ARCADIS GERAGHTY & MILLER

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ARCADIS Geraghty & Miller Inc
126 North Jefferson Street
Suite 400
Milwaukee
Wisconsin 53202
Tel 414 276 7742
Fax 414 276 7603

ENVIRONMENTAL

Aubrey R. Fowler, Esq.
c/o Donald P. Gallo, Esq.
Michael Best & Friedrich LLP
100 East Wisconsin Avenue
Milwaukee, Wisconsin 53202-4108

RECEIVED
FEB 15 2000

Subject:
Scope of Work and Cost Estimate, Supplemental Investigation and Remediation Services, Middleton Cleaners, 6617-6619 University Avenue, Middleton, Wisconsin.

Milwaukee:
4 February 2000

Contact:
James Drought

Extension:
414 277 6204

Dear Mr. Gallo:

Thank you for the opportunity to meet with yourself and Mr. Aubrey R. Fowler, Esq. of Northern Properties, Inc. regarding the Middleton Cleaners (subject property). In accordance with your request, we have completed a review of the historical site investigation data. Based on a review of the investigation data and site conditions, we have developed a scope of work for completing the investigation and implementing a proven remediation technique at the subject property.

This proposal was prepared in accordance with the project Request for Proposal (RFP) from Mr. Don Gallo of Michael Best & Friedrich, dated January 12, 2000. The proposal presents a brief overview of the site conditions and the proposed scope of work for the investigation and remediation phases of the project. An estimate of costs associated with each scope of work is also provided. Finally, we have included a description and case studies of the proposed remediation technique that ARCADIS Geraghty & Miller has successfully used at several sites in Wisconsin that are similar to the subject property.

Project Background

The Middleton Cleaners property is located within a small strip mall. The property was reportedly used for agricultural purposes until the 1950s. The first development of the property included a dry cleaners (Hi-Way Dry Cleaners). This cleaners reportedly used stoddard solvent as the dry cleaning solvent, stored in four underground storage tanks (USTs), from the 1950s to the 1980s. The cleaning equipment was stored in a small shed south of the main building on the property, and the USTs were located adjacent to the shed. From the 1950s to the present, tetrachloroethene (PCE) has been used as the cleaning solvent. The USTs were removed from the site in the early 1980s.

An initial site investigation was completed in 1996. Eight Geoprobe borings were drilled in the vicinity of the shed and former UST locations to collect soil samples for laboratory analysis. Eight additional Geoprobe borings were advanced to collect soil and groundwater samples. Based on the initial analytical results, soil and groundwater at the site had been impacted by stoddard solvent and PCE. Additional

investigation activities were completed in 1999. Nine Geoprobe borings, four monitoring wells, and one piezometer were advanced at the site.

Based on the investigation results, soils at the site consist of sands to a depth of at least 80 feet below land surface (ft bls). Groundwater is located at a depth of approximately 50 ft bls. Soil samples collected during the investigation contained PCE at concentrations up to 239 milligrams per kilogram (mg/kg), and groundwater samples contained PCE concentrations up to 7,800 micrograms per liter (µg/L). The soil analytical results suggest that the lateral and vertical extent of impacted soil has been defined. Additional groundwater monitoring wells are necessary to define the lateral extent of impacted groundwater; however, the analytical results from the piezometer suggest that the vertical extent of impacted groundwater may have been defined.

The sandy soil and deep groundwater should permit the use of a variety of remediation techniques, due to its relatively high permeability. However, the low fraction of organic carbon in this type of soil typically increases the rate of contaminant migration and limits the rate of natural biodegradation.

It is understood that a previous consultant recommended using soil vapor extraction and groundwater recovery to remediate the property. Given the sandy soil and deep water table at the site, soil vapor extraction may represent a feasible remediation method for addressing the impacted soils. However, the use of groundwater recovery would be expensive and ineffective at reducing constituent concentrations within a reasonable period of time. ARCADIS Geraghty & Miller has successfully employed a more cost-effective groundwater remediation technique, known as carbon-enhanced biodegradation, to address PCE and related compounds.

In accordance with the RFP, ARCADIS Geraghty & Miller has developed two scopes of work: one for completing the site investigation, and one for implementing remediation at the property. Details regarding each scope of work are presented in the following two sections.

Scope of Work - Completion of Site Investigation

Additional investigation activities are proposed to develop a more feasible and cost-effective remedial strategy. These activities will focus on delineating the lateral extent of impacted groundwater, collecting data for assessing remediation options, and obtaining eligibility for reimbursement through the Drycleaning Environmental Response Fund (DERF) program. ARCADIS Geraghty & Miller will complete the following tasks:

- Preparation of a DERF application, work plan, subcontractor bids, and access agreements.

- Installation of four additional monitoring wells and two piezometers.

- Collection of groundwater samples from the new and existing wells.
- Preparation of a summary report.

A description of each task is presented below.

Preparation of Work Plan and Access Agreements

As the site is currently occupied by a licensed dry cleaners, investigation and remediation costs should be eligible for reimbursement through the DERF program. The authorizing statute for this reimbursement program was adopted by the Wisconsin Legislature on October 14, 1997. The regulations implementing the program, Chapter NR 169 of the Wisconsin Administrative Code, were adopted by the Wisconsin Department of Natural Resources (WDNR) in August 1999. It is understood that Northern Properties, Inc. has been conducting the site investigation as the owner of the property. Under NR 169, Northern Properties would be eligible for reimbursement of eligible site investigation and remediation costs. Owners and operators that have started an investigation prior to October 14, 1997 must submit a program application by March 31, 2000 to request reimbursement for costs incurred prior to October 14, 1997. ARCADIS Geraghty & Miller will assist with preparing the application for submittal to the WDNR.

Prior to proceeding with the field activities, a brief work plan will be submitted to the WDNR. The work plan will outline the sampling methods and proposed analytical parameters. In addition, ARCADIS Geraghty & Miller will obtain laboratory and driller bids under this task.

Based on the previous groundwater analytical results and site layout, it will likely be necessary to install the proposed additional monitoring wells in the City of Middleton right-of-way and on the adjacent property to the south. ARCADIS Geraghty & Miller will obtain access agreements for these wells prior to proceeding with field activities.

Installation of Additional Monitoring Wells and Piezometers

PCE has been detected at all four of the existing wells at concentrations above the WDNR regulatory limits. To fully assess remediation options for the property, it is necessary to determine the extent of groundwater that will require treatment. Four additional groundwater monitoring wells and two additional piezometers are proposed. One well will be installed in the alley located south of the Middleton Cleaners property, west of Monitoring Well MW-4. A second well will also be installed in the alley, to the east of the facility. A well will be installed on the church property south of the Middleton Cleaners property, south of MW-3. The remaining well will be installed in the right-of-way of University Avenue, to the north of MW-2. The piezometers will be installed downgradient of the building to confirm the vertical extent of groundwater impacts.

The wells will be installed in boreholes using hollow-stem auger drilling techniques. Prior to well installation, soil samples will be collected from the borings at 2-1/2 foot vertical intervals to provide a relatively continuous profile of the subsurface materials at each boring location. Logs will be prepared for each boring in accordance with WDNR requirements and will present both the classification and engineering properties of the materials encountered. The soil samples will be screened with a flame ionization detector (FID) to provide a qualitative assessment of impacts.

Based on the FID results, up to three soil samples per boring may be submitted to a laboratory for analysis of volatile organic compounds (VOCs). In addition, three soil samples will be submitted for analysis of geotechnical parameters, including bulk density, organic carbon, and porosity. These parameters will be used in conjunction with the collected chemical data to evaluate the migration and retardation rates of the constituents.

Each of the soil borings will be converted to a groundwater monitoring well or piezometer. The four wells will be installed to a depth of 55 ft bls, consistent with the existing wells. The piezometers will be installed to a depth of 80 ft bls, consistent with the existing piezometer. Following completion of each borehole, a well will be constructed inside of the hollow-stem augers. Once the well is constructed, the augers will be removed to complete the well. Each monitoring well will consist of a 2-inch diameter Schedule 40 PVC riser and a 10-foot length of 2-inch diameter Schedule 40 PVC well screen. Upon positioning the well screen and riser within the bolehole, the annular space between the well screen and borehole will be filled with a silica sand filter pack and filter pack seal. The remainder of the annular space will be sealed with bentonite, and a flush-mount well vault will be installed at the ground surface.

After construction, the new wells will be developed in accordance with Chapter NR 141 of the Wisconsin Administrative Code. The ground surface and casing at each of the new wells will be surveyed to determine relative elevations. The elevation data will be used to evaluate vertical and horizontal groundwater flow direction and gradients.

Collection of Groundwater Samples

After construction, groundwater samples will be collected from each new and existing well. Conventional bailer sampling methods (which was employed following installation of the existing monitoring wells) can alter sensitive biological parameters such as dissolved oxygen. To obtain more representative groundwater samples, low-flow sampling techniques will be utilized. This technique also has the advantage of producing less water requiring disposal.

A downhole probe will be lowered down each well to measure aquifer parameters such as temperature, pH, dissolved oxygen, and oxidation-reduction potential (ORP). Water will be pumped from the aquifer at a low flow rate (less than 100 milliliters

per minute) until the probe readings stabilize. Samples will then be collected in clean, laboratory-supplied sample containers, and placed in a cooler filled with ice. The groundwater samples will be submitted for the analysis of VOCs, total organic carbon (TOC), and dissolved gases (ethene, ethane) using appropriate chain-of-custody procedures. These parameters provide an indication of biological activity and can be used to evaluate natural attenuation as a remedial alternative.

Project Meeting and Reporting

The investigation results will be used to define the degree and extent of impacts, assess geologic and hydrogeologic conditions, and identify feasible remedial alternatives for this property. We will prepare periodic status reports to provide Northern Properties and Michael Best & Friedrich with results as the field activities progress. Once the analytical results have been received, we will schedule a meeting with Mr. Fowler and you to discuss the investigation results, potential remedial options, and a range of remediation costs.

Based on the results of the investigation and our meeting, we will prepare a summary report. The report will initially be prepared in draft format for review by Northern Properties and Michael Best & Friedrich. Comments will be incorporated into the final document prior to submittal to the WDNR.

Description of Proposed Remediation Strategy

The DERF program is currently structured to require separate project bidding for the remediation phase of the project. Consequently, a remedial action plan will not be prepared until the investigation has been completed and after this bidding requirement has been satisfied. The additional site data collected during the next phase of investigation may also influence the scope and cost of the remediation phase. However, to assist you in planning for the remediation phase of the project, ARCADIS Geraghty & Miller completed a review of the existing investigation data to assess potential remediation options. Based on the known site conditions, ARCADIS Geraghty & Miller believes that a combination of soil vapor extraction and enhanced biodegradation of impacted groundwater will represent the most feasible and cost-effective remediation strategy for the site.

Soil vapor extraction was proposed by a previous consultant for addressing the impacted soil. This technology consists of using a vacuum blower to remove constituents from the soils through a series of extraction wells. Given the contaminant properties and soil type, ARCADIS Geraghty & Miller concurs that this technology would be effective in addressing the impacted soil at the site. We installed and operated a soil vapor extraction system at a former gasoline service station in Middleton to remediate petroleum-impacted soils. A site closure letter for that site should be issued by the WDNR in early 2000. Based on the success with that remediation, soil vapor extraction should also be effective in addressing impacted soils at the Middleton Cleaners property.

One remediation method that ARCADIS Geraghty & Miller has successfully used to address chlorinated solvents in groundwater is enhanced biodegradation. Microorganisms can biologically degrade PCE and other chlorinated solvents to carbon dioxide and water. Biodegradation can occur through several processes, including reductive dechlorination. In this process, PCE is biodegraded under anaerobic and strongly reducing conditions to less chlorinated VOCs (trichloroethene, dichloroethene, and vinyl chloride) and then to ethene and ethane, and finally to carbon dioxide and water. Low concentrations of trichloroethene and dichloroethene were detected in groundwater samples collected from the site, indicating that some biodegradation is occurring.

The low concentrations of trichloroethene and dichloroethene at the property indicate that reductive dechlorination is proceeding at a low rate. The low degradation rate may be due to the absence of strong reducing conditions or a low concentration of organic carbon. Enhanced biodegradation increases the rate of reductive dechlorination by providing more suitable environmental conditions. A carbon amendment solution is injected into the affected aquifer to create strongly reducing conditions and a source of carbon for the microorganisms. These injections can be performed through a series of temporary Geoprobe boreholes, or by installing an injection system with permanent wells. Brief case studies describing the use of this technique at sites in Wisconsin are presented in a later section.

Scope of Work - Remediation

To implement the anticipated remediation strategy, ARCADIS Geraghty & Miller will complete the following tasks:

- Prepare a remedial action plan for the property.
- Conduct an enhanced biodegradation pilot test.
- Prepare a design report for the remediation system, and obtain contractor bids.
- Install and start the remediation system.
- Conduct groundwater monitoring and system operation and maintenance for 1 year.
- Complete periodic status reports

A description of each task is presented below.

Remedial Action Plan

Once the consultant selection process for the remediation phase of the project has been completed in accordance with the DERF program requirements, ARCADIS

Geraghty & Miller will prepare a Remedial Action Plan (RAP). The RAP will present a brief summary of the site investigation data, evaluate potential remediation alternatives, and recommend a remediation strategy. As indicated earlier, a review of the known site conditions indicates that soil vapor extraction and enhanced biodegradation will be the most feasible and cost effective remediation strategy for the property. However, the WDNR will require that remedial alternatives be formally identified and evaluated in a RAP as required by NR 722.

As with the investigation report, the RAP will initially be prepared in draft format for review by Northern Properties and Michael Best & Friedrich. Comments will be incorporated into the final document prior to submittal to the WDNR.

Enhanced Biodegradation Pilot Test

A soil vapor extraction pilot test is typically conducted to evaluate system feasibility and obtain design parameters for a full-scale system. Because ARCADIS Geraghty & Miller has installed and operated a soil vapor extraction system near the subject site, the data from that system can be used to design a soil vapor extraction system for the Middleton Cleaners site. A pilot test will not be conducted to reduce project costs.

To evaluate the feasibility of using enhanced biodegradation at the Middleton Cleaners site, ARCADIS Geraghty & Miller will use the groundwater analytical results from the supplemental investigation to design a pilot test for this technology. These results will provide data on VOC degradation product concentrations, organic carbon concentrations, aquifer conditions, and whether ethene and/or ethane is being produced. A pilot test will then be conducted to determine whether the addition of organic carbon can increase the rate of degradation.

A Wisconsin Pollutant Discharge Elimination System (WPDES) permit is required from the WDNR prior to introducing chemicals into the groundwater. In addition, an exemption from NR 140.28(5)(c) and (d) and variance from NR 812.05 are required by the WDNR prior to introducing remediation chemicals into the groundwater. ARCADIS Geraghty & Miller will prepare the WPDES permit and NR 140 injection applications on behalf of Northern Properties, Inc.

Following receipt of the WPDES permit and NR 140 variance, three injection wells will be advanced around Monitoring Well MW-1. The injection wells will be installed with a truck-mounted drill rig to a depth of about 50 ft bls to facilitate injection of a carbon amendment solution into the aquifer. After the injection is completed, groundwater samples will be collected from MW-1 and PZ-1 two weeks after the injection and on a monthly basis for 3 months. The groundwater samples will be collected using low-flow sampling methods and analyzed for VOCs, TOC, and dissolved gases.

The pilot test results will provide information on designing a full-scale system, such as the amount of carbon solution required per injection event, the frequency of

injections needed to maintain proper reducing conditions, and the locations and spacing of injection wells.

Remediation System Design

The data from our nearby soil vapor extraction system and the results of the enhanced biodegradation pilot test will be used to design a full-scale remediation system for the Middleton Cleaners property. A system design report will be prepared in accordance with NR 724 of the Wisconsin Administrative Code. The design report will present a summary of the pilot test data, a description of the remediation system components and specifications, and a description of start-up activities.

Concurrent with the design report, ARCADIS Geraghty & Miller will also prepare bid packages for subcontractor services. In accordance with the DERF program requirements, three bids will be obtained for subcontractor services.

Remediation System Installation and Start-Up

Once the design is completed and bids are obtained, the remediation system will be installed at the site. Site activities will be conducted in a manner so as to minimize disruptions to the building tenants. A small equipment building will likely be constructed on the south side of the mall to house the remediation equipment. We will work with you and the building tenants on locations for remediation wells and support equipment.

The soil vapor extraction component of the remediation system will be implemented first. Vapor extraction rates will be monitored and adjusted during the first three days of operation to verify proper operation of equipment, optimize extraction rates, and collect air emission samples. Chapter NR 400 requires that air samples be collected from a soil vapor extraction system daily for the first 3 days of operation, and weekly for the first 3 weeks of operation.

The enhanced biodegradation component of the remediation will not likely consist of an automated system. Rather, ARCADIS Geraghty & Miller will install a series of injection wells within the extent of impacted groundwater. Field personnel will periodically use portable equipment to mix and pump the carbon amendment solution into each of the injection wells. This application method will allow for increased flexibility in applying the amendment solution, and eliminate the costs associated with the installation and operation of an automated system. Injections will likely be conducted on a monthly basis for the first 6 months of remediation.

Operation, Maintenance, and Monitoring

This proposal includes a scope of work and cost for operating the remediation system for 1 year. During the first year of remediation, monthly site visits will be conducted to collect an air sample from the soil vapor extraction system in

accordance with the air monitoring requirements of NR 419. After the first 6 months of remediation, the carbon amendment injections will likely be conducted on a bimonthly basis.

To evaluate the progress of remediation, quarterly groundwater samples will be collected from the monitoring well network. Samples will be collected using low-flow sampling techniques and analyzed for VOCs, TOC, and dissolved gases. The air and groundwater monitoring results will be used to assess the progress of remediation and adjust the operating parameters of the remediation system.

Reporting

Throughout the remediation process, we will prepare periodic status reports to provide Northern Properties and Michael Best & Friedrich with results as the field activities progress. Meeting will be periodically scheduled to provide additional information pertaining to the project schedule, budget status, and the progress of remediation.

During the first year of operation, we will prepare two summary reports for submittal to WDNR. The first report will prepared after the first 6 months of remediation, and will include the system as-built plans, a description of start-up activities, and monitoring results through the first 6 months of operation. The second report will be completed after the first year of remediation, and will include a summary of the remediation results and recommendations pertaining to site closure. The reports will initially be prepared in draft format for review by Northern Properties and Michael Best & Friedrich. Comments will be incorporated into the final documents prior to submittal to the WDNR.

It is common for active remediation techniques such as soil vapor extraction to reach their limit of effectiveness within the first year of operation. The annual report will provide an evaluation of trends in groundwater quality and system performance. Based on the site conditions and trends, active remediation may be terminated after the first year. A groundwater monitoring program would be implemented to confirm that improvements in groundwater quality will continue through natural attenuation. After the first year of remediation is completed, a scope of work will be developed for subsequent activities.

Case Studies

As indicated earlier, a previous consultant has recommended groundwater recovery for addressing impacted groundwater at the Middleton Cleaners property. Although groundwater recovery can be effective in creating a hydraulic barrier that reduces off-site migration of constituents, this remediation method is not efficient at removing contaminants from the subsurface. The concentrations of VOCs present at the site are the result of a relatively small mass of solvent. A significant volume of water would have to be extracted to recover an appreciable mass of solvent. This water would require treatment prior to being discharged to the city's sanitary or

storm sewer. These systems can be expensive to operate and maintain, due to biological fouling and inorganic scaling of system components.

The pilot test described in this proposal is designed to evaluate the feasibility of enhanced biodegradation at the Middleton Cleaners property. ARCADIS Geraghty & Miller has successfully implemented this remediation technique on sites across the United States, including four properties in Wisconsin. Groundwater remediation is nearing completion at a dry cleaning facility located at a remodeled strip mall in Germantown, Wisconsin. Remediation at this property included the excavation and off-site disposal of impacted soil and the injection of a carbon amendment solution through over 100 Geoprobe borings. Groundwater PCE concentrations at this property have decreased from 1,500 µg/L to 0 µg/L in 17 months. A plot of constituent concentrations over the course of this project is included as Figure 1 in Appendix A.

ARCADIS Geraghty & Miller also recently completed an enhanced biodegradation pilot test at an industrial facility in Oconomowoc, Wisconsin. The carbon amendment solution was applied to the pilot test area by extracting groundwater from a shallow well, mixing the water with the carbon solution, and pumping the solution into an injection well located 30 feet away. This well configuration improved the distribution of organic carbon within the test area. Groundwater trichloroethene concentrations at the injection well decreased from 4,200 µg/L to 500 µg/L in nine weeks. Figure 2 in Appendix A presents a plot of constituent concentrations versus time over the course of the pilot test. The WDNR has approved the implementation of full-scale remediation based on the pilot test results.

Project Team

The Milwaukee office of ARCADIS Geraghty & Miller has extensive experience in the investigation and remediation of chlorinated hydrocarbons. As the enclosed case studies indicate, we have been successful at reducing hydrocarbon concentrations through the use of enhanced biodegradation and other remedial techniques. The project team for the Middleton Cleaners facility will consist of people who are managing and working on similar sites.

The project manager for this project will be Mr. Ed Buc, P.E. Mr. Buc is an environmental engineer with over 10 years of experience; he also designed the soil vapor extraction system that had operated at the nearby facility in Middleton. Assisting Mr. Buc will be Ms. Jennine Cota and Ms. Rebecca Forbert. Ms. Cota is an engineer and Ms. Forbert is a hydrogeologist; both have extensive experience in conducting site investigations and monitoring/maintaining remediation equipment. Oversight of the project, including technical review and document quality control, will be provided by Mr. James Drought, P.G., and Mr. Mike Maierle, P.E. Mr. Drought and Mr. Maierle are Principals with our firm, and have overseen the successful implementation of enhanced biodegradation at several sites in Wisconsin. Corporate resumes for the project team members are included in Appendix B.

Estimated Costs

The estimated cost for completion of the supplemental investigation is $31,306. This cost includes $15,606 for subcontracted services (i.e., driller, laboratory) and $15,700 for consultant services. Please note that the subcontracted services will be selected on the basis of competitive bids; these costs, therefore, may very slightly from those presented herein. Table 1 presents a breakdown of the project costs.

The estimated cost for completion of the supplemental investigation is $223,806. This cost includes $105,306 for subcontracted services (i.e., driller, laboratory, equipment installation) and $118,500 for consultant services. Please note that the costs for the remediation phase of the project may vary, based on the results of the supplemental investigation. Table 2 presents a breakdown of the project costs. The total cost for both phases will be $255,112.

This project will be performed on a time and materials basis. In accordance with the RFP, a copy of our Services Agreement is included in Appendix C, and a copy of our current certificate of insurance is included in Appendix D. A standard fee schedule is included in Appendix E.

Closing

ARCADIS Geraghty & Miller appreciates the opportunity to submit this scope of work and cost estimate for your consideration. Should you have any questions relating to the proposed services, or if ARCADIS Geraghty & Miller can be of any additional assistance, pleased feel free to call on us at your convenience.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

James F. Drought

James F. Drought, P.H.
Principal Scientist/Hydrogeologist

Attachments

Copies:
Mr. Aubrey R. Fowler - Northern Properties, Inc.
Dr. Edward R. Hommel - Northern Properties, Inc.

Table 1. Cost Estimate for Supplemental Investigation Services, Middleton Cleaners, 6617-6619 University Avenue, Middleton, Wisconsin.

ARCADIS Geraghty & Miller Services		
DERF Notification, Subcontractor Bids, Access Agreements		$2,800
Installation of Additional Monitoring Wells		$3,300
Groundwater Sampling		$3,200
Project Management, Meetings, Reporting		$6,400
Subtotal, ARCADIS Geraghty & Miller Services		$15,700
Subcontracted Monitoring Well Installation Services		$10,000
Subcontracted Surveying		$800
Subcontracted Analytical Testing Services		
Soil Sample Analysis		
Volatile Organic Compounds	18 samples @ $104/each	$1,872
Bulk Density	3 samples @ $17/each	$51
Organic Carbon	3 samples @ $35/each	$105
Porosity	3 samples @ $13/each	$39
Groundwater Sample Analysis - Monitoring Well Network		
Volatile Organic Compounds	11 samples @ $104/each	$1,144
Total Organic Carbon	11 samples @ $30/each	$330
Dissolved Gases	11 samples @ $115/each	$1,265
	Estimated Analytical Fees	$4,806
	Subtotal - Subcontractor Services	$15,606
	TOTAL ESTIMATED COSTS	$31,306

Table 2. Cost Estimate for Remediation Services and First Year Operation, Maintenance, and Monitoring, Middleton Cleaners, 6617-6619 University Avenue, Middleton, Wiscon

ARCADIS Geraghty & Miller Services		
Preparation of Remedial Action Plan		$5,000
Installation of Pilot Test Wells		$2,000
WPDES Permitting and NR 140 Variance		$2,500
Enhanced Biodegradation Pilot Test		$8,000
Preparation of Design Report, Subcontractor Bid Documents		$10,000
Oversight of System Construction		$21,000
Start-up of Remedial System		$6,000
Completion of 1 Year of System Operation, Maintenance, and Monitoring		$20,000
Completion of 1 year of Quarterly Groundwater Monitoring		$26,000
Project Management Meetings, Reporting		$18,000
Subtotal, ARCADIS Geraghty & Miller Services		$118,500
Subcontracted Installation of Soil Vapor Extraction System		$73,000
Subcontracted Injection Well Installation Services		$20,000
Subcontracted Analytical Testing Services		
Air Sample Analysis		
Volatile Organic Compounds	18 samples @ $75/each	$1,350
Groundwater Sample Analysis - Monitoring Well Network		
Eleven Wells, Sampled for Four Quarters		
Volatile Organic Compounds	44 samples @ $104/each	$4,576
Total Organic Carbon	44 samples @ $30/each	$1,320
Dissolved Gases	44 samples @ $115/each	$5,060
Estimated Analytical Fees		$12,306
Subtotal - Subcontractor Services		$105,306
TOTAL ESTIMATED COSTS		$223,806

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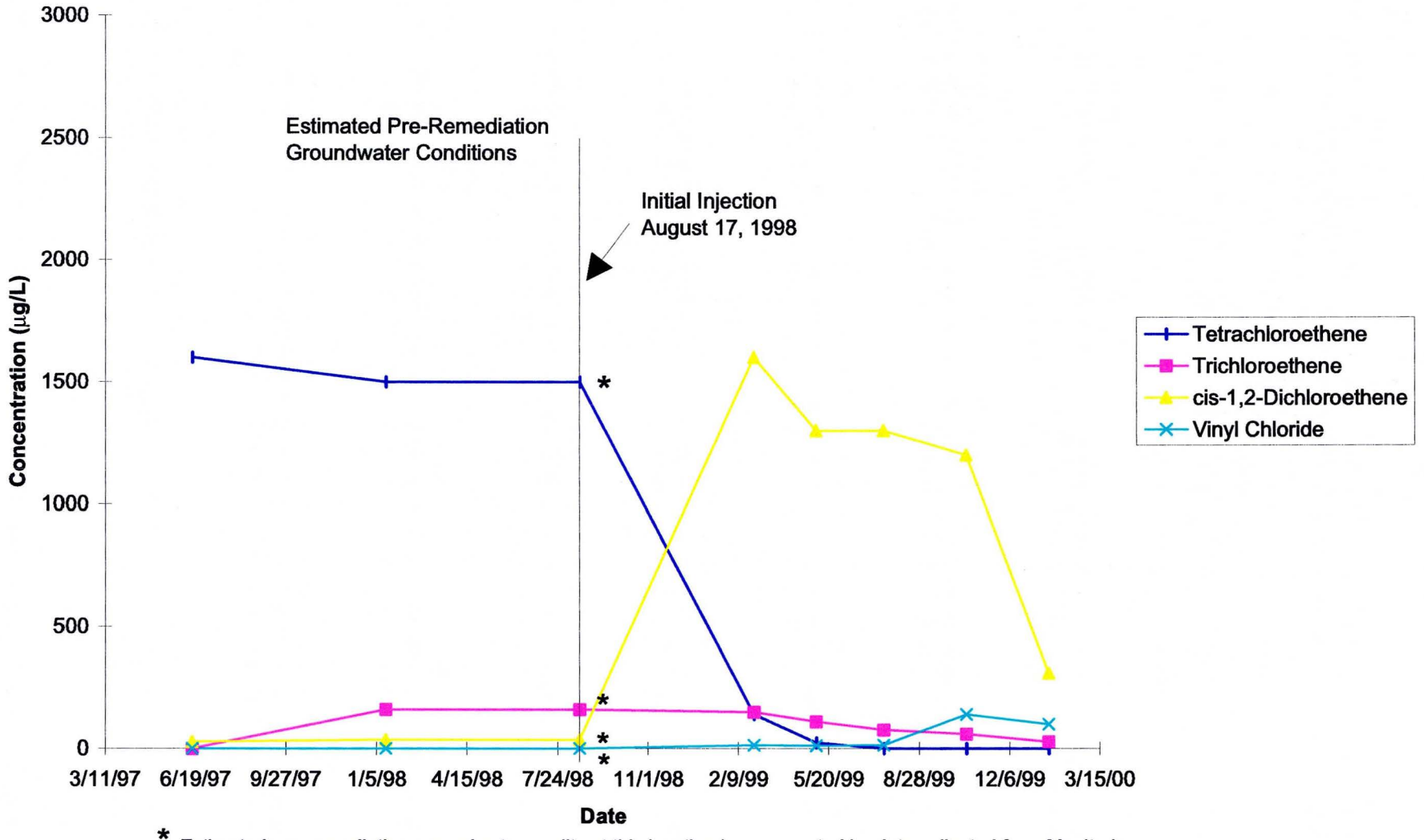

* Estimated pre-remediation groundwater quality at this location is represented by data collected from Monitoring Well MW-3. Monitoring Well MW-14 was installed February 11, 1999.

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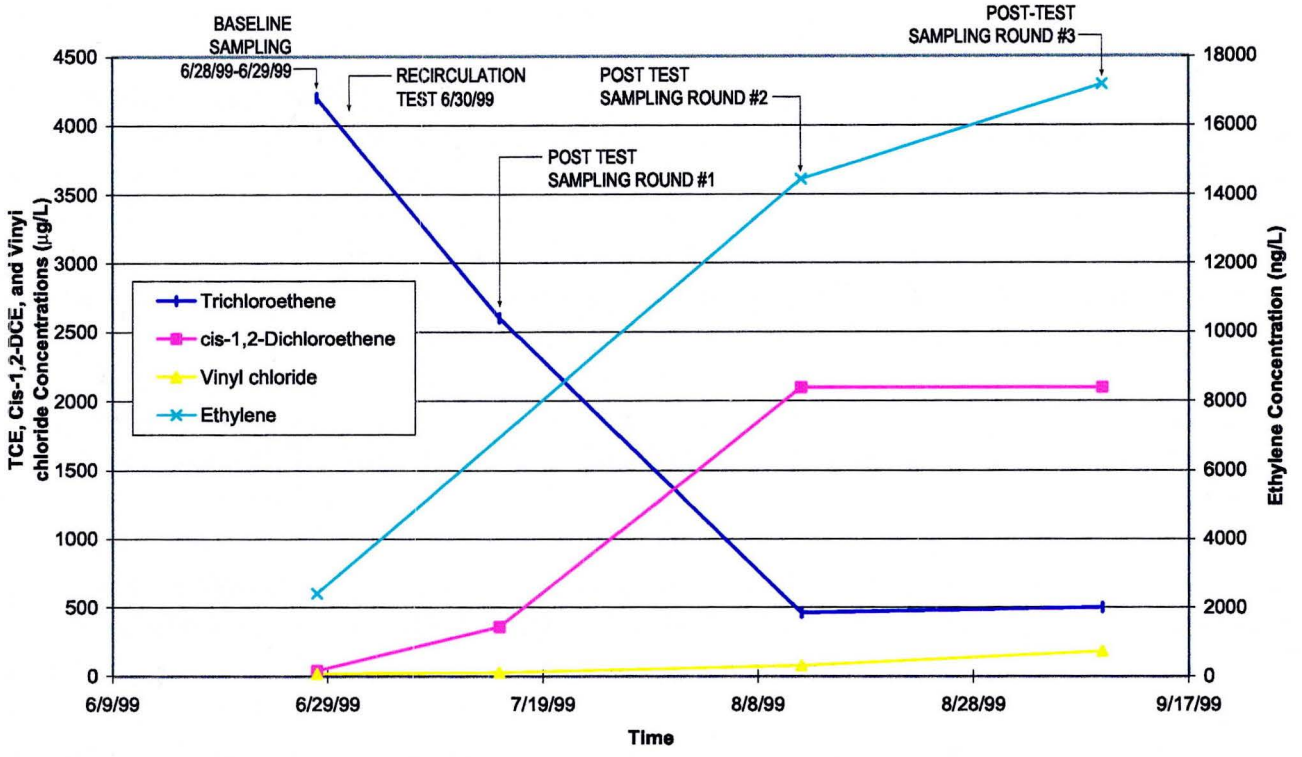
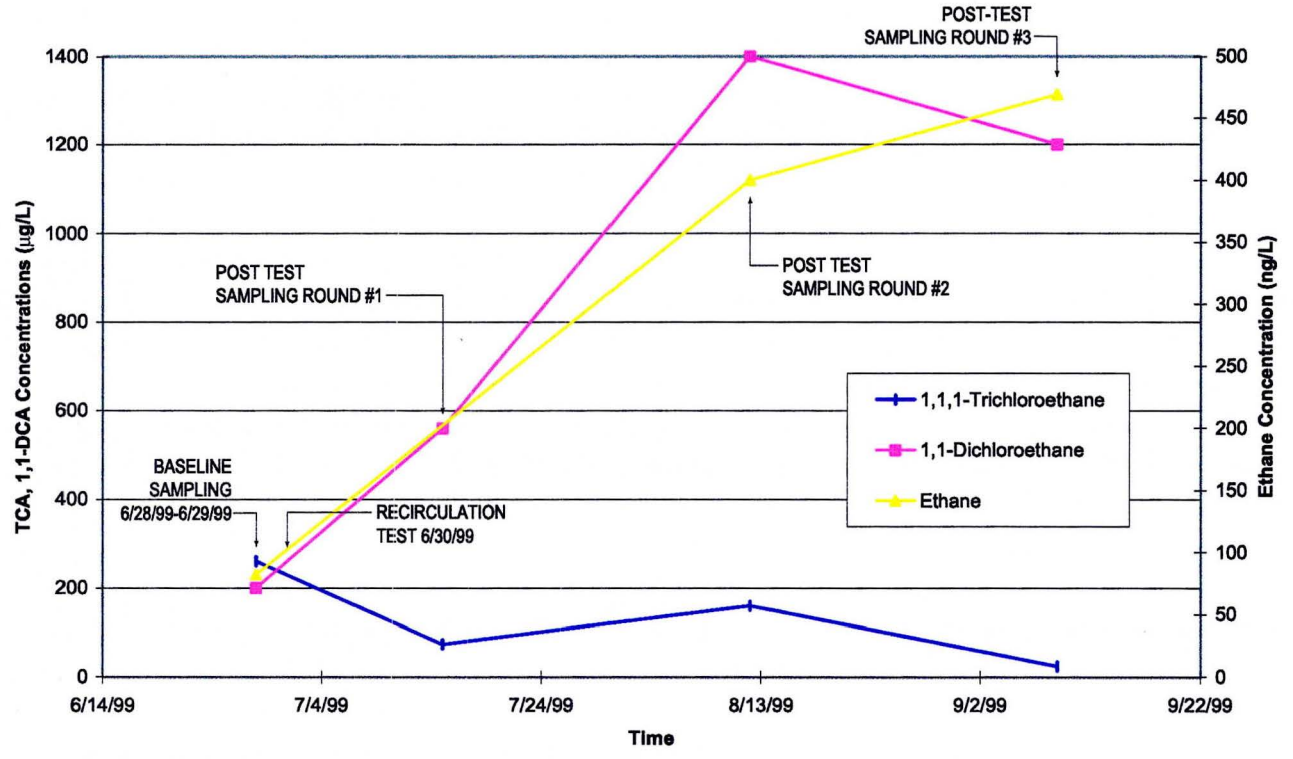
CHANGES IN CONTAMINANT CONCENTRATIONS DURING REMEDIATION

FORMER DRY CLEANERS
GERMANTOWN, WISCONSIN

FIGURE
1





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CHANGES IN CONTAMINANT CONCENTRATIONS DURING PILOT TEST

INDUSTRIAL FACILITY
OCONOMOWOOC, WISCONSIN

FIGURE
2

James F. Drought, P.H.

Principal Scientist/
Hydrogeologist

As a Principal Scientist/Hydrogeologist in the Milwaukee office of ARCADIS Geraghty & Miller, Inc., Mr. Drought is responsible for the development, management and completion of all phases of environmental assessments relating to soil, water and surface waters. Specifically, Mr. Drought is responsible for the investigation and remedial design of NR 700 projects relating to petroleum hydrocarbons, and NR 600 projects relating to aromatic and chlorinated aliphatic hydrocarbons, and reactive wastes. Mr. Drought's project management responsibilities include client and regulatory agency coordination, project scope and budget development and control, development and execution of investigation and remediation work plans, field supervision and monitoring, subcontractor coordination, analytical and feasibility data review, and report preparation and technical review. Mr. Drought is involved in the development and coordination of all petroleum hydrocarbon investigation and remediation projects completed under the PECFA program, and the coordination of all chlorinated hydrocarbon investigation projects completed under the DERF program. Mr. Drought's business development responsibilities include professional seminar presentations to attorneys, lenders, realtors, and contractors, and proposal preparation and execution. Mr. Drought serves as the regulatory compliance specialist in the Milwaukee office by tracking and commenting on proposed regulations at the state and federal level. Mr. Drought is also responsible for the coordination of litigation support projects relating to remedial investigations, remediation, regulatory compliance, cost recovery, and geologic and hydrogeologic issues.

Prior to joining Geraghty & Miller, Inc., Mr. Drought was the Assistant Environmental Manager at a national environmental and geotechnical consulting firm and was responsible for the development, management and completion of soil and groundwater remedial investigations, feasibility studies and remedial design. Mr. Drought was also responsible for the supervision of professional and technical staff and the coordination of an analytical laboratory certified under Chapter NR 149 of the Wisconsin Administrative Code. In addition, Mr. Drought was responsible for the completion and report preparation of Phase I and Phase II environmental site assessments, asbestos identification surveys, and environmental monitoring relating to soil and groundwater.

Previously, Mr. Drought served as an Assistant Environmental Planner at the Bay-Lake Regional Planning Commission (BLRPC) and the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Mr. Drought's responsibilities included the preparation of resource management and environmental planning reports, and serving as a regulatory agency liaison between USEPA, WDNR, WDOA, and local and county units and agencies of government.

Education

Master of Contaminant Hydrogeology and Geosciences, University of Wisconsin-Milwaukee, June 1999

Graduate Coursework in Biological and Chemical Sciences, University of Wisconsin-Milwaukee, 1983-1985

Bachelor of Physical Geography and Biology, Carroll College, May 1982

Professional Registrations

NR 712 Hydrogeologist

Wisconsin Professional Hydrogeologist (No. 45-111)

WDHSS Asbestos Inspector (Certification No. AII-04259)

WDILHR UST Site Assessor

WDILHR PECFA Consultant

Professional Associations

Federation of Environmental Technologists

American Society for Testing and Materials

Wisconsin Ground Water Association

Alliance for Environmental Compliance Regulations

National Ground Water Association

Professional Training

- 40-Hour Health and Safety Training for CERCLA and RCRA Remediation, 1990
- 8-Hour Health and Safety Refresher Training Completed in 1991-1998
- USEPA AHERA Asbestos Building Inspection Course, 1989. AHERA update courses completed in 1990-1998
- Microscopic Identification of Asbestos, McCrone Research Institute, 1989
- Nuclear Density Gauge Operation and Radiation Safety Training, 1993
- UWEX and WDNR Remediation Technologies for Environmental Contamination Clean-Ups Seminar, 1993
- Federation of Environmental Technologist (FET) Programs:

  Solid and Hazardous Waste Committee, 1996-Present

  Legal Committee, 1995-Present

  FET Annual Conference and Exhibition, 1990-1999

  Soil Remediation Issues in Wisconsin, 1992

  Current and Future Wastewater Concerns, 1992

  Criminal Enforcement of Environmental Law, 1992

  NR 700 Update Seminar, 1994

  Environmental Update, 1998
- UWEX and WDNR Environmental Clean-Ups Under NR 700 Seminar, 1994
- National Ground Water Association Soil and Groundwater Modeling for Soil Clean-up Level Evaluation and Risk Assessment Seminar, 1996
- Symposium of Natural Attenuation of Chlorinated Organics in Groundwater, Sponsored by USEPA, Dallas, Texas, 1996
- Wisconsin Ground Water Association Fall Conference, 1998
- In-Situ and On-Site Bioremediation: The Fifth International Symposium, Sponsored by Batelle, San Diego, California, 1999

Fields of Specialization

- Petroleum hydrocarbon (NR 700), hazardous waste (NR 600), and PCB remedial investigations, feasibility studies, and remedial design.
- Underground storage tank (UST) closure assessments, and leaking

underground storage tank (LUST) remedial investigations.

- Commingled petroleum aromatic and chlorinated aliphatic hydrocarbon remedial investigations and remedial design.
- Ex-situ remedial design and monitoring utilizing thermal desorption, passive aeration, and bioremediation technologies
- Petroleum Environmental Clean-up Fund Act (PECFA) reimbursement guidance.
- Dry cleaning solvent (PCE and stoddard solvent) investigation, remedial design, and remediation. Cost recovery under the Drycleaner Environmental Response Fund (DERF).
- Computer fate and transport modeling utilizing the USEPA SESOIL model.
- Abiotic and biotic degradation of chlorinated and petroleum hydrocarbons.
- Subsurface explorations utilizing Geoprobe, truck and track-mounted, portable and low clearance, and all-terrain drilling equipment.
- Feasibility evaluations including vapor extraction and air sparge pilot tests, aquifer studies and in-situ hydraulic conductivity determinations.
- Phase I and II environmental site assessments.
- Environmental monitoring of soils and groundwater.
- State and Federal regulatory compliance.

Key Projects

- Project advisor for the completion of a remedial investigation and an in-situ remedial pilot test at a existing industrial facility located in Oconomowoc, Wisconsin. A spill of TCE occurred at this site in 1994 within a former vapor degreasing system. The spill resulted in the release of TCE to soils and groundwater. The TCE migrated in saturated coarse alluvial deposits in a long and narrow groundwater plume ("core") off-site in the direction of the Oconomowoc River.

  The remedial investigation consisted of the advancement and sampling of 52 Geoprobe borings, eight groundwater monitoring wells, and four piezometers on and off the property. In addition, five seepage meters were installed in the Oconomowoc River to determine rates of contaminant and water fluxes. The in-situ pilot test included injection and recirculation of a natural carbon supplement to

enhance anaerobic conditions and promote reductive dechlorination of TCE as an electron donor. The in-situ pilot test was completed over the course of six months and demonstrated to the WDNR that the injection of natural carbon represented a feasible and cost effective remedial alternative.

A risk assessment was also completed as part of the pilot test activities to determine "threshold" levels for the chlorinated hydrocarbons venting to the Oconomowoc River. The "threshold" levels determined by the risk assessment demonstrated that active remediation was not warranted adjacent to the Oconomowoc River. The project was managed under Chapter NR 700 of the Wisconsin Administrative Code.

- Project advisor for a PCE impacted soil and groundwater investigation and remediation project at a retail mall located in Germantown, Wisconsin. A dry cleaning facility operated within the retail mall over the period from 1980 to 1997. The remedial investigation consisted of the advancement and sampling of Geoprobe borings, monitoring wells, and piezometers within and adjacent to the retail mall. Soil remediation consisted of the excavation and off-site disposal (at a RCRA subtitle C landfill in Michigan) of approximately 3,500 tons of PCE impacted soils. Groundwater remediation consisted of the extraction and treatment of approximately 80,000 gallons of PCE-impacted groundwater from the resulting excavation, and the injection of a natural carbon solution as an electron donor to promote the reductive dechlorination of PCE.

  This project was completed under the Wisconsin Brownfields Program (Wisconsin Act 453) and Chapters NR 700 and 600 of the Wisconsin Administrative Code. In addition, all investigation and remediation activities were completed under a guaranteed maximum price contract developed by ARCADIS Geraghty & Miller.

- Project advisor for a commingled polychlorinated biphenyl (PCB) and tetrachloroethylene (PCE) impacted soil and groundwater project at an existing die casting facility located in Milwaukee, Wisconsin. Prior to 1981, some of the die casting machines within the facility used phosphate ester oil (PEO) hydraulic oils which contained PCBs. PCE was utilized during the die casting process as a vapor degreaser.

  Investigation activities included an evaluation of the extent of PCB and PCE impacted soils and groundwater by advancing and sampling Geoprobe borings and monitoring wells. Groundwater samples were collected using low-flow sampling

methods. Soil and groundwater remedial alternatives were evaluated in accordance with Chapter NR722 of the Wisconsin Administrative Code. A performance standard consisting of a engineered cap and long-term monitoring was selected as the final remedial alternative.

- Project manager for the assessment and remedial design of commingled petroleum aromatic and chlorinated aliphatic hydrocarbon impacted soil and groundwater at two existing dry cleaning/former gasoline service station facilities located in Milwaukee, Wisconsin. Projects were initiated by completing closure assessments on the former USTs which remained from the former gasoline service station operations. Investigation activities identified the presence of petroleum (BTEX) and chlorinated (PCE, TCE) hydrocarbons within the groundwater in exceedance of Chapter NR 140 regulatory levels. The assessment and remedial design activities were completed in accordance with Chapters NR 600 and 700 of the Wisconsin Administrative Code. Feasibility studies completed at these sites included soil vapor extraction, air sparging and aquifer testing. A dual phase vapor and groundwater extraction system was designed and installed for treatment of the commingled plumes at one site; a program to monitor the degradation of PCE was approved by the WDNR for the other site. The cost for the assessment and remediation of the petroleum and chlorinated hydrocarbons were eligible for reimbursement under the PECFA and DERF programs, respectively.

- Project manager for site investigation, remediation, and risk assessment activities completed at a former retail gasoline service station located in northern Illinois. The site operated as a retail gasoline service station over the period from about 1935 to 1985. ARCADIS Geraghty & Miller was retained in March 1996 to review ten years of groundwater gauging, analytical testing, and remedial system performance data, and to implement a strategy for site closure. A risk assessment was completed in accordance with the Illinois Environmental Protection Agency (IEPA) Tiered Approach for Clean-up Objectives (TACO) for the dissolved phase hydrocarbons. An evaluation of the historical groundwater gauging data indicated that the mass of the separate phase product, both on and off the site, had been reduced by approximately ninety percent from the mass that was present in the mid 1980's.

  ARCADIS Geraghty & Miller met with representatives from the IEPA in Springfield, Illinois in June 1996. The meeting was held to discuss the site investigation and remediation activities which were previously

completed on the site, the TACO risk assessment, and a request for no further action. The representatives from the IEPA indicated at the meeting that the groundwater SSLs developed for the risk assessment were generated correctly and, since the maximum analyte levels were below the site-specific levels, further remediation of dissolved phase hydrocarbons was not necessary. The risk assessment developed for this project was the first TACO Tier III risk assessment approved by the IEPA.

- Project manager for a reactive cyanide impacted soil (F listed hazardous waste) assessment and remediation project at a construction project adjacent to the Fox River in Waukesha, Wisconsin. Project was completed in accordance with Chapter NR 600 of the Wisconsin Administrative Code. As the Project Manager, Mr. Drought designed and supervised the installation of a containment system to protect worker and public welfare during construction activities, and to prevent the migration of exposed cyanide wastes from entering the Fox River. Following completion of the investigation activities, remedial alternatives were evaluated including excavation and off-site stabilization and treatment, which was implemented and completed at the CWM facility in Lake Charles, Louisiana.

- Project manager for the investigation and remediation of petroleum hydrocarbon-impacted soil and groundwater on approximately 40 former gasoline service stations, and commercial and industrial sites. Most projects were completed under the PECFA program guidelines to maximize claimant eligibility for reimbursement of investigation and remediation costs. Soil remediation technologies included development of direct contact and groundwater pathway residual contaminant levels (RCLs), low temperature thermal desorbtion, passive aeration, landfill disposal, and vapor extraction. Groundwater remediation technologies included natural attenuation, air sparging, and groundwater extraction and treatment.

- Project manager for Phase I and Phase II Environmental Site Assessments completed in South America, Western Europe, and The United Kingdom. All Phase I environmental site assessments were completed in accordance with ASTM 1527. All Phase II environmental site assessments were completed in accordance with national or international regulatory guidelines.

Selected Publications/ Presentations

Featured on PBS "Outdoor Wisconsin" (1987, 1989, & 1990).

Environmental Liabilities in Real Property Transactions, CECO Exchange Club meeting, Sheraton Inn-Mayfair, Wauwatosa, WI; March 13, 1990.

Multi-Phased Approach to Environmental Assessments, Hazardous Contamination and Environmental Protection Seminar sponsored by the Metropolitan Builders Association of Greater Milwaukee, Milwaukee Athletic Club, Milwaukee, WI; November 13, 1990.

Environmental Assessments and Remediation Alternatives, Upper Midwest Fabricare Exposition sponsored by the Wisconsin Fabricare Institute, Waukesha Exposition Center, Waukesha, WI; October 17, 1992.

USTs and Petroleum-Impacted Soil: Concerns and Solutions, Wisconsin Mortgage Banker's Association meeting, Midway Hotel, Brookfield, WI; January 18, 1994.

Wetlands: Features, Functions, and Regulations, Commercial Real Estate Issues Seminar sponsored by Hiller and Frank S.C., Marriott Hotel, Brookfield, WI; March 17, 1994.

Environmental Consultant's Perspective - Practice Under the New NR 700 Rule Series, State Bar of Wisconsin 1994 Annual Convention, Milwaukee, WI; June 23, 1994.

The Petroleum Environmental Clean-Up Fund Act (PECFA) and Recent Updates, Milwaukee Bar Association, Milwaukee, WI; October 24, 1994.

Overview: Environmental Site Assessments, Registered Environmental Manager Training Seminar, University of Wisconsin - Extension, Madison, Wisconsin; August 28, 1995.

Fate and Transport of Tetrachloroethylene, Wisconsin Fabricare Institute Fall Convention, Pioneer Inn, Oshkosh, Wisconsin; September 17, 1995.

The Petroleum Environmental Clean-up Fund Act: Proposed Changes and a Consultants Perspective on the Future of the Program, The Milwaukee Bar Association, Milwaukee, Wisconsin; December 14, 1995.

Public Comments, Proposed Wisconsin Department of Natural Resources Groundwater Reform Policy, Havenswood State

Forest Auditorium, Milwaukee, Wisconsin, March 21, 1996.

Fate, Transport, and In-Situ Remediation of Hazardous Wastes, Registered Environmental Manager Training, University of Wisconsin - Extension, Madison, Wisconsin; April 22, 1996.

Natural Attenuation and the Wisconsin Groundwater Reform Policy, Wisconsin Fabricare Institute Winter Convention, Radisson Hotel, Green Bay, Wisconsin; February 8, 1997.

Natural Attenuation of Petroleum and Chlorinated Hydrocarbons, Graduate Student Groundwater Seminar, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin; March 31, 1997.

Controlling and Managing Investigation and Remediation Activities and Costs, Wisconsin Fabricare Institute Fall Convention, Devil's Head Resort, Merrimac, Wisconsin; September 20, 1998.

A Case Study of Natural Attenuation at a Dry Cleaning Facility, American Water Resources Association Annual Meeting, Radisson Hotel, La Crosse, Wisconsin; March 25, 1999.

Fate of Tetrachloroethene and Benzene at a Dry Cleaning Facility, In-Situ and On-Site Bioremediation - The Fifth International Symposium, Sheraton San Diego Hotel and Marina, San Diego, California; April 22, 1999.

Development and Implementation of a Better Mouse Trap! Technical Update - Trends and Developments in Site Investigation, Remediation, and Institutional Controls, 1999 Environmental Law Update, Sheraton Hotel, Brookfield, Wisconsin; May 4, 1999.

Natural Attenuation of a Mixed Hydrocarbon Plume, Summer Intern Program, University of Wisconsin-Milwaukee Great Lakes Water Institute, July 19, 1999.

Litigation Support Services

Michael Best & Friedrich - Milwaukee, WI

Cook & Franke - Milwaukee, WI

Fox, O'Neill & Shannon - Milwaukee, WI

Leonard, Street & Dienard - Minneapolis, MN

McCarter & English - Newark, NJ

Michael S. Maierle, P.E.

Principal Engineer

Mr. Maierle is a Principal Engineer with 14 years of technical and project management experience. His expertise includes applying innovative soil and groundwater remediation technologies, detailed engineering design, and the management of solid and hazardous waste. Mr. Maierle has completed a variety of projects involving the design and implementation of various systems and/or programs for remediating contaminated soils, sediments, and groundwater. Mr. Maierle has performed RCRA corrective measure studies, certified RCRA closures, directed environmental compliance audits, and has managed several CERCLA investigation and remediation projects. Based on his expertise in applying remedial technologies and performing detailed engineering design, Mr. Maierle is currently responsible for providing senior technical review for large-scale remediation projects executed by ARCADIS Geraghty & Miller's midwest offices. Mr. Maierle is also a member of the American Society of Testing and Materials (ASTM) E50.01 subcommittee for Remediation by Natural Attenuation.

In addition to his expertise in remediation, Mr. Maierle has extensive expertise in the design and operation of water and wastewater treatment systems. Prior to joining ARCADIS Geraghty & Miller, Mr. Maierle designed complete water and wastewater treatment facilities for both industrial and municipal applications. He has expertise in the preparation of plans and specifications, process monitoring and control, and physical, chemical and biological treatment techniques.

Fields of Specialization

- Soil and Groundwater Remediation Technologies
- Brownfields site remediation and development
- CERCLA Remedial Design
- CERCLA Remedial Investigations/ Feasibility Studies
- RCRA Closures
- Water/Wastewater Treatment Facility Design

Key Projects

- Project Manager for a fixed-price guaranteed remediation project at a brownfield site in Wisconsin. The remedial strategy includes source removal in conjunction with carbon enhanced reductive dechlorination to address PCE contamination from a former dry cleaning facility. A no further action determination for site soils was received from the Wisconsin Department of Natural Resources within nine months of project initiation. A 98% reduction in PCE concentration within site groundwater was also achieved over a nine month period. This expedited remediation project facilitated a

Education

Master of Environmental Engineering, Illinois Institute of Technology, 1993

Bachelor of Civil and Environmental Engineering, University of Wisconsin, Madison, 1985

Professional Registrations

Professional Engineer in Illinois and Wisconsin

Professional Associations

American Water Works Association

Water Pollution Control Federation

American Society of Testing Materials

Solid Waste Association of North America

$10,000,000 retail development on the site.

- Project Manager for a large-scale remediation project at an operating industrial facility in Wisconsin. Designed and implemented a vacuum-enhanced groundwater recovery system to remove LNAPLs and DNAPLs from the contaminant source area. Natural attenuation was selected and approved by the Wisconsin Department of Natural Resources as the remediation process for the dissolved contaminants.

- Project Manager for an in-situ bioremediation project at an abandoned industrial facility in central Iowa. This project involved conducting a nine-month pilot study to establish the effectiveness of an in-situ biological reduction process for treating groundwater contaminated with high concentrations of hexavalent chromium. A 99% reduction in hexavalent chromium concentrations was achieved during the pilot study.

- Project Manager/Coordinator for remedial design/remedial action (RD/RA) activities and principal author of a CERCLA feasibility study report for an abandoned municipal/industrial landfill NPL site in northern Indiana. Remedial components at this site include a 22 acre sanitary landfill cap, perimeter slurry wall, drum removal and low-temperature thermal desorption, and wetlands mitigation.

- Project Manager and Lead Process Engineer responsible for performing a comprehensive treatment and operation audit and assessment of a 15,000 gallon per minute (gpm) industrial wastewater treatment plant at a major steel mill in northwest Indiana. This on-going audit and assessment involves evaluating existing pH neutralization, oil removal, iron oxidation, coagulant/polymer feed, flocculation, and final clarification processes and developing cost-effective system and operating procedure modifications to optimize the performance of the treatment plant.

- Project Manager and Lead Design Engineer responsible for the implementation of a new 250 gpm-capacity water supply system at an existing industrial facility in Dexter, Michigan. The system consists of a new groundwater recovery well located upgradient from an area of known groundwater contamination, vertical turbine pump, brick pump house, automated controls, and a 1,000 foot long force main that feeds an existing elevated storage tank.

- Project Manager for a wastewater discharge characterization study at an industrial facility in Chicago, Illinois. The results of this characterization study were

extremely beneficial in reducing past wastewater discharge user fees levied against the facility by the Metropolitan Water Reclamation District of Greater Chicago.

- Project Manager and principal author of a CERCLA feasibility study report for an abandoned municipal landfill NPL site in Indiana. The development and assessment of remedial alternatives, which focused on source control measures, had to incorporate the placement of a new state highway over the surface of the landfill. USEPA has approved institutional controls as the sole remedial action and has also approved placement of the highway over the landfill.

- Project manager and certifying professional engineer for the development and certification of spill prevention, control, and countermeasures (SPCC) plans at the Richards-Gebaur Air Force Base in Missouri and at several U.S. Coast Guard stations throughout the midwest.

- Lead Design Engineer of a multi-million dollar groundwater collection and treatment system for a confidential client in Kentucky. The system consists of six recovery wells, a 1,500 foot long sub-surface drain cut into weathered limestone, and an automated groundwater treatment system comprised of an oil/water separator, oil absorption system and activated carbon process. The system is designed to recover and treat groundwater contaminated with heavier-than-water PCB-laden oil.

- Lead Design Engineer for a CERCLA Remedial Design (RD) involving the expansion of an existing 1,200 gpm groundwater recovery and treatment system at a chemical manufacturing facility in Axis, Alabama. The modification work involves the addition of one 350 gpm recovery well, installation of 3,000 feet of additional force main, hydraulic balancing of the existing recovery and transmission system, and upgrades to an existing groundwater spray aeration pond.

- Certifying professional engineer (P.E.) on numerous underground storage tank (UST) closure projects executed in the State of Illinois. As certifying P.E. for these UST projects, was responsible for reviewing and approving hydrocarbon release investigation and remediation plans.

- Project Manager and Certifying Professional Engineer for a RCRA closure in Des Plaines, Illinois. Clean closure is being obtained by removing approximately 3,300 cubic yards of contaminated soil. Successfully negotiated risk-based clean-up levels with the Illinois Environmental Protection Agency (IEPA).

- Project Manager for a wastewater discharge violation assessment study at an industrial facility in St. Charles, Illinois. Following this study, recommendations and design guidance were given to the facility which lead to the successful implementation of two separate pH neutralization systems and compliance with all applicable wastewater discharge requirements.

- Project Engineer involved in conducting closure studies for multiple RCRA solid waste management units at the Portsmouth Uranium Enrichment Plant, Piketon, Ohio. The closure studies focused on eliminating hazardous and mixed-waste releases from the RCRA units and investigated the applicability of numerous remedial technologies for contaminated soil and groundwater remediation.

- Project Engineer responsible for the design of a comprehensive leachate collection and transmission system that will be incorporated into an upgraded solid- waste landfill for a confidential industrial client. The leachate collection and transmission system will utilize dual components for separating primary and secondary leachate, electro-mechanical controls for automatic operation, and full instrumentation for monitoring and alarm condition annunciation. Also responsible for co-authoring the permit-to-install application for this upgraded landfill.

- Project Engineer responsible for the complete preliminary design of a turnkey 5.25 MGD municipal water treatment facility for the Village of Montgomery, Illinois. This preliminary design, which incorporated air stripping, solids contact clarification, pH neutralization and multi-media filtration for treating ground water from seven municipal wells, was used to obtain a state construction permit for the facility.

- Project Engineer responsible for the complete final design of a turnkey 2.0 MGD municipal water-treatment facility for the City of Wilmington, Illinois. This final design required the coordination and implementation of a surface-water intake structure, a lime-softening treatment system, sludge-storage lagoons, a finished water-pump station, and a telemetry-control system. Principal author of the operation and maintenance manual developed for this facility.

- Conducted numerous process start-ups, on both the pilot and full-scale level, at water and wastewater treatment facilities located throughout the country. Optimized treatment processes involving the removal of iron, calcium, magnesium, phosphorus, turbidity, suspended solids and organic compounds from various water and

wastewater sources. Also performed several process audits at various water and wastewater treatment facilities for the purpose of ensuring process optimization and regulatory compliance.

Selected Publications/ Presentations

Innovative Landfill Remediation Approaches Using Horizontal Wells, 20th International Madison Waste Conference, April 1998.

Landfill Design, Management and Closure, 7th Annual Environmental Sciences; A Primer for the Technically Challenged, American Bar Association Section of Natural Resources, Energy, and Environmental Law, Chicago, Illinois, November 1998.

Total Water Resources Management, American Water Works Association - Wisconsin Conference, Middleton, Wisconsin, September 1998.

Maierle, M., Suthersan, S., Palmer, P. Utilization of In-Situ Reactive Zones for Microbial Precipitation of Heavy Metals and De-Nitrification, Superfund XVI Conference, Washington, D.C., November 1995.

Edmund A. Buc, P.E.

Project Engineer

Mr. Buc is a project engineer in the Milwaukee office of ARCADIS Geraghty & Miller, Inc. and is experienced in the investigation, design, construction, and operation of multi-disciplinary environmental projects. He has performed work involving remedial action at a variety of contaminated sites, environmental permitting and reporting. In addition, Mr. Buc's responsibilities include managing project personnel and budgets, preparing technical reports, design plans and specifications, and performing field tests and construction management.

Fields of Specialization

- Soil and groundwater remedial systems design, construction and operation
- Soil and groundwater contamination investigation
- Environmental site assessments
- Hazardous waste management
- Regulatory compliance/permitting

Key Projects

- Project Manager for a former manufactured gas plant (MGP) site in southern Wisconsin. Based on site conditions and redevelopment plans, a remedial strategy consisting of natural attenuation, limited source removal at a former tar well, and engineered barriers has been approved by the Wisconsin Department of Natural Resources (WDNR). The barriers will consist of future buildings, parking areas, and vegetative cover. A partnership has been developed between the owner, developers, and ARCADIS Geraghty & Miller to integrate the redevelopment plan with the site remedy.
- Project Manager for soil and groundwater investigation and remediation projects in Wisconsin involving leaking underground storage tanks. Responsibilities included analysis of investigation data, remedial alternatives evaluation, remedial action cost analysis, performing pilot tests and data analyses, preparing and coordinating construction and discharge permits, and overseeing system construction and operation.
- Project Manager for the investigation and remediation of contamination resulting from releases from a pentachlorophenol (PCP) dip tank at a facility in Wisconsin. Responsibilities included analysis of investigative data, preparing a site closure plan in accordance with Wisconsin Administrative Code Chapter NR 600, coordinating contractor and disposal services, and report preparation following the completion of remediation activities.

Education

Master of Civil/Environmental Engineering, Marquette University, 1995

Bachelor of Chemistry, Michigan State University, 1987

Professional Registrations

Professional Engineer in Wisconsin

Certified Hazardous Material Manager

Health and Safety Training for Superfund and RCRA Site Personnel (U.S. EPA/OSHA approved)

Professional Associations

American Chemical Society

American Society of Civil Engineers

Institute of Hazardous Materials Management

- Project Manager for services assisting clients to achieve and maintain compliance with state and federal environmental and health and safety regulations. Responsibilities included conducting facility compliance audits, preparing facility hazard communication programs, assisting with the completion of annual air emission inventory reports, and reviewing facility waste management practices.

- Project Manager for five fast-track Phase I environmental site assessments in three states (two sites in Wisconsin). Reports were delivered in two weeks. Transactions were completed within three weeks of ARCADIS Geraghty & Miller's authorization date.

- Project Engineer for the investigation and remediation of a former gasoline service station/existing dry cleaner. Constituents of concern included petroleum hydrocarbons, chlorinated compounds, and potential dense non-aqueous phase liquid (DNAPL). The selected remedial alternative is natural attenuation. A two year monitoring program has been approved by the WDNR.

- Project Manager for sites where remediation has been shifted from active remediation to natural attenuation. Completed an analysis of remedial system and groundwater monitoring data to demonstrate that the remedial system had reached its limit of effectiveness and that further operation was not resulting in significant additional removal of mass. Acted as a client advocate in negotiating with WDNR to shut down these systems and institute a lower-cost, natural attenuation monitoring program. The strategy at these sites is to gather sufficient data for obtaining closure under the WDNR Flexible Closure Policy.

- Project Manager for a client operating a hazardous waste storage and recycling facility. A corrective action program is being developed in accordance with the Recourse Conservation and Recovery Act (RCRA) and Chapter NR 635. Activities have also included addressing various permit issues and preparation of a spill prevention, containment and countermeasures (SPCC) plan.

- Project Manager for investigation and remediation activities at a site enrolled in the Wisconsin Land Recycling Program. Activities have focused on eliminating areas of environmental concern identified during a Phase I assessment, to obtain a Certificate of Completion from the WDNR under the Act 453 program.

- Member of the subcommittee which was formed in May 1997 at the request of the Wisconsin Department of Commerce COMM to revise Chapter ILHR 47 of the Wisconsin

Administrative Code. Assisted with the development of a priority ranking system to be used in assessing whether sufficient risk at a site exists to warrant active remediation. Prepared process flow charts to graphically illustrate how sites would be investigated and remediated under the revised code. The ranking system and flow charts were used by the full ILHR Code Committee for discussions and drafting of regulatory code.

Jennine L. Cota

Engineer II

Ms. Cota is an Engineer in the Milwaukee office of ARCADIS Geraghty & Miller, with experience in the application of various innovative and cost-effective soil and groundwater remediation technologies, and detailed engineering design. Her primary responsibilities include preparing technical reports, design plans and specifications, performing field tests, and construction management/oversight.

Education

Bachelor of Civil (Environmental) Engineering, University of Iowa, 1996

Professional Training

- Health & Safety Training for Superfund and RCRA Remediation Site Personnel (USEPA/OSHA Approved)
- Engineer in Training (EIT)

Fields of Specialization

- Construction management and oversight for multi-disciplinary projects
- Investigation and assessment of soil and groundwater contamination
- Design and implementation of soil and groundwater remediation technologies

Key Projects

- Engineer for soil and groundwater quality investigation and remediation projects in Wisconsin involving leaking underground storage tanks and solvent/chemical releases. Constituents of concern included petroleum hydrocarbons, chlorinated compounds and polycyclic aromatic hydrocarbons (PAHs). Remedial system experience includes vacuum-enhanced recovery, groundwater pump and treat, product recovery, soil vapor extraction, air sparging, and bioremediation including carbon injection. Responsibilities included analysis of investigation data, remedial alternatives evaluation, and remedial action plan preparation and cost analysis. Additional responsibilities include performance of pilot tests and data analysis, detailed design of remediation systems, coordination and oversight of construction activities, equipment selection and specifications, design drawings and specifications, and startup and operation of remedial systems.
- Engineer for soil and groundwater remediation project in Germantown, Wisconsin involving tetrachloroethylene (PCE) and trichloroethylene (TCE) groundwater and soil contamination. Responsibilities include preparation of bids and specs, design, and construction oversight.
- Engineer for an ongoing manufactured gas plant remediation in the Third Ward area of Milwaukee, Wisconsin. Remedial activities include thermal desorption of affected soil on multiple properties, demolition, and construction management.

Rebecca P. Forbort

Scientist

Ms. Forbort has a diverse background of implementing complex soil and groundwater investigations and remediation projects. Her work includes the oversight of drilling operations, collection of soil, groundwater and air samples, data management and interpretation, report preparation and project management.

Professional Training

- OSHA 1910.120 Certification, 1996
- 8-Hour Supervisor Training, 1997
- 8-Hour OSHA Health & Safety
- Training Refresher, 1997, 1998, 1999
- Confined Space Training, 1999

Fields of Specialization

- Implementation of field investigations
- Innovative drilling, well installation and sampling technologies
- Aquifer testing including in-situ hydraulic conductivity tests
- Application of in-situ groundwater remedial technologies
- Coordination of soil excavation activities
- Implementation of ambient air monitoring program for total suspended particulates
- Geological mapping and stratigraphic interpretation
- Preparation and proofing of technical reports
- Data management in relational databases

Key Projects

- Low-flow groundwater sampling of shallow and deep bedrock monitoring wells.
- Management of project specific soil and groundwater analytical data in a relational database.
- Task management/project management of data collection and interpretation activities.
- Task management of and preparation of site investigation and summary reports.

Selected Publications

Budd, A.F., Petersen (Forbort), R.A., and D.F. McNeill, 1998, Stepwise Faunal Change during Evolutionary Turnover: A Case Study from the Neogene of Curaçao, Neatherland Antilles, Palaios v. 13 p.170-188.

Education

Master of Geology, University of Iowa, 1996

Bachelor of Geology, Bachelor of Biology, Winona State University, 1994

ARCADIS GERAGHTY & MILLER

SERVICES AGREEMENT

This SERVICES AGREEMENT ("Agreement") is made as of _____, 19___ between ARCADIS Geraghty & Miller, Inc., a Delaware corporation ("Consultant"), and _____ ("Client"), hereinafter, sometimes referred as the "Parties." The Parties anticipate the issuance of Work Authorizations under which Consultant will provide Client with specified technical, engineering, consulting and construction services at specified locations or sites, as set forth in the Work Authorizations.

NOW THEREFORE, in consideration of the mutual covenants and promises and other good and valuable consideration contained herein, the receipt and adequacy of which are hereby acknowledged, the Parties agree as follows:

1. The Services Agreement Documents

This Agreement between the Consultant and Client (hereinafter "Agreement") consists of this fully executed Services Agreement, which includes and incorporates the following:

"Exhibit A" - Work Authorization and any documents incorporated therein;

Any Exhibits listed in Paragraph 26 of this Agreement.

The Parties anticipate that multiple Work Authorizations may be issued pursuant to a Services Agreement. The documents are intended to be construed consistently and as a whole, and anything that is required by one document shall be deemed to be required by all.

2. Definitions

As used in this Agreement, identified terms shall have following meaning:

"Change Order" means a written agreement executed by Client and Consultant revising the scope of services under this Agreement and /or the time for performance of such Services.

"Fee Schedule" means Consultant's unit rates or charges for labor, materials, other services, and reimbursable expenses. A Fee Schedule may be included and/or incorporated into each Work Authorization issued pursuant to this Agreement. All Fee Schedules will be subject to periodic update.

"Services" means those tasks to be performed and materials to be delivered by Consultant. Services shall also mean: (i) all of the Services described in Exhibit A; (ii) all other work and services identified in this Agreement; (iii) all work identified in a fully executed Work Authorization incorporating this Agreement; and (iv) such additional services as may be provided pursuant to a written change order.

"Site" means the property(s) or location(s) with respect to which Services are to be performed.

"Work Authorization" means a document, in the form of Exhibit A, which identifies the Site, details the specific scope of services, and includes, as appropriate, any cost estimates, plans, schedules specifications and drawings describing the work.

3. Term of Agreement

This Agreement will be effective upon the date a fully executed copy of this Agreement is delivered to Consultant or the Consultant is authorized to begin work. Unless terminated, this Agreement shall remain in effect until the scope of services defined in this Agreement and/or any Work Authorization issued by Client have been fully performed.

4. Services To Be Performed

Services performed under this Agreement shall be detailed in and determined by a Work Authorization in the form attached hereto as Exhibit A. A fully executed Work Authorization incorporating this Agreement shall be binding upon the Parties. Consultant shall have no obligation to commence the Services as stipulated in this Agreement and/or any associated Work Authorization until both this Agreement and the applicable Work Authorization are fully executed and delivered to Consultant. Any schedule requirements applicable to Consultant's Services will be set forth in Exhibit A.

5. Payment for Services

Consultant shall invoice Client for Services in accordance with Consultant's standard invoicing practices. The amount billed will be calculated on the basis set forth in Exhibit A. Invoices are due and payable on receipt. Consultant shall separately invoice Client for services performed under multiple Work Authorizations. Each Work Authorization shall be considered to be a separate Agreement and Client shall not offset amounts due Consultant under a Work Authorization for any disputes arising under a different Work Authorization.

The Client shall, at the request of the Consultant, prior to execution of this Agreement and promptly from time to time thereafter, furnish to Consultant reasonable evidence that financial arrangements have been made to fulfill the Client's obligations under this Agreement.

If Client reasonably objects to any portion of an invoice, Client shall provide written notification to Consultant of Client's objection and the basis for such objection within 15 days of the date of receipt of the invoice, and the Parties immediately shall make every effort to settle the disputed portion of the invoice. Client shall waive any objections to Consultant's invoice if it fails to timely provide such written notice to Consultant.

If Client fails to make any payment due Consultant for services and expenses within thirty (30) days after receipt of Consultant's invoice, the amounts due Consultant will be increased at the rate of 1.5% per month (or the maximum rate of interest permitted by law, if less) from said 30th day. In addition, Consultant may, after giving seven (7) days' written notice to Client, suspend services under this Agreement until Consultant has been paid, in full, all amounts due for services, expenses and charges. Payments will be credited first to interest and then to principal. In the event Client objects to any portion of an invoice, only that portion so contested may be withheld from payment, and the undisputed portion shall be paid.

If at any time during or after completion of the Services Consultant is requested or required to participate in a deposition or other legal proceeding relating to any Services or the Site, Client shall reimburse Consultant at applicable rates for preparation for and participation in such deposition or legal proceeding.

In the event of litigation or other proceeding to enforce performance of this Agreement or any payment obligation under this Agreement, the prevailing Party shall be entitled to recover from the other Party attorneys' fees and costs as may be reasonably incurred by reason of the litigation.

6. Suspension of Work

If payment of invoices by Client is not maintained on a current basis, Consultant may, after giving seven (7) days' written notice to Client, suspend further performance until such payment is restored to a current basis. Suspension for any reason exceeding thirty (30) days shall, at the option of Consultant, make this Agreement and all Work Authorizations subject to termination and/or re-negotiation. All suspensions shall extend Consultant's time for performance by a length of time equal to the duration of the suspension, and Consultant shall be paid for Services performed and charges incurred prior to the suspension date, plus suspension charges. Suspension charges shall include, without limitation, putting of documents and analyses in order, personnel and equipment rescheduling or reassignment adjustments, additional insurance/bonding coverage, extended overhead and costs, and all other related costs and charges incurred and attributable to suspension.

7. Changes in the Work

At any time after execution of this Agreement, Client may order changes in the Consultant's Services consisting of additions, deletions, and revisions within the general scope of services being performed by Consultant under this Agreement and/or any applicable Work Authorizations. Whenever a change in the scope and/or time for performance of services occurs, or if Client has notified Consultant of a change, Consultant shall submit to Client within a reasonable time an estimate of the changes in cost and/or schedule, with supporting calculations and pricing. Pricing shall be in accordance with the pricing structure of this Agreement. To the extent that such pricing is inapplicable, the cost to Client of the change or the amount of the adjustment shall be determined on the basis of Consultant's then existing fee schedule of rates and charges. Consultant shall perform changes in the Services as directed by the Client, upon receiving approval from Client.

Notwithstanding the above, Client may direct Consultant in writing to perform the change prior to approval of price and schedule adjustments by Client. If so directed, Consultant shall not suspend performance of this Agreement during the review and negotiation of such change, as long as the change is a reasonably foreseeable alteration of the Services originally contemplated. In the event Client and Consultant are unable to reach agreement regarding changes in price and/or time associated with a change order, the matter shall be submitted to mediation as provided in Paragraph 32 of this Agreement.

8. Termination for Convenience

Either Party may terminate this Agreement and any associated Work Authorizations without cause and/or for convenience after giving ten (10) days' written notice to the other Party. However, Consultant shall not have the right to terminate this Agreement, without cause, prior to completion by Consultant of all

Services required under then outstanding Work Authorizations. In the event Client terminates Consultant's services without cause and/or for Client's convenience, Client shall be liable to promptly pay Consultant for all work performed through the date of termination, all of Consultant's expenses directly attributable to the termination, including fair and reasonable sums for overhead and profit, and costs incurred by Consultant in terminating any contracts entered into in connection with the performance of its Services.

9. Termination for Cause

Either Party may terminate this Agreement for cause. Termination for cause shall be by written notice ("Termination Notice") from the terminating Party, delivered to the allegedly defaulting Party at least thirty (30) days prior to the proposed termination date ("Termination Date"). The allegedly defaulting Party shall have thirty (30) days from receipt of the Termination Notice within which to cure the alleged default. Any termination for cause shall be without prejudice to any claims which either Party may have against the other Party, its agents or subcontractors.

The Client may terminate this Agreement and the Services of Consultant for cause if: (i) the Services in any material respect are not performed in accordance with the provisions of this Agreement; (ii) Consultant deliberately disregards the instruction of the Client with respect to any material and applicable laws, rules, regulations, statutes, permits, orders or ordinances pertaining to the Services; (iii) Consultant refuses or fails to supply enough properly skilled labor or proper equipment or materials; (iv) any proceedings in bankruptcy or insolvency, voluntarily or involuntarily, are commenced by or against Consultant; or (v) if Consultant commits any act of bankruptcy or becomes insolvent or unable to meet its debts as they mature.

Client will pay Consultant for such Services performed or furnished in accordance with this Agreement, notwithstanding default. Consultant also will be paid for the charges of Consultant's contractors employed to perform or furnish services and/or materials to the extent such services and/or materials have been performed or furnished in accordance with this Agreement through the effective date of termination.

Consultant may terminate this Agreement for cause or indefinitely suspend work, the basis of which shall be established by Client's actions or inactions set out as follows: (i) if Client fails to timely pay Consultant for the undisputed portion of invoices; (ii) if Client unreasonably interferes with Consultant's ability to perform its duties and obligations under the Agreement; (iii) if Client requests Consultant to furnish or perform services contrary to Consultant's responsibilities as a design professional; (iv) if any proceedings in bankruptcy or insolvency, voluntarily or involuntarily, are commenced by or against Consultant; (v) if Consultant commits any act of bankruptcy or becomes insolvent or unable to meet its debts as they mature; or (vi) if Client fails in any material respect to perform in accordance with the provisions of this Agreement.

In the event of such termination by Consultant, Consultant shall be entitled to receive prompt payment for Services rendered to the Termination Date, pursuant to the terms of this Agreement. If Consultant has substantially completed the Services under this Agreement and/or any applicable Work Authorization at the time of Client's termination, Client is obligated to pay Consultant the full amount of this Agreement and/or the full amount of the applicable Work Authorization.

10. Access to Premises

During the term of this Agreement, Client shall grant to or cause to be made available to Consultant and its personnel, reasonable and necessary nonexclusive access to the Site(s) as necessary to allow Consultant to perform the Services under this Agreement and any Work Authorization(s). Consultant shall comply with generally accepted safety procedures and all other safety procedures which may from time to time be communicated to Consultant by Client.

11. Conflicts of Interest

Consultant shall not perform, or enter into any agreement for, services for any other person, corporation or entity, except with prior written consent of Client, if, in the sole discretion of Consultant, the performance of the services could result in a conflict with Consultant's obligations under this Agreement. Consultant represents that it has reasonably evaluated potential conflicts and has disclosed to Client any prior or existing relationships which present, or could appear to present, a conflict with the Services to be performed.

12. Use of Documents

All documents provided by Consultant pursuant to this Agreement are instruments of service of Consultant, and Consultant shall retain an ownership and property interest therein (including the right of reuse) until Client has made full payment to Consultant for such documents pursuant to this Agreement. All documents generated by Consultant pursuant to this Agreement are not intended or represented to be suitable for reuse by Client or others on any other project, or for purposes relating to the project for which same were created. Client agrees not to reuse said reports or materials on any other project, or for any purpose relating to the project for which they were created, without the prior written consent of Consultant. Reuse of said reports or other material by Client for any other purpose or on other projects without written permission or adaptation by Consultant for the specific purpose then intended shall be at the Client's and user's sole risk, without liability on Consultant's part, and Client agrees to indemnify and hold harmless Consultant from all claims, damages and expenses, including attorneys' fees, arising out of such unauthorized reuse by Client. The provisions of this Paragraph 12 shall survive the termination (for any reason) of this Agreement.

13. Proprietary Rights of Consultant

Client acknowledges that Consultant has developed systems, processes, apparatus, analytical tools and methods which are proprietary to Consultant and which are used in its business. Such systems, processes, apparatus, analytical tools and methods (including software, patents, copyrights and other intellectual property), and all derivations, enhancements or modifications thereof made by Consultant, including those as a result of work performed by Consultant for Client hereunder, shall be and remain the property of Consultant.

14. Standard of Care

Consultant represents that it is knowledgeable and experienced in providing technical, engineering and consulting services comparable to the services provided by firms in good standing under similar circumstances. Consultant represents to Client that the Services shall be performed in a manner

consistent with the standard of care. Consultant agrees to correct, at its own expense, any services provided under this Agreement which do not conform to this standard of care. No other guarantee or warranty, express or implied, is intended by this Agreement.

Nothing in this Agreement shall be construed or interpreted as requiring Consultant to assume the status of, and Client acknowledges that Consultant does not act in the capacity nor assume responsibilities of, Client or others as a 'generator,' 'operator,' 'transporter' or 'arranger' in the treatment, storage, disposal or transportation of any hazardous substance or waste as those terms are understood within the meaning of the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or any other similar federal, state or local law, regulation or ordinance. Client acknowledges further that Consultant has played no part in and assumes no responsibility for generation or creation of any hazardous waste, pollution condition, nuisance, or chemical or industrial disposal problem, if any, which may exist at any site that may be the subject matter of this Agreement. Consultant, after commencement of Services, shall notify Client upon discovery of any hazardous or toxic hazardous substance or conditions which may require handling, treatment, removal or disposal, or which pose or may pose a danger or risk to the work.

Consultant shall not undertake any of the responsibilities of Client or Client's other contractors or suppliers; shall not advise on, issue directions relative to, or assume control over, any aspects of the means, methods, techniques, sequences, or procedures or any installation or construction, unless such advice or directions are specifically required by the Service Agreement Documents; and shall not advise on, issue directions regarding, or assume control over, safety precautions and programs otherwise in force at the Client's facility or site, unless specifically required by the Service Agreement Documents.

15. Indemnification

The Parties shall at all times remain entirely responsible for the results and consequences of their sole negligence and agree to indemnify and hold harmless the other Party from and against any and all claims, losses, damages, costs and expenses, including attorney's fees, which may arise or result from such sole negligence.

Consultant shall indemnify, defend and hold harmless Client, its directors, officers, employees, shareholders and affiliates from and against any and all liabilities, losses, damages, costs and expenses (including attorneys' fees and court costs) which Client and its directors, officers, employees and agents hereafter may suffer in connection with any claim, demand, action or right of action (whether at law or in equity) brought or asserted by any third party (including the employees of Consultant and Client) because of any personal injury (including death) or property damage caused as a result of negligent acts, errors, omissions, or willful misconduct on the part of Consultant. Consultant shall not be liable to the extent that any liability, loss, damage, cost, and expense results from an act of negligence or willful misconduct by Client or its directors, officers, employees or agents, or by any other person or entity not acting on Consultant's behalf or under Consultant's right of direction or control.

Client shall indemnify, defend and hold harmless Consultant, its directors, officers, employees, shareholders and affiliates from and against any and all liabilities, losses, damages, costs and expenses (including attorneys' fees and court costs) which Consultant and its directors, officers, employees and agents hereafter may suffer in connection with any claim, demand, action, or right of action (at law or in equity) brought or asserted by any third party (including the employees of Consultant and Client) because

of any personal injury (including death) or property damage caused as a result of any negligent acts, errors, omissions, or willful misconduct on the part of Client. Client shall not be liable to the extent that any liability, loss, damage, cost and expense results from an act of negligence or willful misconduct by Consultant or its directors, officers, employees or agents, or any other person not acting on Client's behalf or under Client's right of direction or control.

Client agrees to indemnify, defend and hold harmless Consultant, its officers, directors, employees, affiliates and agents from and against any and all claims, demands, liabilities, damages, fines, penalties, forfeitures, losses and expenses (including, but not limited to, attorneys' fees, expert fees and court costs) brought or asserted by any third party under any theory of law or equity on account of Consultant's having contracted with Client in connection with investigation, cleanup, handling, removal, treatment, storage, transportation or disposal of any regulated substances or hazardous or toxic wastes at any Site or sites.

16. Limitation of Liability

The total liability, in the aggregate, of Consultant and Consultant's directors, officers, employees, agents, associates or subcontractors, and any of them, to Client or anyone claiming by, under or through you as Client, for any and all injuries, claims, losses, expenses, including attorneys' fees, expert fees or court costs and damages whatsoever arising out of or in any way related to Consultant's Services under this Agreement, from any cause or causes whatsoever, including but not limited to, negligent acts or omissions, professional negligence, breach of contract, strict liability, errors or omissions of Consultant, or the employees, directors, officers, agents, associates or subcontractors of Consultant, or any of them, will be limited to $_____ or Consultant's fee (including changes), whichever is greater.

The Parties waive incidental, indirect, or consequential damages for claims, disputes, or other matters in question arising out of or relating to this Agreement. This waiver is applicable, without limitation, to all consequential damages due to either Party's termination in accordance with Paragraphs 8 and 9 above.

17. Site Conditions

Consultant shall not be liable for: (i) damage or injury to any subterranean structures (including, but not limited to, utilities, mains, pipes, tanks, and telephone cables) or any existing subterranean conditions; or (ii) the consequences of such damage or injury, if (with respect to either clause (i) or (ii)) such structures or conditions were known or should have been known to Client and were not identified or shown, or were incorrectly shown, in information or on plans furnished by Client to Consultant in connection with the Services, or otherwise disclosed to Consultant.

Should: (i) concealed conditions be encountered in the performance of the Services; (ii) concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Scope of Services or Work Authorization; or (iii) unknown physical conditions below the surface of the ground differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided under this Agreement; then the amount of this Agreement and/or time for performance shall be equitably adjusted by change order upon claim by either Party made within twenty (20) days after the first observance of the conditions.

18. Insurance

Consultant shall maintain for the term of this Agreement insurance policies covering:

Worker's Compensation and Employer's Liability insurance, statutory limits.

Comprehensive General Liability insurance, a total of $2,000,000 each occurrence and $2,000,000 in aggregate.

Comprehensive Automobile Liability insurance, a total of $1,000,000 each occurrence and $2,000,000 in aggregate.

Excess Liability insurance for Comprehensive General Liability and Comprehensive Automobile Liability, $5,000,000.

Professional errors and omissions insurance with a per claim limit of not less than $10,000,000.

19. Materials and Equipment Handling and Retention

In the event that Client desires to dispose of materials on the Site, such materials will be transported to a location selected by Client for final disposal. If a manifest is required for such disposal, such manifest shall be signed by Client.

In the event that materials on the Site, including but not limited to, samples and cuttings, contain substances or constituents hazardous or detrimental to human health, safety, or the environment as defined by federal, state or local statutes, regulations or ordinances, such materials shall remain the property of Client. Client will, using a manifest signed by Client as generator, have such materials transported to a location selected by Client for final disposal. Client recognizes and agrees that at no time will Consultant assume title of said materials.

All laboratory and field equipment contaminated in performing the Services contemplated hereunder which cannot be reasonably decontaminated by Consultant shall become the responsibility of the Client to decontaminate, or become the property and responsibility of Client. All such equipment shall be delivered to Client and disposed of in a manner similar to that indicated for hazardous materials.

Consultant shall preserve all such soil, rock, water, and other samples obtained from the Site as it deems necessary for the Services, but no longer than 45 days after the issuance of any document that includes the data obtained from those samples, unless other arrangements are mutually agreed upon in writing. At any time Consultant may request in writing that Client remove and take possession of samples. Within ten (10) days of the request, Client shall comply with such request and pay and be responsible for the removal and lawful disposal of samples, including signing any required manifests.

20. Force Majeure

Except for the payment of money for Services already completed, each Party shall not be liable to the other for failure to perform its obligations hereunder if and to the extent that such failure to perform is caused by or results from causes beyond its control, including without limitation, strikes, lockouts, or

other industrial disturbances, civil disturbances, fires, acts of God, acts of a public enemy, acts or omissions of subcontractors, compliance with any regulations, orders, or requirements of any governmental body or agency, or inability to obtain transportation or necessary materials in the open market.

21. Confidentiality; Reports

The Services are undertaken as an integral and necessary part of Client's activities at the Site. In order to protect the confidentiality of Client's business, communications and materials (as defined below), the Services shall be conducted in accordance with the following: (i) no records shall be delivered to any person unless specifically directed by Client; (ii) all books, records, photographs, slides, materials, data, boring logs, laboratory reports, calculations, estimates, documents, communications, notes, proposals, reports, scopes of work or related responses ("materials"), whether in written or any other form, which are either generated by Consultant or furnished to Consultant by Client or others, shall be considered as confidential unless specifically marked otherwise by Client or Client's attorneys, or unless Client specifically directs otherwise. Information will not be considered confidential if: (i) information is in the public domain through no action of Consultant in breach of the Agreement; (ii) information is independently developed by Consultant (in the event Consultant believes that it is required by law to reveal or disclose the contents of any confidential information, prior to proceeding with same it shall first notify Client in writing and specify the applicable laws which impose such obligations on Consultant); or (iii) information is acquired by Consultant from a third party not delivered to Consultant in breach of confidentiality agreements that said third party may have with Consultant or Client.

22. Regulatory Matters

Except as otherwise required or provided in the Scope of Services, Consultant will not meet or confer with any member of any federal, state or local regulatory agency concerning the Services without obtaining the prior consent of Client. In addition, Consultant will not discuss any matters arising out of this Agreement with members of the press or public and will not issue any press release without the prior consent of Client.

23. Compliance With Law

Consultant and Client will use reasonable care to comply with applicable laws in effect at the time the Services are performed hereunder, which to the best of their knowledge, information and belief, apply to their respective obligations under this Agreement. Client shall cooperate with Consultant in obtaining any permits or licenses required for the performance of the Services.

24. Delegation and Assignment

Either Party may at any time delegate, orally or in writing, this Agreement, or any portion thereof, with the prior written consent of the other Party. No such delegation shall operate to relieve the Party of its responsibilities hereunder and, notwithstanding any such delegation, the Party shall remain primarily obligated under this Agreement, unless the other Party agrees in writing that such delegation relieves the Party from its relevant obligations under this Agreement.

ARCADIS GERAGHTY & MILLER

25. Notices

All notices required or permitted hereunder shall be in writing and shall be served on the Parties at the following address:

Consultant:	Client:
_____	_____
_____	_____
_____	_____
_____	_____

Any such notices shall be either: (i) sent by certified mail, return receipt requested, in which case notice shall be deemed delivered three business days after deposit, postage prepaid in the U.S. Mail; (ii) sent by overnight delivery using a nationally recognized overnight courier, in which case it shall be deemed delivered one business day after deposit with such courier; or (iii) sent by personal delivery. The above addresses may be changed by written notice to the other Party; provided, however, that no notice of a change of address shall be effective until actual receipt of such notice. Copies of notices are for informational purposes only, and a failure to give or receive copies of any notice shall not be deemed a failure to give notice.

26. Entire Agreement

This Agreement constitutes the entire agreement between the Parties with respect to the Services, and supersedes all prior negotiations, representations or agreements relating thereto, written or oral, except to the extent they are expressly incorporated herein. Unless otherwise provided for herein, no amendments, changes, alterations or modifications of this Agreement shall be effective unless in writing, executed by Client and Consultant. There are no third party rights or benefits under this Agreement. The following documents are incorporated by reference into this Agreement:

a. Exhibit A - Work Authorization No. _____
b. _____
c. _____
d. _____
e. _____

27. Construction Costs

The Client shall advise Consultant in writing before design commencement of any budgetary limitations for the overall cost of construction. Consultant will endeavor to work within such limitations and will, if requested and included within the scope of services, submit to Client an opinion of probable construction cost. Opinions of probable construction cost will represent Consultant's best judgment as a design professional familiar with the construction industry, but does not represent that bids or negotiated prices will not vary from budgets or opinions of probable cost. Client acknowledges that neither Consultant nor the Client has control over the cost of labor, materials or methods by which contractors determine prices for construction.

28. Severability and Waiver

If any portion of this Agreement is held invalid or inoperative, then so far as is reasonable and possible, the remainder of this Agreement shall be deemed valid and operative, and effect shall be given to the intent manifested by the portion held invalid or inoperative. The failure by either Party to enforce against the other Party any term or provision of this Agreement shall be deemed not to be a waiver of such Party's right to enforce against the other Party the same or any other such term or provision.

29. Governing Law

This Agreement and the legal relations of the Parties shall be governed by the laws of the State in which the Site is located.

30. Counterparts

This Agreement may be signed in two or more counterparts, each of which shall be treated as an original but which, when taken together, shall constitute one and the same instrument.

31. Headings

Headings of particular paragraphs are inserted only for convenience and are in no way to be construed as a part of this Agreement or as a limitation of the scope of the paragraphs to which they refer.

32. Further Assurances

Consultant and Client each covenant and agree to sign, execute and deliver, or cause to be signed, executed and delivered, and to do or make, or cause to be done or made, upon written request of the other Party, all agreements, instruments, papers, deeds, acts or things, supplemental, confirmatory or otherwise, as may be reasonably required by either Party hereto for the purpose of or in connection with consummating the transactions described herein.

33. Mediation

If any dispute arises out of or relates to this Agreement, or the breach thereof, then said dispute will first be referred to a panel consisting of at least one representative of each Party having authority to enter into agreements to settle the dispute. The panel will engage in any conference or discussion deemed appropriate under the circumstances to arrive at a settlement of the dispute. If the dispute cannot be settled through direct discussions by the panel representatives of the Parties, the Parties agree then to submit the matter to mediation under the Construction Industry Mediation Rules of the American Arbitration Association before having recourse to a judicial forum. No written or oral representation made during the course of any settlement negotiations or mediation shall be deemed a party admission.

ARCADIS GERAGHTY & MILLER

IN WITNESS THEREOF, the Parties have caused this Agreement to be executed on the day and year first set forth above.

ARCADIS Geraghty & Miller, Inc.

By:_____

Title:_____

[CLIENT]

By:_____

Title:_____

ARCADIS GERAGHTY & MILLER

EXHIBIT A

WORK AUTHORIZATION NO. _____

This WORK AUTHORIZATION is entered into by and between ARCADIS Geraghty & Miller, Inc., a Delaware corporation ("Consultant"), and _____ ("Client"). This Work Authorization incorporates by reference the SERVICES AGREEMENT entered into by the Parties dated _____ (the "Services Agreement"). The Services Agreement is hereby amended and supplemented as follows:

I. General Description of Basic Services

A. Client hereby authorizes Consultant to perform the following general scope of Basic Services:

B. Client authorizes Consultant to provide the Basic Services described in this Work Authorization in connection with the following Site(s):

A more detailed description of the Site(s), if necessary, is attached as Attachment 1 to this Work Authorization.

C. The above-described Basic Services shall be provided by Consultant in phases, as set forth below. (N/A indicates phase is not applicable to services to be provided under this Work Authorization).

ACORD. CERTIFICATE OF INSURANCE

DATE (MM/DD/YY) 01/04/00

PRODUCER
MARSH USA Inc
1225 17TH STREET SUITE 2100
DENVER CO 80202

ATTN: SHARON TIMMONS
33320-12345 10M ARC

INSURED
ARCADIS GERAGHTY & MILLER
ATTN TERRI YOUNG
1099 18TH STREET SUITE 2100
DENVER CO 80202

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY A	LUMBERMENS MUTUAL CASUALTY CO
COMPANY B	HARTFORD INSURANCE CO OF THE MIDWEST
COMPANY C	NATIONAL UNION FIRE INS. CO OF PITTSBURGH
COMPANY D	

COVERAGES

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

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY	4LS000012-01	01/01/00	01/01/01	GENERAL AGGREGATE	$ 2,000,000
	[X] COMMERCIAL GENERAL LIABILITY				PRODUCTS - COMP/OP AGG	$ 2,000,000
	[ ] CLAIMS MADE [X] OCCUR				PERSONAL & ADV INJURY	$ 2,0000,00
	OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	$ 2,000,000
					FIRE DAMAGE (Any one fire)	$ 100,000
					MED EXP (Any one person)	$ 10,000
B	AUTOMOBILE LIABILITY	46UENGY8026 (AOS)	01/01/00	01/01/01	COMBINED SINGLE LIMIT	$ 1,000,000
	[X] ANY AUTO	46UENGY8664 (TX)	01/01/00	01/01/01		
	ALL OWNED AUTOS				BODILY INJURY (Per person)	$
	SCHEDULED AUTOS					
	HIRED AUTOS				BODILY INJURY (Per accident)	$
	NON-OWNED AUTOS					
					PROPERTY DAMAGE	$
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	[ ] ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	$
					AGGREGATE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$ 5,000,000
C	[X] UMBRELLA FORM	BE7391453	01/01/00	01/01/01	AGGREGATE	$
	[ ] OTHER THAN UMBRELLA FORM					$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	43WBDX2536	01/01/00	01/01/01	[X] STATUTORY LIMITS	
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: [ ] INCL [ ] EXCL				EACH ACCIDENT	$ 1,000,000
					DISEASE - POLICY LIMIT	$ 1,000,000
					DISEASE - EACH EMPLOYEE	$ 1,000,000
	OTHER					
A	CLAIMS-MADE PROFESS-IONAL&OCC FORM EXCESS LIABILITY W/POLLUTION	4LS000136	02/14/99	02/14/00	$10,000,000	

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS (LIMITS MAY BE SUBJECT TO RETENTIONS)

CERTIFICATE HOLDER

SPECIMEN

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

GERAGHTY & MILLER, INC.
1997 FEE SCHEDULE FOR PROFESSIONAL SERVICES

Invoices for services provided by Geraghty & Miller, Inc., consist of: (1) hourly rate professional services fees; (2) material and equipment expenditures and usage; (3) subcontractor costs; (4) travel, shipping, and communications charges; and (5) sales or gross receipt taxes, as applicable.

Subject to periodic revisions, hourly rate fees for Geraghty & Miller, Inc. professional services are indicated below:

STAFF CATEGORIES	HOURLY RATES
ENGINEERS AND SCIENTISTS	
Staff Scientist/Engineer 1	$59
Staff Scientist/Engineer 2	$76
Project Staff 1	$90
Project Staff 2	$105
Senior Project Staff 1	$121
Senior Project Staff 2	$142
CONSTRUCTION SERVICES AND TECHNICIANS	
Technician 1	$45
Technician 2	$59
Technician 3	$68
Field Manager 1	$88
Field Manager 2	$100
OFFICE SUPPORT STAFF	
Clerical/Word Processing	$44
Drafting	$56
Project Assistant/Senior Drafting	$65
Designer/Senior Designer	$77

INVOICING AND PAYMENT: Progress invoices will be issued monthly and payment is due within thirty (30) days of invoice date. Invoices for subcontractor charges are payable upon presentation. Non-standard, client-requested invoice formats and supporting documentation will be invoiced at $44.00 per hour plus expenses. A finance charge of 1.5% per month will be payable on past-due account balances.

GERAGHTY & MILLER, INC.
1997 FEE SCHEDULE FOR PROFESSIONAL SERVICES

ADDITIONAL TERMS

PROJECT MATERIALS AND EQUIPMENT: All project-related expenses, materials, field supplies, equipment charges; premiums for insurance, bonds, and letters of credit required by the client in addition to normal coverage; project-required permits and licenses; etc. will be invoiced at cost plus 15%.

PROJECT COMMUNICATION AND SHIPPING EXPENSES: Charges for long-distance telephone, photocopying, blueprints, express and regular shipping and postage will be invoiced at cost plus 15%.

TRAVEL AND RELATED EXPENSES: Charges for rental vehicles, meals, travel and lodging will be invoiced at actual cost plus 15%. Personal vehicles will be charged at $0.40/mile.

SUBCONTRACTS: Subcontractor (drillers, analytical laboratories, etc.) charges will be invoiced at cost plus 15%.

LEGAL PROCEEDINGS: A surcharge of 50% will be added to the professional services rates for actual sequestered preparation time and for actual time spent in depositions, public testimony, court and/or hearings.

PROJECT ADVISORS AND SENIOR EXPERTS: Rates for Project Advisors are $220/hour. Rates for Senior Experts are a function of the individual and are quoted upon request.

GERAGHTY & MILLER EQUIPMENT AND MATERIALS: Geraghty & Miller-owned equipment, vehicles and materials will be invoiced at fixed unit rates. A summary of these rates will be provided upon request.

GERAGHTY & MILLER TREATABILITY LAB ANALYSES: Routine Treatability Laboratory analyses will be invoiced at a fixed price per test. Rates will be available upon request.