# TANKS SOLICITATION

## Professional Services Questionnaire

**Solicitation # SCC060008**

Arizona Department of Environmental Quality
Contracts and Procurement Unit

Definitions:

1. "*Branch Office*" means a satellite, or subsidiary extension, of a headquarters office of a company, regardless of any differences in name or legal structure of such a branch due to local or state laws. Branch offices are normally subject to the management decisions, bookkeeping, and policies of the main office.

2. "*Consultant*" means a highly specialized individual or firm having significant input and responsibility for certain aspects of a project and possessing unusual or unique capabilities for assuring success of the finished work.

3. "*Discipline*," means the primary technological capability of individuals in the responding firm. Possession of an academic degree, professional registration, certification or extensive experience in a particular field of practice normally reflects an individual's primary technical discipline.

4. "*Key Persons, Specialists, and Individual Consultants*," means those individuals who will have major project responsibility or will provide unusual or unique capabilities for the project under consideration.

5. "*Parent Company*" means firm, company, corporation, association or conglomerate which is the major stockholder or highest tier owner of the firm completing this questionnaire; i.e., Firm A is owned by Firm B which is, in turn, a subsidiary of Corporation C. The "parent company" of Firm A is Corporation C.

6. "*Prime*" means that firm which may be coordinating the concerted and complementary inputs of several firms, individuals or related services to produce a completed study or facility. The "prime would normally be regarded as having full responsibility and liability for quality of performance by itself as well as by subcontractor professionals under its jurisdiction.

7. "*Principals*" means those individuals in a firm who possess legal responsibility for its management. They may be owners, partners, corporate officers, associates, administrators, etc.

8. "*Subcontract*" means any Contract, express or implied, between the Contractor and another party or between a subcontractor and another party delegating or assigning, in whole or in part, the making or furnishing of any material or any service required for the performance of the Contract.

9. "*Subcontractor*" means one who is awarded a portion of an existing Contract by a Contractor, esp. a general contractor. For example, a Contractor who performs environmental work typically retains Subcontractors to perform specialty work such as drilling, well installations, lab analysis, etc.

**Instructions for Filing** (Numbers below correspond to numbers contained in form):

1. Show date on which form is prepared. All information submitted shall be current and accurate as of this date.

2. Type accurate and complete name of submitting firm, its address, zip code and primary phone number.

   2.1 Indicate whether form is being submitted in behalf of a parent firm or a branch office.

3. Provide date the firm was established under the name shown in question 2.

4. Enter type of ownership, or legal structure, of firm (sole proprietor, partnership, corporation, etc.)

   Check appropriate boxes indicating if firm is (a) a small business concern; (b) a small business concern owned and operated by socially and economically disadvantaged individuals; or (c) Woman-owned

   Note: *ARS §41-1001(19): "Small business" means a concern, including its affiliates, which is independently owned and operated, which is not dominant in its field and which employs fewer than one hundred full-time employees or which had gross annual receipts of less than four million dollars in its last fiscal year. For purposes of a specific rule, an agency may define small business to include more persons if it finds that such a definition is necessary to adapt the rule to the needs and problems of small businesses and organizations.*

5. Branches of subsidiaries of large or parent companies, or conglomerates, should insert name and address of highest-tier owner.

   If present firm is the successor to, or outgrowth of, one or more predecessor firms, show name(s) of entity.

   Year parent Company was established.

6. List not more than two principals from submitting firm who may be contacted by ADEQ. (Different principles may be listed on forms going to another agency.) Listed principals must be empowered to speak for the firm on the policy and contractual matters.

7. Show total number of employees, by discipline, in submitting office. (*If form is being submitted by main headquarters office, firm should list total employees, by discipline, in all offices.) While some personnel may be qualified in several disciplines, each person should be counted only once in accord with his or her primary function. Include clerical personnel as "administrative." Write in any additional disciplines—geologist, archeologist, biologists, etc.—and number of people in each, in blank spaces provided.

8. Using chart (on the form) insert appropriate index number to indicate range of professional services fees received by submitting firm each calendar year for the last five years, most recent year first. Fee summaries should be broken down to reflect the fees received each year for (a) work performed directly for the State (not including grant and loan projects) or as a sub to other professionals performing work directly for the State; (b) all other domestic work, U.S. and possessions, including Federally-assisted projects, and (c) all other foreign work.

9. Select and enter, in numerical sequence, not more than six "Experience Profile Code" numbers from the listing below, which most accurately reflect submitting firm's demonstrated technical capabilities and project experience. Carefully review the list. (It is recognized some profile codes may be part of other services or projects contained on the list; firms are encouraged to select profile codes, which best indicate type and scope of services provided on past projects.) For each code number, show total number of projects and gross fees (in thousands) received for profile projects performed by firm during past five years. If firm has one or more capabilities not included on the list, insert name in blank spaces at end of list and show numbers in question 9 on the form. In such cases, the filled-in listing must accompany the complete Professional Services Questionnaire when submitted to the State.

10. Using the "Experience Profile Code" numbers in the same sequence as entered in item 9, give details of at least one recent (within the last five years) representative project for each code number, up to a maximum of five separate projects, or portions of projects, for which firm was responsible. (Project examples may be used more than once to illustrate different services rendered on the same job. Example: a dining hall may be part of an auditorium or educational facility.) Firms, which select less than five "profile codes" may list two or more project examples (to illustrate specialization) for each code number so long as total of all project examples does not exceed five. After each code number in question 10, show: (a) whether firm was "P," the prime professional, or "C," a consultant, or "SC," a Subcontractor on that particular project (new firms, in existence less than five years may use the symbol "IE" to indicate "Individual Experience" as opposed to firm experience); (b) provide name and location of the specific project which typifies firm's (or individual's) performance under that code category; (c) give name and phone

number of the owner of that project (if government agency indicate responsible office); (d) show the estimated construction cost (or other applicable cost) for that portion of the project for which the firm was primarily responsible. (Where no construction was involved, show approximate cost of firm's work); and (e) state year work on that particular project was, or will be, completed.

11. Insert the number of personnel by discipline proposed for subject contract on line (A) who will be directly involved at the Task Assignment level. While some personnel may be qualified in several disciplines, each person should be counted only once in accord with his or her primary function. Include clerical personnel as "administrative." Write in any additional disciplines—geologists, archeologists, biologists, etc. – and number of people in each, in blank spaces provided.

12. List only those projects, which the firm is currently performing under direct contract with an agency or department of the State. Exclude any grant or loan projects being financed by the Federal Government but being performed under contract to other non-Federal Government entities. We prefer that you list recent such projects. Prime consideration will be given to projects, which illustrate respondent's capability for performing work similar to that being sought. Required information must include: (a) name and location of project, (b) brief description of type and extent of services provided for each project (offeror should indicate which individual was the prime on that particular project and what role they played), (c) name of the Government agency (indicate responsible office) and name and phone number of individual to contact for reference (preferably the project manager), (d) percent complete (Indicate in this item the percentage of work completed upon filing this form), (e) total construction cost of completed project (or where no construction was involved, the approximate cost of the work) and that portion of the cost of the project for which the named firm was/is responsible.

13. List up to five projects, which demonstrate the firms competence to perform work similar to that likely to be required under this contract. We prefer that you list recent such projects. Prime consideration will be given to projects, which illustrate respondent's capability for performing work similar to that being sought. Required information must include: (a) name and location of project, (b) brief description of type and extent of services provided for each project (offeror should indicate which individual was the prime on that particular project and what role they played), (c) name of the owner of that project, and name and phone number of individual to contact for reference (preferably the project manager), (d) completion date (actual when available, otherwise estimated), (e) total construction cost of completed project (or where no construction was involved, the approximate cost of the work) and that portion of the cost of the project for which the named firm was/is responsible.

14. Respondent should provide brief resumes for key persons (only Offerors employees) expected to participate on this contract. Care should be taken to limit resumes to only those personnel and specialists who will have major project responsibilities (Professional Level III and above only). Each resume must include: (a) name of each key person and specialist and his or her title, (b) the project assignment or role which that person will be expected to fulfill in connection with this contract, (c) years of relevant experience with present firms and other firms, (d) the highest academic degree achieved and the discipline covered (if more than one highest degree, such as two Ph.D.'s, list both), the year received and the particular technical/professional discipline which that individual will bring to the contract, (e) if registered as an architect, engineer, surveyor, etc. show only the field of registration and the year that such registration was first acquired. If registered in several states, list states, and (f) a synopsis of experience, training, or other qualities, which reflect individual's potential contribution to this contract. Include such data as: familiarity with Government or agency procedures in relation to UST corrective actions, similar type of work performed in the past, management abilities, familiarity with the Arizona geographic area, etc. Please limit synopsis of experience to directly relevant information.

15. Respondent should provide an organizational chart showing the staffing and lines of authority for the key persons to be used under this contract. The relationship of key personnel to management and to support personnel should be clearly illustrated.

16. Pricing shall be provided on an all inclusive basis and shall contain the labor rate, labor benefits, payroll burden, insurance, Workman's Compensation, fees, all taxes, profit, overhead, administrative costs (including backup documentation, subcontractor administration and all other related administrative factors) and all other related cost factors.

    The Hourly rates will be evaluated on the aggregate total of the hourly rates submitted. The hourly rates shall show a progression in price from level to level within the three groups e.g., Support Services, Field Services and Professional Personnel. An hourly rate must be submitted for each staff level identified in the Hourly Rate Pricing Schedule. If an hourly rate is not provided for a staff level the proposal shall be considered non-responsive.

    *Note: All Hourly Rates Shall be Rounded to the nearest dollar ($38.49 = $38.00 or $38.50 = 39.00).*

17. Equipment rental pricing shall be provided on an all inclusive basis and shall contain all fees, administrative costs (including backup documentation) and all other related cost factors.

18. Through narrative discussion, show reason why the firm believes it is especially qualified to undertake the project. Information provided should include, but not be limited to, such data as: specialized equipment available for this work, any awards or recognition received by a firm or individuals for similar work, required security clearances, special approaches or concepts developed by the firm relevant to this project, etc. Respondents may say anything they wish in support of their qualifications. When appropriate, respondents may supplement this proposal with graphic material and photographs, which best demonstrate design capabilities of the team proposed for this project.

19. All information contained in the form should be current and factual.

**Experience Profile Code Numbers (for use with questions 9 and 10)**

| | | | | | |
|---|---|---|---|---|---|
| 001 | Abatement | 023 | Groundwater Sampling and Monitoring | 045 | Soil Vapor Extraction |
| 002 | Aerial Photograph Review | 024 | Hydrogeological Assessment | 046 | Surface Water Quality Standards |
| 003 | Air Quality Monitoring | 025 | Interviews | 047 | System Installation and Start up |
| 004 | Air Sparging | 026 | Investigative Derived Waste Disposal | 048 | System Operation and Maintenance |
| 005 | Archaeological Studies | 027 | Laboratory Analysis | 049 | Tier II Evaluation |
| 006 | Bioremediation | 028 | Monitored Natural Attenuation | 050 | Treatment System - Groundwater |
| 007 | Bore Hole Sampling and Logging | 029 | Monitoring Well Installation - Groundwater | 051 | Treatment System - Soil |
| 008 | Chain of Title Search | 030 | Monitoring Well Installation – Vadose Zone | 052 | Treatment System – Surface Water |
| 009 | Chemical Oxidation | 031 | Multi Phase Extraction | 053 | UST System Closure / Tank Pull |
| 010 | Corrective Action Plan Preparation | 032 | Permitting | 054 | Well Development |
| 011 | Cultural Resource Survey | 033 | Pilot Testing | 200 | |
| 012 | Data Evaluation | 034 | Pump-and-Treat Remediation | 201 | |
| 013 | Data / Document Management | 035 | Records / Document Review | 202 | |
| 014 | Dual-Phase Extraction | 036 | Remedial System Design | 203 | |
| 015 | Environmental Sample Collection | 037 | Report Preparation | 204 | |
| 016 | Fate and Transport Modeling | 038 | Research of Legal Description | 205 | |
| 017 | Feasibility Study | 039 | Risk Assessment – Health/Ecological/Toxicological | 206 | |
| 018 | Free Product Recovery / Removal | 040 | Site Investigation – Phase I | 207 | |
| 019 | Geologic Mapping | 041 | Site Investigation – Soil / Groundwater | 208 | |
| 020 | Geophysical Surveys | 042 | Site Reconnaissance | 209 | |
| 021 | GIS Mapping / Database | 043 | Soil Boring | 210 | |
| 022 | Groundwater Modeling | 044 | Soil Testing | 211 | |

1. Date Prepared: January 4, 2006

2. Firm Name
Ninyo & Moore

Business Address and Primary Phone Number
3001 S. 35th Street, Suite 6
Phoenix, AZ 85034
602-243-1600

2.1 Submittal is for

| | Parent Company | X | Branch or Subsidiary Office |
|---|---|---|---|

3. Year Present Firm was Established

1998

4. Specify type of ownership and check below, if applicable.

| a. Small Business | b. Small Disadvantaged Business | c. Women – Owned Business |
|---|---|---|
| | | |

5. Name of Parent Company, if any:

5.1 Former Parent Company Name(s), if any:

5.2 Year Parent Company was Established:
1986

6. Names of not more than two Principals to contact:

| | Name | Title | Telephone Number | Fax Number |
|---|---|---|---|---|
| 1. | Robert McMichael | Chief Engineer/Managing Principal | (602) 243-1600 | (602) 243-2699 |
| | | E-Mail Address: | robert.mcmichael@ninyoandmoore.com | |
| 2. | Robert Laumann | Principal Geologist | (602) 243-1600 | (602) 243-2699 |
| | | E-Mail Address: | rlaumann@ninyoandmoore.com | |

7. Total Personnel by Discipline: (List each person only once, by primary function)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Administrative | | Ecologists | | Sanitary Engineers | 1 | Environmental Scientist |
| | Archeologists | | Electrical Engineers | 2 | Soils Engineers | 2 | Geological Engineer |
| | Biologists | 1 | Environmental Engineers | | Specifications Writers | 2 | Estimator |
| | Chemical Engineers | 10 | Geologists | | Structural Engineers | | |
| 1 | Chemists | 1 | Hydrologists | | Surveyors | | |
| 10 | Civil Engineers | | Landscape Architects | | Toxicologists | | |
| 24 | Construction Inspectors | | Mechanical Engineers | | Transportation Engineers | | |
| 2 | Draftsmen | | Risk Assessor | | | 62 | **Total Personnel** |

8. Summary of Professional Services Fees Received: (Insert Index Number)

Last five years (most recent year first)

| | 2004 | 2003 | 2002 | 2001 | 2000 |
|---|---|---|---|---|---|
| Direct State contract work | 6 | 6 | 5 | 4 | 4 |
| All other domestic work | 8 | 7 | 7 | 6 | 6 |
| All other foreign work | 1 | 1 | 1 | 1 | 1 |

Ranges of Professional Services Fees "Index"
1. Less than $100,000
2. $100,000 to $250,000
3. $250,000 to $500,000
4. $500,000 to $1 Million
5. $1 Million to $2 Million
6. $2 Million to $5 Million
7. $5 Million to $10 Million
8. $10 Million or greater

9. Profile of Firm's Relevant Project Experience

| | Profile Code | Number of Projects | Total Gross Fees | | Profile Code | Number of Projects | Total Gross Fees |
|---|---|---|---|---|---|---|---|
| 1. | 053 | 35 | 1,200 | 4. | 020 | 95 | 670 |
| 2. | 040 | 350 | 825 | 5. | 029 | 42 | 1,750 |
| 3. | 041 | 225 | 3,200 | 6. | 039 | 17 | 245 |

10. Project Examples, Last Five Years

| | Profile Code | "P," "C," "SC," or "IE" | Project Name and Location | Owner Name | Owner Phone Number | Cost of Work | Completion Date (Actual or Estimated) |
|---|---|---|---|---|---|---|---|
| 1. | 053 | P | Charleston Estates, Queen Creek, AZ | Mr. Paul Haggerty | (480) 252-6428 | 186,000 | November 2005 |
| 2. | 040 | P | 67th Ave & Peoria, Glendale, AZ | Mr. Rory Malouf | (602) 906-1187 | 2,500 | December 2005 |
| 3. | 041 | P | 2235 E. Apache, Tempe, AZ | Mr. Tim Jones | (480) 350-1187 | 72,500 | August 2005 |
| 4. | 020 | P | UST Locate, SR85, Ajo, AZ | Mr. Ed Green | (602) 712-7768 | 3,900 | April 2005 |
| 5. | 029 | P | FCSY Monitoring Well, San Diego, CA | Mr. Paul Brown | (619) 686-6200 | 63,000 | April 2004 |

11. Personnel by discipline: (List each person only once, by primary function.) Enter proposed personnel at the Task Assignment Level on line "A".

| A | | A | | A | | A | |
|---|---|---|---|---|---|---|---|
| 3 | Administrative | | Ecologists | | Sanitary Engineers | 1 | Environmental Scientist |
| | Archeologists | | Electrical Engineers | | Soils Engineers | | |
| | Biologists | 1 | Environmental Engineers | | Specifications Writers | | |
| | Chemical Engineers | 6 | Geologists | | Structural Engineers | | |
| 1 | Chemists | 1 | Hydrologists | | Surveyors | | |
| 2 | Civil Engineers | | Landscape Architects | | Toxicologists | | |
| | Construction Inspectors | | Mechanical Engineers | | Transportation Engineers | | |
| 1 | Draftsmen | | Risk Assessor | | | 16 | **Total Personnel** |

12. All work by firm currently being performed directly for State Agencies. (list not more then 5 projects)

| | a. Project Name and Location | b. Nature of Firm's Responsibility | c. Agency (Responsible Office) Project Managers Name & Phone Number | d. Completion Date (Actual or Estimated) | e. Estimated Cost (In Thousands) | |
|---|---|---|---|---|---|---|
| | | | | | Entire Project | Work for Which Firm was/is Responsible |
| 1. | UST Locate, SR85, Ajo, AZ | Geophysical Survey for Underground Storage Tanks | ADOT Environmental & Enhancement. Mr. Ed Green (602) 712-7768 | 4/2005 (100% Complete) | 13.9 | 3.9 |
| 2. | Marsh Station Interchange, Benson District, AZ | Geotechnical Engineering, Storm Water Pollution Prevention Planning | ADOT, Materials Group. Mr. J.J. Liu (602) 712-8209 | 3/2006 (75% Complete) | 10,000 | 250 |
| 3. | Spill Assessment and Cleanup Tuba City, AZ | Environmental Engineering, Sampling, Reporting, Materials Testing, and Oversight | ADOT Health and Safety Section Mr. Jeff Page (602) 712-4417 | 8/2005 (100% Complete) | 1,250 | 35.6 |
| 4. | Phase I ESA SR 280 from I-8 to Business I-8, Yuma AZ | Phase I Environmental Site Assessment | ADOT Environmental & Enhancement. Mr. Ed Green (602) 712-7768 | 8/2005 (100% Complete) | 7.5 | 7.5 |
| 5. | ADOT disposal D-2-145 Tucson, AZ | Hazardous Materials Investigation and Removal | ADOT Environmental & Enhancement. Mr. Ed Green (602) 712-7768 | 1/2006 (50% Complete) | 11.5 | 11.5 |

13. Work by firm, which best illustrates current qualifications relevant to this contract. (list not more then 5 projects)

| | a. Project Name and Location | b. Nature of Firm's Responsibility | c. Project Owner's Name and Project Managers Name & Phone Number | d. Percent Complete | e. Estimated Cost (In Thousands) | |
|---|---|---|---|---|---|---|
| | | | | | Entire Project | Work for Which Firm was/is Responsible |
| 1. | Consolidated Rental Car Facility<br>Phoenix, AZ | Environmental oversight and documentation, Environmental remediation, Underground Storage Tank removal and closure | City of Phoenix, Aviation Department, Environmental Section<br>Ms. Rebecca Godley, P.E.<br>(602) 273-4578 | 95 | 50,000 | 260 |
| 2. | Charleston Estates<br><br>Queen Creek, AZ | Underground storage tank removal, characterization, and closure.<br>Phase II environmental site assessment, technical specification preparation for remediation | Lennar Community Development<br>Mr. Paul Haggerty<br>(480) 252-6428 | 99 | 395 | 186 |
| 3. | 2412 E. Broadway Phase I/II Site Investigation<br><br>Phoenix, Arizona | Phase I and Phase II environmental site assessment, geophysical survey, soil vapor survey, exploratory excavation, development of remedial action plan | City of Phoenix<br>Ms. Linda Palumbo<br>(602) 495-0975 | 100 | 39 | 39 |
| 4. | Superfund Technical Assistance and Response Team / Brownfields Targeted Site Assessments<br><br>EPA Region IX | Engineering studies. Preparation, review and implementation of RI/FS work plans; and public information services. | U.S. EPA Region IX c/o Ecology & Environment<br>Mr. Thompson Chambers<br>(415) 981-2811 | 90 | 3,200 | 850 |
| 5. | Red Diamond Facility<br><br>Phoenix, Arizona | Performed site inspection and sampling for removal action in concert with ADEQ inspector.<br>Remediated drywells and building components. | M & I Thunderbird Bank<br>ADEQ Inspector<br>Mr. Richard McIver<br>(602) 771-4149 | 100 | 23.5 | 11.2 |

14. Brief resume of key persons, specialists and individual consultants/associates anticipated for this contract:

| | |
|---|---|
| Name of Individual<br>Walter Crone | Title<br>Principal Geologist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level VI | Area of Expertise<br>Environmental Geology |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Principal In Charge | Education<br>Masters of Science, Geology, 1982 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 26 | 19 | Registered Geologist, 1988, AZ, CA, ID |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Principal Environmental Geologist, N&M, Irvine, CA | December 1996 | Present |
| 2. | Project/Group Manager, IT Corporation, Irvine, CA | June 1986 | November 1996 |
| 3. | Geologist, Self Employed | December 1985 | June 1986 |
| 4. | Geologist, Freeport-McMoRan, Reno, Nevada | May 1982 | November 1985 |
| 5. | Research Fellow, Mackay Minerals Research Institute | September 1980 | May 1982 |
| 6. | Geologist, U.S. Steel Corporation, Corpus Christi, Texas | March 1978 | September 1980 |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Principal-in-Charge for over 200 UST Closures throughout Arizona and California. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Principal-in-Charge and Project Manager for site characterization services on hundreds of projects throughout the southwest. Projects typically include: collecting soil samples at specified intervals in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Principal-in-Charge and Project Manager for exploratory test borings on over 100 projects in the southwestern United States. These projects included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

## Brief Resume Continued

**Free Product Removal**: Principal-in-Charge and Project Manager for free product removal at over 20 UST sites. Free product removal services typically include: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

**Groundwater Monitoring Well Installation**: Principal-in-Charge, Project Manager, and performed third party observations during groundwater monitoring well installation. Groundwater monitoring well installation services typically include: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Principal-in-Charge for preparation of over a hundred technical reports involving UST removal, site characterization, groundwater monitoring, sampling, and testing; preparation UST closure; and UST remediation reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**Sampling and Monitoring Groundwater:** Principal-in-Charge and Project Manager for groundwater sampling and testing at several sites. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Remedial Design and Installation**: Principal-in-Charge and Project Manager for a remedial design and installation of a vapor extraction system at a site in Phoenix, in addition to over 20 systems in the southwestern United States. The remedial services included installation of the vapor extraction well, design of the VES system, observation during installation of the VES piping, and pressure testing the system following installation.

**Groundwater Modeling:** Principal-in-Charge and Project Manager for groundwater modeling at several sites. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports.

**Multi Phase Extraction:** Principal-in-Charge and Project Manager for multi-phase extraction systems at various sites. These services included installation of both vapor extraction and air sparge wells; design of the VES system; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly basis.

**Air Sparge:** Principal-in-Charge and Project Manager for installation and monitoring of air sparge systems in the southwestern United States. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the quarterly monitoring reports.

**System Operation and Maintenance**: Principal-in-Charge and Project Manager for system operation and maintenance on several VES units. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.

**In-Situ Groundwater Treatment:** Principal-in-Charge and Project Manager for in-situ groundwater treatment at several sites. These services included installation of groundwater monitoring wells, installation of bio-remedial socks, monthly monitoring of the site, and preparation of the quarterly monitoring reports.

**Risk Based Corrective Actions:** Mr. Crone is highly experienced in Risk Based Corrective Actions and actively participates on the American Society for Testing and Materials (ASTM), Risk-Based Corrective Action (RBCA) committee.

**Testifying Expert:** Since 1996, Mr. Crone has provided expert opinions and technical reviews to the USEPA regarding a high profile investigation and cleanup of contamination of the City of Santa Monica's municipal drinking water supply by MTBE. He is the principal technical advisor to the USEPA for an investigation/clean-up of the drinking water supply for a town of more than 60,000 residents. In this role, he works directly with EPA and the California Regional Water Quality Control Board - Los Angeles Region and reviews plans and oversees implementation of field work performed by consultants/contractors for 31 potentially responsible parties/sites. Mr. Crone evaluates the sufficiency of the PRPs' work within a five-square-mile investigation area. He works directly with EPA and local agency technical and legal staff and legal staff from the U.S. Department of Justice and California Attorney General's Office to assist development of enforcement strategies and draft scopes of work for both consent and unilateral administrative orders.

| Name of Individual | Title |
|---|---|
| Robert Laumann | Principal Geologist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level V (Senior Technical Leader) and VI (Contract Manager/Principal) | Area of Expertise<br>Environmental Geology |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Senior Technical Leader and Contract Manager/Principal | Education<br>Master of Science, Geology, 1997 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 12 | 8 | Registered Geologist, AZ(2000), WY(2003) |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | October 2003 | Present |
| 2. | Environmental Resources Management | November 1998 | October 2003 |
| 3. | Basin & Range Hydrogeologists, Inc. | July 1997 | November 1998 |
| 4. | Arizona State University | August 1993 | May 1997 |
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Executive Summary of Career Highlights

**Specialized Training and Certifications:**

Ninyo & Moore's Qualified Individual for ADEQ SAF Prequalified Firm Status (Firm #1303)

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates

**Contract Management:** Principal-in-Charge and Contract Manager for environmental contracts of the Phoenix, Arizona office of Ninyo & Moore. Contracts include on-call environmental services contracts with the cities of Phoenix and Tempe as well as numerous contracts with Chandler, Avondale, other municipalities, developers, engineering and planning firms, military entities, oil companies, the semiconductor industry, construction contractors, and insurance companies, as well as other environmental consultants.

**UST Closure:** Principal-in-Charge for UST Closures throughout Arizona. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Principal-in-Charge and Project Manager for site characterization services on projects throughout Arizona. Projects typically include: collecting soil samples at specified intervals in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Report Preparation**: Principal-in-Charge, Project Manager, and/or Geologist for preparation of technical reports involving UST removal/closure, LUST site characterization, groundwater monitoring, sampling, and testing; and LUST site corrective action; and preparation of boring logs, tables, figures, and other support documentation for each of the reports. Final reviewer of environmental reports for the Phoenix, Arizona office of Ninyo & Moore.

## Brief Resume Continued

**Bore Hole Sampling and Logging**: Principal-in-Charge and/or Project Manager for exploratory test borings on over 100 projects in the southwestern United States. These projects included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

**Free Product Removal**: Project Geologist for free product removal at UST sites in Arizona. Free product removal services typically included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

**Groundwater Monitoring Well Installation**: Principal-in-Charge, Well Designer, Project Manager, and/or Geologist for approximately 85 groundwater monitoring well installations. Groundwater monitoring well installation services typically include: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Sampling and Monitoring Groundwater:** Principal-in-Charge and Project Manager for groundwater sampling and testing at several sites. Set up groundwater monitoring program for over 50 wells at one site, including installation of passive diffusion bags. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Remedial Design and Installation**: Project Geologist for installation of the vapor extraction systems at the Air National Guard Base at Sky Harbor International Airport and for the Dolphin industrial facility in Phoenix, Arizona. Remedial services included installation of dual-completion and triple-completion vapor extraction, air sparge, and vapor monitoring wells, observation during installation of the VES piping, and pressure testing the system following installation.

**Groundwater Modeling:** Project Geologist for groundwater modeling at several sites. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; examining, evaluating, and interpreting groundwater modeling results; and preparation of quarterly groundwater monitoring maps and reports.

**Pilot Testing/Study**: Performed pilot testing of VES/air sparge systems at various sites in Arizona. These services were performed prior to full-time operation of the systems and included monitoring the systems to determine the optimal operating conditions. Results of the pilot tests, including flow rates, inlet/outlet vapor concentrations, water levels, and air pressures were discussed in pilot testing reports.

**Multi Phase Extraction:** Project Geologist for multi-phase extraction systems at various sites. These services included installation of both vapor extraction, air sparge wells, and vapor monitoring wells; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly basis.

**Air Sparge:** Project Geologist for installation and monitoring of air sparge systems in the southwestern United States. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the quarterly monitoring reports.

**System Operation and Maintenance**: Principal-in-Charge, Project Manager, and/or Project Geologist for system operation and maintenance on several VES units. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.

**In-Situ Groundwater Treatment:** Project Geologist for in-situ groundwater treatment at sites in Arizona. These services included installation of groundwater wells, mixing and injection of remedial solutions, regular monitoring of the site, and preparation of quarterly monitoring reports.

**Risk Based Corrective Actions:** Project Manager for preparation of Risk Based Corrective Action reports for UST facilities in Arizona.

**Additional Experience:** Experience in aquifer protection program permitting, stormwater pollution prevention plans, waste characterization, Brownfields sites, coordination with USEPA Region IX, and sites on Indian Community lands. Installed 425-foot-deep groundwater extraction wells for remediation of a chlorinated solvent plume at an industrial facility. Involved in a four-day, 24-hour-per-day mixing and injection of potassium permanganate solution designed to expedite groundwater remediation. Principal-In-Charge and/or Project Manager for preparation of Quality Assurance Project Plans (QAPPs), Field Sampling Plans, Sampling and Analysis Plans, and Health and Safety Plans.

| Name of Individual | Title |
|---|---|
| Dwight Clark | Senior Environmental Engineer |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Remediation |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Bachelor of Science, Environmental Engineering, 2005 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 20 | 16 | Certified Hazardous Materials Manager (CHMM), 2001<br>Certified Environmental Trainer (CET), 2002 |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | November 2004 | Present |
| 2. | Jason Associates Corporation | May 2001 | November 2004 |
| 3. | Teledyne Brown Engineering | December 1998 | May 2001 |
| 4. | M4 Environmental Management L.P. | April 1996 | November 1998 |
| 5. | Advanced Science and Technology Associates | January 1996 | April 1996 |
| 6. | US Navy, Nuclear Operations Program | July 1984 | January 1996 |
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Executive Summary of Career Highlights

**UST Closure:** Managed and performed 12 UST closures within Arizona and over 20 closures nationwide. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**LUST Characterization**: Program and Project Manager for over 6 LUST characterization projects in Arizona. Projects include the characterization using ADEQ guidance and preparation of the LUST characterization report.

**Site Investigation Soil/Groundwater:** Managed and performed site characterizations at over 30 sites within Arizona. Site characterization included: coordination with a drilling or excavation subcontractor to perform horizontal and vertical extent subsurface investigation to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

## Brief Resume Continued

**Bore Hole Sampling and Logging**: Managed, reviewed, and performed observations and sampling services for over 50 exploratory test borings in several states. These services included: coordination of subcontractors; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

**Free Product Removal:** Program manger for large scale free product removal at a 42,000 barrel release site in Yuma. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, and pumping; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

**Groundwater Monitoring Well Installation:** Project Manager and Program Manager for a large well field installation in Yuma, AZ. Supervised staff observation during groundwater monitoring well installation. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Performed report preparation for hundreds of technical projects in several states including Arizona. Report preparation involving USTs included: UST removal reports, LUST site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and UST remediation/corrective action reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**Remedial Design and Installation:** Project Manager for remedial design and installation of vapor extraction system (VES) at a large site in Yuma. The remedial services included installation of the vapor extraction wells, design of the VES system, and observation during installation of the VES piping, and pressure testing the system following installation.

**Pilot Testing/Study**: Project Manager for a 24-hour, and subsequent 6-month pilot test on a vapor extraction system in the Yuma area. These services were performed prior to full-time operation of the system(s) and included monitoring the system(s) to determine the optimal operating conditions. Discussions of the pilot test(s) were prepared as part of quarterly monitoring reports.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations and Emergency Response, with updates
OSHA 1910.120 Hazardous Waste Operations Supervisor
Arizona Department of Health Services Multi-media Sampling Techniques
Arizona Department of Health Services Laboratory Quality Assurance/Quality Control

**Selected Publications and Presentations:**

Case Studies in Environmental Documentation, Presented to Environmental Bankers Association, Risk Management Committee, August 2005

Clark, D.H. (2005). Chemical and Biological Weapons. In D.B. Cox (ed.), Hazardous Material Management Desk Reference 2nd ed, Academy of Hazardous Materials Managers.

Application of ISO 14000 to DoD Facilities - Presented to Thunderbird Chapter ACHMM June 2004.

Cleanup of Heterogeneous Energetic Materials Remediation, White Paper Review - Presented to Defense Policy Board Program Managers meeting May 2004.

| Name of Individual | Title |
|---|---|
| Michael McDowell | Project Engineer |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Site Investigation and Remedial Design |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Master of Science, Civil Engineering (groundwater modeling research), 1999 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 6 | 6 | Professional Engineer, 2003, AZ, CA |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | March 2003 | Present |
| 2. | Haley & Aldrich Industrial and Environmental Group | March 2001 | March 2003 |
| 3. | URS Corporation Site | February 2000 | March 2001 |
| 4. | Horrocks Engineering | November 1999 | February 2000 |
| 5. | Colorado Department of Public Health and Environment | May 1999 | October 1999 |
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Executive Summary of Career Highlights

**UST Closure**: Project Manager for 4 UST Closures within the Phoenix Metropolitan Area. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Project Manager and performed site characterizations at several sites within Phoenix Metropolitan Area. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Performed observations and sampling services for hundreds of exploratory test borings within Arizona. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

**Free Product Removal:** Performed free product removal at several sites within Arizona and California. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

## Brief Resume Continued

**Groundwater Monitoring Well Installation:** Performed observation during groundwater monitoring well installation on 12 projects in Arizona and California. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Performed report preparation for hundreds of technical projects in the greater Phoenix, Los Angeles, San Diego, Detroit, Salt Lake City, and Houston Metropolitan areas. Report preparation involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and UST remediation reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**GIS Mapping and Database:** Performed mapping and database review for several UST projects in the greater Phoenix Metropolitan Area. GIS mapping and database services included preparation of figures and drawings showing the depth and horizontal extent of the groundwater impact, vadose zone, smear zone, and groundwater models; and maps showing the change in elevation and groundwater flow direction.

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at several sites within the greater Phoenix and Detroit Metropolitan Areas. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Pilot Testing/Study**: Assisted in performing a 24-hour pilot test on a vapor extraction system in the greater Phoenix Metropolitan Area and a several month pilot test in the Los Angeles Metropolitan Area. These services were performed prior to full-time operation of the system and included monitoring the system to determine the optimal operating conditions. Discussions of the pilot test were prepared as part of quarterly monitoring reports.

**Remedial Design and Installation:** Performed remedial design and installation of vapor extraction systems at sites in Phoenix and in the Los Angeles Metropolitan Area. The remedial services included installation of the vapor extraction wells, design of the VES system, observation during installation of the VES piping, and pressure testing the system following installation.

**Groundwater Modeling:** Performed groundwater modeling at several sites within the greater Phoenix, Denver, southern Utah, and Detroit Metropolitan Areas. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports.

**Contaminant Fate and Transport Modeling:** Designed a groundwater model for a site near Denver for the purpose of monitoring radionuclide and contaminant migration across the industrial area of the site using ArcView GIS, GMS, and EquisGeo interface.

**Permitting and Air/NPOS:** Prepared air permits in association with three VES system in the Los Angeles Metropolitan Area for the South Coast Air Quality Management District and prepared the Closure Report for the Los Angeles Region Water Quality Control Board after the vapor extraction objectives had been met.

**Multi Phase Extraction:** Performed and handled multi-phase extraction systems at various sites in the greater Phoenix and Detroit Metropolitan Areas. These services included installation of both vapor extraction and air sparge wells; design of the VES system; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly basis.

**Air Sparge:** Performed installation and monitoring of air sparge systems in Phoenix Metropolitan Area. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the monthly and quarterly monitoring reports.

**Risk Assessment:** Calculated Maximum Individual Cancer Risk (MICR) based on effluent concentrations and site conditions for two soil vapor extraction systems in the Los Angeles Metropolitan Area.

**System Operation and Maintenance:** Performed system operation and maintenance on several VES in the greater Phoenix and Los Angeles Metropolitan Areas. These services included assistance during installation of the system, weekly monitoring of the system, monitoring VOC outlet concentrations to assure that the system is operating in accordance with permitted concentration limits, system optimization, drainage and disposal of the condensation water, and preparation of quarterly reports.

**In-Situ Groundwater Treatment:** Preformed in-situ groundwater treatment at several sites within the greater Phoenix and Los Angeles Metropolitan Areas.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates

| Name of Individual | Title |
|---|---|
| A. Thomason MacDougall | Project Engineer |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Groundwater and Soils Investigations |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Masters of Science, Civil and Environmental Engineering, 2004 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 6 | 6 | Professional Engineer, 2005, AZ |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | March 2004 | Present |
| 2. | Geomatrix Consultants | July 2000 | March 2004 |
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Executive Summary of Career Highlights

**UST Closure:** Performed some UST closures within the San Francisco Metropolitan Area. Closure services included: scheduling a certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination with a certified laboratory for analytical testing; and observation and testing of the backfilling.

**Site Investigation Soil/Groundwater:** Performed site characterizations at several sites within San Francisco Metropolitan Area. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; collecting groundwater samples, observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Performed sampling services for many exploratory test borings within the greater Phoenix and San Francisco Metropolitan Areas. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

## Brief Resume Continued

**Free Product Removal:** Performed free product removal at over 6 separate sites within the San Francisco Metropolitan Area. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

**Groundwater Monitoring Well Installation:** Performed groundwater monitoring well installation at several sites within the Phoenix and San Francisco Metropolitan Area. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary ADWR permit application for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at several sites within the greater San Francisco Metropolitan Area. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations and Emergency Response, with updates

| Name of Individual | Title |
|---|---|
| Richard Munck | Project Environmental Scientist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Site Assessment and Site Investigation |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Bachelor of Science, Earth Science, 1992 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 13 | 10 | |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | November 2004 | Present |
| 2. | GEC-SA&B | May 1996 | November 2004 |
| 3. | CTI and Associates Inc. | November 1994 | January 1996 |
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Executive Summary of Career Highlights

**UST Closure:** Performed over 50 UST Closures within the Phoenix Metropolitan Area. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Performed over 125 site characterizations within Phoenix Metropolitan Area. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Performed observations and sampling services for hundreds of exploratory test borings within the greater Phoenix, Detroit, and Houston Metropolitan Areas. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

| Brief Resume Continued |
|---|
| **Free Product Removal**: Performed free product removal at several sites within the greater Phoenix and Detroit Metropolitan Areas. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.<br>**Groundwater Monitoring Well Installation**: Performed observation during groundwater monitoring well installation at several sites within the greater Phoenix and Detroit Metropolitan Area. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.<br>**Report Preparation**: Performed report preparation for hundreds of technical projects. Report preparation involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and UST remediation reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.<br>**GIS Mapping and Database**: Performed mapping and database review for several UST projects in the greater Phoenix Metropolitan Area. GIS mapping and database services included preparation of figures and drawings showing the depth and horizontal extent of the groundwater impact, vadose zone, smear zone, and groundwater models; and maps showing the change in elevation and groundwater flow direction.<br>**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at several sites within the greater Phoenix and Detroit Metropolitan Area. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.<br>**Pilot Testing/Study**: Assisted in performing a 24-hour pilot test on a vapor extraction system in the greater Phoenix metropolitan area These services were performed prior to start-up of the system and included monitoring the system over a 24-hour period to determine the optimal operating conditions and discussion of the pilot test in quarterly monitoring reports.<br>**Remedial Design and Installation**: Performed a remedial design and installation of a vapor extraction system at a site in Phoenix. The remedial services included installation of the vapor extraction well, design of the VES system, observation during installation of the VES piping, and pressure testing the system following installation.<br>**Groundwater Modeling:** Performed groundwater modeling at several sites within the greater Phoenix and Detroit Metropolitan Area. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports.<br>**Multi Phase Extraction:** Performed and handled multi-phase extraction systems at various site in the greater Phoenix and Detroit metropolitan area. These services included installation of both vapor extraction and air sparge wells; design of the VES system; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly basis.<br>**Air Sparge:** Performed installation and monitoring of an air sparge system in Phoenix, Arizona. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the quarterly monitoring reports.<br>**System Operation and Maintenance**: Performed system operation and maintenance on several VES in the greater phoenix area. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.<br>**In-Situ Groundwater Treatment:** Preformed in-situ groundwater treatment at several sites within the greater Phoenix Metropolitan Area. These services included installation of groundwater monitoring wells, installation of bio-remedial socks, monthly monitoring of the site, and preparation of the quarterly monitoring reports.<br>**Specialized Training and Certifications:**<br>OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates |

| Name of Individual | Title |
|---|---|
| Mark Edwards | Project Geologist/Geophysicist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Geophysical Evaluation / Hydrogeology |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Master of Science, 1995, Geohydrology |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 15 | 10 | G.I.T., AZ (2003) |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | October 2000 | Present |
| 2. | EnTech, Inc | February 1999 | October 2000 |
| 3. | Summit Geophysical Services/Ezdehar Geophysical | December 1996 | November 1998 |
| 4. | EDCON, Inc | June 1995 | December 1996 |
| 5. | Illinois State University | August 1993 | June 1995 |
| 6. | Scientific Applications International Corporation | September 1991 | August 1993 |
| 7. | Kennecott Exploration | September 1990 | September 1991 |
| 8. | Cascade Earth Sciences | June 1990 | August 1990 |
| 9. | | | |
| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Supported 25 UST closures within the Phoenix Metropolitan Area. Closure services included: supported obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of five UST Closure report. Modeling experience with MODFLOW and MODPATH within contamination groundwater modeling and groundwater resource development programs, including model calibration based on field observations over time.

**LUST Characterization**: Performed more than 10 LUST investigations within Arizona. Investigations included: coordination with a drilling subcontractor to perform horizontal and vertical extent borings to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; directing installation of several monitoring wells; directing well development activities; groundwater monitoring and sampling on a quarterly basis; assessing the extent of groundwater contamination; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; preparation of lithologic cross-sections, contaminant isopach maps, and conceptual site models; and preparation of comprehensive site characterization reports.

**Bore Hole Sampling and Logging**: Managed and performed observations and sampling services of 150 exploratory test borings throughout the Phoenix Metropolitan Area. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard geologic boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing including use of mobile laboratories; interpretation of the analytical data; and preparation of reports.

**Free Product Removal**: Managed and performed free product removal at several sites within Arizona. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product, and preparation of monthly free product recovery reports.

## Brief Resume Continued

**Groundwater Monitoring Well Installation**: Planned and directed observations during groundwater monitoring well installation at more than 25 sites in Phoenix. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; directing monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of a certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Performed report preparation for 150 technical projects in the greater Phoenix Metropolitan Areas. Reports involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the UST closure reports; and UST remediation reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**GIS Mapping and Database**: Performed mapping and database review for several UST projects in the greater Phoenix Metropolitan Area. GIS mapping and database services included preparation of figures and drawings showing the depth and horizontal extent of the groundwater impact, vadose zone, smear zone, and groundwater models; and maps showing the change in elevation and groundwater flow direction.

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at several sites within Phoenix. Groundwater sampling and monitoring services included: directing installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Pilot Testing/Study**: Assisted in performing a 24-hour pilot test on a vapor extraction system in the greater Phoenix metropolitan area These services were performed prior to start-up of the system and included monitoring the system over a 24 hour period to determine the optimal operating conditions and discussion of the pilot test in quarterly monitoring reports.

**Remedial Design and Installation**: Performed installation of vapor extraction systems at sites in Phoenix. The remedial services included installation of vapor extraction wells, observation during installation of the VES piping, and pressure testing the system following installation.

**Groundwater Modeling:** Performed groundwater modeling at several sites within Arizona. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports. Groundwater flow and transport modeling by MODFLOW and MODPATH, including module programming and variable controls at the source code level (non-Windows based controls).Production well and monitoring well design, construction, development, testing, and modeling. Some models analyzed in conjunction with AQTESOLV. Modeling experience with MODFLOW and MODPATH within contamination groundwater modeling and groundwater resource development programs, including model calibration based on field observations over time.

**Contaminate Fate and Transport Modeling**: Groundwater flow, and contaminant transport modeling by MODFLOW and MODPATH, including MODFLOW module programming and variable controls at the source code level (non-Windows based programming). Production well and monitoring well design, construction, development, testing, and modeling. Some models analyzed in conjunction with AQTESOLV. Modeling experience with MODFLOW and MODPATH within contamination groundwater modeling and groundwater resource development programs, including model calibration based on field observations over time.

**Multi Phase Extraction:** Performed and handled multi-phase extraction systems at various Arizona sites. These services included installation of both vapor extraction and air sparge wells; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly or bi-weekly basis.

**Air Sparge:** Performed installation and monitoring of an air sparge system in Phoenix, Arizona. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the quarterly monitoring reports.

**System Operation and Maintenance**: Performed system operation and maintenance on two VES in the greater Phoenix area. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is within permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.

**In-Situ Groundwater Treatment:** Preformed in-situ groundwater treatment at several sites within the greater Phoenix Metropolitan Area. These services included installation of groundwater monitoring wells, monthly monitoring of the site, and preparation of the quarterly monitoring reports. In-situ treatment was accomplished over time through natural degradation of compounds that were not migrating off site.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates

| Name of Individual | Title |
|---|---|
| Holly Land | Project Geologist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Site Investigation |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Bachelor of Science, Geology, 1997 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 6 | 6 | Certified Hazardous Materials Manager, 2004 |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | November 2004 | Present |
| 2. | Kleinfelder | April 2004 | October 2004 |
| 3. | Jason Associates Corporation | October 2001 | April 2004 |
| 4. | Northwind Environmental | February 2000 | October 2001 |
| 5. | East Carolina University | January 1997 | June 1997 |
| 6. | | | |
| 7. | | | |
| 8. | | | |
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| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Performed 12 UST closures within Arizona. Closure services included: obtaining a UST closure permit from ADEQ; registration of previously unregistered USTs, scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**LUST Characterization**: Performed several LUST investigations within Arizona. Investigations included: coordination with a drilling subcontractor to perform horizontal and vertical extent borings to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; assessing the extent of groundwater contamination; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; preparation of lithologic cross-sections, contaminant isopach maps, and conceptual site models; and preparation of a comprehensive site characterization report

**Site Investigation Soil/Groundwater:** Performed site characterizations at over 40 sites within Arizona. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; identification of potential contaminants of concern; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

## Brief Resume Continued

**Bore Hole Sampling and Logging**: Project Manager and performed observations and sampling on over 50 projects in Arizona. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

**Free Product Removal:** Performed free product removal on four projects within Arizona. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, pumping, purging; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization.

**Groundwater Monitoring Well Installation:** Project Manager and performed observation during groundwater monitoring well installation at several sites within Arizona. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the groundwater and perched water monitoring wells; logging the general soil type and lithology for each individual boring; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Project Manager and prepared reports for hundreds of technical projects in Arizona. Reports preparation involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at several sites within Arizona. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, dissolved oxygen, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports. Several projects were performed for the superfund and states compliance programs with direct regulatory oversight and third party quality assurance monitoring.

**Remedial Design and Installation:** Performed a remedial design and installation of Vapor Extraction Systems (VES) at sites in Phoenix and Yuma. The remedial services included installation of the vapor extraction well, design of the VES system, observation during installation of the VES piping, and pressure testing the system following installation.

**Groundwater Modeling:** Performed groundwater modeling at several sites within several ground water basins in Arizona. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports.

**Multi Phase Extraction:** Performed and handled multi-phase extraction systems at various sites within Arizona. These services included installation of both vapor extraction and air sparge wells; design of the VES system; observation during installation of the VES system; pressure testing the systems; pilot testing the system; preparation of the VES system manual; and monitoring of the system on a weekly basis.

**System Operation and Maintenance:** Performed system operation and maintenance on VES systems. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports. Developed permit application and for operating air permit.

**In-Situ Groundwater Treatment:** Preformed in-Situ groundwater treatment at more than eight sites within Arizona. These services included installation of groundwater monitoring wells, monthly monitoring of the site, and preparation of the quarterly monitoring reports.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates
OSHA 1910.120 Hazardous Waste Operations Supervisor
Arizona Department of Health Services Laboratory Quality Assurance/Quality Control

| Name of Individual | Title |
|---|---|
| Tariq Abdellatif | Project Environmental Scientist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>Environmental Site Assessment and Site Investigation |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Bachelor of Science, Chemistry, 1998 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 6 | 6 | |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | March 2005 | Present |
| 2. | GEC-SA&B | February 2000 | March 2005 |
| 3. | Harding Lawson Associates | January 1999 | February 2000 |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
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| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Performed over 10 UST closures within Arizona. Closure services included: obtaining a UST closure permit from ADEQ; registration of previously unregistered USTs, scheduling an ADEQ certified UST removal contractor; performing oversight during excavation and purging of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratories for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**LUST Characterization**: Performed over 12 LUST investigations within Arizona. Investigations included: coordination with a drilling subcontractor to perform horizontal and vertical extent borings to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; groundwater monitoring and sampling on a quarterly basis; assessing the extent of groundwater contamination; coordination of an Arizona certified laboratories for analytical testing; interpretation of the analytical data; preparation of lithologic cross-sections, contaminant isopach maps, and conceptual site models; and preparation of a comprehensive site characterization report

**Site Investigation Soil/Groundwater:** Performed site characterizations at several sites within Arizona. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; identification of potential contaminants of concern; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratories for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

## Brief Resume Continued

**Bore Hole Sampling and Logging**: Performed observations and sampling services on more than 30 projects in Arizona. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, methanol extraction, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratories for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

**Free Product Removal:** Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, pumping, purging; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization.

**Report Preparation**: Prepared reports for technical projects in Arizona. Report preparation involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing on more than eight projects within Arizona. Groundwater sampling and monitoring services included: monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, dissolved oxygen, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**System Operation and Maintenance:** Performed system operation and maintenance on VES systems These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates

| Name of Individual | Title |
|---|---|
| Brett McClellan | Project Geologist / GIS Specialist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level IV | Area of Expertise<br>GIS / CADD / Geology |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Project Personnel | Education<br>Bachelor of Science, Geology, 1997 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 12 | 10 | Professional Geologist, 2001, TN, TX, UT |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | October 2004 | Present |
| 2. | Miller Brooks Environmental, Inc | May 1998 | September 2004 |
| 3. | Environmental Technologies, Inc. | May 1997 | May 1998 |
| 4. | Environmental Management Consultants, Inc | October 1995 | May 1997 |
| 5. | Mars Global Surveyor Space Flight Facility (N.A.S.A.) | April 1993 | October 1995 |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Performed UST closures throughout the Phoenix Metropolitan Area and throughout Arizona. Closure services included: obtaining a UST closure permit from ADEQ; scheduling an ADEQ certified UST removal contractor; performing oversight during excavation, removal, and disposal / destruction of the USTs; monitoring the lower explosive limit and oxygen levels in the USTs prior to removal; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and assisted with the preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Assisted with site characterizations at multiple sites within Phoenix Metropolitan Area and throughout Arizona. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of groundwater monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and assisted with the preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Performed observations and sampling services for over 100 exploratory test borings within the greater Phoenix Metropolitan Area and throughout Arizona. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; counting and recording the drill rig blow counts for each individual soil sample; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and assisted with the preparation of a sampling report.

**Free Product Removal:** Performed free product removal over 20 sites within the greater Phoenix Metropolitan Area and throughout Arizona. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, purging, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the products.

## Brief Resume Continued

**GIS Mapping and Database:** GIS and geologic cartography expertise encompasses a wide variety of illustrations including site layout, geologic mapping, geologic cross sections and fence diagrams, hydrologic and topographic contour schematics, deep domestic pumping well and groundwater monitor / remediation well construction diagrams, UST installation and removal plans, remediation system design, major utility and engineering schematics, contaminant plume modeling, digital elevation modeling, GIS integration, conceptual land management and geotechnical models, oil field, mining, and landfill management illustrations, watershed and drainage mapping, and three-dimensional conceptual modeling.

**Pilot Testing/Study**: Assisted in pilot tests on pump and treat systems and vapor extraction systems in the greater Phoenix Metropolitan Area and throughout Arizona. The services performed prior to and during the start-up of the system included monitoring the system to determine the optimal operating conditions, the installation, synchronization, and programming of down-well transducers to monitor live drawdown and recovery actions during the test, retrieval and analysis of the transducer logs, data preparation for AQTESOLV modeling to measure the effective radius of influence from the pilot tests.

**Remedial Design and Installation:** Assisted in the remedial design and installation of multiple vapor extraction, air sparge, air stripping systems, and thermal oxidizer / catox units within the Phoenix Metropolitan Area and throughout Arizona. The remedial services included installation of vapor extraction and air sparge wells, design of the VE/AS systems, observation during installation of the VE/AS piping, pressure testing the system, sampling of influent and effluent emissions, stack height permitting, sound emission analysis, and regular maintenance and sampling of the systems.

**Groundwater Modeling:** Performed groundwater modeling for multiple sites within the greater Phoenix Metropolitan Area and throughout Arizona. Groundwater modeling services included coordination with a registered surveyor to determine the elevation of each well; groundwater monitoring on a monthly basis; calculation of the flow rate of the aquifer, calculating the direction of groundwater flow; calculating the slope gradient at which the aquifer flows; and preparation of quarterly groundwater monitoring maps and reports.

**Multi Phase Extraction:** Assisted in the design and installation of multi-phase extraction systems at several sites in the greater Phoenix Metropolitan Area and throughout Arizona. These services included installation of both vapor extraction and air sparge wells; design of the VES system; observation during installation of the VES system; pressure testing the systems; pilot testing the system; and monitoring of the system on a weekly basis.

**Air Sparge:** Assisted in the installation and monitoring of air sparge systems in greater Phoenix Metropolitan Area and throughout Arizona. These services included installation of the air sparge wells, assistance in designing of the air sparge system, installation and maintenance of the system, monitoring of the system, and preparation of the quarterly monitoring reports.

**System Operation and Maintenance:** Performed system operation and maintenance on several VES in the greater Phoenix Metropolitan Area and throughout Arizona. These services included assistance during installation of the system, weekly monitoring of the system, checking the VOC output of the system to assure that it is with permitted allowance, drainage and disposal of the condensation water, and preparation of quarterly reports.

**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates
Certificate as GIS Professional ALSEA Geospatial, Inc. December 2002
Certificate Professional AutoCAD 2000, University of Advanced Computer Technology November 2001
Associate of Applied Science Computer Aided Drafting and Design, Gateway Community College May 1990

| Name of Individual | Title |
|---|---|
| Keenan Murray | Senior Staff Geologist |
| Personnel Classification/Level (*Reference ASRAC Statement of Work Table 1*)<br>Professional Level III | Area of Expertise<br>Environmental and Geological Evaluations |
| Proposed Project Role (*e.g. Project Manager, Project Engineer, Project Hydrologist, ect.*)<br>Staff Personnel | Education<br>Master of Science, Geology, 1997 |

| Years of Experience | Years of Related Experience | Registrations and Certifications Held and Year Received |
|---|---|---|
| 8 | 2 | Registered Geologist, 2003, AZ |

## Employment History

| | Firms Name | Start Date | End Date |
|---|---|---|---|
| 1. | Ninyo & Moore | August 2005 | Present |
| 2. | Arizona State Land Department | October 1999 | August 2005 |
| 3. | ATC Associates, Inc. | October 1998 | March 1999 |
| 4. | Basin & Range Hydrogeologists, Inc. | February 1998 | September 1998 |
| 5. | Canyon Resources Briggs | June 1997 | December 1997 |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

Executive Summary of Career Highlights

**UST Closure:** Performed three UST Closures within the Phoenix Metropolitan Area. Closure services included: obtaining a UST closure permit from ADEQ; collecting soil samples following removal of the USTs; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of the UST Closure report.

**Site Investigation Soil/Groundwater:** Performed site characterizations for over 20 sites within Phoenix Metropolitan Area. Site characterization services included: coordination with a drilling subcontractor to perform horizontal and vertical extent boring to assess the impacted area; collecting soil samples at specified interval in the borings; observing and logging the general soil lithology in each of the borings; performing decontamination of the sampling equipment between each sample; observation during installation of several monitoring wells; observation during well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a comprehensive site characterization report.

**Bore Hole Sampling and Logging**: Performed observations and sampling services for exploratory test borings within the greater Phoenix Metropolitan Area. These services included: coordination of a drilling subcontractor; observation during exploratory test borings, logging the general soil type and lithology for each individual boring, noting the depth to groundwater if encountered; collecting soil samples at selected intervals, monitoring each of the samples for volatile organic compounds using a photoionization detector; collecting and preserving the soils samples using various mediums including brass sleeves, glass jars, Encore samplers, and acetate sleeves; handling the samples under standard chain-of-custody protocol; preparing standard boring logs for each individual boring; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a sampling report.

## Brief Resume Continued

**Free Product Removal:** Performed free product removal at more than five sites within the greater Phoenix Metropolitan Area. Free product removal services included: monitoring depth and thickness of the free product in each of the monitoring wells using a water level indicator and multi-phase interface probe; performed free product recovery using various methods including hand bailing methods, free product skimmers, pumping, purging, and free product recovery socks; cleaning, maintenance, and decontamination of the skimming equipment; proper handling, storage, and labeling of free product drums, sampling and testing of the drums for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the product.

**Groundwater Monitoring Well Installation:** Performed observation during groundwater monitoring well installation at more than 20 sites within the greater Phoenix Metropolitan Area. Groundwater monitoring well installation services included: coordination with a drilling subcontractor to perform the monitoring well installation; preparation of the necessary permit paperwork for the well installation; observation during installation of the monitoring wells; observing and logging the depth intervals of the casing, screening, filter sand, bentonite seal, and concrete slurry cap in each of the borings; observation during monitoring well development activities; groundwater monitoring and sampling on a quarterly basis; coordination of an Arizona certified laboratory for analytical testing; interpretation of the analytical data; and preparation of a monitoring wells installation and groundwater sampling report.

**Report Preparation**: Performed report preparation for technical projects in the greater Phoenix Metropolitan Area. Report preparation involving USTs included: UST removal reports, site characterization reports, groundwater monitoring, sampling, and testing reports; preparation of the ADEQ USTs registration paperwork; preparation of the ADEQ UST permanent closure assessment report forms, preparation of the ADEQ 14-day letter reports; UST closure reports; and UST remediation reports; and preparation of boring logs, tables, figures, and other support documentation for each of the reports.

**GIS Mapping and Database:** Performed GIS mapping and analysis on a variety of mineral resource and environmental projects throughout Arizona using ArcView. Environmental GIS mapping includes mapping physical contaminant density, contaminant screening locations, and soil sample locations linked with associated laboratory results. Mineral resource GIS mapping includes geologic mapping, and quantitative and qualitative mineral resource mapping and analyses. Worked closely with consultants on the development of the Arizona State Land Department's Mineral Assessment Asset Management GIS project. Prepared numerous maps and associated reports.

**Sampling and Monitoring Groundwater:** Performed groundwater sampling and testing at more than 20 sites within the greater Phoenix Metropolitan Area. Groundwater sampling and monitoring services included: observation during installation of the monitoring wells; monitoring depth to water and thickness of the free product in each of the monitoring wells using a water level indicator and/or multi-phase interface probe; calculating the well purge volume prior to sampling; preparation and decontamination of the sampling pump and equipment, calculating the flow rate of the purge water; monitoring the temperature, pH, and conductivity of the purge water prior to sampling, sampling the groundwater using various mediums including glass vials and jars; using proper handling, labeling, preservation, and chain-of-custody protocol for the samples; sampling and testing of the purge water for characterization, coordination of a recycling and/or disposal contractor for proper disposal of the purge water; coordination of a laboratory for analytical testing; interpretation of the analytical data; and preparation of groundwater monitoring and/or sampling reports.

**Pilot Testing/Study**: Assisted in performing several pilot tests on vapor extraction systems in the greater Phoenix Metropolitan Area. These services were performed prior to start-up of the system and included evaluating the system to determine the optimal operating conditions and discussion of the pilot test in quarterly monitoring reports.

**Groundwater Modeling:** Performed groundwater modeling at more than 10 sites within the greater Phoenix Metropolitan Area. Groundwater modeling services included groundwater monitoring on a monthly basis; calculating the direction of groundwater flow; and preparation of quarterly groundwater monitoring maps and reports.

**Air Sparge:** Performed installation of several air sparge wells in Phoenix Metropolitan Area.

**System Operation and Maintenance:** Performed system operation and maintenance on more than five VES in the greater Phoenix area. These services included assistance during installation of the system, monitoring of the system, and checking the VOC output of the system to assure that it is within permitted allowance.

**In-Situ Groundwater Treatment:** Performed in-situ groundwater treatment at more than five sites within the greater Phoenix Metropolitan Area. These services included installation of groundwater monitoring wells, installation of bio-remedial socks, monthly monitoring of the site, and preparation of the quarterly monitoring reports.

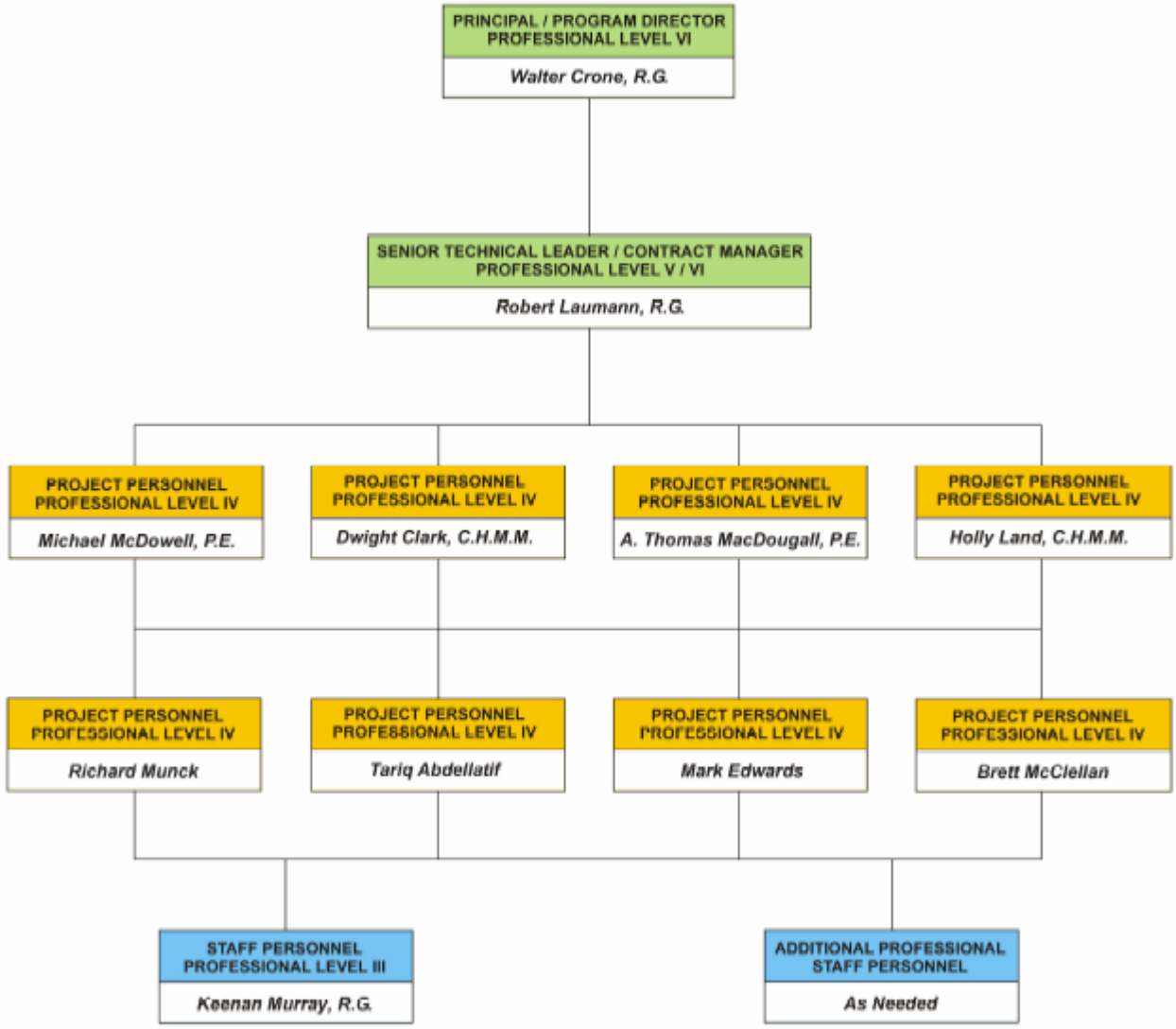
**Specialized Training and Certifications:**

OSHA 1910.120 Hazardous Waste Operations And Emergency Response, with updates

15. Provide an organizational chart showing the staffing and lines of authority for the key persons to be used under this contract.

Ninyo & Moore

ORGANIZATIONAL CHART
FOR
UNDERGROUND STORAGE TANK CONSULTING




Ninyo & Moore
Environmental
and
Geotechnical
Sciences
Consultants

16. Complete the Pricing Schedule in its entirety.

| Support Services | Minimum Responsibilities, Qualifications and Education | Base Hourly Rate |
|---|---|---|
| **Support Level I (Word Processor)** | Responsibilities: Clerical, word processing, filing, general administration.<br>Qualifications: Entry level, no experience restriction.<br>Education: No education restriction. | **$ 41. 00** |
| **Support Level II (Admin Assistant)** | Responsibilities: Drafting, project manager's assistant, graphics.<br>Qualifications: 1 - 2 years experience.<br>Education: No education restriction. | **$ 45. 00** |
| **Support Level III (Technical)** | Responsibilities: Drafting supervisor, administrator supervisor, Senior Word Processor.<br>Qualifications: 2 - 4 years experience.<br>Education: No education restriction. | **$ 47. 00** |
| **Field Services** | **Minimum Responsibilities, Qualifications and Education** | **Base Hourly Rate** |
| **Field Services Level I** | Responsibilities: Closely supervised; conducts routine heavy labor during equipment installations; sampling/gauging, equipment maintenance.<br>Qualifications: Entry level, 1 - 2 years of experience.<br>Education: No education restriction. | **$ 35. 00** |
| **Field Services Level II** | Responsibilities: Limited supervision; occasional heavy labor; sampling/gauging, equipment installations, operations, troubleshooting.<br>Qualifications: 2 - 4 years of experience.<br>Education: No education restriction. | **$ 42. 00** |
| **Field Services Level III** | Responsibilities: Supervises on-site tasks such as system installations and operations, trouble shooting; technical advisor.<br>Qualifications: 5 - 7 years of experience.<br>Education: No education restriction. | **$ 44. 00** |
| **Field Services Staff (Field)** | Responsibilities: Limited supervision; experience specific to Scope of Work, independent field work and/or specialist.<br>Qualifications: 7 - 9 years experience/special knowledge or expertise in field.<br>Education: No education restriction. | **$ 57. 00** |
| **Field Services Manager** | Responsibilities: Overall supervision of field services staff; works with Project Managers on scheduling and coordination.<br>Qualifications: 7 - 9 years of experience.<br>Education: Bachelor of Science (BS) degree in applicable field of study or 15 plus years experience. | **$ 57. 00** |
| **Professional Personnel *** | **Minimum Responsibilities, Qualifications and Education** | **Base Hourly Rate** |
| **Professional Level I** | Responsibilities: Close supervision, routine tasks associated with environmental projects.<br>Qualifications: 1 - 2 years of experience.<br>Education: Bachelor of Science (BS) degree. | **$ 65. 00** |
| **Professional Level II** | Responsibilities: Collects and interprets data, report writing, provides project input.<br>Qualifications: 2 - 4 years of experience<br>Education: Bachelor of Science (BS) degree. | **$ 77. 00** |
| **Professional Level III (Staff)** | Responsibilities: Limited supervision, independent fieldwork, oversees Professional Levels I and II.<br>Qualifications No. 1: 4 - 6 years of experience with Bachelor of Science (BS) degree.<br>Qualifications No. 2: 1-2 years of experience with Masters degree. | **$ 85. 00** |
| **Professional Level IV (Project)** | Responsibilities: Manages projects of moderate scope, prepares cost estimates, supervises others.<br>Qualifications No. 1: 6 - 8 years experience with Bachelor of Science (BS) degree or registration (PE or RG).<br>Qualifications No. 2: 3 - 4 years of experience with Masters degree. | **$ 100. 00** |
| **Professional Level V (Senior)** | Responsibilities: Senior technical leader for environmental projects, QA of Project Plans, report review.<br>Qualifications: 8 or more years of experience.<br>Education: Advanced degree in field or registration (PE or RG).<br>***** Must meet both the experience & education requirements *****  | **$ 110. 00** |
| **Professional Level VI (Principle)** | Responsibilities: Recognized registered professional, resident expert, expert testimony, QA of Project Plans and report review and/or Oversees and coordinates all levels of personnel, senior technical leader and has signature authority.<br>Qualifications No. 1: 5 or more years in field project formulation, survey, excavation and technical reporting experience.<br>Education No. 1: Doctorate degree and registration as PE or RG or Doctorate degree in Risk Assessment or Toxicology .<br>Qualifications No. 2: 12 or more years of experience.<br>Education No. 2: Advanced degree in field and registration as PE or RG or Advanced degree in Risk Assessment or Toxicology.<br>Qualifications No. 3: 20 or more years in field project formulation, survey, excavation and technical reporting experience.<br>Education No. 3: Bachelor of Science (BS) degree in applicable field of study.<br>***** Must meet both the experience & education requirements ***** | **$ 125. 00** |

* There will be multiple technical disciplines that will fall under the descriptions of each professional level. A geologist, engineer, public involvement specialist, or environmental scientist with one year environmental experience would each fall under a Professional Level I.

| | |
|---|---|
| **Aggregate Hourly Rate Total:** | **$ 930. 00** |

17. Complete the Rental Equipment Pricing Schedule in its entirety.

| Equipment Name | Price Per Day | Price Per Week | Price Per month |
|---|---|---|---|
| Air Sparge Compressor ≤ 15psi | $ 200. 00 | $ 500. 00 | $ 1,500. 00 |
| Air Sparge Compressor ≥ 15psi | $ 350. 00 | $ 750. 00 | $ 1,750. 00 |
| Bladder Pump | $ 120. 00 | $ 360. 00 | $ 1,080. 00 |
| Centrifugal Pump | $ 210. 00 | $ .630 00 | $ 1,890. 00 |
| Combustible Gas Indicator (CGI) | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| Depth Specific Sampler | $ 45. 00 | $ 125. 00 | $ 375. 00 |
| Disposable Bailer (each) | $ 15. 00 | -- | -- |
| Dissolved Oxygen Meter | $ 55. 00 | $ 165. 00 | $ 385. 00 |
| Electric Catalytic Oxidizer ≤ 250cfm | $ 575. 00 | $ 1,438. 00 | $ 2,990. 00 |
| Flame Ionization Detector (FID) | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| Flow Through Cell | $ 40. 00 | $120. 00 | $ 360. 00 |
| Generator ≤ 6kw | $ 55. 00 | $ 165. 00 | $ 495. 00 |
| Hand Auger w/Slide Hammer Sampler | $ 100. 00 | $ 300. 00 | $ 900. 00 |
| Interface Probe – Oil/Water | $ 40. 00 | $ 120. 00 | $ 360. 00 |
| Lower Explosive Limit/Oxygen Meter (LEL/O2) | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| Peristaltic Pump | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| Photoionization Dectector (PID) | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| pH Temperature and Conductivity Meter | $ 125. 00 | $ 375. 00 | $ 1,125. 00 |
| Portable Flow Meter - Water | $ 60. 00 | $ 180. 00 | $ 540. 00 |
| Portable Pilot Test Unit (includes trailer, anemometer, blower/compressor, vacuum/pressure gauges, pitot tubes, generator, miscellaneous fittings, power cords and plugs. | | | |
| AS Pilot Test Unit | $ 460. 00 | $ 1,380. 00 | $ 4,140. 00 |
| SVE Pilot Test Unit | $ 650. 00 | $ 1,350. 00 | $ 2,800. 00 |
| Pressure Transducer, Cable and Data Logger | $ 200. 00 | $ 500. 00 | $ 1,500. 00 |
| Submersible Pump w/Controller | $ 125. 00 | $ 300. 00 | $ 650. 00 |
| Thermal/Catalytic Oxidizer 250cfm | $ 575. 00 | $ 1,350. 00 | $ 2,800. 00 |
| Thermal/Catalytic Oxidizer 500 cfm | $ 863. 00 | $ 1,725. 00 | $ 3,450. 00 |
| Vehicle | $ 75. 00 | $ 300. 00 | $ 900. 00 |
| Water Level Indicator | $ 40. 00 | $ 120. 00 | $ 360. 00 |

18. Use this space to provide any additional information or description of resources (including any computer design capabilities) supporting your firm's qualifications for the proposed contract.

## Professional Philosophy

Avram Ninyo in San Diego California established Ninyo & Moore in 1986. Ninyo & Moore provides environmental engineering, services to clients in the governmental (federal, state, and local), commercial, and private sectors. Ninyo & Moore has helped clients develop and implement innovative solutions to environmental challenges for 20 years. Ninyo & Moore pledges to complete every project assignment in a high-quality manner with special attention given to quality assurance, timeliness of delivery, and cost efficiency. Moreover, Ninyo & Moore embodies many strengths that we believe make us exceptionally qualified to undertake any project.

## Quality Assurance/Quality Control Program

Ninyo & Moore is dedicated to providing superior environmental consulting services. Quality is achieved through a consistently applied Quality Management Process (QMP) program to which all team members must adhere. Our QMP program is backed by written policies that are incorporated into the project from the onset. Ninyo & Moore's program features a separate quality assurance group to monitor quality assurance/quality control (QA/QC) on work assignments, with independent corporate oversight; a detailed set of proven QA procedures and protocols to cover all project aspects; a centralized document control system that ensures chain-of-custody control and a paper trail for all controlled documents. Detailed procedures for auditing, post-auditing, and non-conformance reporting; and a training program for orienting all personnel on the QA procedures are also featured. One important goal of the QMP program is to produce environmental data of known and acceptable quality on all work assignments. Our policy is to maintain professional standards in all aspects of project tasks and management.

## Professional Staff and Our Services

Ninyo & Moore's personnel are licensed in their specific disciplines and are fully committed to providing the necessary resources for successful completion of projects. Ninyo & Moore's geotechnical and environmental project staff brings a wealth of experience and diversity that includes Registered Engineers (PE, GE), Professional Geologists (PG, RG, CEG, CPG), Registered Geophysicists (RGP), Certified Hazardous Materials Managers (CHMM), Registered Environmental Assessors (REA), Certified Industrial Hygienists (CIH), and personnel with other applicable registrations, licenses, and certifications. Many of our professionals hold advanced degrees, and are active in accredited professional organizations. Ninyo & Moore's field and laboratory staff are highly experienced and qualified to provide testing and inspection services for an extensive range of project requirements. Our technicians and inspectors are certified by ICBO, AWS, ATI, ACI, NICET, and local government agencies and municipalities, and our laboratory and field personnel are certified and skilled at testing in accordance with a wide variety of standards and codes, including UBC, AASHTO, ADOT, CCRL, FAA, ASTM, State, and other applicable codes and guidelines.

## Underground Storage Tank Services

Ninyo & Moore's underground storage tank (UST) services include tank removal, site characterization, remediation, and site closure. Work is performed in accordance with ADEQ guidance including the August 20, 2002, *Release Reporting and Corrective Action Guidance* (and updates) as well as Arizona Administrative Code Title 18 Chapter 12. Our firm is prequalified for State Assurance Fund UST consulting (Firm #1303 - Qualifying Individual Mr. Robert Laumann, R.G.). UST removal services typically include obtaining local permits; local agency notification; tank excavation, triple rinsing, degassing, and certification; and removal, manifesting, and disposal of tank and tank rinsate. Soil samples are collected from the former UST excavation and along the former product piping. The excavation is backfilled, compacted, and repaved, as appropriate, often utilizing the expertise of our certified field technicians. Removal activities are summarized in a tank removal report for submission to state/local agencies. If necessary, UST site characterization includes the preparation and implementation of a workplan, performance of contamination assessment to characterize the vertical and horizontal extent of the release in accordance with ADEQ guidance, and preparation of a site characterization report. Corrective action, if necessary, may include natural attenuation monitoring, soil excavation, soil vapor and/or free product extraction, enhanced in-situ bio remediation (bioventing), oxygen release compound addition, and groundwater pump and treat. Depending on the prescribed remedial action, a pilot test is typically conducted to determine full-scale design parameters. Systems are designed, installed, operated, and maintained by Ninyo & Moore staff. Site closure samples are collected when system monitoring indicates site cleanup levels have been reached.

*":…Ninyo & Moore provided both consulting and project management expertise that resulted in the successful removal of our underground storage tanks…they also managed the removal and installation of two replacement underground storage tanks…Ninyo & Moore had done an excellent job for SDSU and I would recommend them for future projects."* -Terry Gee SDSU Department of Environmental Health & Safety