between employees and subcontractors are conducted prior to commencement of any on-site activities as a commitment to safety and also to allow for the identification and communication of safety concerns that may arise during the job. Subcontractors are required to comply with all aspects of SMA's site specific Health and Safety Plan.

Hazard Communication, Personal Protective Equipment & Respiratory Protection

SMA's Hazard Communication Program outlines a broad range of requirements and methods to keep employees and subcontractors informed of the hazards associated with the handling, storage, and the disposal of chemicals that might be encountered on the jobsite. The Hazard Communication Program compliments SMA's Personal Protective Equipment (PPE) Program that is setup to protect SMA employees and subcontractors from the risks of injury by creating a barrier against workplace hazards. This is accomplished through training in the use of all PPE that may be required on the jobsite. PPE is determined on a jobsite specific basis, but at a minimum will consist of Level D protective gear including head protection, safety shoes that meet ANSI standard Z41-1991, long pants, shirt, gloves, eye and hearing protection (where appropriate).

Because of the need for PPE and jobsite training, the general public will not be allowed to enter the designated work zone. Job hazard assessment, the on-site identification and evaluation of any additional chemical and physical hazards which may require additional PPE, such as respiratory protection, is the responsibility of the Health & Safety Officer, which is a provision included in all of SMA's site specific Health and Safety Plans.

The object of the Respiratory Protection Program maintained by SMA is to minimize potential exposure to harmful levels of air contaminants during completion of job duties. The Respiratory Protection Program includes the fit-testing of air-purifying respirators for all SMA employees who risk exposure during field work and training in the use of air-purifying respirators. The Respiratory Protection Program also includes air monitoring on the jobsite using either an MHSA approved LEL continuous sampling meter, calibrated to pentane with an audible and visual alarm set at 10% LEL, or an OVM (PID) calibrated to isobutylene. All air monitoring for potential exposure is conducted in the breathing area. All employees are trained on the Hazard Communication Program, Personal Protective Equipment Program and Respiratory Protection Program at least annually.

An example of a SMA Site Specific Health and Safety Plan follows this page.

FORMER SKY CHIEF TEXACO UST RELEASE
SITE SAFETY AND HEALTH PLAN

Location:
Former Sky Chief Texaco
723 Maxwell Avenue
Springer, New Mexico

PREPARED FOR:
State of New Mexico Environment Department
Petroleum Storage Tank Bureau (PSTB)

PREPARED BY:
SOUDER, MILLER & ASSOCIATES
3451 CANDELARIA RD NE, SUITE D
ALBUQUERQUE, NEW MEXICO 87107
505-299-0942
FAX 505-293-3430

DATE: April 3, 2013

TABLE OF CONTENTS

I. Introduction:

The health and safety of ***Souder, Miller & Associates*** employees, subcontractors, and the general public is of the upmost importance, and is our primary concern. The inherent dangers involved in the handling of hazardous materials or waste, and hazards associated with any job site require that all participants in this project become familiar with the contents of this Health and Safety plan.

II. SITE DESCRIPTION

Date: **April 4-5, 2013**

Location: **723 Maxwell Avenue**
(Address)
Springer, New Mexico
(City, State)

Hazards: Potential hazards may include; heavy equipment, overhead hazards, and falling tripping hazards

---

Area affected: Parking Lot East of Sky Chief Liquors

(Site Description)

The specific areas of interest are diesel dispensers to the west and the former tank pit to the east of the former station building.

Surrounding population: The surrounding area will consist of one or more of the following: Commercial, Industrial, Undeveloped Industrial and I-40 interstate right of way.

III. ENTRY OBJECTIVES

A. Task 1 Advance 1 soil boring on property

B. Task 2 Complete the soil boring as monitoring well

C. Task 3

D. Task 4

IV. ON-SITE ORGANIZATION & COORDINATION

The following personnel are designated to carry out the stated job functions on site. (*Note: one person may carry out more than one job function.)*

Souder, Miller & Associates:

PROJECT TEAM LEADER: Laura Van Alst

FIELD TEAM LEADER: Laura Van Alst

ALTERNATES:

_____

Subcontractors:

SITE CREW CHIEF: Geomechanics Southwest, Inc.

Owner: Kenny Ross, Ross Oil

FEDERAL AGENCIES: EPA

STATE AGENCIES: NMED PTSB

_____

_____

Other Agencies: _____

_____

V. ON-SITE CONTROL

The occupancy of the area will be minimal. Only key personnel will be in attendance. Representatives of ***Souder, Miller & Associates*** may include the following: Matt Earthman, Laura Van Alst. EPA or State Agency personnel will be varied with the contact person being Mr. John Kovacs.

Control boundaries will be established and prior to Task 1, and the Exclusion Zone (the contaminated area), Contamination Reduction (decontamination) Zone, and Support Zone (clean area) will be identified as noted.
All personnel involved in the project will be required to adhere to all boundaries and rules regarding the project. All personnel will be required to show proof of 40 Hour HAZWOPER and other applicable training.

Boundaries to be marked:

Containment: Orange temp fencing & yellow caution tape.

Traffic/Hotline: Orange Cones.
Decontamination: Orange Cones & White Tape.
Support/Staging area: Vehicles & As needed.

VI. HAZARDS EVALUATION

Table 1 and 2 list several potential hazards that might be associated with execution of this project. This list is by no means all inclusive and other unforeseen hazards may be contingent upon conditions.

Table 1
Possible Chemicals

Substances Involved	Concentration	Fire	Eyes	Skin	Respiratory
Anti-Freeze	Ethylene Glycol Variable				
Used Oil	Petroleum Hydrocarbons Variable				
Gasoline	Variable				
Diesel	Variable				
Grease	Variable				
Solvent/Cleaners pH Approximate Range 3.5 To 11 (Irritating Liquids) and possible Chorinated Hydrocarbons	Variable				
Off-Spec Paint (Liquid/Solid)	Lead And Chromium Variable 8% - 15%				
Tar & MC 250 & MC-70	Variable				
Polychlorinated Biphenyl (PCB)	Variable, Halogens				
Organic Solvents	Variable				
Acids	Variable				
Bases	Variable				
Organic Peroxides	Variable				

Legend :

Slt.	Slight	Mod	Moderate
Hi.	High	IDLH	Immediately Dangerous to Life and Health
NA	Not Applicable		

Table 2
Potential Health And Safety Hazards

Hazard	Task 1:	Task 2:	Task 3	Task 4
Inhalation Hazard	**X**	**X**		
Contaminated Soil/Liquid Contact	**X**	**X**		
Noise	**X**	**X**		
Heat/Cold Stress	**X**	**X**		
Electrical (Transformers And Buried Powerlines)				
Potential Fire/Explosion	**X**	**X**		
High Pressure Liquids				
Collapsing Of Sidewalls				
Confined Spaces				
Physical Injury	**X**	**X**		
Overhead Powerlines	**X**	**X**		
Buried Piping/Tanks	**X**	**X**		
Skin Hazards	**X**	**X**		
Ventilation Problems				
Vandalism				
Heavy Equipment/Trucking /Traffic	**X**	**X**		
Level Of Protection	D	D		
Air Monitoring	NA	NA		
Buried Line Detection	One-Call 48 hr Notice			

VII. PERSONAL PROTECTIVE EQUIPMENT

Based on the OVM (PID) readings in the breathing zone, the criteria for levels of protection are as follows:

Background-25 (PPM)	Level D
25-50(PPM)	Level C
50-100(PPM)	Level B
>100 (PPM)	Level A

NOTE: Deviations from these levels will be based on the types of products and constituents. No changes to the specified levels given in table 1 and the above table shall be made without the approval of the site safety officer and the project team leader.

A. Personal Protective Equipment Matrix:

	COVERALL	HARDHAT	GLOVES	SAFETY BOOTS	NOMEX	HEARING PROTECTION	SAFETY GLASSES W/SIDE	LEVEL C	LEVEL B	LEVEL A	OTHER
DAILY ROUTINE		X	X	X		X	X				
SAMPLING (OIL FIELD)											1
SAMPLING (NON-OIL FIELD)											
EXCAVATION (OIL FIELD)											1
EXCAVATION (NON OIL FIELD)											
DRILLING (INVESTIGATION)											
FACILITY INVENTORY											
CHEMICAL INVENTORY											2
UNDERGROUND STORAGE TANK REMOVAL											
EMERGENCY RESPONSE											2

1. Minimum required will be determined by Client's current policy
2. MSDS will be consulted to determine proper Personal Protective Equipment.

VIII. PROTOCOL

The following briefly describes the protocol to be followed for any soil and water samples to be taken at a site. A working knowledge of applicable EPA SW-846, sampling and analytical procedures and proper use of field testing equipment is necessary. New disposable Nitrile gloves shall be worn for all water and soil sampling activities.

A. Water samples:

Volatile Organic Analysis (VOA)- Use of a 40 mL VOA glass vial with Teflon closure, leave no airspace present, and preserve as required; keep cool with ice in cooler, use chain-of-custody sample handling procedures, and transport to Laboratory. For other analyses, see detailed procedures.

B. Soil samples for assessment/verification:

Field vapor headspace - 475 mL wide mouth glass container, fill 1/2 full, seal with aluminum foil, or use heavy zip-locking plastic bags.

Laboratory analysis for hydrocarbons (standard) - Use laboratory supplied sterile glass container, with Teflon closure. Fill completely, keep cool with ice in cooler, use chain-of custody sample handling procedures, transport to Laboratory. For NMED USTB Methanol Extraction, see detailed procedure.

C. Air Monitoring:

Air monitoring for the site will be accomplished with an MHSA approved LEL continuous meter, calibrated to pentane, and with and alarm at 10% LEL. An OVM (PID) calibrated to isobutylene can be substituted to an LEL. All air monitoring for exposure is to be in breathing area. (for frequencies, see Section VI, Table 2).

IX. SITE WORK PLAN

This project will be completed in the Tasks outlined in Section B. The following outlines the key personnel and their responsibilities:

Project Team Leader:

Laura Van Alst
Souder, Miller & Associates
Albuquerque, NM (505) 299-0942

Alternates:

Matt Earthman

Scott McKitrick

The Project Team Leader will function as the Project Manager, Site Health & Safety Officer, Site Supervisor, and sampler for this Project.

Tailgate safety meetings will be held and all personnel will be briefed on the contents of this plan prior to initiating any efforts. Tailgates will also cover any safety and/or health issues not anticipated or addressed in this plan. The Project Manager will be responsible for briefing and record keeping.

X. COMMUNICATION PROCEDURES

Radio communication is not anticipated to be essential for this project. Personnel in the Exclusion Zone should be in visual contact of the Project Team Leader.

The following standard hand signals will be used:

Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I'm all right, I understand
Thumbs down	NO, Negative

Others as needed while handling, moving, or loading materials, are acceptable provided that all personnel involved agree to their meaning.

Telephone communication will be available in the Staging Area by mobile phone.

XI. DECONTAMINATION PROCEDURES

The following are a brief summary of decontamination procedures. Common sense should be used at all times.

A. Personal Decontamination:

The following procedure assumes level "D" Personal Protective Equipment (PPE). Prior to entering a vehicle and leaving the site, coveralls are to be doffed and placed in appropriate laundry/duffel bags in the reduction zone, and hands and face are to be washed.

For all other levels of PPE, PPE to be doffed in the reduction zone, Tyvek and other disposables will be placed with the waste for off-site disposal, and all other reusable PPE will be washed with brushes or soapy rags and rinsed by hand sprayers. All exposed skin to be washed in reduction zone also.

B. Excavation/Exploratory Equipment:

All equipment will be decontaminated by high pressure wash, and/or steam cleaned as necessary, initially in the exclusion zone and final rinsed in the reduction zone. Rinse and wash media to be disposed of with contaminated soil/groundwater.

C. Sampling Equipment:

Reusable sampling equipment is to be triple rinsed with alconox soap, tap water and deionized water. Disposable sampling equipment is to be consolidated with waste for off-site disposal.

XII. CONTINGENCIES

A. FIRST AID MEASURES/MEDICAL EMERGENCIES

The nearest hospital is located at:

Alta Vista Regional Hospital
104 Legion Drive, Las Vegas, NM 87701

In the event that personnel exposure symptoms occur, the following procedures will be used:

B. PETROLEUM PRODUCTS / IRRITATING LIQUIDS:

1. Eye contact:

Flush eye immediately with copious amounts of water and repeat until irritation is eliminated. If prolonged irritation occurs for more than 15 minutes, seek medical attention.

2. Skin contact:

Wash exposed area with soap and water. If dermatitis or severe reddening occurs, seek medical attention.

3. Inhalation:

Remove person into fresh air. If symptom occurs for more than 15 minutes, seek medical attention.

4. Ingestion:

Do not induce vomiting, seek medical attention.

C. PHONE LIST:

AMBULANCE	911
POLICE, FIRE & RESCUE	911
STATE POLICE	505-841-9256
POISON CONTROL	1-800-362-0101
CHEMTREC	1-800-424-8802

First aid and emergency fire equipment will be available in ***Souder, Miller & Associates*** vehicles.

D. ENVIRONMENTAL MONITORING

The following environmental monitoring instruments will be used on site:

The following instruments will be used continuously to monitor air quality.

Combustible gas Indicator: Trigger level will be 10%. The alarm will be audible or vibratory in the event of extreme noise levels.

FID/OVA: Will measure in the parts per million. It will indicate organic volatiles.

pH meter. The pH meter will be used to indicate the pH of each separate sample.

E. EMERGENCY PROCEDURES (to be modified as required for project or incident)

The following standard emergency procedures will be used by on site personnel. The Site Safety Officer shall be notified of any on site emergencies and be responsible for ensuring that the appropriate procedures are followed.

1. Personal Injury in the Exclusion Zone:

Upon notification of an injury in the Exclusion Zone, all site personnel shall assemble in the Reduction Zone. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader shall evaluate the nature of the injury, prior to movement to the Support Zone. Appropriate first aid will be initiated, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

2. Personal Injury in the Support Zone:

Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of remaining personnel, operations may continue. If the injury increases the risk to others, the designated emergency signal horn shall be sounded and all site personnel shall move to the Reduction Zone for further instructions.

In any case, the appropriate first aid will be initiated and necessary follow-up as stated above.

3. Fire / Explosion:

Upon notification of a fire or explosion on site, the designated emergency signal horn shall be sounded and all site personnel assembled at the Reduction Zone . The fire department shall be alerted and all personnel moved to a safe distance from the involved area. *Fire extinguishers shall be used with discretion to minimize the risk of fire and explosion that would result in injuries.*

4. Personal Protective Equipment Failure:

If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusive Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

5. Other Equipment Failure:

If any other equipment on site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on site emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. ***The hazards have been reassessed.***
2. ***The conditions resulting in the emergency have been corrected.***
3. ***The Site Safety Plan has been reviewed.***
    3. ***Site personnel have been briefed on any changes in the Site Safety Plan.***

XIII. CLOSURES AND SIGNATURES

This plan has been reviewed and has the full approval of the following Management.

Owner:

NAME:_____
TITLE:_____
DATE:_____

Consultant ***Souder, Miller & Associates***.

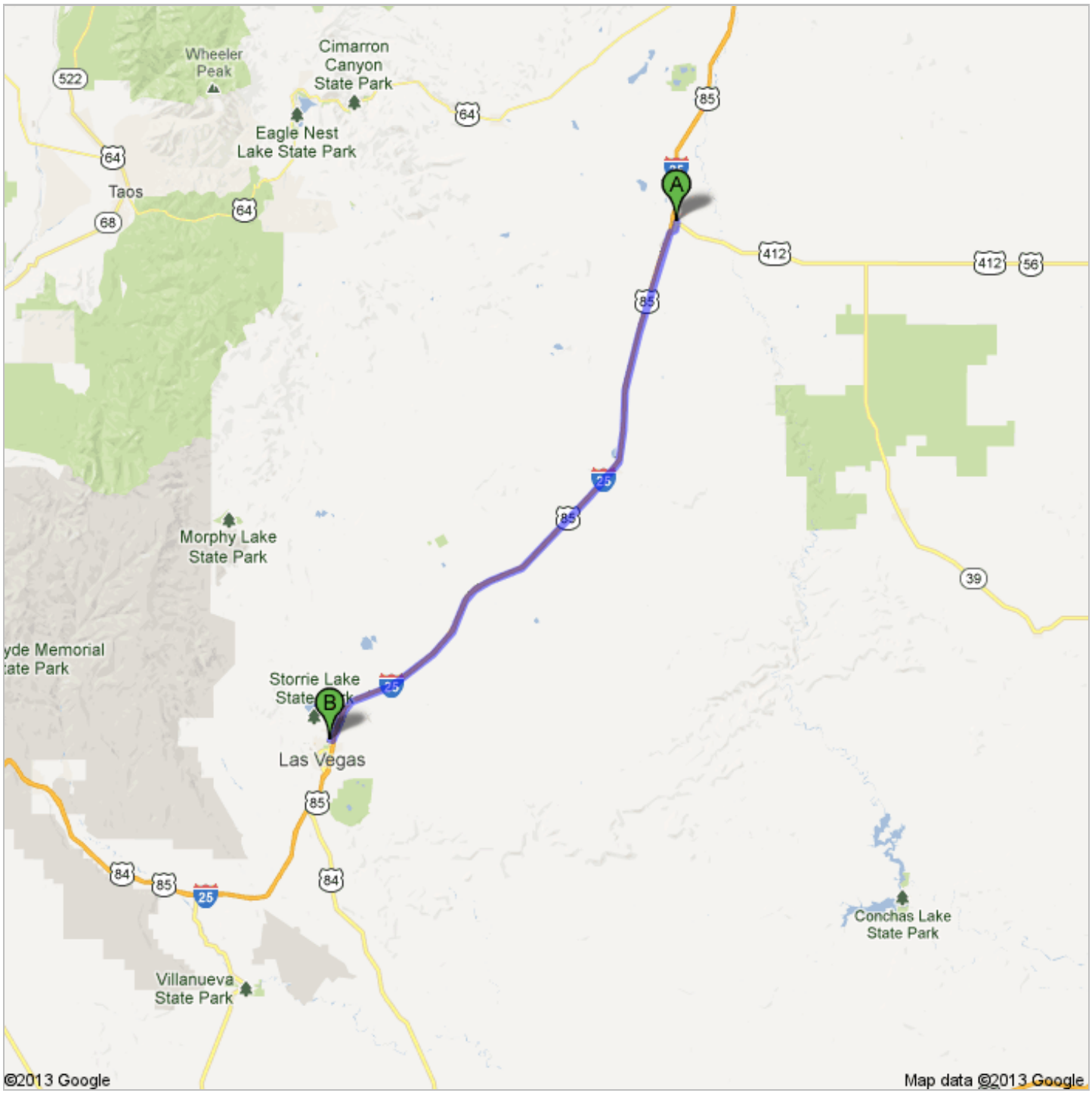
NAME:_____
TITLE:_____
DATE:_____

All site personnel have read the above plan and are familiar with its provisions.

	Print Name	Signature
Site Safety Officer	_____	_____
Project Team Leader	_____	_____
Other Site Personnel	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Google

Directions to Alta Vista Regional Hospital
104 Legion Dr, Las Vegas, NM 87701
66.2 mi – about **58 mins**



723 Maxwell Ave, Springer, NM 87747

	1. Head **south** on **Maxwell Ave** toward **7th St** About 4 mins	go 1.4 mi total 1.4 mi
	2. Turn left to merge onto **I-25 S** toward **Las Vegas** About 53 mins	go 64.1 mi total 65.5 mi
	3. Take exit **347** toward **NM-65/NM-518/Las Vegas/Taos**	go 0.3 mi total 65.8 mi
	4. Slight right onto **US-85 S**	go 0.1 mi total 65.9 mi
	5. Take the 1st right onto **Legion Dr** Destination will be on the right About 47 secs	go 0.2 mi total 66.2 mi

Alta Vista Regional Hospital
104 Legion Dr, Las Vegas, NM 87701

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Tab 16 – Professional Engineering Licensure

Pursuant to the requirements of 20.5.16.11 New Mexico Administrative Code (NMAC), the statements regarding Professional Engineering licensure are as follows:

- Karl E. Tonander, P.E. – Vice President is a Professional Engineer on staff with Souder, Miller & Associates.
- Karl E. Tonander, P.E. – Vice President can contractually bind Souder, Miller & Associates.
- Karl E. Tonander, P.E. – Vice President is in compliance with the Professional Engineer rules, Part 8 and 9 of 16.39 NMAC.
- Karl E. Tonander, P.E. – Vice President is a New Mexico Registered Professional Engineer.

A true copy of Mr. Tonander's New Mexico Professional Engineering license is shown below.

State of New Mexico

State Board of Licensure
For Professional Engineers and Professional Surveyors

This is to Certify that Karl E. Tonander

having given evidence of the necessary qualifications, as required by Sections 6123-1 through 6123-32 NMSA (1978), has been duly licensed and is hereby authorized to practice

Professional Engineering

in the state of New Mexico

GREAT SEAL OF THE STATE OF NEW MEXICO · 1912 ·

License No. 18742

in Testimony Whereof, Witness the signature of the Chairman and Secretary under seal of the Board

dated July 14, 2008

Chairman

Secretary

Tab 17 – Construction Industries Division License

SMA is a New Mexico licensed contractor and holds State of New Mexico Construction Industries Division (CID) License Number 55890. A true copy of SMA's CID card is shown below. Additionally, SMA complies with all other applicable State and Federal regulations.

STATE OF NEW MEXICO
CONSTRUCTION INDUSTRIES DIVISION

SOUDER MILLER & ASSOCIATES

LICENSE NUMBER
55890

EXPIRES
08/31/2021

Qualifying Party(S)
ROBERTSON ANDREW
YOUNG EWAN
FANT PETER G.
TONANDER KARL

CLASSIFICATION(S)
GB98, GS29, MS03

DIRECTOR

This card is the property of the CID and shall be surrendered upon demand

Tab 18 – Insurance Certificate

SMA maintains all required insurance policies meeting or exceeding NMED requirements. A true copy of SMA's Certificates of Liability Insurance is shown below.

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/30/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Western Assurance Corp. 3701 Paseo Del Norte NE PO Box 94600 Albuquerque NM 87199-4600	CONTACT NAME: Melissa Beauchamp PHONE (A/C, No, Ext): (505) 265-8481 FAX (A/C, No): (505) 266-3500 E-MAIL ADDRESS: mbeauchamp@westernassurance.com
INSURED Souder Miller & Associates, DBA: Miller Engineers, 2904 Rodeo Park Drive East Building 100 Santa Fe NM 87505	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A: Selective Insurance — 12572 INSURER B: Lloyd's of London INSURER C: INSURER D: INSURER E: INSURER F:

COVERAGES **CERTIFICATE NUMBER:** 18-19 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X Primary& NonContributory GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY X PRO-JECT LOC OTHER:			S2303977	11/1/2018	11/1/2019	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Employee Benefits	$ 1,000,000 $ 500,000 $ 15,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $ 1,000,000
A	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS			S2303977	11/1/2018	11/1/2019	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) Underinsured motorist	$ 1,000,000 $ $ $ $ 1,000,000
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $			S2303977	11/1/2018	11/1/2019	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000 $
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		WC9075350	11/1/2018	11/1/2019	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
B	Professional Liability & Contractors Pollution			EMP18000037-01	11/1/2018	11/1/2019	Occurrence Aggregate	3,000,000 3,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Termini: SMA Project #3223767, Santa Fe County Judicial Complex

CERTIFICATE HOLDER	CANCELLATION
Cathy.Velazquez@state.nm.u New Mexico Environment Department Petroleum Storage Tank Bureau 2905 Rodeo Park Drive East Building 1 Santa Fe, NM 87505	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE M Beauchamp/BEAUCH Melissa Beauchamp

ACORD 25 (2014/01) The ACORD name and logo are registered marks of ACORD
INS025 (2014/01)

Tab 19 – Business References

As instructed in Section IV.B.1 in the NMED RFP No. 19-667-3200-0004, dated November 29, 2018, business reference forms will be submitted directly from the individual reference to PSTB prior to the proposal submission deadline of December 28, 2018 at 3:00 MST. The three (3) references and required information are as follows:

Reference #1

Client name:
Thriftway Marketing
Project description(s):
Thriftway #220, Farmington, New Mexico, refurbish existing remediation system, including re-piping soil vapor extraction system, re-developing wells, pneumatic pump repair, oil/water separator repair, air stripper repair. On NMED direction, demolish existing remediation system and proceed with implementation of new SVE system. Drill new SVE wells, complete pilot testing on wells, complete Final Remediation Plan upon successful testing.
Project dates:
From 2010 to present.
Technical environment:
The project included the use of SMA field equipment (SVE pilot test unit, PIDs, explosimeters, pH/EC/Temp. meters, pumps, GIS units, surveying units, product/water level probes, etc.) and office equipment including AutoCAD with the Land Development design module (release 2013) as well as word processing and spreadsheet programs. As noted, SMA designed, constructed, and operated an engineered remediation system with vapor extraction blower, manifold, and other ancillary equipment.
Key SMA staff:
Mr. Reid S. Allan, P.G., Ms. Shawna Chubbuck, Ms. Stephanie Hinds, E.I., Mr. Robert Krueger, P.E.
Client project manager:
Mr. Robert Moss
Phone: *(505) 564-6804*
Email: *robertgmoss@me.com*

Reference #2

Client name:
New Mexico Department of Transportation
Project description:
Various projects across New Mexico ranging from PST release sites at NMDOT patrol yards to Initial Site Assessments and Detailed Site investigations. ISAs and DSIs are equivalent projects to ASTM Phase I, II, and III Environmental Site Assessments. SMA's work at the PST release sites include definition of the extent and magnitude of soil and groundwater contamination at Encino Patrol Yard. SMA proceeded to preliminary remedial design of an air sparging/soil vapor extraction system at the Encino site. The technology was pilot tested, final design was completed, and the system constructed and operated successfully. SMA has also completed assessment of NAPL and dissolved phase contamination at the Farmington Patrol Yard and continues with monitoring work to the present.
Project dates:

Approximately 1995 to present

Technical environment:

The project included the use of SMA field equipment (SVE pilot test unit, PIDs, explosimeters, pH/EC/Temp. meters, pumps, GIS units, surveying units, product/water level probes, etc.) and office equipment including AutoCAD with the Land Development design module (release 2013) as well as word processing and spreadsheet programs. As noted, SMA designed, constructed, and operated an engineered remediation system with air compressor, vapor extraction blower, manifold, and other ancillary equipment.

Key SMA staff:

Mr. Reid S. Allan, P.G., Scott McKitrick, P.G., Mr. Karl Tonander, P.E., P.G., C.P.G., Mr. Alan Eschenbacher, P.G.

Client project manager:

Ms. Audrey Moore, Mr. Larry Kemp
Phone: *(505) 827-1715*
Email: *audrey.moore@state.nm.us*

Reference #3

Client name:

Texas Commission on Environmental Quality (TCEQ)

Project description(s):

Petroleum Storage Tank Assessment and Monitoring

SMA provided services to the TCEQ in the western contract zone of Texas, spanning from El Paso to Pecos to Lubbock, for approximately 8 years. Projects included routine groundwater monitoring, product recovery, well installation and risk analysis, as well as more sophisticated mobile dual phase extraction (MDPE) and peroxide injection. The number of sites assigned by TCEQ each year varied but typically averaged 10-12 locations, ranging from abandoned former service stations to active truck stops. Many projects required negotiated access, bilingual staff capabilities and significant subcontractor interaction.

Project dates:

2009-2017

Technical environment:

The projects completed for TCEQ utilized both field and office resources. While in the field, SMA utilized photoionization detectors; combustible gas indicators; various water quality meters for pH, Eh, etc; submersible Grundfos sampling pumps as well as a variety of other small DC pumps; spill buddy (product recovery pump), and; various 2 and 4 wheel drive field vehicles. Additional subcontracted resources included drilling rigs, MDPE units, portable SVE units and a variety of other support equipment.

Key SMA Staff:

Mr. Karl Tonander, P.E., P.G., C.P.G., Mr. R. Jay Vanlandingham, R.G., Ms. Victoria Black, P.G., Mr. Alan Izard, P.G.

Client project manager (for both projects):

Mr. Donald Boothby
Phone: (512) 239-2485
Email: Donald.boothby@tceq.texas.gov