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**VOLUME I: REVISED TECHNICAL PROPOSAL  
IMPLEMENTATION OF THE COMBINED PHASES RFI/RI WORK  
PLAN FOR ROCKY FLATS PLANT OPERABLE UNIT NO. 11  
WEST SPRAY FIELD**

**TASK ORDER MTS 351302TB/NM3-WLB-254-94  
MASTER TASK AGREEMENT NO. MTS 225440SG**

**Prepared for:**

**EG&G Rocky Flats, Inc.  
P.O. Box 464  
Golden, Colorado 80402**

**Prepared by:**

**The S.M. Stoller Corporation  
5700 Flatiron Parkway  
Boulder, Colorado 80301**

**July 8, 1994**

*W.R. Ballinger*  
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*7/8/94*

*1/171*

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**VOLUME I: REVISED TECHNICAL PROPOSAL  
IMPLEMENTATION OF THE COMBINED PHASES RFI/RI WORK PLAN  
ROCKY FLATS PLANT OPERABLE UNIT NO. 11 WEST SPRAY FIELD**

**1.0 INTRODUCTION**

**1.1 Background**

The S.M. Stoller Corporation (Stoller) and its subcontractors, Watkins-Johnson Environmental, Inc. (WJE) and James P. Walsh & Associates (Walsh), have prepared this Revised Technical Proposal in response to EG&G's Request for Proposal (RFP) Task Order MTS 351302TB/NM3-WLB-254-94, titled "Implementation of the Combined Phases RFI/RI Work Plan for Rocky Flats Plant Operable Unit No. 11 West Spray Field" Revision 3 and dated June 24, 1994. Work will be performed in conformance with Revision 3 of the Statement of Work (SOW) provided by EG&G as an attachment to the RFP and dated June 1994. A Revised Cost Proposal is provided under separate cover as Volume II. As specified in the RFP, one copy of the Revised Cost Proposal includes ODC costs and labor hours but excludes labor rates and total labor costs.

Rocky Flats is conducting the Combined Phases RCRA Facility Investigation/Remedial Investigation (RFI/RI) for Operable Unit No. 11 (OU 11) as part of the Interagency Agreement (IAG) between the U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Colorado Department of Health (CDH). The purpose of the RFI/RI is to collect data necessary to characterize the nature and extent of contamination at OU 11 and to determine the need for further investigation and remedial action.

Stoller, WJE, and Walsh are extremely well qualified to support EG&G in the Implementation of the Combined Phases RFI/RI Work Plan for Rocky Flats Plant Operable Unit No. 11 West Spray Field. All three companies have experience working with Rocky Flats and have reputations for technical excellence and client satisfaction. Stoller has the proven management skills to assure EG&G that the project will be performed on schedule and within budget. Our qualifications and experience are summarized in Section 5.0.

## **1.2 Purpose**

The purpose of the Combined Phases RFI/RI is to characterize potential contamination at OU 11 and determine the need for additional investigation and remedial action. The objectives of the RFI/RI for OU 11 are to characterize the physical features of the site, define contaminant sources, determine the nature and extent of contamination, describe fate and transport of the contaminants, and conduct a Human Health Risk Assessment.

These objectives will be met by conducting a streamlined program that combines the Phase I and Phase II investigations. The Phase I investigation examines the nature and extent of contamination within the source and soils and evaluates the risks from air pathways and direct contact. The Phase II investigation examines the potential fate and transport of the contamination and evaluates the risks. The implementation of a Combined Phases RFI/RI will allow the determination of human health risks posed by OU 11 in advance of the mandated IAG schedule.

## **1.3 Modifications**

This revised proposal addresses (1) Revision 3 of the SOW, dated June 1994 which was attached to Amendment Task Order No. MTS 351302TB/NM3-WLB-254-94, dated June 24, 1994, and (2) all modifications included in Stoller's Revised Technical Proposal dated April 29, 1994.

## 2.0 PROJECT TEAM ORGANIZATION

### 2.1 Team Responsibilities

The following subsections briefly describe the respective roles of Stoller, WJE, and Walsh for the implementation of the Combined Phases RFI/RI and list key project personnel. A team organization chart is shown in Figure 1. Key personnel are listed in Table 1. Resumes are provided in Appendix A.

#### 2.1.1 The S.M. Stoller Corporation

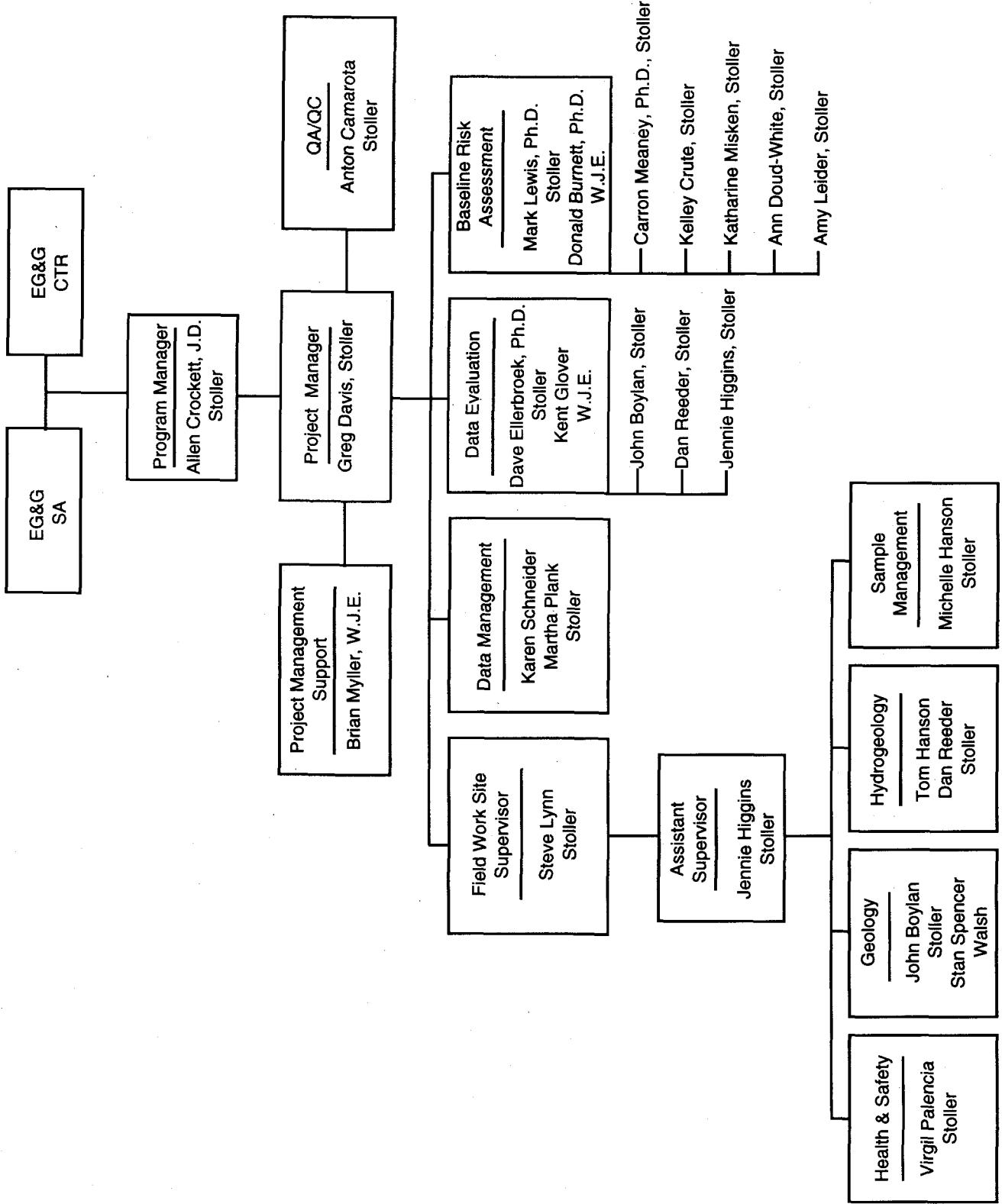
As primary subcontractor to EG&G under the Area 5 MTS, Stoller will provide overall program management, quality assurance, site coordination, and administrative support. Additionally, Stoller hydrogeologists, soil scientists, geochemists, biologists, risk assessment specialists, and geostatisticians will perform the technical work and will be responsible for the preparation of all deliverables.

Stoller's proposed key personnel and their assignments for this project are listed below.

<u>Project Role</u>	<u>Name</u>
Program Manager	Allen Crockett
Project Manager	Greg Davis
Quality Assurance Manager	Anton Camarota
Site Supervisor	Steve Lynn
Lead Hydrogeologist	David Ellerbroek
Hydrogeologist	Scott Burcar
Hydrogeologist	Dan Reeder
Hydrogeologist	Jennifer Higgins
Lead Geologist	Michelle Hanson
Geochemist	Kathy Tegtmeier
Geologist	John Boylan
Geologist	Connie Hayden Scott
Health & Safety Manager	Virgil Palencia
Risk Assessment Lead	Mark Lewis
Risk Assessment Support	Kelley Crute

Risk Assessment Support	Katharine Misken
Risk Assessment Support	Anne Doud White
Risk Assessment Support	Amy Leider
Risk Assessment Support	Carron Meaney
Risk Assessment Support	Steve Kline
Risk Assessment Support	Dave Palmer
Risk Assessment Support	Gary Magno
Database Lead	Karen Schneider
Database Support	Martha Plank
GIS Lead	Mark Tullius
GIS Support	Caren McMahan
Deliverables Coordinator	Sheryl Shapiro
Project Management Support	Susan Serreze
Project Management Support	Mike Lauer
Project Management Support	Bob Lundeen

Figure 1 - Detailed Organizational Chart, Implementation of the Combined Phases RFI/RI Work Plan for Rocky Flats Plant, Operable Unit No. 11, West Spray Field



**Table 1 Implementation of the Combined Phases RFI/RI Work Plan for Rocky Flats  
Plant Operable Unit No. 11 West Spray Field  
Key Personnel**

S.M. Stoller		
Allen Crockett	J.D. Natural Resource Law Ph.D. Terrestrial Ecology	Program Manager
Greg Davis	M.S. Geochemistry	Project Manager
Anton Camarota	MBA	Senior Engineer
Steve Kline	M.S. Mechanical Engineering	Senior Engineer
Mike Lauer	B.A. Construction Management	Engineer III
Steve Lynn	B.A. Geological Sciences	Geologist II
David Ellerbroek	M.S. Environmental Science and Engineering Ph.D. Environmental Engineering	Senior Geologist
Kathy Tegtmeier	Ph.D. Geochemistry	Senior Geologist
Susan Serreze	M.A. Geology	Senior Geologist
Scott Burcar	M.S. Hydrology/Hydrogeology	Geologist I
Connie Hayden Scott	M.S. Geology	Geologist I
Mark Tullius	B.S. Geology	Geologist I
Dan Reeder	M.S. Geology	Geologist II
John Boylan	M.S. Geology	Geologist II
Michelle Hanson	B.S. Geology	Geologist II
Jennifer Higgins	B.S. Geology	Geologist II
Karen Schneider	B.A. Geology	Geologist II
Mark Lewis	Ph.D. Aquatic Toxicology	Senior Biologist
Dave Palmer	M.S. Environmental Health	Senior Biologist
Gary Magno	B.S. Environmental Resource Mgt.	Senior Biologist
Kelley Crute	B.S. Environmental Science	Biologist II
Katharine Miskin	B.A. Biology	Biologist II
Anne Doud White	M.S. Ecology	Biologist II
Amy Leider	M.A. Biology	Biologist II
Virgil Palencia	B.S. Environmental Health	Biologist II
Carron Meaney	Ph.D. Biology	Biologist I
Bob Lundeen	M.B.A.	Technician I
Sheryl Shapiro	B.A. Journalism	Technician I
Caren McMahan	B.S. Geography	Technician II
Martha Plank	B.A. English	Technician II

Watkins-Johnson Environmental, Inc.		
Brian Myller	B.S. Environmental Geology	Assistant Project Manager
Kent Glover	B.S. Watershed Science	Senior Geologist
Michael Boubin	M.S. Geology	Geologist I
James P. Walsh & Associates		
Stan Spencer	B.S. Natural Resources	Project Manager
Tom Furst	Ph.D. Soil Science	Geologist I
Dave Buscher	M.S. Ecological Engineering	Geologist II
Harvey Johnson	B.S. Environmental Health	Geologist II
Robert German	M.S. Environmental Science	Geologist II
Heather Gabriel	B.A. Geology	Geologist III
Bret Goss	U.S. Marine Corps Radiation Technician	Technician I

2.1.2 Watkins-Johnson Environmental, Inc.

Personnel from WJE will provide support roles in tasks involving risk assessment, data analysis, and report review. WJE's proposed key personnel are listed below:

<u>Project Role</u>	<u>Name</u>
Assistant Project Manager	Brian Myller
Hydrogeology Review	Kent Glover
Hydrogeology	Michael Boubin

2.1.3 James P. Walsh & Associates

Personnel from Walsh will provide support to the field activities including, primarily, the sonic drilling task. Walsh's proposed key personnel are listed below.

<u>Project Role</u>	<u>Name</u>
Project Manager	Stan Spencer
Geology/Field Support	Tom Furst

Geology/Field Support	Dave Buscher
Geology/Field Support	Harvey Johnson
Geology/Field Support	Robert German
Geology/Field Support	Heather Gabriel
Geology/Field Support	Bret Goss

#### 2.1.4 Other Subcontractors

Stoller, WJE, and Walsh provide more than sufficient staff resources and expertise to perform the scope of work for this project. However, Stoller will use qualified subcontractors for drilling operations and surveying for the Combined Phases RFI/RI fieldwork. Stoller will use Water Development Inc. for drilling to fulfill the requirement in the SOW for resonant sonic drilling technology. Stoller also occasionally utilizes ADIA personnel as temporary word processors and couriers. We have found that the use of temporary personnel is cost-effective, both for Stoller and EG&G, because of their relatively low hourly rates and the fact that they are not carried on overhead when their services are not needed. ADIA personnel are used only in the clerical or support roles listed above and are billed to EG&G at no markup. Stoller may also use outside photocopying services for special needs, such as color copying and large volume copying. These costs are billed to EG&G at no markup.

#### 2.2 Commitment of Staff and Resources

Stoller, WJE, and Walsh are committed to the successful completion of this project. All key personnel listed in this proposal will be available, throughout the period of performance of this subcontract, for the roles and amounts of time indicated. All other necessary resources will also be available to the extent required for satisfactory performance of the work.

#### 2.3 Training

All personnel supporting the Implementation of the Combined Phases RFI/RI will be appropriately trained. Figure 2 (Training Requirements) shows the current training status of all key personnel.

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Figure 2 Training Requirements

NAME	40-HOUR OSHA	8-HOUR OSHA	HAZARDOUS WASTE COMMUNICATIONS	HAZARDOUS WASTE SUPERVISOR	OSHA SUPERVISOR	GET	RADIATION WORKER TOR II	HAZARDOUS WASTE TRAINING	DOT TRAINING	RESPIRATOR FIT	SITE-SPECIFIC SAFETY	RCRA TRAINING LIST	RCRA TRAINING	QA OVERVIEW	WASTE GENERATOR QUALIFICATION	WASTE RESIDUE ID & CHAR.	DRUM TRAINING	DECOR PAD TRAINING
BOYLAN, JOHN	✓	✓	X		✓	✓		SITE		X	SITE	SITE	SITE	SITE				
BURCAR, SCOTT	✓	✓						SITE			SITE	SITE	SITE	SITE				
BUSCHER, DAVE	✓	✓	✓			✓		SITE			SITE	SITE	SITE	SITE				
CAMAROTA, ANTON	✓	✓			✓	✓		SITE		✓	SITE	SITE	SITE	SITE				
CROCKETT, ALLAN	✓	✓			✓	✓		SITE			SITE	SITE	SITE	SITE				
CRUTE, KELLEY	✓	✓			✓	✓		SITE			SITE	SITE	SITE	SITE				
DAVIS, GREG	✓	✓	X	X	✓	✓		SITE			SITE	SITE	SITE	SITE				
DOUD WHITE, ANNE	✓	✓				X		SITE			SITE	SITE	SITE	SITE				
ELLERBROEK, DAVE	✓	✓	X	X	X	✓		SITE			SITE	SITE	SITE	SITE				
FURST, TOM	✓	✓	✓		✓	✓		SITE			SITE	SITE	SITE	SITE				
GABRIEL, HEATHER	✓	✓	✓		✓	✓		SITE			SITE	SITE	SITE	SITE				
GERMAN, ROBERT	✓	✓	✓		✓	✓		SITE			SITE	SITE	SITE	SITE				
GOSS, BRET	✓	✓	✓		✓	✓		SITE			SITE	SITE	SITE	SITE				
HANSON, MICHELLE	✓	✓	X	X	✓	✓		SITE	X		SITE	SITE	SITE	SITE				
HANSON, TOM	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
HAYDEN SCOTT, CONNIE	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
HIGGINS, JENNIFER	✓	✓	X	X	✓	✓		SITE		X	SITE	SITE	SITE	SITE	X		X	
JOHNSON, HARVEY	✓	✓	✓			✓		SITE			SITE	SITE	SITE	SITE				
KLINE, STEVE	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
LAUER, MIKE	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
LEIDER, AMY	✓	✓				X		SITE			SITE	SITE	SITE	SITE				
LEWIS, MARK	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
LYNN, STEVE	✓	✓	X	X	✓	✓		SITE		✓	SITE	SITE	SITE	SITE	X		X	
MCMAHON, CAREN	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
MEANEY, CARBON	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
MISKEN, KATHARINE	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
MONTGOMERY, BRIAN	✓	✓	X			✓		SITE		✓	SITE	SITE	SITE	SITE				
PALANCIA, VIRGIL	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
PALMER, DAVE	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
PLANK, MARTHA	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
REEDER, DAN	✓	✓	X			✓		SITE		X	SITE	SITE	SITE	SITE	X		X	
RIGOR, DAYNA	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				
SCHNEIDER, KAREN	✓	✓	X			✓		SITE		✓	SITE	SITE	SITE	SITE				
SCHOCK, PAUL	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				
SERREZE, BUSAN	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
SHAPIRO, SHERYL	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
SPENCER, STAN	✓	✓	✓			✓		SITE			SITE	SITE	SITE	SITE				
TEETMEYER, KATHY	✓	✓	X	X	X	✓		SITE			SITE	SITE	SITE	SITE				
TULLIUS, MARK	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
ROUBIN, MICHAEL	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
BURNETT, DONALD	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
GLOVER, KENT	✓	✓				✓		SITE			SITE	SITE	SITE	SITE				
MYLLER, BRIAN	✓	✓	✓	✓	✓	✓	X	SITE		X	SITE	SITE	SITE	SITE				X
DRILLER 1	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				X
DRILLER 2	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				X
DRILLER 3	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				X
DRILLER 4	✓	✓	X			✓		SITE			SITE	SITE	SITE	SITE				X

X - Required and not completed  
 ✓ - Required and completed  
 [shaded box] - Not required  
 SITE - On-site training required

### **3.0 SCOPE OF WORK**

#### **3.1 General Approach**

All data collection, sampling, and support activities (e.g., labeling, handling, shipping, and data capture) will be performed in compliance with the SOW provided with the RFP and EG&G's Environmental Management Department Standard Operating Procedures (SOPs). The SOPs will include the following: (1) EMD Operating Procedures Volume I: FIELD OPERATIONS Manual No. 0-21000-OPS-FO; (2) EMD Operating Procedures Volume II: GROUNDWATER Manual NO. 5-21000-OPS-GW; and (3) EMD Operating Procedures Volume III: GEOTECHNICAL Manual No. 5-21000-OPS-GT. Stoller will use the most recently approved SOP available. If any field or support element described in the SOW should be found to conflict with the analogous operating procedure, Stoller will bring the discrepancy to the attention of the CTR and await specific instructions on how to proceed.

#### **3.2 Task Descriptions**

##### **3.2.1 Objectives and Scope of Work**

This section provides a brief description of the study area and describes the tasks outlined in Revision 3 of the SOW. Each subsection includes a brief discussion of (1) each task and associated issues, and (2) our proposed technical approach, which is based on Revision 3 of the SOW, Combined Phases RFI/RI Work Plan, EMD operating procedures, prior experience at Rocky Flats, and other RFI/RI's.

We have assumed that EG&G will be responsible for procuring the laboratories and data validation and that Stoller will be responsible for developing the Work Plan Implementation Plan and the Health and Safety Plan, coordinating and performing field studies, handling and shipping of samples, coordinating and performing data analysis, preparing the Human Health Risk Assessment, and preparing the RFI/RI Report. In all tasks, we have made every effort to keep our costs to a minimum while ensuring that requirements for quality and schedule can be met.

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### 3.2.2 Task 1 -- Work Plan Implementation Plan

Formulation of a technically sound Work Plan Implementation Plan (WPIP) is required for the efficient and thorough collection and analysis of field samples and interpretation of field and laboratory results. This WPIP specifically addresses the following RFI/RI objectives:

- Organization and structure of the program
- Procedures to implement the work plan
- Equipment requirements and specifications
- Field procedures and support
- Training requirements
- Detailed project schedules
- A description of the analytical techniques best suited to interpret the data to meet program objectives

The WPIP addresses, by task, equipment and procedures required to implement the Technical Memorandum No. 1, Revised Field Sampling Plan and Data Quality Objectives, The West Spray Field (IHSS 168), Operable Unit No. 11 Final Revision 0, (FSP TM), dated June 13, 1994, including equipment to be provided by the subcontractor and equipment to be provided by EG&G. Additionally, the WPIP will address procedures for the following:

- Integrating field activities to ensure that quality data are obtained, field activities are performed in accordance with the IAG schedule, and appropriate sampling points are preserved and maintained for future use
- If requested, integrating OU 11 sampling activities with ongoing sitewide sampling programs to eliminate redundant efforts, reduce costs, and maintain consistent field sampling protocol/quality

- Incorporating the Environmental Evaluation (performed by EG&G) into the Combined Phases RFI/RI Report
- Modifying the OU 11 FSP TM

Development of the WPIP will include a brief review of (1) previous site characterization results, (2) new information that has become available since preparation of the original work plan, and (3) programmatic information (such as health and safety requirements, drilling rates and problems encountered, and site characterization data) obtained during Stoller's participation in the installation of monitoring wells at OU 7. Additionally, the WPIP will present a baseline schedule in GANT and Pert Chart format, as specified in Section 4.2.1 of the SOW, detailing project milestones, tasks, and review/approval periods. Upon notification by the EG&G technical lead of any impacts to original funding levels or milestones, the baseline schedule will be revised.

### 3.2.3 Task 2 -- Health and Safety Plan

A comprehensive site-specific Health and Safety Plan (HASP) will be developed and approved prior to the initiation of any fieldwork. This plan will define all precautions and procedures to be used to effectively protect the health and safety of all field personnel performing Combined Phases RFI/RI-related work.

The following documents will be used in the preparation of the HASP: Environmental Management Radiological Guidelines (ERMGs), the Plan for Prevention of Contaminant Dispersion (PPCD), and the EG&G Rocky Flats Health and Safety Practices Manual.

The HASP will provide specific work procedures, protective equipment requirements, radiological and monitoring requirements, training requirements, and emergency response guidelines for each site activity performed on this project for all workers, vendors, and visitors to the site. The HASP will be prepared under the supervision of an Industrial Hygienist. A draft HASP will be submitted to EG&G's Health and Safety personnel for review and approval within 15 days of the notice to proceed. All comments will be addressed in the final HASP and implemented for the project.

The implementation of the HASP will include site-specific training for field personnel, provision of direct reading air monitoring equipment, provision of all appropriate personal protective equipment for field personnel, and collection of air samples for laboratory analysis. Other equipment will be provided by EG&G.

### 3.2.4 Task 3 -- Combined Phases RFI/RI Implementation

#### 3.2.4.1 Field Activities

Field activities to be performed at OU 11 are discussed in detail in Section 4.3 of the OU 11 FSP TM, and Stoller's technical approach is discussed below, along with potential modifications. All field activities will be performed according to EG&G Rocky Flats operating procedures except where noted.

Initial Survey. Prior to initiating fieldwork, a visual survey will be performed to (1) identify any potential hazards that would prohibit or limit the use and/or access of the field equipment, (2) evaluate potential impacts of ongoing RFP operations on the proposed field activities and quality of data collected, (3) identify areas of soil staining or stressed vegetation that could indicate potential contamination, and (4) delineate areas impacted by spray evaporation activities. Locations of all borings and sample points will be paced and/or taped off and staked prior to sampling or drilling.

Soil Borings. Borings will be drilled at 12 locations within OU 11. All borings drilled within OU 11 will penetrate the surficial alluvium to a perched saturated zone. Stoller will consult with the EG&G project manager prior to penetrating an underlying aquitard. If a perched water table is not encountered, the borings will either be advanced to the saturated zone, abandoned, or drilled to the alluvial/bedrock contact as determined by the EG&G project manager. After a boring has been advanced to bedrock, it will be abandoned in accordance with SOP GT.05.

Drilling will be performed using resonant sonic drilling technology, and borehole material samples will be collected in a split spoon sampler as defined in SOP GT.02 or using other methods appropriate to resonant sonic drilling. Resonant sonic technology has several advantages over conventional drilling, as follows:

- No fluids are used during drilling.
- It provides for the recovery of relatively undisturbed, continuous core samples.
- The drilling process is faster.
- Little or no cuttings are produced, depending on the geologic formation being drilled.
- It is safer because the drill rig handles the casing.
- Monitoring wells are easily installed in the boreholes.

Because resonant sonic drilling is a relatively new technology, the resonant sonic drilling technique will be tested at one site to ensure that it meets program objectives. If program objectives are not achieved, hollow-stem augers will be used.

Samples for water content measurements will be collected every two feet and tested in the field using a "Speedy Soil Moisture Tester." Duplicate water content samples will be collected and sent to an EG&G approved geotechnical laboratory for analysis.

Investigation-derived wastes such as cuttings, which are minimal using resonant sonic drilling technology, and residual samples will be placed in EG&G-supplied drums and transported by the Stoller Team to the 90-day storage area in the subcontractor yard.

During drilling, all drill core and soil samples will be screened with field instruments for radiological contamination and VOCs. For all borings, soil samples for chemical analysis will be collected from the ground surface to the perched groundwater or saturated zones. Two-foot composite samples will be collected from the ground surface to a depth of 30 feet. From a depth of 30 feet to the saturated zone, 6-foot composite samples will be collected. Soil samples will be classified, logged, peeled, and composited for laboratory analyses according to SOP GT.01, SOP GT.02, and SOP FO.13.

All drilling and sampling equipment will be decontaminated before arrival at the work site and between each boring in accordance with SOPs FO.03 and FO.04. To prevent vertical migration

of contaminants after drilling, all boreholes will be grouted and abandoned immediately after drilling.

Monitoring Well Installation. Twelve groundwater monitoring wells will be constructed to monitor perched groundwater or saturated zone conditions. Screened intervals will be selected in accordance with specifications outlined in Section 4.3.3.2 of the FSP TM or as clarified by the EG&G project manager. Monitoring well development and groundwater sampling will be performed in accordance with SOPs GT.06 and GW.02. If the saturated thickness of the perched groundwater zones are significantly greater than anticipated (we assume saturated zones will be approximately 7 feet thick), multiple screened intervals to assess the vertical concentration profile may be warranted. For the purposes of this proposal, we assume that a single screened interval will be adequate for characterizing perched groundwater zones. These wells will be used to determine the quality of the perched groundwater in OU 11. For costing purposes, we have assumed that wells will be installed in each borehole. However, it may be necessary to drill monitoring wells adjacent to boreholes depending on the results of borehole drilling. The uncertainty of the presence of perched zones along with their assumed thinness may make identification difficult.

Aquifer Tests. A slug test will be performed in each monitoring well to measure the apparent hydraulic conductivity of the alluvium or bedrock *in situ*. Slug tests will be performed following guidelines in SOP GW.03 using equipment provided by EG&G.

Groundwater Sampling. Groundwater sample collection will be performed in accordance with SOP GW.06. Groundwater will be sampled and analyzed for the contaminants of concern (COCs) and field parameters (pH-specific conductance, temperature, dissolved oxygen, and barometric pressure) will be measured at the time of sample collection. Stoller proposes to conduct the first round of sampling 48 hours after the wells have been developed to allow time for the water level to stabilize. These wells will be sampled by EG&G quarterly for a period of one year. Based on the results of the first year of sampling and the recommendations of the EG&G CTR, further sampling needs will then be evaluated.

Subsurface Soil Sampling. Subsurface soil samples will be collected from drill core from each boring and analyzed for nitrate, plutonium, and metals. In order to determine contaminant concentration as a function of depth, samples will be collected at 2-foot intervals from the ground surface to the perched groundwater or saturated zone. Assuming a depth to saturated

zone of 30 feet and 2-foot composite samples, 90 subsurface soil samples will be collected from the six borings.

Groundwater Measurements. As specified in the FSP TM, static depth-to-water measurements will be obtained according to SOP GW.01 and used with total depth measurements and well casing diameter to determine the volume of water in the well casing.

Final Location Survey. After sampling, drilling, or well installation, the locations will be surveyed using standard land surveying techniques following guidelines in SOP GT.17. Horizontal accuracy will be  $\pm 0.1$  feet for borings wells. Vertical accuracy will be  $\pm 0.1$  feet for borings and  $\pm 0.01$  feet for wells because static depth-to-water measurements are made to  $\pm 0.01$  feet. Three elevations will be determined for each well: ground surface, top of well casing, and top of surface casing.

#### 3.2.4.2 Data Management and Analysis

Data Management and Reporting Requirements. Field data will be entered into the Rocky Flats Environmental Database System (RFEDS) using the DATACAP module supplied by EG&G. Data will be entered on a timely basis and a 3.5-inch diskette will be delivered to EG&G weekly, as specified in SOP FO.14. A hard copy report will be generated from the module for contractor use.

Data collected during the Combined Phases RFI/RI fieldwork and returned from the analytical laboratory will be managed in a project specific database. The database software will be compatible with current Rocky Flats software and hardware requirements and will also interface with Stoller's and EG&G's Geographic Information Systems (GIS). The database will consist of spatial, field, and analytical data and will cover geology, soils, hydrogeology, surface water, and sediment data collected during the Combined Phases RFI/RI fieldwork. Data will be analyzed to characterize OU 11 physical features, sources of contamination, and nature and extent of contamination and support the Baseline Risk Assessment (BRA).

Data Evaluation and Analysis. Data collected during the Combined Phases RFI/RI will be integrated with existing sitewide and OU 11-specific data that describe environmental conditions at OU 11. The resulting data set will consist of geology, soils, hydrogeology, surface water, sediment, air, and biota data. The objectives of the data evaluation will be to (1) better

characterize site physical features, contaminant sources, and the nature of contamination, (2) revise the current conceptual model of the site, if necessary, and (3) support the Baseline Risk Assessment. Historical and Phase I data will be used to evaluate remedial alternatives.

Site Characterization. During the site characterization effort, the physical data collected in the Combined Phases RFI/RI will be integrated with previous data to provide a better description of the site stratigraphy, groundwater flow conditions, and groundwater-surface water interactions. Geology and soils data will be incorporated into existing site maps and cross-sections, and any new interpretations of site stratigraphy based on geologic logs from boreholes and wells will be added.

Water-level data will be used to characterize the alluvial groundwater flow regime. The response of water levels to precipitation events will be evaluated for both historical and new data. Well hydrographs will be prepared for all wells, and the data will be summarized graphically for wells in each of the three spray areas. Groundwater potentiometric surface maps will be prepared for low and high water elevation time periods and will show areas of saturated surficial materials.

Source Characterization. Analytical data obtained from subsurface soil and groundwater will be used to (1) characterize the nature of contaminant sources, (2) determine the lateral and vertical extent of contaminant sources, (3) evaluate onsite contaminant concentrations, and (4) better quantify the volume of source material.

Chemical concentration data from various media sampled at OU 11 will be statistically evaluated to identify analytes present at concentrations elevated relative to their concentrations in media from background locations. Analytes having elevated concentrations in media from OU 11 will be considered potential contaminants of concern (PCOCs). PCOCs will be identified by comparison to background data using the statistical and quantitative methods outlined in EG&G's Statistical Comparisons of Site-to-Background Data in Support of RFI/RI Investigation dated 1994. The site-to-background comparison methods will be used to identify inorganic analytes and radionuclide PCOCs. Organic compounds will be considered PCOC if repeatedly detected in samples from OU 11.

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### 3.2.5 Task 4 -- Baseline Risk Assessment

The BRA has two components: the Human Health Risk Assessment (HHRA) and the Environmental Evaluation (EE). EG&G will complete the EE, and Stoller will incorporate the findings of the EE into the BRA for the Combined Phases RFI/RI Report. Stoller will conduct the HHRA according to the tasks outlined in the SOW and current EPA guidance on conducting risk assessment.

#### 3.2.5.1 Human Health Risk Assessment

The HHRA will be conducted for OU 11 according to current EPA guidance, including the EPA *Risk Assessment Guidance for Superfund: Volume I*. The HHRA will include five subtasks: (1) Data Evaluation and COC Identification, (2) Exposure Assessment, (3) Toxicity Assessment, (4) Risk Characterization, and (5) Uncertainty Analysis. A brief description of each subtask is provided below.

Data Evaluation and COC Identification. A high degree of confidence is required for data used for the quantitative Baseline Human Health Risk Assessment. EPA has published guidelines for evaluating data quality, including *Guidance for Data Usability in Risk Assessment* and *The Functional Guidelines for Data Validation* (for organics and inorganics). The Quality Assurance Project Plan (QAPjP) for Rocky Flats and OU 11 was developed using EPA guidance and provides the site-specific quality assurance framework for collection and handling of samples and analytical results associated with the Combined Phases RFI/RI. EG&G's *General Radiochemistry and Routine Analytical Services Protocol* (GRAASP) provides the framework for selection and use of analytical methods for environmental data at Rocky Flats. The procedures described in these documents were designed to meet general data quality objectives for use of environmental data at Rocky Flats, including baseline risk assessments. The Quality Assurance Program Plan (QAPP), QAPjP, GRAASP, and the data validation process have all been approved for use by EPA and CDH. One hundred percent of laboratory analyses are routinely subjected to the standard EG&G data evaluation and validation process by EG&G subcontractors.

The Stoller Team will further evaluate the data for OU 11 data quality objectives including precision, accuracy, representativeness, consistency, and comprehensiveness (PARCC). The OU 11 data will be compared against the QAPjP goals set for each of these parameters. These

evaluations will be completed 90 days after receipt of all of the validated data as described in this section. The resulting data will be evaluated to identify OU 11 site-specific chemical contaminants using the general process developed in conjunction with EPA and CDH. This process was designed to identify sitewide contaminants and "hot spots," as well as possible data anomalies that may have resulted from measurement error.

COCs will be identified from the list of OU 11 contaminants. The process of identification will be based on EPA guidance on conducting a concentration-toxicity screen to determine chemicals that contribute more than one percent of the total carcinogenic and non-carcinogenic human health risk at OU 11. The screening process will include evaluation of chemicals found only in "hot spots." Concentration-toxicity screening will be conducted by comparison of site data to applicable or relevant and appropriate requirements (ARARs) and established toxicity benchmark values. Consideration will also be given to the chemical's mobility, persistence, and bioaccumulation properties and whether the chemical is an essential nutrient.

Exposure Assessment. The goal of the exposure assessment is to estimate the magnitude of existing or potential exposures to human receptor populations. The exposure assessment includes two main components. First, all potential exposure pathways and exposed or potentially exposed populations are identified, and representative exposure scenarios are selected for detailed analysis. Second, exposures are estimated using appropriate exposure point concentrations calculated directly from site data or from fate and transport modeling.

*Identification of Exposure Scenarios and Exposure Pathways.* Potential human receptors under current exposure scenarios (e.g., onsite workers) and hypothetical future scenarios (e.g., offsite residents) will be defined according to current EPA guidance (*Risk Assessment Guidance for Superfund: Volume I, Parts A and B [RAGS]*). Selected exposure scenarios will also be consistent with HHRA's performed for other operable units at Rocky Flats. Appropriate exposure parameters for each scenario will be obtained from the most current EPA guidance, such as RAGS or the *Exposure Factors Handbook*, or from recent literature on human health risk assessment.

All potential exposure pathways will be determined for each scenario. For example, under current conditions, exposure pathways for onsite workers may include dermal contact with soil or surface water, incidental ingestion of soil or surface water, and inhalation of volatile compounds and fugitive dusts (total of six possible exposure pathways). Offsite residents may

be exposed through dermal contact with or incidental ingestion of contaminated surface water, inhalation of airborne soil particulates, or ingestion of offsite groundwater. Costs for performing the exposure assessment were estimated assuming that COCs will be restricted to metals and radionuclides. Based on the FSP-TM, occurrence of volatile and semivolatile organic compounds are not expected and, therefore, assessment of exposures for such compounds will be unnecessary.

*Quantification of Exposures.* Exposures to identified receptors will be quantified using the exposure scenario parameters and site-specific data from OU 11. Exposure point concentrations for use in current and onsite scenarios will use site-specific data aggregated according to current guidance for conducting risk assessments at Rocky Flats. Methods for data aggregation are currently being discussed by EPA, CDH, and DOE, and a formal agreement should be available for use in the OU 11 BRA. Results of these discussions will be used to guide the exposure assessment for OU 11. Exposure point concentrations experienced by populations under the current exposure scenario will be derived using statistical summaries (i.e., mean and upper-bound confidence limits of the mean) of ambient (i.e., historical and Phase I) data. Exposure point concentrations experienced by populations under future exposure scenarios will use ambient data or will be modeled on the basis of ambient data. A significant modeling effort to determine these exposure point concentrations is anticipated and may require air modeling, groundwater modeling, and surface water modeling. Subtask components are described below.

Fate and transport models used to estimate exposure point concentrations will be selected in coordination with EG&G. Factors influencing the selection of models include applicability for the transport processes and contaminants, appropriate documentation and validation, and cost-effectiveness (e.g., simplified versus detailed analysis needs). Exposure point concentrations will be modeled using historical and current sampling data. Average and "reasonable maximum" (i.e., upper 99 percent confidence limit on the mean) values will be calculated for those media used in the exposure assessment and uncertainty analysis (i.e., onsite subsurface soil and groundwater) or for use in modeling air, offsite groundwater, and offsite surface water exposure point concentrations.

Toxicity Assessment. This task will characterize existing information pertaining to the potential for adverse health effects related to exposure of human receptors to each COC and evaluate, to the extent practicable, dose-response relationships. Bioavailability for each COC will be discussed; we will select the most appropriate bioavailability estimate for the conditions and

potential exposure pathways at the site. The toxicity assessment will also identify the primary target organs and toxic effects for each COC and assess the applicability of toxicological data to the identified exposure scenarios. The toxicity assessment will draw mainly upon secondary sources such as published EPA source documents (e.g., the Integrated Risk Information System and Health Effects Assessment Summary Tables) and other sources. For compounds with inadequate information, a search of the primary literature will be performed for up to five compounds. Because the occurrence of organic compounds is not expected in media at OU 11, performance of toxicity assessments for organic compounds is not anticipated.

This subtask will include an evaluation and discussion of uncertainties inherent in the development and application of toxicity factors. The text will specifically address issues such as EPA methods for classifying carcinogens, uncertainties associated with cancer slope factors and reference doses, the relevance of the carcinogenic mechanism to likely exposure pathways, the importance of pharmacokinetic characteristics, and the applicability of toxicity results from laboratory animal testing to human populations. COCs deemed to pose the greatest risk to human receptors will receive additional toxicological analysis to more fully describe the level of confidence in the available toxicity factors.

Risk Characterization. The risk characterization integrates the results of the exposure and toxicity assessments to obtain, where possible, quantitative estimates of risk. This task will include the preparation of a report that presents the decision maker with relevant qualitative and quantitative information developed in the exposure assessment task and the toxicity assessment task. The risk characterization will integrate the toxicity factors for the COCs with the estimated chemical intakes and radiation exposures projected for multiple exposure scenarios to provide estimates of carcinogenic and noncarcinogenic health risks.

Uncertainty Analysis. A key objective of the BRA will be the identification of the uncertainty associated with point estimates of risk. The BRA will satisfy the technical and administrative requirements of the NCP, which require developing a Reasonable Maximum Exposure (RME) scenario. However, the BRA will also go beyond these minimum requirements to provide an objective assessment of risk in a form that can be incorporated into a risk management decision-making process.

A quantitative uncertainty analysis will be conducted using Monte Carlo simulation methodology. This method will allow assessment of the probability that the calculated exposures will actually

occur. Probabilities will be estimated using the statistical distributions of contaminants in environmental media, uncertainty distributions associated with the fate and transport models, and uncertainty associated with human intake parameters. The incorporation of all sources of uncertainty requires two steps. First, the sources and magnitudes of sources of uncertainty must be identified. Second, quantitative techniques must be applied, where possible, to analyze the propagation of these sources of uncertainty into the final risk characterization.

The advantages of quantitative uncertainty assessment are its apparent objectivity and ability to provide a graphic demonstration of the range of possible risks incorporating plausible ranges of input parameters. However, many of the probability distributions for input parameters are themselves uncertain and are based on assumed distributions. Thus, the variance revealed by Monte Carlo techniques is only approximate and often subject to much debate among technical reviewers. Thus, these results must be communicated effectively to ensure that results are neither over- nor under-interpreted; our technical staff has extensive experience in concise technical writing and risk communication.

Uncertainties in the toxicity values will be discussed qualitatively and will not be part of the Monte Carlo assessment. Particular emphasis will be placed on the confidence that a particular chemical will cause the defined effect in humans (e.g., animal to human extrapolation) and the likely variability in responsiveness in humans. The appropriateness of the low dose extrapolation model for specific chemicals will also be described.

Technical Memoranda. Throughout the HHRA, it will be important to obtain informal and formal input from the regulating agencies into the risk assessment process. To gain formal input, Technical Memoranda (TMs) will be produced that outline methods, results, and/or the rationale used to assess human health risks at OU 11. Each of the TMs will discuss aspects of the risk assessment as they relate to the three spray areas into which OU 11 has been divided. The TMs will be submitted to the agencies for review and comment. Comments will then be incorporated in the TM before use in the final risk characterization.

For the purpose of estimating cost, it has been assumed that each TM will be revised twice. The first revision will incorporate comments resulting from DOE and EG&G review and be delivered to EG&G within 10 business days after receiving the final comments. The second revision will incorporate comments made by EPA and CDH on the first revision and be delivered to EG&G within 10 business days after receiving the agency review. Stoller assumes that three copies of

each version of the TM will be submitted to EG&G. The content of Technical Memoranda Nos. 2 through 5 will be as summarized below. As noted previously, Technical Memorandum No. 1 is the Revised Field Sampling Plan and Data Quality Objectives document (see Section 3.2.2).

- *HHRA Technical Memorandum No. 2 -- Exposure Scenarios* Technical Memorandum No. 2 (TM-2) will describe the rationale for selection of the exposure scenarios, the intake parameters selected for use with each, and the pathways to be assessed. The costs for this task were estimated assuming that two current exposure scenario and five hypothetical future use scenarios will be defined and evaluated. The costs also assume that chemicals of concern will be limited to radionuclides, metals, and volatile organic compounds. TM-2 will reflect EPA guidance on selecting exposure scenarios and parameters, recent CDH guidance on performing risk assessments at RCRA facilities, and current guidance for conducting risk assessments at Rocky Flats.
- *HHRA Technical Memorandum No. 3 -- Model Description* Fate and transport models proposed for use in predicting exposure point concentrations will be outlined in Technical Memorandum No. 3 (TM-3). The models will be selected according to criteria suggested by EPA. The document will provide the basis for model selection and a summary of data to be used with the models.
- *HHRA Technical Memorandum No. 4 -- Identification of COCs* Technical Memorandum No. 4 (TM-4) to EG&G will present the COC selection process, the rationale for COC selection, and the HHRA COCs. TM-4 will also include a list of all hazardous substances present at OU 11 and the concentrations at which they occurred as well as all data used in selecting COCs. TM-4 will be prepared within 60 days after all validated data have been received by Stoller.
- *HHRA Technical Memorandum No. 5 -- Toxicity Assessment* EPA-approved toxicity values for COCs identified in TM-4 and the rationale for their selection will be presented in Technical Memorandum No. 5 (TM-5). Toxicity values will be obtained from standard EPA sources (e.g., the *Integrated Risk Information System* [IRIS], *Health Effects Assessment Summary Tables* [HEAST]), or the scientific literature. Toxicity factors will consist of slope factors for carcinogenic compounds and reference dose (RfD) values for non-carcinogens.

### 3.2.5.2 Environmental Evaluation

As noted in the introduction to Task 4, the EE, which serves as the ecological risk assessment component of the BRA, is being prepared by EG&G. The EE report will be provided to Stoller, which will integrate the findings of the EE into the RFI/RI Report (see Task 5, Section 3.2.6). The EG&G EE report will be included as an appendix.

### 3.2.6 Task 5 -- RFI/RI Report

Stoller will prepare a Phase I RFI/RI Report for OU 11 that will consolidate and summarize the data obtained during fieldwork performed under this task order as well as data collected from previous and ongoing investigations. This report will:

- Describe field activities that serve as a basis for the Phase I RFI/RI Report. This will include any deviations from the work plan that occurred during implementation of the field investigation.
- Discuss sample analysis and data validation criteria established by the ER Program QAPjP and the EPA and summarize the amount, validity, and useability of data obtained previously and during the RFI/RI.
- Discuss data management procedures, including documentation of field activities, sample management and tracking, and management and recording of analytical data and other information.
- Present and discuss site physical features and contamination at OU 11 based on existing data and data derived during the Phase I RFI/RI. This discussion will include surface features, climate, surface water hydrology, surficial geology, soils, stratigraphy, groundwater hydrology (perched zone), demography and land use, and ecology. Media to be addressed will be limited to contaminant source and soils.
- Discuss contaminant fate and transport based on existing information. This will include a preliminary identification of potential contaminant migration routes and

a discussion of contaminant persistence, chemical attenuation processes, and potential receptors.

- Present a BRA consisting of a Baseline HHRA and an EE. The BRA will evaluate the potential human health and environmental risks associated with the site and provide a basis for determining whether remedial actions are necessary. The HHRA and EE reports will summarize results of field activities performed to define or characterize the sites, sources of contamination, nature and extent of contamination, toxicity and concentrations of hazardous substances present, contaminant fate and transport mechanisms, environmental setting, areas threatened by releases from each site, potential for human and/or environmental exposure, and potential short- and long-term threats to human health and the environment.
- Present a summary of findings and conclusions.
- Identify data needs for additional characterization of OU 11 if necessary.

Before submittal of the Combined Phases RFI/RI Report, a Preliminary Site Characterization Summary will be provided to EPA and CDH for review. This summary will provide an early description of the initial site characterization effort, including a preliminary presentation of analytical data and a listing of chemical and radiological contaminants, the affected media, and potential sitewide chemical-specific ARARs. In addition to the characterization summary, technical memoranda will be prepared with the completion of each field sampling task to provide preliminary results of field investigations.

### 3.2.7 Task 6 -- Project Management

The scope and complexity of the Combined Phases RFI/RI requires rigorous project management to assure the achievement of milestones, fulfillment of deliverables, and completion of the project on time and within budget.

### 3.2.7.1 Administrative Management

Schedule and Budget. Several project management tools can be used successfully for tracking schedule and cost progress. Stoller has used the following project management tools on many Rocky Flats projects.

- Monthly Schedule and Budget Development
- Earned Value and Variance Reporting

Monthly Schedule and Budget. A schedule containing the Combined Phases RFI/RI activities is included in Figure 3.

Report tasks will be progressed using a percentage method. The project manager will determine how much work has been completed toward the milestone or deliverable. Potential measurement criteria could include database development, development of annotated outline, preliminary characterization and development of maps, and refined characterization. Sampling tasks will be measured by the percentage of samples taken and the number of days required to perform the sampling. The number of days estimated to complete the task will be scheduled; however, progress will tracked by the number of boreholes drilled and the number of samples completed and shipped to the laboratory. Negative schedule variances such as days lost due to inclement weather or other unanticipated and unavoidable delays as a result of circumstances outside the control of the project will be distinguishable from field related delays.

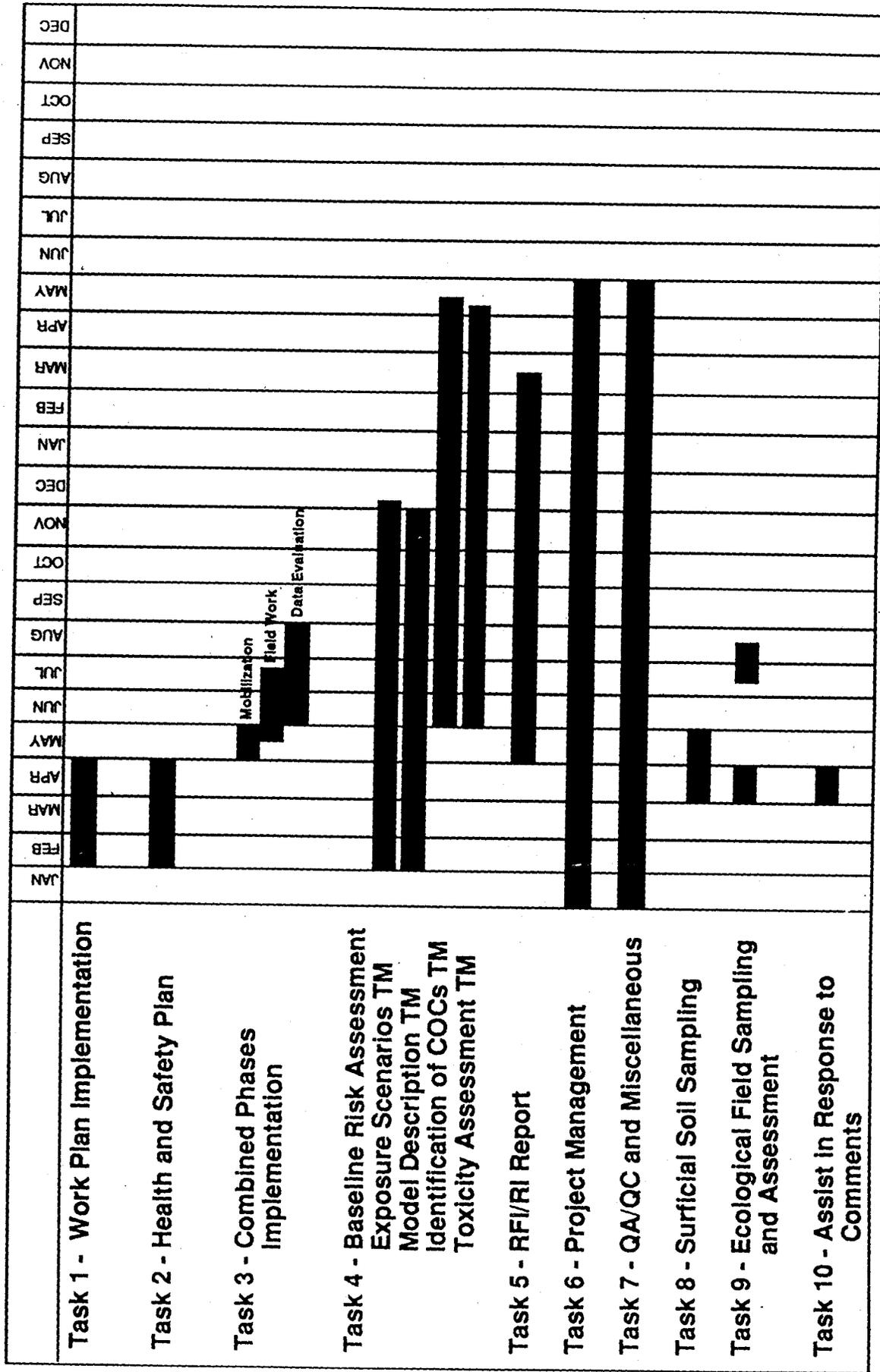
The schedule and budget status will be formally reported to the EG&G Procurement representative and the EG&G CTR on the 15th day of the month for the proceeding month's activity. This reporting will include current and project-to-date incurred values, percentage completed, number of FTEs at the contractor facility, and number of FTEs at the subcontractor facility for the current month. Additionally, this status report will also include narrative describing the progress, changes, and potential problems of the project.

Earned Value and Variance Reporting. The earned value of the project is a measure of the work accomplished. Earned value tracking is based on the task work breakdown structure, schedule, monthly budget, and monthly progress of each task. Every month, the work performed is converted into a percentage of the total project scope. The budgeted cost is multiplied by the

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**Figure 3 Project Schedule  
Implementation of the Combined Phases RFI/RI Work Plan for  
Rocky Flats Plant Operable Unit No. 11**

**Tasks**



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percentage to determine the earned value. Information included in the earned value tabulation is the current month and cumulative budget, schedule, budgeted cost of work performed (BCWP), actual cost of work performed (ACWP), budgeted cost of work scheduled (BCWS), earned value, and cost variance and schedule variance for each task and the project. Using this data, Stoller prepares a variance report which details the reasons for task variances.

### 3.2.7.2 Meetings

Stoller will attend performance meetings as needed. Meetings may be held with EG&G project team members on a biweekly schedule and with EG&G, regulatory agencies, and DOE on a bimonthly basis. Stoller will participate in logistical and coordination meetings. Meeting minutes will be prepared by Stoller and will be delivered to the EG&G CTR within one week of the meeting date. Meeting minutes will be typed in WordPerfect for the Macintosh, and a hard copy and electronic copy will be transmitted to the EG&G CTR. Stoller will attend additional meetings at the request of the EG&G CTR.

### 3.2.8 Task 7 -- Quality Assurance/Quality Control and Miscellaneous Tasks

The complexity of the RFI/RI process requires the implementation of various miscellaneous tasks that support project goals and objectives. Two key support functions are quality assurance/quality control (QA/QC) and data management. QA/QC is required throughout all phases of the project to ensure that data is correctly collected, analyzed, and stored; documentation is complete; and reports are technically correct and consistent in format. Data management is critical to the data analysis task. Effective data management ensures that all project data is correct, accessible, and usable.

Stoller will perform several miscellaneous tasks that will help to ensure the quality of the project -- Field Deficiency Resolution, Data Management and Quality, Document Format, Data Compatibility and Management, and QA training.

#### 3.2.8.1 Quality Assurance/Quality Control

Stoller's corporate QA/QC policy ensures that all work performed under this work order complies with the EG&G Environmental Management (EM) QAPjP, EPA QAMS-005/80, and DOE Order 5700.6B. The QA/QC aspects of this project will incorporate all items detailed in

the SOW related to QA/QC organization and authority, onsite and offsite training, documentation, protocols, and corrective action.

Stoller will follow elements of its QA/QC program relevant to the work required in performance of this task order. Stoller will also ensure that all components of the "Quality Assurance Requirements" provided by EG&G in Section 6.0 of the SOW are fully satisfied by Stoller and subcontractor personnel. Those requirements are included with this proposal on the following three pages.

#### 3.2.8.2 Field Deficiency Resolution

The field program is critical to the success of the overall project and rigorous QA/QC must be employed in all aspects of the field program. As part of the QA/QC of the program, Stoller will participate in field management review meetings. These meetings will assess the field sampling program and will review deficiencies identified by EG&G and DOE QA/QC audit findings or the regulatory agencies. Stoller will prepare written responses to any field deficiencies which will include the corrective action to be taken. Additionally a schedule for resolving deficiencies will be developed.

#### 3.2.8.3 Data Management and Quality

Rocky Flats has developed QA/QC procedures for environmental sampling and environmental data management. Stoller will attend an EG&G Sample Management Organization briefing before sampling activities and before data use and extraction.

#### 3.2.8.4 Document Format

Stoller will develop all reports, letters, and other documentation in accordance with EG&G Administrative Procedures and Records Management Format.

#### 3.2.8.5 Data Compatibility and Management

Stoller will provide GIS support for the OU 11 project. All spatially referenced OU 11 data will be managed within the GIS environment and will be used for spatial modeling and map development. Base coverages will be supplied by Rocky Flats. The spatial data will have an

## 6.0 QUALITY ASSURANCE REQUIREMENTS

Work performed under this SOW is governed by the EG&G Environmental Restoration(ER) Quality Assurance Project Plan (QAPjP). The ER QAPjP complies with the requirements of EPA QAMS-005/80 and DOE Order 5700.6C which addresses ASME NQA-1. The subcontractor shall comply with the following specific Quality Assurance (QA) requirements prior to the initiation of work, as appropriate:

### 6.1 Quality Assurance Addendum

After review of the draft work plan, EG&G ER shall prepare a Quality Assurance Addendum that shall be submitted as part of the final work plan.

### 6.2 Organization

The authority and responsibilities of persons or organizations performing work under this statement of work shall be established, documented and submitted to EG&G ER. An organization chart identifying specific individuals by name, supported by itemized authorities and responsibilities is a suitable means of documentation.

### 6.3 Personnel Qualification

Personnel performing technical work shall receive training and indoctrination in accordance with 3-21000-ADM-2.02 to applicable procedures to assure proper understanding of the QA and technical requirements of this SOW before beginning work. In addition, written personnel qualification requirements shall be established for all positions performing technical work. Documented evidence of personnel training, training material content, personnel qualification requirements, and the qualification of personnel who meet the personnel qualification requirements shall be maintained and made available to EG&G for review upon request. EG&G will provide training for Quality Assurance and technical procedures furnished by EG&G.

Specific training shall include instruction to conform with EG&G health and safety, hazardous waste management and radiation worker requirements, as applicable.

### 6.4 Design

Activities involving the performance of technical design related activities, specifically, but not limited to, calculations used in developing data and calculations incorporated into reports, shall be reviewed, verified and documented. Calculations shall be performed in accordance with EG&G procedure number 3-21000-ADM-03.01.

### 6.5 Instructions, Procedures, and Drawings

All work shall be performed to EG&G ER approved and controlled procedures except where excluded in writing by EG&G.

### 6.6 Document Control

The subcontractor shall acknowledge receipt of and manage EG&G plans and procedures in accordance with EG&G procedure number 2-11000-ADM-06.01.

#### **6.7 Control of Purchased Items and Services**

Items or services procured under this subcontract shall be performed in accordance with the requirements of the QAPjP.

#### **6.8 Identification and Control of Items**

When applicable, the subcontractor shall prepare written procedures that ensure that only correct and accepted items are used or installed and that they are traceable through unique identifiers. The procedures shall be submitted to EG&G for approval 10 working days after notification of the requirement.

#### **6.9 Inspection**

Quality affecting activities are subject to inspection by EG&G. These inspections will be performed in accordance with EG&G procedure number 3-21000-ADM-10.01.

#### **6.10 Control of Measuring and Test Equipment**

Activities in which personnel use measuring and test equipment shall be controlled in accordance with EG&G procedure number 3-21000-ADM-12.01. Such devices shall be controlled, calibrated, and adjusted at predetermined intervals (established by the subcontractor and approved by EG&G) to maintain accuracy.

#### **6.11 Handling, Storage, and Shipping**

Activities in which personnel handle, store, package, ship, or receive items which if damaged, lost, or deteriorated would be detrimental to the work performed by the subcontractor or those activities in which personnel handle, store, package, or ship hazardous material shall be controlled by written procedures. The procedures shall be submitted to EG&G for approval 10 working days after notification of the requirement.

#### **6.12 Control of Nonconforming Items**

Activities regarding the identification and disposition of nonconforming items shall be performed in accordance with EG&G procedure number 3-21000-ADM-15.01. The control of nonconforming items shall apply to all activities that involve the handling of all items, including samples, data, raw materials, hardware, and software.

#### **6.13 Corrective Actions**

Activities that identify, rectify and preclude recurrence of conditions adverse to quality shall be conducted in accordance with EG&G procedure number 3-21000-ADM-16.01.

#### **6.14 Software Quality Assurance**

The development and use of both administrative and scientific computer software which have a potential to affect quality shall be performed in accordance with written procedures prepared by the subcontractor and submitted for approval by EG&G 10 working days after notification of the

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requirement.

#### 6.15 Accessibility

The subcontractor's work place and working records shall be accessible during normal working hours for verification or audit by EG&G or their representatives, during the performance of this subcontract. All completed records shall become the property of EG&G and shall be turned over to EG&G no later than sixty (60) days following the completion of the technical work.

#### 6.16 Miscellaneous

The subcontractor shall perform all work in accordance with EG&G Quality Assurance program requirements. All work shall be performed under the cognizance of the responsible EG&G organization and in accordance with approved EG&G implementing procedures, or subcontractor procedures which have been approved by the responsible EG&G organization prior to the start of any work. The responsible EG&G organization shall review and approval all work in accordance with applicable implementing procedures.

The subcontractor shall not be permitted to:

- Provide any safety-related items without prior inspection and acceptance by EG&G Quality Assurance organization.
- Perform any special processes such as welding, NDE, heat treatment, plating, etc., for which acceptance is based on supplier-furnished personnel qualifications or other quality assurance criteria.
- Perform inspections or tests of equipment or components for the purpose of determining final acceptance by EG&G, except for those inspections and tests conducted in accordance with approved EG&G implementing procedures or supplier procedures which have been approved by EG&G. All such inspections and tests shall be performed using measuring and test equipment verified and authorized by the Rocky Flats Metrology Lab. All work shall be performed under the direct supervision of EG&G, and witnessed by qualified EG&G personnel."

XY coordinate projection of True State Plan in the Colorado Central Zone with the NAD27 datum. Stoller will deliver all data to Rocky Flats as an ARC/Info export file for a UNIX operating system.

Stoller will enter all field data into DataCap on a daily basis. DataCap files will be transmitted to RFEDS weekly on 3.5-inch diskettes. Stoller will work closely with RFEDS personnel to ensure the completeness and correctness of all OU 11 data. As stated earlier, appropriate Stoller personnel will attend all training necessary to assure the quality and security of this data.

#### 3.2.8.6 Training

All Stoller Team personnel and subcontractor personnel who will be performing fieldwork will undergo the necessary Rocky Flats field training and are current in all health and safety requirements. Because many Stoller personnel are already trained, training costs can be kept to a minimum.

#### 3.2.9 Task 8 -- Surficial Soil Sampling

Based on Revision 3 of the SOW, Stoller understands that it will not perform additional sampling of surficial soils at the West Spray Field. Stoller assumes that EG&G personnel will perform all activities associated with collection of surface soil samples including collection, shipment, and tracking of samples and entry and management of data. Stoller also assumes that EG&G personnel will perform this task while operating under an existing EG&G Health and Safety Plan that addresses respiratory and other health concerns during sampling. Stoller assumes that revision of the Health and Safety Plan (Task 2.1) to address surface soil sampling is not required and mobilization activities relative to surficial soil sampling are not required under Task 3.1 (Mobilization and Field Support).

Stoller will evaluate and interpret the analytical data from the surficial soil sampling program and incorporate the results into the Baseline Risk Assessment and the RFI/RI Report. Stoller has incorporated the level of effort for these activities into the data evaluation, baseline risk assessment, RFI/RI Report, QA/QC, and project management tasks.

3.2.10 Task 9 -- Ecological Field Sampling and Assessment

Stoller will perform sampling for volatile and semivolatile organic compounds in subsurface materials and groundwater and incorporate analytical results into the environmental risk assessments for the OU 11 RFI/RI Report. The scope of work includes collection, shipping, and tracking of samples, datacap entry, data analysis, and documentation and discussion of results in the RFI/RI Report. Stoller has incorporated the level of effort for these activities into Task 1.0 (Work Plan Implementation Plan) which must be revised to address this activity, Task 3.1 (Mobilization and Field Support), and Task 5.1 (Draft RFI/RI Report).

Stoller assumes, on the basis of interpretations in the Technical Memorandum - Revised Field Sampling Plan and Data Quality Objectives, West Spray Field, Operable Unit No. 11, Revision 3, dated June 24, 1994, that media at OU 11 are not contaminated with organic compounds. Consequently, Stoller assumes that qualitative and statistical evaluation of organic data will not be necessary and the level of effort to evaluate, discuss, and present organic data in the RFI/RI Report will be minimal.

3.2.11 Task 10 -- Assist in Response to Comments to TM to Revise Field Sampling Plan

Stoller will assist EG&G in responding to regulatory agency comments on the TM to revise the Field Sampling Plan. Comments and issues will be reviewed to assess their technical validity, applicability, and implementability. In accordance with the modified SOW, Stoller has assumed that the TM will not be rewritten.

3.2.12 Task 11 -- Drill Six More Boreholes in Accordance with Task 3 and Incorporate the Information into the Baseline Risk Assessment and RFI/RI Report

Stoller will oversee the drilling of six additional boreholes in accordance with Task 3, including borehole sampling; geologic logging; and monitoring well installation, development, sampling, and testing for aquifer parameters. Boreholes will be drilled using the resonant sonic drilling method (if the test borehole demonstrates that the drilling method will meet DQOs for OU 11).

This task also addresses (1) incorporation of the information into the Baseline Risk Assessment and RFI/RI Report and (2) other tasks impacted by this additional scope of work including project management, field deficiency resolution, data management, etc.

### **3.3 Project Management**

Rocky Flats has been Stoller's most important client since 1981, and we have provided environmental and waste management support to EG&G since 1989. During that time, Stoller has developed a management approach specifically designed to meet the needs of procurement and technical personnel at EG&G. Stoller has successfully managed numerous Rocky Flats projects, both large and small.

#### **3.3.1 Management Philosophy**

Stoller's management approach for work at Rocky Flats is based on our experience that it is important to provide a single point of contact to EG&G for contracting purposes while providing direct access of EG&G technical personnel to the subcontractor team. Stoller, as the primary subcontractor, will serve as the single point of contact for administrative issues and will have ultimate responsibility for ensuring the performance of the project team. Stoller, WJE, and Walsh will function as part of a fully integrated technical organization, with EG&G's CTR serving as the overall technical lead. Clear lines of authority and communication within the team will ensure that information or work efforts are not fragmented and that unnecessary duplication of effort is avoided.

#### **3.3.2 Corporate Responsibilities**

Stoller's corporate-level responsibilities for its MTS task orders include program management, technical oversight, accounting and invoicing, quality assurance, and health and safety. Oversight and assistance are provided at the corporate level to ensure that all required resources are available to the Program Manager and Project Manager and that subcontractors are provided with coordination at the highest level. Responsibilities at the corporate level include:

- Providing direct lines of communication between EG&G's contractual authority and a corporate official empowered to obligate the Company
- Ensuring that the project staff has all the administrative and technical support necessary for satisfactory completion of the project

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- Providing a system of review and controls that will ensure the legal and technical quality of the product
- Assuring compliance with EEO, OSHA, substance abuse, conflict of interest, and other laws or policies
- Providing timely financial/accounting data to the Program Manager and Project Manager and invoicing to the client

### 3.3.3 Personnel Responsibilities

Key personnel for the OU 11 team include a Program Manager, Project Manager, Deliverables Coordinator, Health and Safety Manager, Quality Assurance Manager, and Task Leaders from Stoller and an Assistant Project Manager from WJE. The remainder of the project team will consist of technical, computer, and clerical support personnel. Key personnel for the Combined Phases RFI/RI are listed in Table 1 and a team organization chart is provided as Figure 1 (see Section 2.1). The qualifications and experience of key project personnel are summarized in Section 5.2. Resumes are provided in the Appendix. Responsibilities of key personnel are described below.

#### 3.3.3.1 Program Manager

The Program Manager will oversee the project and serve as the senior reporting official for all personnel participating in the project and the formal point of contact with the client's contracting officer. He has full authority to commit the required corporate resources and is ultimately responsible for successful performance of every task. His responsibilities include (1) providing continuing top-level interface with the client's contract personnel; (2) providing high-level guidance and direction to project staff; (3) monitoring each task to guarantee successful, on-time completion; and (4) managing and controlling lower-tier subcontractors and vendors. Dr. Allen Crockett, Stoller's Area 5 Program Manager, will serve as the Program Manager for the OU 11 Combined Phases RFI/RI.

### 3.3.3.2 Project Manager

The Project Manager will ensure that the technical and financial goals of the project are met and that milestones are achieved. He will assist the Program Manager in routine status assessment and reporting functions and will have direct responsibility for subcontractor coordination. He will communicate regularly with EG&G technical personnel and provide internal quality assurance of subcontractor personnel. Additionally, the Project Manager will provide the field, data analysis, and report development tasks with problem solving capabilities, oversight, and review. Stoller has designated Mr. Greg Davis as the Project Manager.

### 3.3.3.3 Assistant Project Manager

The Assistant Project Manager will assist the Project Manager in achieving the technical and programmatic goals of the Implementation of the Combined Phases RFI/RI. The Assistant Project Manager will direct the day-to-day operation of all field tasks and will manage and participate in data analysis and report writing tasks. The Assistant Project Manager will have direct contact with the EG&G CTR. Stoller has designated Mr. Brian Myller of WJE as the Assistant Project Manager.

### 3.3.3.4 Task Leaders

Task Leaders have been assigned on the basis of specialized expertise and prior experience in the technical areas represented by the tasks described in the SOW. As senior technical personnel for each task, the Task Leaders will be responsible for both directing and participating in the field and support activities. Stoller and its subcontractors all believe strongly that senior personnel should take an active part in all phases of a task and not merely the planning or reporting functions. This is especially true in the hydrogeologic sciences in which an understanding of site conditions, component interactions, and patterns or trends can be thoroughly attained only as the result of time in the field. Besides their technical input to the project, the Task Leaders will have important communication responsibilities. They will interact regularly with the Program and Project Managers on routine issues such as project status and in the event that problems arise and with the Site Supervisor (see below) for coordinating field logistics and sample shipment.

Task Leaders for the Combined Phases RFI/RI include Dr. David Ellerbroek, hydrogeology/geochemistry; Dr. Mark Lewis, baseline risk assessment; and Mr. Virgil Palencia, health and safety. All of these Task Leaders have strong educational backgrounds and degrees in their areas of responsibility and extensive prior experience in the region, including Rocky Flats. Ms. Karen Schneider, designated as Task Leader for database tasks, has extensive experience in database construction and management support for EG&G.

#### 3.3.3.5 Site Supervisor

The Site Supervisor will serve as the lead person in two important areas: field logistics and client liaison. Stoller has designated Mr. Steve Lynn for this position because of his proven ability to coordinate field activities at Rocky Flats. Through his previous experience in environmental investigations at the site, he has gained a thorough understanding of the intricacies of site access, security, health and safety, sample handling, and data management associated with work at Rocky Flats. This knowledge of the site and EG&G requirements will help to ensure that each task is properly scheduled and coordinated.

As client liaison, Mr. Lynn will communicate with the EG&G CTR, or his field designee, daily during periods of field activity. He also will be responsible for scheduling and coordinating the management and shipment of samples to the various subcontractor laboratories to ensure that sample integrity, chain-of-custody, holding times, and analytical batch requirements are met.

#### 3.3.3.6 Health and Safety Manager

The Health and Safety Manager will be responsible for preparing the project HASP and ensuring that field and support personnel are adequately protected during sample collection, sample handling, equipment operation, and decontamination activities performed during the Combined Phases RFI/RI. He will direct and coordinate site health and safety technicians, calibrate and maintain monitoring instrumentation, order personal protective equipment, verify that OSHA and Rocky Flats training is current, verify medical clearances, and audit health and safety records of all team companies, as appropriate. Mr. Virgil Palencia will serve as Stoller's Health and Safety Manager.

### 3.3.3.7 Quality Assurance Manager

The Quality Assurance Manager will ensure that all work performed under this task order complies with the EG&G EM QAPjP, EPA QAMS-005/80, and DOE Order 5700.6B. The QA Manager will also ensure that the work performed will incorporate all items detailed in the SOW related to QA/QC organization and authority, onsite and offsite training, documentation, protocols, and corrective action. Mr. Anton Camarota, Stoller's Corporate Quality Assurance Manager, will serve in this capacity, as he does on all Stoller field projects.

### 3.3.4 Cost and Schedule Control

Stoller's project management approach has been developed specifically to meet the needs of EG&G. Stoller uses an automated accounting system (DELTEK) to ensure accurate and timely tracking of project expenditures and status. Each contract is assigned a contract (job) number, and each task under the contract is assigned a distinct task number. The task numbers provide a cross-reference among employee time sheets, expense reports, and subcontractor or vendor invoices. All time sheets, expense reports, and subcontractor or vendor invoices are reviewed by the Program Manager and Project Manager. Any problems are found and corrected before the invoice or status report are prepared. Stoller employs a signature-level authority scale to further ensure that large cost items are approved at the appropriate level. DELTEK provides for automatically generated reports on the status of each job/task and automatic cost verification. The output may also be reviewed interactively at any time to determine the most recent accounting status of any job/task. These reports delineate for each task all costs for the current period (monthly), year-to-date, and for the total tasks (if it spans an accounting year). The same database is used for accounting records, billing, and management control. This system controls task accountability and allows managers to verify task progress against billed hours.

Each month, every item charged to a task is totaled by the following categories: direct labor by individual, travel by individual, telephone, reproduction charges, computer usage, materials, subcontractor travel, subcontractor labor, and other direct charges (e.g., courier). A summary sheet provides a list of all charges by labor and other direct costs and specifies total labor hours expended, percentage of costs spent, percentage of costs budgeted, and percentage of time elapsed on the subcontract. From these reports, the Program Manager can ascertain the status of each task, from the total percentage of work completed to the level of how many hours a certain person worked on a particular task.

WJE, Walsh, and other lower-tier subcontractors will be required to submit their invoices to Stoller by the fifth working day of the following month to ensure that project status reports to EG&G are current. The Stoller Project Manager will verify all subcontractor changes.

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#### **4.0 SCHEDULE AND LEVEL OF EFFORT**

The Stoller Team will perform the work as shown in the attached project schedule (Figure 3). As stated in the SOW, we have assumed three review agencies for the BRA Technical Memoranda. As is appropriate for the schedule, comment/approval from the regulatory agencies may not be received in time for the draft BRA or RFI/RI Report. Levels of effort by task are provided in Table 2. The work breakdown structure is provided in Table 3.

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Table 2 Level of Effort

	Jan-94	Feb-94	Mar-94	Apr-94	May-94	Jun-94	Jul-94	Aug-94	1/2	1st Year
										TOTAL
TASK 1 - WORK PLAN IMPLEMENTATION MANAGEMENT PLAN	94	106	0	73.5	0	0	0	0	0	273.5
TASK 2 - HEALTH AND SAFETY	53	35	0	49	95	90	0	0	0	322
TASK 3 - COMBINED PHASES RFI/RI IMPLEMENTATION	0	0	0	218	663	481	440	971	2773	
TASK 4 - BASELINE RISK ASSESSMENT	83	166	198	627	595	611	1032	74	3386	
TASK 5 - RFI/RI REPORT	0	0	0	0	130	474	630	460	1694	
TASK 6 - PROJECT MANAGEMENT	70	42	46	54	54	54	75	39	434	
TASK 7 - QA/QC AND MISCELLANEOUS TASKS	216	120	72	4	122	226	194	21	975	
TASK 8 - SURFICIAL SOIL SAMPLING	0	0	0	0	0	0	0	0	0	
TASK 9 - ECOLOGICAL FIELD SAMPLING AND ASSESSMENT	0	0	0	0	304	0	0	0	304	
TASK 10 - ASSIST IN RESPONSE TO COMMENTS TO TM TO REVIEW FIELD SAMPLING PLAN	0	0	0	106	0	0	0	0	106	
TASK 11 - DRILL 6 ADDITIONAL BOREHOLES IN ACCORDANCE WITH TASK 3	0	0	0	0	0	0	0	0	0	
TASK 991 - PROPOSAL PREPARATION	0	0	81.5	175	0	0	0	0	256.5	
TASK 992 - PROPOSAL PREPARATION	0	0	0	0	0	64.7	107.5	0	172.2	
<b>TOTAL*</b>	<b>516</b>	<b>469</b>	<b>397.5</b>	<b>1306.5</b>	<b>1963</b>	<b>2000.7</b>	<b>2478.5</b>	<b>1565</b>	<b>10696.2</b>	

\* ±25% of labor hours by category; ±25% of ODCs

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Table 2 Level of Effort

	1/2											2nd Year
	Aug-94	Sep-94	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	TOTAL	
TASK 1 - WORK PLAN IMPLEMENTATION MANAGEMENT PLAN	0	0	0	0	0	0	0	0	0	0	0	0
TASK 2 - HEALTH AND SAFETY	0	0	0	0	0	0	0	0	0	0	0	0
TASK 3 - COMBINED PHASES RFI/RI IMPLEMENTATION	8	700	0	0	80	0	0	0	0	0	0	788
TASK 4 - BASELINE RISK ASSESSMENT	264	343	0	379	189	0	0	0	0	0	8	1183
TASK 5 - RFI/RI REPORT	0	373	0	321	286	0	0	0	0	0	0	980
TASK 6 - PROJECT MANAGEMENT	35	66	62	62	62	48	48	48	44	54		529
TASK 7 - QA/QC AND MISCELLANEOUS TASKS	25	2	22	22	22	22	2	2	2	8		129
TASK 8 - SURFICIAL SOIL SAMPLING	0	0	0	0	0	0	0	0	0	0	0	0
TASK 9 - ECOLOGICAL FIELD SAMPLING AND ASSESSMENT	0	0	0	0	0	0	0	0	0	0	0	0
TASK 10 - ASSIST IN RESPONSE TO COMMENTS TO TM TO REVIEW FIELD SAMPLING PLAN	0	0	0	0	0	0	0	0	0	0	0	0
TASK 11 - DRILL 6 ADDITIONAL BOREHOLES IN ACCORDANCE WITH TASK 3	0	0	0	0	0	0	0	0	0	0	0	0
TASK 991 - PROPOSAL PREPARATION	0	0	0	0	0	0	0	0	0	0	0	0
TASK 992 - PROPOSAL PREPARATION	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL*</b>	<b>332</b>	<b>1484</b>	<b>84</b>	<b>784</b>	<b>639</b>	<b>70</b>	<b>50</b>	<b>50</b>	<b>46</b>	<b>70</b>		<b>3609</b>

\* ±25% of labor hours by category; ±25% of ODCs

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Table 2 Level of Effort

TASK	TASK TOTAL
TASK 1 - WORK PLAN IMPLEMENTATION MANAGEMENT PLAN	273.5
TASK 2 - HEALTH AND SAFETY	322
TASK 3 - COMBINED PHASES RFI/RI IMPLEMENTATION	3561
TASK 4 - BASELINE RISK ASSESSMENT	4569
TASK 5 - RFI/RI REPORT	2674
TASK 6 - PROJECT MANAGEMENT	963
TASK 7 - QA/QC AND MISCELLANEOUS TASKS	1104
TASK 8 - SURFICIAL SOIL SAMPLING	0
TASK 9 - ECOLOGICAL FIELD SAMPLING AND ASSESSMENT	304
TASK 10 - ASSIST IN RESPONSE TO COMMENTS TO TM TO REVIEW FIELD SAMPLING PLAN	106
TASK 11 - DRILL 6 ADDITIONAL BOREHOLES IN ACCORDANCE WITH TASK 3	0
TASK 991 - PROPOSAL PREPARATION	256.5
TASK 992 - PROPOSAL PREPARATION	172.2
<b>TOTAL*</b>	<b>14305.2</b>

\* ±25% of labor hours by category; ±25% of ODCs

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**Table 3 Implementation of the Combined Phases RFI/RI Work Plan for  
Rocky Flats Plant Operable Unit No. 11 West Spray Field  
Work Breakdown Structure**

**Task 1 -- Work Plan Implementation Plan**

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Senior Geologist	Dave Ellerbroek, Susan Serreze, Kathy Tegtmeier
Geologist II	Steve Lynn
Technician I	Sheryl Shapiro

**Task 2.1 -- Site Specific Health and Safety Plan**

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Biologist I	Kathy Spencer
Biologist II	Virgil Palencia
Technician I	Sheryl Shapiro

**Task 2.2 -- Health and Safety Field Support**

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Biologist II	Virgil Palencia
Technician I	Sheryl Shapiro

**Task 3.1 -- Field Activities**

Program Manager	Allen Crockett
Project Manager	Greg Davis

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Assistant Project Manager  
Project Manager - Walsh  
Senior Geologist

Brian Myller  
Stan Spencer  
Dave Ellerbroek, Kathy  
Tegtmeyer

Geologist I  
Geologist II

Tom Hanson, Tom Furst  
John Boylan, Michelle Hanson,  
Jennifer Higgins, Dan Reeder,  
Karen Schneider, Dave  
Buscher, Harvey Johnson,  
Robert German

Geologist III  
Technician I  
Technician II

Heather Gabriel  
Sheryl Shapiro, Bret Goss  
Caren McMahan, Martha Plank

Task 3.2 -- Data Analysis

Program Manager  
Project Manager  
Assistant Project Manager  
Senior Geologist

Allen Crockett  
Greg Davis  
Brian Myller  
Greg Davis, Dave Ellerbroek,  
Kathy Tegtmeyer

Geologist I  
Geologist II

Mark Tullius, Michael Boubin  
John Boylan, Michelle Hanson,  
Jennifer Higgins, Dan Reeder,  
Karen Schneider

Technician I  
Technician II

Sheryl Shapiro  
Caren McMahan, Martha Plank

Task 4.1 -- Human Health Risk Assessment

Program Manager  
Project Manager  
Assistant Project Manager  
Senior Geologist

Allen Crockett  
Greg Davis  
Brian Myller  
Greg Davis, Dave Ellerbroek,  
Kathy Tegtmeyer

Senior Biologist

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno

Biologist II

Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Senior Engineer

Steve Kline

Task 4.2 -- Technical Memoranda Development

Program Manager

Allen Crockett

Project Manager

Greg Davis

Assistant Project Manager

Brian Myller

Senior Geologist

Greg Davis, Dave Ellerbroek,  
Kathy Tegtmeier

Senior Biologist

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno

Biologist II

Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Senior Engineer

Steve Kline

Task 4.3 -- Environmental Evaluation Incorporation

Program Manager

Allen Crockett

Project Manager

Greg Davis

Senior Biologist

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno

Biologist II

Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Task 5.1 -- Draft RFI/RI Report

Program Manager

Allen Crockett

Project Manager

Greg Davis

Assistant Project Manager  
Senior Geologist

Brian Myller  
Greg Davis, Dave Ellerbroek,  
Kent Glover, Kathy Tegtmeyer  
Mark Tullius, Michael Boubin  
John Boylan, Michelle Hanson,  
Jennifer Higgins, Dan Reeder,  
Karen Schneider

Geologist I  
Geologist II

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno  
Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Senior Biologist

Biologist II

Senior Engineer  
Technician I

Steve Kline  
Sheryl Shapiro

Task 5.2 -- Comment Response and Final RFI/RI Report

Program Manager  
Project Manager  
Assistant Project Manager  
Senior Geologist

Allen Crockett  
Greg Davis  
Brian Myller  
Greg Davis, Dave Ellerbroek,  
Kent Glover, Kathy Tegtmeyer  
Mark Tullius, Michael Boubin  
John Boylan, Michelle Hanson,  
Jennifer Higgins, Dan Reeder,  
Karen Schneider

Geologist I  
Geologist II

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno  
Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Senior Biologist

Biologist II

Senior Engineer  
Technician I

Steve Kline  
Sheryl Shapiro

Task 6 -- Project Management

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Senior Geologist	Susan Serreze
Engineer III	Mike Lauer
Technician I	Bob Lundeen, Sheryl Shapiro

Task 7 - QA/QC and Miscellaneous Tasks

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Senior Geologist	Greg Davis, Dave Ellerbroek, Kathy Tegtmeier
Geologist I	Mark Tullius, Michael Boubin
Geologist II	John Boylan, Michelle Hanson, Jennifer Higgins, Dan Reeder, Karen Schneider
Technician II	Caren McMahan, Martha Plank

Task 8 -- Surficial Soil Sampling

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller
Geologist II	John Boylan, Michelle Hanson, Jennifer Higgins, Dan Reeder

Task 9 -- Ecological Field Sampling and Assessment

Program Manager	Allen Crockett
Project Manager	Greg Davis
Assistant Project Manager	Brian Myller

Senior Biologist

Allen Crockett, Mark Lewis,  
Dave Palmer, Gary Magno

Biologist II

Kelley Crute, Anne Doud  
White, Amy Leider, Katharine  
Miskin

Task 10 -- Assist in Response to Comments to TM to Revise Field Sampling Plan

Program Manager

Allen Crockett

Project Manager

Greg Davis

Assistant Project Manager

Brian Myller

Senior Geologist

Greg Davis, Dave Ellerbroek,  
Kathy Tegtmeyer

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## **5.0 QUALIFICATIONS AND EXPERIENCE**

The Stoller Team is extremely well qualified to perform the Combined Phases RFI/RI. Specific capabilities of the various team companies are summarized below.

### **5.1 Key Personnel**

Qualifications and experience of selected key project personnel are described in the following subsections. Resumes of all key and available project personnel are provided in an appendix.

#### **5.1.1 The S.M. Stoller Corporation**

Dr. Allen Crockett, Technical Director of Stoller's Environmental Services group, will serve as Program Manager for this task order. He has a B.S. and graduate studies in geology, a Ph.D. in ecology, a J.D. in environmental law, and 19 years of consulting experience in the Denver-Boulder area. Recent relevant experience has included serving as Program Manager for the 1992 RCRA Groundwater Monitoring Report Annual Soil Sampling and the Geostatistics Data Assessment under MTS Area 8; Program Manager for Implementation of the EE Work Plans for OUs 5 and 6 under MTS Area 5; Program/Project Manager for the Ecological Monitoring Program; Project Manager for the Residue Drum Storage Facility Environmental Assessment; Project Manager/Principal Investigator for RFI/RI EE Work Plans for OUs 4 and 11 and Implementation of the EE Work Plans for OUs 1, 2, and 5; and Program Director for the Phase I RFI/RI for OU 7. Dr. Crockett has an active DOE "Q" clearance.

Mr. Greg Davis, Manager of Stoller's Environmental Geosciences group, will serve as Project Manager. Mr. Davis has an M.S. in geochemistry/hydrogeology and 11 years of professional experience related to groundwater investigations at hazardous waste sites, including Rocky Flats, Lowry Landfill, and the Rocky Mountain Arsenal. Mr. Davis has provided project management and technical support to the Implementation of the Phase I RFI/RI Work Plan Operable Unit 7 Present Landfill, No Further Action Justification for Operable Unit 16, RCRA Groundwater Monitoring Reports, and the 1993 Well Evaluation as well as serving as project manager of the modification of the GSLIB. He is extremely familiar with Rocky Flats groundwater, soils, and geochemical systems and has evaluated contaminants in groundwater and soil for sitewide and OU-specific projects.

Dr. Mark Lewis, Manager of Stoller's Biological Science group, will serve as Task Leader for the Baseline Risk Assessment. Dr. Lewis has a Ph.D. in aquatic ecology and toxicology and has served as project manager or task leader for Stoller's involvement in the EEs for OUs 1, 2, 4, 5, 6, and 7 at Rocky Flats. His responsibilities have included designing field and laboratory studies, preparing work plans, establishing data quality objectives, developing decision trees for the selection of contaminants and tissues of concern, collecting and interpreting field data, coordinating subcontractor laboratories, and writing complex multidisciplinary reports. Dr. Lewis has an active DOE "Q" clearance.

Dr. David Ellerbroek holds a Ph.D. in environmental engineering and has seven years of experience evaluating contaminants in soils and groundwater. Dr. Ellerbroek is currently providing geostatistical expertise to the sitewide soils program at Rocky Flats through the enhancement of the GSLIB. He has also supported the Implementation of the Phase I RFI/RI Work Plan Operable Unit 7 Present Landfill and 1993 Well Evaluation.

Ms. Karen Schneider has a B.A. in geology and over nine years of experience in database management and geology. She is currently supporting the data analysis activities for the Implementation of the Phase I RFI/RI Work Plan Operable Unit 7 Present Landfill and has lent her expertise to database tasks for the Environmental Evaluations at Operable Units 1, 2, 5, and 6. Additionally, Ms. Schneider held a key role in Stoller's RFEDS support task.

Mr. Vigil Palencia has a B.S. in environmental health and over five years of professional industrial hygiene experience. Mr. Palencia has prepared health and safety plans for Rocky Flats field projects and has supported field health and safety tasks and managed employee health and safety files.

Mr. Steve Lynn has a B.A. in geology and over four years of professional experience. Mr. Lynn has been involved in several field programs at Rocky Flats, including the Implementation of the Phase I RFI/RI Work Plan Operable Unit 7 Present Landfill, multimedia sampling, and field oversight. He was a critical participant in the OU 7 project, participating in borehole drilling, well installation, sampling, and sample shipping and handling. Additionally, he is experienced with the DataCap system and Rocky Flats QA/QC and training procedures. His previous field experience at Rocky Flats has given him a unique knowledge of the field requirements of Rocky Flats.

5.1.2 Watkins-Johnson Environmental, Inc.

Mr. Kent Glover has a B.S. in watershed sciences and over 17 years of experience in solving groundwater hydrology and contaminant migration problems. His areas of technical expertise include evaluations of contaminant migration, development of numerical and statistical models of hydrologic systems, design and analysis of hydraulic tests and tracer tests, applied research in fractured-rock hydrology, and investigations of stream-aquifer relations. His recent Rocky Flats experience includes support to the 1993 Well Evaluation.

Mr. Brian Myller has a B.S. in environmental geology and more than 10 years of professional experience in contaminant hydrogeology and remedial investigation programs. Mr. Myller was a key participant in the 1993 Well Evaluation at Rocky Flats. He advanced from field hydrogeologist to site manager, and ultimately managed the sitewide groundwater monitoring program at the Rocky Mountain Arsenal and was principal investigator for the well evaluation program at that facility. Additional experience includes directing RI/FS-based evaluation at Fort Douglas, Utah; managing the RI report for the South Plants Study Area at Rocky Mountain Arsenal; and participating in field and data evaluation activities for several large hazardous waste sites.

Mr. Michael Boubin has an M.S. in geology and over four years of experience in hydrogeology. His experience includes hydrogeologic site characterizations, field investigations, aquifer testing, and regulatory compliance. In addition, Mr. Boubin has supervised well installation, aquifer testing, and field sampling programs.

5.1.3 James P. Walsh & Associates

Mr. Stan Spencer has a B.S. in natural resources and 16 years of professional experience including nine years as an environmental project manager and principal investigator for hydrologic investigations. Mr. Spencer is currently the project manager for remediation at the Department of Energy National Renewable Energy Laboratory. He is the Walsh Program Manager for the RI/FS at the Rocky Flats Plant.

Mr. Tom Furst has a Ph.D. in soil science and is presently in charge of conducting soil surveys and environmental investigations for Walsh. Dr. Furst has performed soil surveys at the California Gulch CERCLA site in Leadville, Colorado, and the Anaconda/Butte/Silver Bow

CERCLA site in Montana. He is currently working on a soil characterization and metal speciation study of a former lead smelter site in Kansas City, Kansas, and is actively involved in soil surveys in Vail Colorado, and Peru, South America. His recent Rocky Flats experience includes support on the surficial soil sampling for the Phase I RFI/RI at Operable Unit No. 7 - Present Landfill.

Mr. Buscher has an M.S. in ecological engineering and 10 years of professional experience, six years as a geologist, two years as a soil scientist with the U.S. Soil Conservation Service (SCS), and two years as a soil scientist/environmental engineer. His Rocky Flats experience includes extensive support to the Phase I RFI/RI for Operable Unit No. 7 - Present Landfill.

Mr. Harvey Johnson has a B.S. in environmental health and four years of professional experience. Mr. Johnson performed surface soil sampling and health and safety support for the Phase I RFI/RI of Operable Unit No. 7 - Present Landfill at the Rocky Flats.

Mr. Robert German has an M.S. in environmental science and 10 years of experience as a geoscientist. He has participated in a shallow soil gas investigation of one of the operable units at Rocky Flats.

Ms. Heather Gabriel has a B.A. in geology and one year of experience as a geoscientist. Ms. Gabriel is experienced in soil, groundwater, and surface water sampling and is presently involved in soil gas surveys at Rocky Flats.

Mr. Bret Goss is an environmental technician currently engaged in RI/FS studies at Rocky Flats. His duties include soil vapor surveys, surficial and subsurface soil and water sampling, and data compilation. He is familiar with a variety of field sampling protocols and standard operating procedures for Rocky Flats.

**APPENDIX A  
RESUMES**

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**THE S.M. STOLLER CORPORATION  
KEY PERSONNEL**

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**John A. Boylan**  
*Geologist II*  
DOE "Q" Clearance (Pending)

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**AREAS OF EXPERTISE**

Geology  
Aqueous Geochemistry  
Mine Reclamation

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**SUMMARY OF QUALIFICATIONS**

Mr. Boylan has six years of experience in geology and geochemistry, including sampling, mapping, field and laboratory analysis, preparation of sampling and analysis plans, design and implementation of RCRA/CERCLA investigations, and data analysis/interpretation/report preparation. RCRA/CERCLA support has included studies of contaminant and background geochemistry of sediment, surface water and groundwater; aquifer testing; monitoring well location, design, and installation; and geologic data collection ranging from detailed core logging to field core logging and sampling to field mapping. Mr. Boylan also performs characterization and remediation of mine sites producing acid mine drainage.

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**EXPERIENCE**

**Geochemist**  
**September 1990 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provides technical expertise, project planning, field oversight, and technical support for geologic and hydrogeologic portions of remedial investigations, environmental assessments, and monitoring programs at various sites. RCRA field activities have included over 100 hours of Level C work.

At the Rocky Flats Plant (RFP), has performed oversight of routine groundwater, surface water, and sediment collection programs in compliance with the National Pollutant Discharge Elimination System (NPDES), U.S. Environmental Protection Agency (EPA), Colorado Department of Health (CDH), U.S. Department of Energy (DOE), and EG&G standards. Assisted in the evaluation and revision of Standard Operating Procedures (SOPs) for these monitoring programs.

As technical lead for the 1993 well evaluation project at RFP, worked to characterize the sitewide alluvial and bedrock groundwater geochemical conditions and to assess the effectiveness of the existing monitoring well network to meet regulatory requirements and programmatic monitoring goals. Formulated recommendations related to sampling frequency, analytical suite, and installation of new wells and abandonment of existing wells to provide better coverage on

John Boylan  
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a plantwide scale, with particular emphasis on RCRA and CERCLA units and OUs. Contributed to the planning, graphics, and technical writing of the resulting report.

In support of the OU 7 Phase I RFI/RI at RFP, worked as Rig Geologist to coordinate and perform geologic drilling, borehole sampling, and monitor well installation, development, and sampling. Also performed cone penetrometer testing, BAT sampling, methane surveying, and *in situ* gas sampling using a CPT rig. Worked as a project stratigrapher to produce detailed descriptions of surficial and bedrock geology and generating detailed core logs of cores obtained during drilling activities. Contributed to the graphics and technical writing for the OU 7 Phase I RFI/RI Report.

As a rig geologist for the RFP Phase II Geological Characterization, coordinated and performed geologic drilling, borehole sampling, pump-in packer testing, borehole geophysical surveys, and monitor well installation activities; also provided field support for the Sitewide Geologic Mapping Program and contributed to the graphics and technical writing for the 1991 Geologic Characterization Report.

In support of the Phase III RFI/RI for OU 3 and the Rocky Flats Sitewide Stream Sediment Characterization Plan, designed special analytical methods, wrote the laboratory protocol and related SOPs, and performed sampling to evaluate the mineralogy of Rocky Flats' soils and sediments. Also assisted in the development of the accompanying sequential extraction procedures.

Worked as a project stratigrapher in support of the Phase III RFI/RI for OU 1 at RFP, producing detailed descriptions of surficial and bedrock geology and generating detailed core logs. Assisted in converting these logs to electronic format for the resulting report.

Performed field team leadership and sampling of surficial soils at RFP for the Annual Sitewide Sampling Program, the OU 2 Phase II RI/FS, and various treatability studies.

Has performed sample collection at RFP in support of the Multimedia Sampling Program, collecting samples of soils, sediments, and various industrial media for analysis for radionuclides, metals, or other hazardous constituents.

Assisted in the design, setup, and operation of the Event-Related Surface Water Sampling Program at RFP, which is intended to monitor surface water quality and flow at various points upgradient of the industrial area, within the industrial area, and at the downgradient boundary of RFP.

Other assorted activities at RFP have included the handling and shipping of various samples to appropriate laboratories; coordination of sampling, laboratory analyses, and client deliverables; generation of daily progress reports for the client; oversight of sampling programs during audits and sampling visits performed by regulatory agencies; performance of soil chemistry screenings and water quality analyses using available test kits; and participation in studies of aquifer

John Boylan

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characteristics, groundwater and surface water geochemistry, sediment mineralogy and geochemistry, contaminant sources, mobility, and transport. Contributed to the graphics and technical writing for the Draft 1989 Surface Water and Sediment Geochemical Characterization Report and the Draft 1991 Residue Drum Storage Facility Environmental Assessment.

At mine sites, has developed acid mine drainage (AMD) sampling and analysis plans; located and installed piezometers and monitoring wells; performed core logging and borehole sampling; conducted mapping of surficial geology, sampling of soils, sludges, tailings, waste rock and other geologic materials, and sampling and analysis of surface waters and seeps; developed Interim Remedial Actions (IRAs), including passive AMD treatment, drainage engineering, various AMD minimization techniques, and conceptual design of various remediation and reclamation options; contributed to the graphics and technical writing of resulting IRA documents; contributed to the development of Health and Safety Plans and acted as Site Safety and Health officer; and interfaced with various concerned parties including state and federal agencies. Has also collected soil samples and installed monitoring wells in support of property evaluations.

Wrote corporate standard operating procedures for the installation of monitoring wells and piezometers; logging and sampling of test pits, trenches, and construction excavations; surface soil sampling; and logging surficial deposits and bedrock material.

**Exploration Geologist**  
**June 1989 - November 1989**

**Amoco Production Company**  
**Denver, Colorado**

As an exploration geologist at Amoco, searched company files of well logs, constructed cross-sections of selected logs, used these cross-sections to characterize production fields, and applied the results to regional exploration efforts.

**Physical Science Technician**  
**June 1988 - May 1989**

**United States Geological Survey**  
**(Igneous and Geothermal Processes Branch)**  
**Denver, Colorado**

As a physical science technician at the U.S. Geological Survey, performed geologic sampling, mapping, sample preparation, and laboratory chemical analyses; reviewed technical manuscripts; and constructed maps.

**Research Assistant**  
**June 1987 - May 1989**

**University of Colorado**  
**Department of Geological Sciences**  
**Boulder, Colorado**

Performed acid mine water treatment chemistry, pH measurement, reagent preparation, and laboratory maintenance.

John Boylan

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Operated an x-ray diffraction laboratory. Responsibilities included use, instruction, and scheduling of Scintag Powder X-Ray Diffractometer and accompanying computer software packages; use of single-crystal precession camera and diffractometer; sample preparation for both diffractometers; and laboratory maintenance.

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### EDUCATION

M.S., Geological Sciences (Geology/Geochemistry), University of Colorado, Boulder, 1990

B.A. (summa cum laude), Geological Sciences (Geology), University of Colorado,  
Boulder, 1987

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### TRAINING

Environmental Chemistry for Investigating and Remediating Soil and Groundwater

Contamination, College of Engineering at the University of Wisconsin, Madison, 1993

Subsurface Investigation and Remediation for Sites Contaminated with Hazardous Wastes,

College of Engineering at the University of Wisconsin, Madison, 1993

8-Hour Health and Safety Supervisor Course, Urie Environmental Health, Inc., 1993

Chemical and Geological Characterization of Mine Waste, WC Monitor Forums, 1992

Impact of Heavy Metals on Mined Land Restoration, Great Plains - Rocky Mountain Hazardous  
Substance Research Center, 1992

Photovac Portable Gas Chromatograph, Stoller, 1992

8-Hour Health and Safety Refresher Course, Urie Environmental Health, Inc., 1991 and 1992

Respirator Fit Test Update, EG&G Rocky Flats, 1991 and 1992

Applications of Aqueous Geochemistry to Ground-Water Investigations, Colorado Ground-Water  
Association, 1991

8-Hour Radiation Safety Training, EG&G Rocky Flats, 1991

CPR, Red Cross, 1991

40-Hour Hazardous Waste Site Worker Health and Safety Training, Urie Environmental Health,  
Inc., 1990

RFP Respirator Indoctrination and Fit Test Training, EG&G Rocky Flats, 1990

RFP Industrial Safety Training, EG&G Rocky Flats, 1990

RFP RCRA Training, EG&G Rocky Flats, 1990

RFP Radiation Safety Training, EG&G Rocky Flats, 1990

**Scott A. Burcar**  
*Geologist I*

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**AREAS OF EXPERTISE**

Geology/Hydrogeology  
Vadose Zone Hydrology  
Soil Chemistry

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**SUMMARY OF QUALIFICATIONS**

Mr. Burcar has five years of experience in the combined geologic disciplines of exploration geology, geophysics, and geological engineering. He has a strong background in geologic mapping, exploration drilling and sample collection, drill hole logging, and geophysical data collection. As a graduate student at the University of Nevada, Reno, he conducted research that evaluated preferential infiltration and associated nutrient movement through soils in the Lake Tahoe basin.

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**EXPERIENCE**

**Hydrogeologist**  
**February 1994 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently providing technical support to the Operable Unit 7 (Present Landfill) RFI/RI at the Rocky Flats Plant. Performed extensive statistical analyses to identify contamination in soil, surface water, groundwater, boreholes, and pond sediments. Responsible for interpretation of statistical evaluations and assessment of the nature and extent of contamination at the site.

Provided technical support for an RI/FS at an abandoned metals mine near Pecos, New Mexico. Designed remedial investigation and long-term monitoring programs to characterize saturated and unsaturated groundwater flow.

**Surveyor**  
**August 1993 - December 1993**

**Denver Water Department**  
**Denver, Colorado**

Surveyed property boundaries and performed site engineering on construction projects along the Denver Water Department's water collection and distribution system.

**Graduate Research Assistant**  
**September 1990 - December 1992**

**University of Nevada**  
**Reno, Nevada**

Conducted vadose zone hydrologic and soil chemical research that evaluated preferential water and nutrient movement through soils in the Lake Tahoe basin. Utilized rainfall simulation to

Scott A. Burcar  
Page 2

record infiltration patterns and to measure and model soil infiltration rates. Performed extensive chemical and physical soil analyses.

**Geological Engineer**  
**June 1990 - August 1990**

**California Department of Water Resources**  
**Red Bluff, California**

Performed geological engineering tasks for the first phase planning study of a potential water development project in northern California. Performed geologic mapping of proposed reservoir locations and a potential construction material site. Generated geologic cross-sections of reservoir locations, analyzed packer test data, estimated grouting requirements, measured groundwater levels, and wrote corresponding sections for the planning study report. Performed surveys on the South Fork Trinity and Sacramento rivers for erosion and sediment transport investigations.

**Exploration Geologist/Geophysicist**  
**September 1985 - January 1990**

**Newmont Exploration Limited**  
**Reno, Nevada**

Performed numerous geologic and geophysical tasks in exploration for gold. Conducted extensive surface and underground geologic mapping and sampling on projects throughout the Great Basin. Compiled and interpreted project and regional geologic data, located exploration drill holes, supervised drill crews, described cuttings, and wrote monthly project status reports. Utilized remote sensing and aerial photography for exploration and mapping. Performed regional and project-scale stream sediment and soil sample surveys. Collected and interpreted (using Newmont in-house geophysical software) geophysical data. Geophysical experience included electromagnetic pulse, ground magnetics, VLF, and VLFR.

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### EDUCATION

M.S., Hydrology/Hydrogeology, University of Nevada, Reno, 1992  
B.S., Geology, Fort Lewis College, Durango, Colorado, 1984

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### TRAINING

40-Hour Hazardous Waste Site Safety (OSHA) Training, Red Rocks Community College, 1993

**Anton G. Camarota**  
*Senior Engineer*  
DOE "Q" Clearance (Active)

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### **AREAS OF EXPERTISE**

Quality Assurance Program Assessment and Audit  
Quality Assurance Program Development  
QA Program Assessor/Auditor Training

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### **SUMMARY OF QUALIFICATIONS**

Mr. Camarota has 14 years of professional and technical experience as a quality assurance program manager, assessor, and inspector for commercial, governmental, and nuclear industries. Programs developed and assessed include DOE 5700.6C, ANSI/ASME NQA-1, ISO 9000, QAMS-005/80, MIL-Q-9858, ANSI N45.2, and ANSI/ASQC E4.

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### **EXPERIENCE**

**Senior Quality Assurance Specialist**  
**September 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Develops quality assurance program and project plans to support national environmental characterization, remediation/restoration, and waste management projects. Performs independent oversight and assessment of project quality and operational systems.

Developed and implemented a comprehensive management self-assessment program for the EG&G Rocky Flats Residue Waste Program, which evaluated environmental regulatory compliance, operational safety, design, and quality assurance activities. Trained management staff in program performance and reporting requirements. Performed independent oversight and audits of program facilities.

Developed a software quality program for the U.S. Department of Energy Residue Elimination Project, which included management systems for software development, modification, and reverse engineering. Provided comprehensive training for project staff in plan requirements and operational methods. Designed Residue Elimination Project QA program according to DOE Order 5700.6C criteria. Prepared procedures to implement quality requirements for project activities and processes including design, self-assessment, waste storage, and waste processing.

Anton G. Camarota

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Developed quality assurance program plan for the Idaho National Engineering Laboratory Pit 9 Proof of Process Test based on DOE 5700.6C criteria. This program provided controls for multiple organizations performing integrated test performance and data quality functions.

Developed a quality assurance program for the EG&G Rocky Flats Systems Engineering Analysis project, which evaluated strategies for decontamination, decommissioning, and land use. The Systems Engineering Analysis quality plan contained a comprehensive software development section to control the Engineering Analysis Simulator, which provided real-time dynamic event-related strategy simulations.

**Quality Assurance Technical Support Specialist**  
**June 1991 - September 1992**

**EG&G Rocky Flats**  
**Golden, Colorado**

Developed and managed operational readiness review and environmental regulatory compliance quality assurance program plans. As a Lead Auditor, he assessed the operational readiness of five national environmental and waste management projects, including the Waste Isolation Pilot Plant (WIPP) Test and Transportation Program. Additional assessments included RCRA quality assurance program for hazardous waste generation, storage, and shipping; CERCLA site and facility remediation quality assurance program; and surface and groundwater monitoring quality assurance program. Developed and taught a comprehensive training program for management self-assessments.

**Graduate Research Assistant**  
**June 1990 - June 1991**

**University of Denver**  
**Denver, Colorado**

Provided research and technical support for post-graduate finance projects. Responsibilities included analysis and development of SAS programs to provide time series, regression, correlation, and other statistical analyses using a DEC VAX and an IBM 3090 connected to INTERNET. Coordinated research findings with the University of Arizona, and conducted additional research using commercial databases such as Lexis/Nexis, Dow Jones, and Dun and Bradstreet.

**Senior Quality Assurance Program Auditor**  
**October 1981 - July 1986**

**Rockwell International**  
**Golden, Colorado**

Performed more than 75 internal assessments and audits of quality assurance programs for manufacturing, health and safety, environmental monitoring, and waste management. Responsibilities included audit program planning and development, audit team management, and report preparation and presentation. Developed and taught a comprehensive training and certification program for quality program auditors.

Anton G. Camarota  
Page 3

**Quality Assurance Inspection Specialist**  
**August 1980 - October 1981**

**Rockwell International**  
**Golden, Colorado**

Performed physical, chemical, and electrical evaluation of product characteristics. Responsibilities included analytical instrumentation operation and calibration; data interpretation and analysis; and report preparation.

**Quality Assurance Inspection Specialist**  
**August 1979 - September 1980**

**B.K. Jweeney Division**  
**Sargent Industries**  
**Denver, Colorado**

Same as Rockwell International (August 1980 - October 1981).

**Quality Assurance Inspection Specialist**  
**August 1978 - August 1979**

**Gardner-Denver Co.**  
**Denver, Colorado**

Same as Rockwell International (August 1980 - October 1981).

**Quality Assurance Inspection Specialist**  
**September 1977 - August 1978**

**Redfield Company**  
**Denver, Colorado**

Same as Rockwell International (August 1980 - October 1981).

**Quality Assurance Inspection Specialist**  
**June 1976 - August 1977**

**Litton Industries**  
**Lionville, Pennsylvania**

Same as Rockwell International (August 1980 - October 1981).

**Quality Assurance Inspection Specialist**  
**June 1975 - June 1976**

**High Energy Corporation**  
**Malvern, Pennsylvania**

Same as Rockwell International (August 1980 - October 1981).

**Quality Assurance Inspection Specialist**  
**June 1974 - June 1975**

**Chem-Par Inc.**  
**Phoenixville, Pennsylvania**

Same as Rockwell International (August 1980 - October 1981)

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### EDUCATION

M.B.A., University of Denver, Denver, Colorado,  
Strategic Management, 1991  
B.S., Computer and Management Science, Summa Cum Laude,  
Metropolitan State College of Denver, Denver, Colorado, 1989

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### TRAINING

Quality Assurance Audit Techniques for Commercial, Government, and Nuclear Industries,  
NQA-1 Lead Auditor Certification, L. Marvin Johnson and Associates, 1992  
ISO 9000 Quality Management and Quality Assurance Audit Techniques, and ISO 9000 Lead  
Assessor Training, L. Marvin Johnson and Associates, 1992  
Facility Performance Monitoring, U.S. Department of Energy, 1992  
Respirator Indoctrination, EG&G Rocky Flats, 1992  
RCRA Awareness, EG&G Rocky Flats, 1992  
Nuclear Materials Safeguards, EG&G Rocky Flats, 1992  
Hazard Communications, EG&G Rocky Flats, 1992  
Beryllium Operations, EG&G Rocky Flats, 1992  
RCRA Custodian, EG&G Rocky Flats, 1992  
Environmental Regulation and Law, Executive Enterprises, 1992  
Environmental Audits, Government Institutes, 1991

## **Allen B. Crockett, Ph.D.**

*Program Manager*  
DOE "Q" Clearance (Active)

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### **AREAS OF EXPERTISE**

Bioscience  
Geoscience  
Project Coordination  
Regulatory Oversight

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### **SUMMARY OF QUALIFICATIONS**

Dr. Crockett has 19 years of professional experience, a Ph.D. in Terrestrial Ecology, and a J.D. in Environmental Law. He has extensive experience as a program manager and terrestrial ecologist and has been a key team member on over 60 projects throughout the Rocky Mountain and Intermountain regions. He has conducted ecological studies in the Denver-Boulder area since 1972. Project experience includes RFI/RI and CMS/FS management and implementation, environmental assessments and impact statements, environmental and human health risk assessments, baseline inventories, mitigation plans, and habitat restoration/reclamation programs. Dr. Crockett is well versed in the requirements of RCRA, CERCLA, and NEPA. His experience on projects at Rocky Flats includes program management and participation in numerous environmental tasks.

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### **EXPERIENCE**

**Technical Director, Environmental Services**  
May 1990-Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Manages a staff of 40 professionals in the areas of groundwater and surface water hydrology, geology, terrestrial and aquatic ecology, soils and wetland science, data base management, and geographic information systems. The Environmental Services division is currently involved in a wide range of environmental programs at Rocky Flats. Responsibilities include coordination and technical oversight for all task order proposals, field programs, and report deliverables for environmental science and engineering projects performed at Rocky Flats by Stoller.

Principal investigator for ecological studies performed in conjunction with environmental evaluation programs and regulatory compliance for NEPA, RCRA, and CERCLA. Recent tasks include the Environmental Evaluations for Operable Units 1, 2, 5, 6, and 7. Participated in development of Environmental Evaluation Work Plans for Operable Units 4 and 11. Developed Standard Operating Procedures for ecology field studies at Rocky Flats. Task manager for an Environmental Assessment of the proposed Residue Drum Storage Facility.

Allen B. Crockett, Ph.D.

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Project manager for Stoller's support of DOE's Sitewide Environmental Impact Statement (EIS) at Rocky Flats. The EIS addresses future operation, remediation, and land-use scenarios for the site. Work performed for DOE as a subcontractor to Parsons Brinckerhoff.

Project manager for the Pecos Mine RI/FS in north-central New Mexico. Directs a program to assess potential sources of acidic leachate, generation and transport of contaminants in groundwater and surface water, effects on soils and water quality, and impacts or risks to vegetation, wildlife, and human receptors at an inactive metals mine. Project support also includes the development and evaluation of alternative remedies, identification of applicable or relevant and appropriate requirements (ARARs), and design of a wetland protection program. Principal investigator for ecological investigations. Work performed for Cyprus Amax Minerals Company.

Principal investigator for ecological investigations and mitigation planning in support of a proposed ski area and golf/residential development near Eagle, Colorado. Has designed and conducted studies of vegetation, wildlife, and wetlands and developed a resource management/mitigation plan to support project design and EIS documentation by the U.S. Forest Service and U.S. Army Corps of Engineers. Work performed for Adam's Rib Recreational Area.

**Instructor**  
1974/75, 1985/86, 1990/91

**University of Colorado**  
**Boulder, Colorado**

Taught "Wildlife Ecology" and "Environmental Laws and Impact Statements" portions of a summer environmental science class at the University of Colorado in 1985, 1986, 1990, and 1991.

**Applied Science Manager**  
October 1985-May 1990

**MK-Environmental Services, Inc.**  
**Denver, Colorado**

Managed RI/FS activities for the Rocky Mountain Arsenal project. Related tasks included the site characterization, risk assessment, natural resource damage assessment, technology evaluation, and mitigation/habitat enhancement programs. Responsibilities included design and implementation of field and laboratory studies, analysis of data, preparation of multidisciplinary technical reports, coordination of subcontractors, and interaction with state and federal agencies. Also participated in an RI/FS for a Superfund site in New Mexico. Managed a staff of 20 professionals in the areas of terrestrial and aquatic ecology, hydrogeology, air quality, soils, chemistry, toxicology, risk assessment, and litigation support.

**Senior Wildlife Ecologist**  
March 1980-October 1985

**Western Resource Development Corp.**  
**Boulder, Colorado**

Principal investigator for ongoing ecological and geological studies in support of an EIS for a proposed potash project near Moab, Utah (1976-1982). Responsibilities included design and

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Allen B. Crockett, Ph.D.

Page 3

implementation of multiyear field studies, preparation of multidisciplinary technical reports, and design of a mitigation program. Work performed for Buttes Resources.

Project manager or principal investigator for baseline studies, impact assessments, and mitigation/reclamation planning at proposed or existing coal, uranium, synfuels, or precious metals mines and petroleum projects in Colorado, Wyoming, Utah, New Mexico, Nevada, and Virginia. Responsibilities included study design, field investigation, data analysis, report preparation, and agency interaction. Clients included AMOCO, Anaconda, ARCO, Arch Minerals, A.T. Massey, Buttes Resources, Conoco, Exxon, Marline, Mid-Continent Resources, Mobil, Nuclear Dynamics, Pegasus Minerals, Peabody, UCO, Union Mines, Utah International, and W.R. Grace.

Principal contributor for siting studies and alternative corridor assessments for two proposed reservoirs and three proposed electric transmission line projects in Colorado (1980-1985). Responsibilities included field investigations, threatened or endangered species surveys, data analysis, and preparation of mitigation plans. Clients included Public Service Company of Colorado, Tri-State Transmission and Generation Association, Western Area Power Administration, and Northern Colorado Water Conservancy.

Graduate teaching assistant for ornithology, general biology, general geology, and paleontology courses at the University of Colorado in 1967-1968 and 1970-1974. Summer jobs as geologist with Union Oil Company in Colorado, Texas, and Oklahoma and the U.S. Geological Survey in Denver.

**Senior Wildlife Ecologist**  
**March 1977-March 1980**

**Camp Dresser and McKee, Inc.**  
**Denver, Colorado**

Project manager of a third-party EIS for a proposed molybdenum project near Gunnison, Colorado (1978-1980). Responsibilities included coordination of multi-disciplinary field studies, report preparation, peer review of other contractors, and design and implementation of ecological studies. Project components included a mine, alternative mill locations, and transportation/utility corridor route selection. Work performed for AMAX. Principal investigator for ecological studies for a large coal project in Wyoming (NERCO), two uranium projects in New Mexico (Mobil), and base metal projects near Durango, Colorado (AMAX, Central and Southwest Fuels).

**Senior Biologist/Geologist**  
**June 1975-March 1977**

**Genge Environmental Consultants**  
**Denver, Colorado**

Principal investigator for ecological studies at large coal projects in Wyoming (Texaco) and New Mexico (Peabody), a proposed ski area near Eagle, Colorado (HBE), and a proposed potash project near Moab, Utah (Buttes Resources).

**EDUCATION**

Ph.D., Terrestrial Ecology, University of Colorado, 1975  
J.D., Natural Resource Law, University of Denver, 1981  
Graduate Studies, Geology, University of Colorado  
B.S., Geology, University of Oklahoma, 1967

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**TRAINING**

40-Hour Hazardous Waste Site Health and Safety Training  
8-Hour Hazardous Waste Site Supervisor Health and Safety Training  
Radiation Safety Training

**Kelley E. Crute**  
*Biologist II*

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**AREAS OF EXPERTISE**

Ecological Risk Assessment  
Ecological Characterization  
Human Health Risk Assessment  
Implementation and Training Support

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**SUMMARY OF QUALIFICATIONS**

Ms. Crute has professional experience providing technical support for ecological and human health risk assessments, including statistical data management, exposure analysis, toxicity assessment, risk calculation and analysis, report composition, and computer modeling. She has laboratory and field experience in ecology, geology, hydrology, and atmospheric science. Ms. Crute has provided regulatory and implementation support to EPA's Superfund Program; evaluated endangered, threatened, and sensitive species; characterized local flora and fauna for an Environmental Impact Report; and assisted in creating SARA Title III reports.

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**EXPERIENCE**

**Environmental Scientist**  
**July 1993 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provided technical support for the Environmental Evaluation (EE) conducted for the RCRA Facility Investigation/Remedial Investigation (RFI/RI) for Operable Unit (OU) 1 and OU2 at the U.S. Department of Energy's Rocky Flats Plant (RFP). Developed a summary of contaminant sources and releases for each project, including multiple individual hazardous substance sites (IHSSs), based on historical information, aerial photographs, and preliminary site data. Estimated potential exposures of key receptors to contaminants of concern for the OU1 EE for multiple exposure routes. Performed simulation modeling to determine probabilistic estimates of risk. Responsible for developing exposure scenarios for the OU11 human health risk assessment and preparing a technical memorandum to detail approach and methods for exposure estimations.

Developed chemical hazard assessment methodology for the risk assessment approach for the future handling of solid residues at RFP under the Residue Elimination Project.

Kelley E. Crute  
Page 2

Scientist II  
March 1992 - June 1993

Clement Division of ICF Kaiser Engineers  
Fairfax, Virginia

Evaluated past and continuing impacts of the Exxon Valdez oil spill on fish and shellfish subsistence species, based on current literature and Natural Resource Damage Assessment studies.

Conducted an in-depth study on DDT residues in wildlife and subsequent toxic effects at a Superfund site in a southern bottomland wetland habitat. Focused on potential food chain impacts to various aquatic and terrestrial species.

Evaluated endangered, threatened, and sensitive species and characterized local flora and fauna as part of an Environmental Impact Report (EIR) for a cement kiln facility. Also, identified archaeological and historical landmarks; recreational, forest, open space, and wildlife areas; and groundwater and surface water resources in the vicinity of the facility for the EIR.

Conducted statistical analyses of site sampling data using an in-house statistical package developed from Paradox. Integrated and reformatted data from Lotus, ASCII, and dBase into Paradox, used SYSTAT to determine data set distributions and select appropriate statistical methods, compared background and blank levels to sample data, and analyzed resulting statistics to determine values for exposure point calculations.

Conducted water quality modeling using the Exposure Analysis Modeling System, Version 2.94 (EXAMS), and the Water Quality Analysis Simulation Program, Version 4.22 (TOXI4), to predict chemical concentrations in surface water and fish.

Collected site-specific meteorologic, demographic, geological, and ecological information for use in the development of specific exposure parameter factors and exposure pathways. Calculated chronic daily intakes of chemicals and resulting risks for multimedia, multi-pathway risk assessments using information on regional and site-specific activity patterns.

Assisted in the stateside management of a human health risk assessment at a proposed future Olympic venue near New South Wales, Sydney, Australia. Responsibilities included development of exposure parameters and calculation of chronic daily intakes and risk levels for five pathways of exposure.

Conducted monthly searches of the Integrated Risk Information System (IRIS) to update health risk and regulatory information on 900 chemicals for Clement's Paradox-based toxicity profile data base.

Developed an historical summary of chemical contaminants in 45 potential source areas at the Aberdeen Proving Ground.

Kelley E. Crute  
Page 3

**Research Assistant**  
**August 1990 - February 1992**

**ICF Incorporated**  
**Fairfax, Virginia**

Conducted onsite ecological characterizations of two proposed areas for expansion of the Strategic Petroleum Reserve (SPR) in southeastern Texas. Identified flora and fauna to collect information for the ecological portion of the SPR Environmental Impact Statement. Researched endangered and commercially important fish, birds, and furbearing species in Texas and Louisiana.

Summarized the history and progress of groundwater remediation in the Superfund program from the early 1980s to 1991. Focused on the limitations of groundwater remediation and the relationship between groundwater remedies and the incidence of dense non-aqueous phase liquid (DNAPL) contamination.

Studied the potential hazards of hydrogen fluoride in the environment by researching the Acute Hazardous Events Data Base and the Accidental Release Prevention Program to develop a plan for the prevention of accidental releases. Researched accident histories involving flammable chemicals to assess consequences of potential accidents and to determine realistic inputs for consequence analysis modeling.

Analyzed Superfund cleanup level and remedy selections to study the effects of Applicable or Relevant and Appropriate Requirements (ARARs), risk, and technology on remedial decision making. Reviewed Records of Decision (RODs) to identify key contaminants and selected remedies for analysis of the Superfund remedy selection process.

Implemented and maintained a database of all RODs signed from the inception of the Superfund program through FY91.

Supported EPA's Emergency Response Division in worker protection implementation activities. Coordinated activities, prepared materials, and provided onsite support at Hazardous Waste Operations and Emergency Response (HAZWOPER) workshops. Developed fact sheets on planning, training, and medical surveillance requirements in HAZWOPER.

Conducted research to identify facilities operating on Indian reservations and chemicals reported or released on tribal lands. Prepared materials for SARA Title III workshops on implementing Title III on Indian land and researched current issues affecting federally recognized Indian reservations.

Provided support for the implementation of guidance to prepare a Bioremediation Spill Response Plan for Galveston Bay, Texas.

Provided support to the National Incident Coordination Team (NICT) and EPA Headquarter's Emergency Operations Center in response to Operation Desert Shield, Desert Storm, and the Persian Gulf Oil Spills. Prepared updates of activities in the Persian Gulf for NICT.

Kelley E. Crute  
Page 4

Reviewed the Hazardous Materials Annex to Emergency Support Function (ESF) #10. Developed a summary of 30 policy and program issues in ESF #10. Reviewed and commented on regional supplements to the Plan for Federal Response to a Catastrophic Earthquake, focusing on EPA's relationship with FEMA and other federal agencies, and on EPA's support to other ESF lead agencies in response to natural disasters.

Participated in *Response '91A*, an earthquake simulation to test the effectiveness of federal, state, and local responses to natural disasters.

Researched communication between EPA regions and state agencies to develop requirements for EPA/state interaction during the remedial investigation/feasibility study portion of the Superfund process.

Developed a comment-response document for EPA for a Memorandum of Understanding (MOU) between National Oceanic and Atmospheric Administration (NOAA) and EPA concerning natural resource coordination.

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#### EDUCATION

B.A., Environmental Sciences, University of Virginia, 1990

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#### TRAINING

EG&G General Employee Training for Subcontractors, 1993

Integrated Risk Information System (IRIS) training course, National Library of Medicine, 1992

**Gregory S. Davis**  
*Project Manager*

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**AREAS OF EXPERTISE**

Contaminant Fate and Transport  
Geochemical and Hydrogeologic Investigations  
Solute Transport and Groundwater Flow Modeling  
Vadose Zone Investigations  
Geostatistical and Statistical Analyses

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**SUMMARY OF QUALIFICATIONS**

Mr. Davis has more than 11 years of experience in private industry and government projects related to saturated and vadose zone hydrogeology and aqueous geochemistry. For the past year, he has been manager of the Environmental Geosciences Group, which includes 12 technical personnel responsible for the design and implementation of investigations related to soil, air, and groundwater quality; geochemical characterization of contaminated media; and contaminant fate and transport. Major areas of expertise include design, implementation, and management of groundwater quality and quantity investigations (including all aspects of well installation, development, sampling, and aquifer testing); soil contamination investigations; unsaturated zone investigations (including installation of field instrumentation and laboratory determination of hydraulic properties); and hydrochemical interpretations (including groundwater modeling, tracer studies, and isotopic investigations). Investigations include RCRA/CERCLA sites, underground storage tanks, hazardous and municipal solid waste landfills, mining sites, and characterization of baseline conditions.

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**EXPERIENCE**

**Manager, Environmental Geoscience**  
**September 1990 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently acts as project manager for implementation of the Phase I RFI/RI for the Present Landfill (Operable Unit 7) at the Rocky Flats Plant. The RFI/RI encompasses field studies, data analysis, determination of the nature and extent of contamination, risk assessment, and the development of the RFI/RI report. Potential contamination at this site includes volatile organic compounds (VOCs), semi-volatiles, metals, and radionuclides.

Served as project manager for the 1993 Well Evaluation Project for Rocky Flats Plant. Evaluated the effectiveness of the 538 monitoring well network to meet regulatory requirements and programmatic monitoring goals. Pragmatic goals include early detection of releases and source characterization, interception and monitoring of predicted migration pathways, delineation of nature and extent of contamination, and ability to quantify contamination migration rates and temporal trends in contaminant concentrations. Characterized site geology and current

Gregory S. Davis  
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hydrogeologic and geochemical conditions. Addressed federal, state, DOE and site-specific regulations. Formulated recommendations related to reconfiguration of the existing well network, frequency of sampling, and analytical suites.

Served as project manager for preparation of the Phase I RFI/RI Work Plan for the Present Landfill (Operable Unit 7) at Rocky Flats. Wrote the Phase I RFI/RI Work Plan for OU 7 describing the hydrogeologic setting and known nature and extent of contamination in soils, groundwater, surface water, and air. The work plan presents the Field Sampling Plan, Baseline Risk Assessment Plan, QA Plan, and Standard Operating Procedures necessary to comply with the RCRA/CERCLA investigation and remediation process. Currently serving in a similar capacity for RFI/RI Work Plans for OU 8 (700 Area), OU 15 (Inside Building Closures), and OU 16 (Low-Priority Sites).

Served as project manager for the development of a menu-driven user interface for the Geostatistical Software Library (GSLIB). Validated the statistical programs and methodology using data sets from Rocky Flats Plant.

Acted as project manager for the 1992 Annual RCRA Groundwater Monitoring Report for Regulated Units at the Rocky Flats Plant.

Wrote the 1990 and 1991 Annual RCRA Groundwater Reports for Regulated Units at Rocky Flats Plant. These reports used EPA-approved statistical methods to evaluate potential releases from the Solar Evaporation Ponds, West Spray Field, and Present Landfill. Additionally, these reports recommended improvements to the groundwater assessment activities performed at each of the RCRA-regulated units.

Performed data analysis and interpretation for the 1989 and 1990 Surface Water and Sediment Geochemical Characterization Reports at Rocky Flats Plant. Evaluated transport of metals, radionuclides, semi-volatile organic compounds and major ions to evaluate impact of plant-related activities and offsite transport of contamination.

Worked as project manager for preparation of a background report for the AMAX Tererro Mine CERCLA site. Report summarizes all background information, and characterize sources of contamination, release mechanisms, and contaminant transport pathways in air, surface water, and groundwater.

Served as project manager for conducting an environmental and regulatory compliance audit and a soil and groundwater investigation at an industrial facility in the eastern United States. Assisted the client in evaluating previous investigations, reviewing Notice of Deficiencies regarding RCRA compliance, and determining the nature and extent of metal and VOC contamination in soil and groundwater through additional sampling and analysis.

Gregory S. Davis  
Page 3

Was project manager for numerous underground storage tank (UST) investigations, including preliminary and Phase I investigations of contamination, preparation, and implementation of Corrective Action Plans, and routine groundwater monitoring programs.

Designed special sequential extraction analytical methods for evaluating geochemical distribution and mobility of radionuclides in Rocky Flats soils and stream sediments in support of the Phase III RFI/RI for Operable Unit 3 and the Rocky Flats Sitewide Stream Sediment Characterization Plan.

Wrote standard operating procedures for the collection of stream sediment samples and laboratory protocol for analysis of samples using sequential extraction methods. Managed numerous environmental media sampling programs (consisting of sample plan development, sample collection, packaging and shipping, entry of sample data into automated sample tracking system, data analysis, and preparation of progress and final reports) in addition to providing oversight of field sampling activities performed by other contractors.

**Geochemist**  
**August 1989 - September 1990**

**MK-Environmental Services**  
**Denver, Colorado**

At MK-Environmental Services, was responsible for RI/FS-related geochemical and hydrogeologic studies of pesticide, fuel-related, and organic solvent contamination at the Rocky Mountain Arsenal. Major tasks addressed the vertical and lateral extent of contamination, cosolvency, and colloidal-phase transport of organochlorine pesticides, behavior of light non-aqueous phase and dense non-aqueous phase liquids, soil venting, natural and enhanced *in situ* biodegradation, and the effectiveness of pump-and-treat systems. Participated in treatability and pilot studies and contributed to alternatives identification, analysis, and selection.

**Hydrogeochemist**  
**August 1987 - August 1989**

**Golder Associates**  
**Lakewood, Colorado**

Responsibilities included mixed waste investigations at Hanford Reservation, Washington; RI/FS field investigations on NPL sites (Mosely Road, Oklahoma and Adams Center Hazardous Waste Disposal Facility, Indiana); RCRA facility investigations (Adams Center Hazardous Waste Disposal Facility, Indiana; Denver-Arapahoe Disposal Site; Denver-Arapahoe Chemical Waste Processing Facility); solid waste landfill investigations (Colorado Springs Landfill, Colorado; Farmington Landfill, New Mexico; and Anchorage Regional Landfill, Alaska); and technical review of PRP contractor-prepared documents (Mosely Road, Oklahoma).

Tasks included preparation of work plans, quality assurance plans, statements of work, and final reports; design and management of site characterization investigations, including drilling programs, aquifer pump tests, monitoring well networks, groundwater sampling programs, and modeling investigations of contaminant migration.

Designed and implemented hydrogeologic and geochemical investigations at solid and hazardous waste sites in New Mexico, Colorado, Alaska, Pennsylvania, and Washington. Major projects included a hydrogeologic characterization of the existing and proposed portions of the Adams Center Hazardous Waste Facility in Indiana in support of a RCRA Part B Permit application; design of the RCRA monitoring well network for the Adams Center Facility using solute transport computer modeling; interpretation of groundwater quality for the Denver-Arapahoe Chemical Waste Processing Facility in Colorado, including authorship of the Ground-Water Quality Assessment Plan and the Ground-Water Quality Assessment Report addressing apparent contaminant leakage from the facility; and installation of RCRA groundwater monitoring wells around mixed waste burial grounds in the 200 East area at the Hanford Reservation in Washington.

As a project geochemist, performed hydrologic assessment of site suitability of a proposed solid waste landfill expansion in Colorado Springs, Colorado, and Farmington, New Mexico, for Waste Management of Colorado.

As a project geochemist, performed a geochemical evaluation of Appendix IX parameters in groundwater at the Adams Center Hazardous Waste Facility, Indiana, and used a groundwater model to design improvements to the existing monitoring well network.

Installed RCRA monitoring wells for Battelle Northwest Laboratory around mixed waste (organic solvents and radioactive wastes) burial grounds in the 200 East and 200 West areas of the Hanford Reservation.

As a project geochemist, installed groundwater quality monitoring wells at the Anchorage Regional Landfill.

As a project geochemist, reviewed groundwater quality data for RCRA permitting and monitoring at the Denver-Arapahoe Disposal Site (Lowry Landfill) and Waste Processing Facility in Colorado.

Reviewed the HRS scoring of a Superfund site, Mosely Road Landfill, Oklahoma, for possible NPL listing.

As project geochemist, conducted a hydrogeologic characterization of the existing (Phase I, II, and III) and proposed (Phase IV and South Property) portions of the Adams Center Hazardous Waste Facility, Indiana. Work included aquifer testing and analysis of data.

**Hydrogeochemist**  
**January 1984 - January 1987**

**University of Colorado/U.S.G.S.**  
**Boulder, Colorado**

As a research assistant at the University of Colorado, worked in cooperation with the U.S.G.S. on the Nevada Nuclear Waste Isolation Program (NNWIP); studies were related to the movement and chemistry of groundwater at Yucca Mountain. Tasks included investigation of

Gregory S. Davis  
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methods to obtain representative vadose zone water samples for analyses, measurement of *in situ* unsaturated hydraulic properties, collection of vadose zone water samples for isotopic dating, and an analysis of stable isotope content in precipitation and groundwater for assessing paleoclimatic infiltration patterns and recharge.

Worked on NNWIP as a hydrologic field assistant with the U.S.G.S. This experience focused on field instrumentation and laboratory analytical techniques for investigating vadose-zone hydrogeochemistry. Performed laboratory and *in situ* determinations of existing moisture conditions, soil moisture characteristic relationships, residual moisture contents, particle size distributions, bulk densities, and porosities. The soil moisture characteristic data were used in computer algorithms to calculate fitting parameters for closed-form analytical expressions that define the soil moisture characteristic curve and the relative hydraulic conductivity versus saturation relationship.

**Assistant Geochemist**  
**January 1981 - March 1983**

**Envirologic Systems, Inc.**  
**Denver, Colorado**

At Envirologic Systems, assisted in the design and implementation of hydrogeologic and geochemical investigations for mining and RCRA projects in Colorado, South Dakota, and Arizona. Responsibilities included data collection, analysis, interpretation, and report writing; groundwater and surface water sampling programs; and groundwater pump tests. Projects included uranium tailings and metals mines in Colorado, South Dakota, and Arizona. Conducted a technical review of the MITRE model used to rank Superfund sites.

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## EDUCATION

M.S., Geochemistry/Hydrogeology, University of Colorado, Boulder, 1987  
B.A., Geology, University of Colorado, Boulder, 1974

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## TRAINING

Short Course - Capture-Zone Analysis for Remediation and Wellhead Protection, NWWA, 1992  
Vadose Zone Monitoring Short Course, NWWA, 1991  
Radiation Worker Health and Safety Course, EG&G Rocky Flats Plant, 1990  
Unclassified Nuclear Information (UCNI) Training Course, Stoller, 1990  
40-Hour Hazardous Waste Site Health and Safety Training, Golder Association, 1988

**Anne B. Doud White**  
*Biologist II*

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**AREAS OF EXPERTISE**

Plant Population Biology  
Statistical Analyses  
Plant Identification  
Ecological Theory

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**SUMMARY OF QUALIFICATIONS**

Ms. Doud White has four years of research experience at the university level involving botanical and ecological skills at the individual, population, and community level. She has four years post-secondary teaching experience in plant taxonomy, botany, ecology, evolution, plant anatomy, and zoology. Ms. Doud White is recognized for excellent writing, organization, and communication skills. She has utilized numerous computer programs for word processing, statistical analyses, databases, and other uses.

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**EXPERIENCE**

**Plant Ecologist/Biologist**  
**November 1993 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Responsible for designing and conducting plant ecological field investigations and preparing technical reports in support of NEPA documentation, RCRA/CERCLA site characterization, risk assessment, resource development projects, and developing mitigation and monitoring programs. Performs threatened and endangered species surveys.

Projects include remediation planning and ecological risk assessment for the U.S. Department of Energy's Rocky Flats Plant. Compiled plant species lists for a portion of hazardous sites. These lists will be used in support of mitigation and monitoring programs.

Developed and wrote the site description and biological sampling plans for a remedial investigative report for a lead-zinc mine in north-central New Mexico.

Conducted mitigation planning for a proposed ski area in west-central Colorado and helped to formulate native seed mixes for use on the revegetation project.

Anne B. Doud White  
Page 2

**Research Assistant**  
**March 1991 - September 1993**

**University of California**  
**Davis, California**

Quantified and analyzed the competitive interactions and possible co-evolution of two desert annuals coexisting in the Mojave Desert near Daggett, California, to partition resources. Results were based on information from soil water depletion, growth analysis, and reproductive fitness.

Conducted field research assessing plant community dynamics for a California Blue Oak conservation project. Results from this project are to be used to design threshold population sizes and land preservation methods to support remediation decisions utilizing the genetic variation and environmental gradients to conserve this rapidly declining species. Duties included soil sampling, acorn collection and manipulation for germination, and database management for community quantification.

**Botanist**  
**August 1991 - September 1991**

**Department of Fish and Game**  
**Redding, California**

Plant surveyor for the Cantara Loop toxic spill. Conducted surveys to assess plant community ecological damage to the Sacramento River riparian system after a soil fumigant was released into the river. The information was used for remediation and assessment of revegetation requirements.

**Teaching Assistant**  
**September 1990 - September 1993**

**University of California**  
**Davis, California**

Teaching assistant in the Department of Agronomy and Range Science. Designed and instructed labs while assisting the professor in a range and wild lands plant taxonomy and ecology course.

Teaching assistant in the Department of Zoology. Instructed labs and designed discussion sections in addition to assisting the professors in an introductory biological sciences class.

Both positions involved preparing and presenting lectures; holding requested office hours; drafting and administering exams; and grading lab reports, term papers, and exams for 25 to 150 students each term.

**Research Assistant**  
**October 1987 - July 1988**

**University of Colorado Health Sciences Center**  
**Denver, Colorado**

Conducted research on immunologic reactions of burn patients using gel electrophoretic and tissue culture techniques. The information gathered was used to develop pharmaceutical treatments for severely burned patients.

Anne B. Doud White  
Page 3

**Naturalist**  
**June - October 1987**

**The Keystone Science School**  
**Keystone, Colorado**

Designed and led outdoor day trips in the Keystone area as an environmental instructor. Subjects taught included plant identification, geology, stream ecology, and natural history.

**Teaching Assistant**  
**1986 - 1987**

**The Colorado College**  
**Biology Department**  
**Colorado Springs, Colorado**

Demonstrated techniques and assisted students' laboratory practices in two vertebrate zoology classes.

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### EDUCATION

M.S., Ecology, University of California, Davis, 1993  
B.A., Biology, The Colorado College, Colorado Springs, 1987

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### TRAINING

40-hour OSHA Training

**David A. Ellerbroek, Ph.D.**  
*Senior Geologist*

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**AREAS OF EXPERTISE**

Soil and Groundwater Remediation  
Environmental Site Assessments  
Surface Water/Groundwater Hydrology  
Water Quality Modeling Systems Design  
Geostatistics

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**SUMMARY OF QUALIFICATIONS**

Dr. Ellerbroek has more than six years of experience in groundwater hydrology with an emphasis on monitoring and modeling of contaminant transport in soil and groundwater systems. His expertise includes environmental site assessments, statistical design of environmental monitoring programs, and remediation of soil and groundwater affected by organic contaminants. Dr. Ellerbroek is experienced in field techniques and applying analytical and numerical models to complex geologic environments. His international experience includes environmental assessments of mining sites, oil operations, and industrial facilities in Indonesia, Romania, and the United Kingdom.

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**EXPERIENCE**

**Senior Hydrogeologist**  
August 1993 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Responsible for the design, management, and implementation of monitoring programs, field sampling plans, and investigations of groundwater and soil contamination. Performed testing of geostatistical software for spatial estimation of actinide contamination in soils at the Rocky Flats Plant. Performs classical statistical analyses of chemical data from the Phase I RFI/RI at the Present Landfill (OU 7) to identify site-related contamination. Provides technical input to the design of the Field Sampling Plan for the Phase II RFI/RI at OU 7.

**Senior Hydrologist**  
October 1991 - August 1993

**Advanced Aquatic Technology Associates**  
Fort Collins, Colorado

Managed and conducted environmental site assessments for industrial facilities and mining operations including international sites. Designed monitoring programs for soils, groundwater, and drinking water to evaluate hazards from heavy metals and organic contaminants. Designed hydrologic and water quality monitoring programs for risk assessments and NPDES permit applications. Designed, operated, and maintained computer-controlled, automated monitoring systems for the collection of hydrologic and meteorologic data. Performed groundwater and

David A. Ellerbroek

Page 2

surface-water modeling, and hydrogeologic analysis. Evaluated remedial technologies for soil and groundwater at sites contaminated by petroleum products.

Developed a technical program for evaluating hazardous substances in soil and water for use in the United Kingdom. Designed site assessment protocols including sampling techniques, hydrogeologic characterizations, and chemical hazard risk assessments.

**Research Assistant and Ph.D. Candidate**  
**September 1989 - September 1991**

**Colorado State University**  
**Fort Collins, Colorado**

Studied groundwater hydrology and contaminant transport emphasizing the transport of organic compounds in soils and groundwater. As part of dissertation research, designed and evaluated new modeling and monitoring procedures for assessing the transport of pesticides through unsaturated soils and the impact of preferential flow pathways on chemical transport.

Conducted hydrologic fieldwork in the San Luis Valley of Colorado, which included designing and installing monitoring systems for pesticides in soil and groundwater and analyzing soil and water samples for the herbicide metolachlor using gas chromatography. Tested a wide range of predictive models assessing contaminant transport through soils. Designed and performed a stochastic analysis using Monte Carlo techniques to characterize the variability of metolachlor transport in field soils and the impact of preferential flow pathways on pesticide transport.

Completed advanced course work in groundwater hydrology and hydrogeology, flow in porous media (non-aqueous phase liquids) in soil and groundwater, bioremediation, unsaturated flow and contaminant transport, numerical modeling of groundwater flow and contaminant transport, statistics and geostatistics, water-quality hydrology, and geochemistry.

**Project Hydrologist**  
**June 1990 - September 1990**

**National Park Service**  
**Fort Collins, Colorado**

Performed fieldwork and hydrologic analyses associated with environmental assessments at National Parks. Designed and installed groundwater monitoring systems for organic chemicals which involved development of sampling schedules and procedures, QA/QC guidelines, and data analysis techniques. Performed fieldwork involving flood plain mapping and flood risk assessment, including HEC2 hydrologic modeling.

**Project Hydrologist**  
**June 1988 - September 1989**

**Bureau of Land Management**  
**Denver Service Center**  
**Denver, Colorado**

Conducted numerous environmental assessments and field projects including water quality monitoring at remote mining sites in Alaska, hydrogeology of the Dolores River basin in Colorado, mined-land reclamation, and water rights assessment studies. Provided technical

David A. Ellerbroek  
Page 3

support and hydrologic expertise to multidisciplinary environmental study teams. Many field projects involved remote sites and difficult working conditions.

**Research Assistant**  
**September 1987 - June 1989**

**Colorado School of Mines**  
**Golden, Colorado**

Participated in acid mine drainage studies that assessed the role of wetlands in acid mine pollution remediation. Projects evaluated natural and artificial wetlands for potential use as treatment facilities for acid mine drainage. Responsibilities included system design, monitoring well installation, water and soil sampling, and soil microbial analysis. Course work included hydrology, water quality modeling, geochemistry, hydrogeology, and environmental law.

**Industrial Hygienist**  
**1987**

**Spence-Geiger Associates**  
**Lakewood, Colorado**

Conducted air quality monitoring surveys at asbestos abatement sites and monitored worker exposure levels and ambient air quality. Performed health and safety assessments of workers in hazardous environments. Performed asbestos risk assessments and inspections as an EPA-certified inspector.

**Geotechnical Engineer**  
**1986**

**Peter Kaldveer Associates**  
**Oakland, California**

Inspected large construction sites documenting the incorporation of design specifications, as a field engineer. Projects included road construction, building foundations, water diversion projects, and landfills.

**Research Assistant**  
**1985**

**C.I.R.E.S.**  
**Boulder, Colorado**

Used seismic models to locate earthquake epicenters for an earthquake prediction research group. Utilized a DEC PDP 11/770 mainframe computer and the Unix operating system.

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## EDUCATION

Ph.D., Environmental Engineering, Colorado State University,  
Fort Collins, 1993

M.S., Environmental Science and Engineering,  
Colorado School of Mines, Golden, 1989

B.S., Geophysics, University of Colorado, Boulder, 1985

**TRAINING**

40-Hour Hazardous Waste Site Health and Safety Training, 1993

90

**Michelle G. Hanson**  
*Geologist II*

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**AREAS OF EXPERTISE**

Geology and Hydrogeology  
Site Investigations and Assessments  
Air, Groundwater, and Storm Water Monitoring

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**SUMMARY OF QUALIFICATIONS**

Ms. Hanson has approximately four years of professional experience in geological and hydrogeologic investigations of hazardous waste and other sites, including supervising drilling of soil borings and monitoring wells; soil-gas, cone penetrometer, BAT, and Hydropunch sampling surveys; supervising geophysical site investigations; and performing trenching and excavation activities. Ms. Hanson also has extensive experience in soil sampling and logging, sampling and monitoring storm water runoff, conducting preliminary and Phase II site assessments, and conducting air monitoring. Ms. Hanson possesses excellent written communication skills and has written and co-written numerous technical reports submitted to various state regulatory agencies.

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**EXPERIENCE**

**Hydrogeologist**  
**November 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provides assistance in project planning and development, field oversight, and team support for geologic investigations and monitoring programs at various sites. Responsibilities include coordinating geologic investigation site activities; supervising monitoring well installation, development, and sampling; and performing multimedia sampling and a variety of geologic field tests.

Supervised cone penetrometer testing, methane survey, soil-gas sampling, and groundwater sampling using BAT techniques for the RFI/RI at the Present Landfill (Operable Unit 7) at the Rocky Flats Plant. Prepared cross-sections detailing geology and hydrogeology of the site, as well as landfill-generated gas (i.e., methane) contour maps illustrating the occurrence and relative concentrations of gases within the landfill. Evaluated field and laboratory data for precision and accuracy in an effort to determine data useability. Evaluated the nature and extent of contamination of leachate/groundwater within the Present Landfill.

Conducted Phase II Environmental Assessment of a crude oil production and storage facility in preparation for a real estate transaction. Assessment involved installing and sampling several temporary groundwater wells and analyzing soil and groundwater samples for crude oil and

Michelle G. Hanson  
Page 2

associated constituents. Evaluated impact to the site from past and present activities on this and adjacent sites. Prepared Phase II Environmental Assessment Report. Coordinating remediation efforts in accordance with state Oil and Gas Conservation Commission requirements.

**Geologist III**  
**July 1990 - November 1992**

**SP Environmental Systems, Inc./Industrial Compliance**  
**Sacramento, California**

Supervised remedial investigations, including drilling of soil borings and monitoring wells using both hollow-stem auger and air rotary casing hammer procedures. Oversaw soil-gas and Hydropunch sampling surveys as well as cone penetrometer testing.

Monitored storm water runoff at an industrial site, which included sampling discharge and effluent for the purpose of analyzing the samples for chemical constituents as well as biotoxicity properties. Also responsible for interpreting the analytical data and generating the quarterly monitoring reports in accordance with requirements set forth by the California Regional Water Quality Control Board.

Characterized debris pile, including contaminated soil and miscellaneous drums. This material was characterized as non-hazardous and recycled at a significant cost savings to the client.

Supervised excavation of lead and volatile organic compound-contaminated soil at an active railyard in conjunction with the California Environmental Protection Agency, Department of Toxic Substances Control guidelines. Responsible for overseeing excavation activities, including the loading and transportation of impacted material, and conducting confirmation sampling. Also responsible for conducting the daily air sampling and monitoring, including maintaining the meteorological station and calibrating sampling equipment.

Managed remediation activities for a former underground storage tank site. Organized field activities for the excavation and subsequent confirmation sampling of the impacted areas. Also responsible for submitting the final report to the appropriate agency requesting closure.

Conducted preliminary site assessment of real estate parcel, which included researching regulatory files, conducting a site visit and personal interviews, and preparing an inventory of potentially sensitive receptors within the site vicinity.

Supervised the design of a groundwater remediation system which included the installation of numerous onsite and offsite extraction wells. Involved in obtaining offsite easements for underground conveyance system proposed to route impacted groundwater to the onsite remediation plant, which consisted of an oil/water separator, air stripping tower, and both vapor-phase and liquid-phase carbon adsorption units. Also supervised pilot studies, including air stripping and peroxidation techniques.

Michelle G. Hanson  
Page 3

Prepared a closure plan in accordance with Title 23 of the California Code of Regulations for a Toxic Pits Cleanup Act (TPCA) surface impoundment, which included engineering and design specifications for this proposed Class III landfill.

Wrote and co-wrote numerous environmental reports, including remedial investigation work plans and reports, feasibility studies, remedial action plans, work plans for monitoring well installation, closure reports for underground storage tank sites and Class III landfills, preliminary and Phase II site assessment reports, and quarterly reports for groundwater and storm water runoff monitoring programs.

**Cooking School Director**  
November 1986 - January 1990

**Orange Tree Imports**  
Madison, Wisconsin

Responsible for managing staff; scheduling classes and instructors; writing, designing, and typesetting course brochures; coordinating advertising; establishing and maintaining budgets and business accounts; and assisting individual cooking classes.

**Assistant Geologist**  
January 1984 - September 1985

**Wisconsin Geologic and Natural History Survey**  
Madison, Wisconsin

Responsibilities and activities included well logging (laboratory examination), correlating well logs, constructing geologic maps and cross-sections, well sampling and measuring (collecting samples for laboratory analysis, measuring water elevations and groundwater parameters), assisting with the development of mineralogical data base project and data entry, presenting water flow model at seminar, working with state and federal agencies in compiling and comparing data for minerals division.

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## EDUCATION

B.S., Geology/Geophysics, University of Wisconsin, Madison, 1984

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## TRAINING

Radiation Safety for Environmental Restoration, EG&G Rocky Flats, 1992  
General Employee Training for Subcontractors, EG&G Rocky Flats, 1992  
40-Hour Hazardous Waste Operations Training, SP Environmental Systems, Inc., 1990

**Jennifer A. Higgins**  
*Geologist II*

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**AREAS OF EXPERTISE**

Hydrogeology/Geology  
Hydrogeologic Investigations  
Groundwater Monitoring Programs

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**SUMMARY OF QUALIFICATIONS**

Ms. Higgins has five years of professional experience in hydrogeological investigations, including involvement on RCRA/CERCLA and Superfund projects for Fortune 100 business clientele. She has extensive experience in geologic drilling, multimedia sampling, monitor well installation, hydrogeologic field tests, and field and laboratory data analysis for report generation.

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**EXPERIENCE**

**Hydrogeologist**  
**October 1992–Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Assists in project planning development and provides field oversight, team support, and report preparation for hydrogeologic investigations and monitoring programs. Coordinated hydrogeologic investigation site activities for the RFI/RI at Operable Unit No. 7, Present Landfill, at the Rocky Flats Plant, including monitor well installation, development, and multimedia sampling; monthly water-level measurements, well development activities, and groundwater quality sampling; and hydraulic conductivity testing. Schedules and performs continuing quarterly groundwater quality sampling activities for underground storage tank (UST) site and generates quarterly reports for private industry client and agency review. Developed long-term groundwater and surface water monitoring plan of investigations for large, private-industry client. Produces sections of investigative reports for a variety of hydrologic reports. Assists in analytical data interpretation and presentation. Prepares and plans scopes of work and cost proposals for private industry clients.

**Project Hydrogeologist**  
**September 1989–June 1992**

**Eckenfelder, Inc.**  
**Rochester, New York**

Supervised hydrogeologic and remedial investigation field activities. Supervised field crews and rig activities, including sampling soil and rock for analytical testing; installing piezometers; installing single- and multiple-cased monitoring, remedial pumping, and water supply wells; packer-pressure testing; hydrofracturing; core-logging; *in situ* groundwater quality sampling; record keeping; site safety monitoring; and billing.

Jennifer A. Higgins  
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Implemented a variety of hydrologic field tests, sampled groundwater, assisted in developing cost proposals, interpreted analytical data, prepared geologic and hydrogeologic maps and cross-sections, and generated investigative reports for submittal to clients and government agencies. Participated in various types of projects, including Superfund investigations and hydrogeologic investigations for Fortune 100 clientele and existing and proposed sanitary landfill sites.

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### EDUCATION

B.S., Geology, Kent State University, Ohio, 1989

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### TRAINING

The Princeton Course: Groundwater Pollution and Hydrology, 1994  
NGWA Outdoor Action Conference Attendee, 1993  
Environmental Law Overview, 1993  
First Aid/CPR, Annually  
Quantitative Hydrogeology Module II, Eckenfelder, Inc., 1992  
High Impact Communication Skills, 1992  
8-Hour Radiation Protection Training, Eckenfelder, Inc., Annually since 1990  
40-Hour Hazardous Waste Site Health and Safety Training, New England Consortium, 1989

**Stephen C. Kline, P.E.**  
*Senior Engineer*

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**AREAS OF EXPERTISE**

NEPA Documentation and Compliance  
Safety/Risk Analysis  
Environmental Risk Analysis  
Transportation Operations  
Waste Management

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**SUMMARY OF QUALIFICATIONS**

Mr. Kline has over 20 years of professional experience in support of programs within the DOE Weapons Complex and the nuclear power industry. He is responsible for providing technical assistance to clients for development of NEPA compliance strategies, environmental documentation, risk assessment, and safety analysis support. Mr. Kline has been the project manager or a principal contributor to NEPA documentation and risk/safety analyses for several waste management actions or remedial actions at the Rocky Flats Plant, Nevada Test Site, and Waste Isolation Pilot Plant (WIPP). He has provided strategy development and peer review of multiple waste generator environmental assessments (including Los Alamos National Laboratory, Oak Ridge National Laboratory, and Savannah River Plant) in support of the Defense Transuranic Waste Program. Mr. Kline has also supported key transportation studies over the past several years. While a member of the General Atomic engineering staff at the Fort St. Vrain Nuclear Power Plant, he was responsible for initiation and review of modifications to the plant design baseline and attendant technical and safety analysis reviews and unreviewed safety question determinations.

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**EXPERIENCE**

**Manager, Technical Services**  
1981 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Served as project manager and a principal contributor for the preparation of a Safety Analysis Report for the Pondcrete and Saltcrete (cemented low-level mixed waste forms) Storage Facilities at Rocky Flats Plant in accordance with DOE Orders 5480.22 and 5480.23. An analysis was conducted to support determination of the Hazard Classification of the facilities. Subsequent tasks included identification of applicable regulations, DOE orders, codes, and standards; development of analysis methodologies; characterization of the low-level waste forms; analysis of normal and accident conditions (radiological and hazardous chemical); preparation of facility and conduct of operations descriptions; and preparation of facility safety requirements.

Principal contributor to Revision 1 of the Safety Analysis Report for U.S. DOE Operations at the Carlsbad Municipal Firing Range. The analysis concluded that continued use of the range

Stephen C. Kline, P.E.

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for live fire exercises is within acceptable levels of risk with implementation of identified administrative controls and range safety practices.

Served as project manager and a principal contributor for a study evaluating all onsite and offsite transportation risks associated with operations at Rocky Flats. The resulting document will serve as a technical resource for evaluation of transportation impacts in the proposed Site-Wide Environmental Impact Statement. The study characterized materials, transportation packing and containers, transportation movements, and related transportation activities and evaluated associated impacts normally incident to transportation and those due to the nature of the cargo being transported. The risk assessment involved pathway and exposure analysis and dispersion modeling of radiological and hazardous materials.

Principal contributor to a draft environmental assessment for the proposed Residue Drum Storage Facility. Supported identification of the NEPA analysis scope and document preparation and performed the transportation risk assessment.

Principal contributor to a transportation risk assessment to support NEPA documentation for the shipment of uranium billets from the Hanford Site to England. Both land/sea and land/air routes were evaluated. Primary responsibilities included development of release fractions for severe accidents, support of RADTRAN risk calculations, dispersion modeling and exposure analysis for the bounding transportation accident, and providing RADTRAN training to client personnel.

Served as project manager and a principal contributor for an environmental assessment for the partial closure of the solar evaporation ponds in which actions for enhanced natural evaporation, forced evaporation, and solidification of evaporator concentrate and pond sludge were discussed, as well as alternative actions. Potential hazards and exposure pathways and controls associated with the proposed action were qualitatively evaluated.

Served as Stoller project manager and a principal contributor to the preparation of an environmental assessment of the Supercompactor and Repackaging Facility and the TRU Waste Shredder. Responsible for evaluating transportation and offsite disposal impacts, including interface issues with NEPA documentation for the Waste Isolation Pilot Plant and severe accident consequences. The severe accident consequence analysis incorporated pathway and exposure analysis and dispersion modeling to evaluate impacts to the public. Responsibilities also included resolution of state and public comments.

Served as Stoller project manager and a principal contributor in the preparation of a Safety Evaluation for the Supercompactor and Repackaging Facility. Tasks included identification of the analysis scope, methodology, and potential hazards, including failure mode and effects analysis and evaluation of the probability of occurrence and prediction of hazardous chemical and radiological releases from normal operations and accident conditions.

Served as Stoller project manager and a principal contributor to the NEPA risk assessment incorporated into the Surface Water Interim Measures/Interim Remedial Action Plan and

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Stephen C. Kline, P.E.

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Decision Document for the South Walnut Creek Basin. Supported preparation of risk calculations, including dispersion modeling and exposure analysis associated with construction and operation of the proposed action, including accident conditions.

Principal contributor for the NEPA documentation portion of the draft Interim Remedial Action Plans for both the groundwater and surface water remedial actions for Operable Unit No. 2. Occupational and non-occupational impacts were evaluated for construction, normal treatment operations, and accident conditions. For the groundwater action, prepared the NEPA scope, purpose, affected environment, and environmental effect comparison sections, and helped establish precedents for the integration of NEPA/CERCLA documentation at Rocky Flats.

Served as project manager and principal contributor for a task to evaluate the structural response of an ATMX-600 series railcar to hypothetical accident conditions in support of preparation of a safety assessment for the railcar. A finite element model (ANSYS) of the major structural components was developed, and supporting analyses were performed for five serious derailment accident scenarios. These results were utilized to further support railcar system documentation for a request for exemption from certain DOT hazardous material regulations.

As project manager and a principal contributor for an environmental assessment of an Interim Remedial Action proposed for the high-priority sites at Rocky Flats (881 Hillside Area), responsible for addressing transportation impacts and resolution of DOE/HQ's comments. Described and evaluated alternative interim actions to prevent the release and migration of alluvial groundwater contaminants. The risk assessment involved an evaluation of contaminant releases, transport modeling, and exposure assessment for construction, normal operations, and accident conditions.

Served as project manager and a principal contributor for preparation of an Action Description Memorandum to comply with NEPA requirements for Rocky Flats remedial actions associated with the 881 Hillside Area. Subsequently contributed to preparation of a draft environmental assessment of 881 Hillside waste management actions, including transportation-related impacts.

Served as principal contributor to the preparation of the transportation risk assessment incorporated in the WIPP Supplemental Environmental Impact Statement and supported resolution of public comments regarding the analysis. The risk assessment included pathway and exposure analysis and dispersion modeling for a spectrum of postulated accidents occurring along the routes to the WIPP facility.

Contributed to an environmental assessment for the disposal of mixed low-level waste at the Nevada Test Site Area 5 Radioactive Waste Management Unit. Evaluated the impacts associated with construction and operation of Area 5 and transportation of mixed low-level waste from waste generator sites to the Nevada Test Site.

Contributed to the development of a strategy for DOE to comply with NEPA requirements for shipping defense TRU wastes to WIPP and principal contributor to a follow-up study (including

Stephen C. Kline, P.E.

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scoping, risk analysis, and documentation), which provided DOE-managed TRU waste generation and storage sites with guidance and supporting analyses to facilitate compliance with NEPA transportation requirements.

Served as principal contributor in a study to assess the risks of transporting Fort St. Vrain Nuclear Power Plant spent fuel from Colorado to Idaho. The analysis included estimates of risk from normal transport and accidents associated with radioactive material as well as from those normally incident to transportation (independent of cargo) resulting in traumatic injuries and fatalities. The RADTRAN code was utilized to assess radiological impacts.

Principal contributor to a technical evaluation of the WIPP Integrated Risk Assessment Document, which is a probabilistic risk analysis of offsite radioactive releases from contact-handled (CH) TRU waste operations under accident conditions. A detailed review of accident fault/event trees and dispersion/exposure analyses was performed and recommendations for improvements made.

Served as principal contributor for a DOE study to review utility power plant probabilistic risk assessments and to identify key components contributing to risk for nuclear power plants.

As a principal contributor to another DOE study, reviewed several utility power plant probabilistic risk assessments and developed alternative fault tree and event tree analyses in order to evaluate the cost/risk benefits associated with implementation of selected NRC regulations (e.g., separation of redundant safety systems). Based on the review of the probability risk assessments, also identified key components contributing to risks for nuclear power plants in order to improve ways to collect and assess equipment failure rate statistics for the Nuclear Power Reliability Data System.

Project manager and principal contributor to a study to develop a preliminary definition of a transportation operations system capable of fulfilling the needs of the Office of Civilian Radioactive Waste Management. Developed a description of the transportation operations system functions/activities starting from dispatching a shipping cask to the waste generator to unloading the cask at its destination, including subsequent maintenance and certification for reuse.

Assisted the Transportation Operations Project Office (TOPO) in identifying detailed functions of the OCRWM transportation system and assisted in the preparation of activity descriptions and functional flow block diagrams for waste acceptance, transportation, and operations support functions.

Served as project manager and contributor to the development of waste acceptance criteria for a remote-handled TRU waste processing facility at Oak Ridge National Laboratory. Major considerations included definition of wastes requiring processing, proposed facility processing capabilities, safety analysis issues, and transportation regulations.

Stephen C. Kline, P.E.  
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Project manager and contributor to development of certification plans for shipment of highly enriched uranium to WIPP. Identified certification methods and procedures for waste forms and containers, and quality assurance requirements.

Served as principal contributor to preparing a preliminary long-range plan for management of Los Alamos National Laboratory buried TRU waste.

**Senior Engineer**  
1979 - 1981

**Gulf Oil Corporation**  
Denver, Colorado

Provided coordination, review, and approval of the specification, design, fabrication, and procurement details of the SRC-II Demonstration Plant Piping System. Total cost of materials for the piping system was estimated at approximately \$100 million. This was a project engineering position and involved providing direction to subcontractor personnel who were responsible for developing major engineering design elements. In this position, defined project valuing requirements, including initiation of test programs at the Fort Lewis Pilot Plant in Washington State to evaluate valve components for slurry applications.

**Senior Engineer**  
1972 - 1979

**General Atomic Company**  
San Diego, CA, and Platteville, CO

As a member of the General Atomic engineering staff at Fort St. Vrain Nuclear Power Plant, provided technical support for completion of plant construction, hot functional testing, plant start-up, and initial operation. Responsibilities included initiation and review of modifications to the plant for both nuclear steam supply and balance of plant systems. Performed the attendant technical and safety analysis reviews, unreviewed safety question determinations, and subsequent coordination of modification activities. Modifications were also reviewed with respect to compliance with the plant technical specifications and the need for potential changes. Other assignments with General Atomic included development of the preliminary process flow and piping and instrumentation diagrams for the nuclear steam supply systems for the proposed 4,000-MW(t) HTGR power plant.

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## EDUCATION

M.S., Engineering, University of California at Los Angeles, 1974  
B.S., Mechanical Engineering, Loyola University, 1970

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## TRAINING

RADTRAN Transportation Risk Analysis Workshop  
Rocky Flats Plant Basic Radiation Safety and Industrial Safety

**Michael J. Lauer**  
*Engineer III*

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**AREAS OF EXPERTISE**

Project Scheduling  
Project Planning  
Project Costing  
Construction Management

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**SUMMARY OF QUALIFICATIONS**

Mr. Lauer has three years of experience as a project controls engineer in support of Environmental Management, Waste Processing, and Waste Operations projects at the Rocky Flats Plant. This support has required close interaction with the client on a regular basis to compile budget and activity information into the schedules. The schedules provide the foundation for project management and cost estimation, which support Department of Energy deliverables. These deliverables include the Five-Year Plan, Base Programs, Current-Year Work Plan, Interagency Agreement, Site-Specific Plan, Roadmap, and the Comprehensive Treatment and Management Plan (CTMP).

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**EXPERIENCE**

**Associate Project Control Engineer**  
**January 1991 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently developing the strategic planning initiative schedules and resource loadings. The goal of this strategy is to produce a plan that will accelerate the assessment and remediation activities at Rocky Flats in accordance with EPA, CDH, and DOE requirements.

In support of the National Environmental Policy Act (NEPA) division at Rocky Flats, gathered and interpreted activity progress and budget information from the various NEPA project managers and incorporated this information into the various Environmental and Waste Management project schedules. Served as a key contributor to the development of work packages for NEPA projects, which included generating the FY92 budget. This has required the ability to revise and write ARTEMIS code in order to generate ad hoc reports requested by Rocky Flats and DOE. Possesses comprehensive understanding of NEPA requirements.

Supported the Technology Development division and the development of the CTMP. This effort required the development of a "generic" technology project schedule and a "generic" analytical characterization schedule, which were used as tools to develop detailed schedules for all of the technology development projects at Rocky Flats. Responsible for the development and maintenance of the detailed schedule for the Microwave Solidification Project, which consisted of over 570 activities and was fully resource-loaded and leveled. This effort required extensive

Michael J. Lauer

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importing and exporting from Lotus 1-2-3; generating fiscal-year budgets; and producing various schedule, resource, and cost reports (i.e., histograms, Gantt charts, logic diagrams, and tabular resource usage reports).

Was tasked in the development and resource loading of the Level 5 Detailed Schedules for the Interagency Agreement, which is a 7,000-activity network depicting the required remediation actions at Rocky Flats.

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### EDUCATION

B.S., Construction Management, Colorado State University, Fort Collins, 1990

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### TRAINING

Computer User Security, EG&G Rocky Flats  
Industrial Safety, EG&G Rocky Flats  
Radiation Safety, EG&G Rocky Flats

**Amy L. Leider**  
*Biologist II*

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**AREAS OF EXPERTISE**

Terrestrial Wildlife Ecology  
Animal Behavior/Ethology  
Population Genetics

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**SUMMARY OF QUALIFICATIONS**

Ms. Leider's diverse background in wildlife ecology encompasses professional experience with avian, mammalian, salmonid, and insect systems at both the individual and community levels. Her work includes the design, implementation, analysis, and presentation of research in the areas of population ecology, behavioral ecology, and population genetics.

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**EXPERIENCE**

**Wildlife Ecologist**  
November 1993 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Designs and conducts wildlife field investigations and prepares technical reports in support of NEPA documentation, RCRA/CERCLA site characterization, risk assessment, and resource development projects. Develops mitigation and monitoring programs. Performs threatened and endangered species surveys. Projects include remediation planning and ecological risk assessment for the U.S. Department of Energy's Rocky Flats Plant and a metals mine in north-central New Mexico and mitigation planning for a proposed ski area in west-central Colorado.

**Graduate Assistant II**  
August 1992 - July 1993

**Department of Biology**  
New Mexico State University  
Las Cruces, New Mexico

As a graduate assistant in the Department of Biology at New Mexico State University, conducted research on the species distribution and population genetics of desert soldier beetles employing field collections and protein gel electrophoresis. Additionally, assisted in curating the Entomological Museum, including species identification and collection maintenance.

As a teaching assistant, instructed laboratories in general biology for both majors and non-majors. Prepared and presented lectures, held regular office hours, drafted and administered exams, graded lab reports and term papers, and assigned all final grades for up to 100 students each term.

Amy L. Leider  
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**Staff Research Biologist**  
**February 1992 - August 1992**

**College of Natural Resources**  
**University of California**  
**Berkeley, California**

Designed and implemented a study to estimate population size and densities, home range size and translocation return distances of the California ground squirrel (*Spermophilus beecheyi*) on the Concord Naval Weapons Station (CNWS). Conducted extensive small mammal trapping and behavioral observations, mark-recapture studies, and habitat surveys. Anesthetized, ear-tagged, collared, and recorded body measurements of animals used in home range and translocation studies. Radio-tracked collared animals and triangulated and mapped locations of individuals.

Conducted raptor surveys, and monitored the nest sites of raptors including Golden Eagles (*Aquila chrysaetos*). Collected samples for diet analysis of large predators in area. Supported affiliated study of the endangered California tiger salamander (*Ambystoma tigrinum californiense*).

Supervised one full-time and two part-time field assistants. Established project goals, timetables, and daily work schedules. Worked in close contact with CNWS natural resources manager and military security. Prepared quarterly reports for U.S. Navy, and co-authored publication on findings.

**Fisheries Technician**  
**July 1991 - September 1991**

**Montana Fish, Wildlife & Parks**  
**Hamilton, Montana**

Participated in a population study of native and introduced trout in western Montana. Collected mark-recapture data using electroshock techniques with both bank and backpack generators. Censused fry to establish redd success and species diversity in temporal irrigation canals. Conducted sedimentation rate surveys, classified stream-bottom habitats, and gauged stream flows. Collected suspected hybrid individuals for genetic analysis.

**Research Assistant**  
**February 1991 - May 1991**

**Department of Biology**  
**University of California**  
**Los Angeles, California**

Provided field assistance for a long-term study on the evolution and breeding ecology of Sage Grouse (*Centrocercus urophasianus*). Conducted highly detailed behavioral observations; radio-tracked and -located individuals; captured and collared birds by spotlighting or cannon netting; located roost and nest sights. Conducted vegetation measurements and provided field support for associated project on nest predation.

Amy L. Leider  
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**Graduate Teaching Assistant**  
**September 1987 - December 1990**

**Division of Biological Sciences**  
**University of Montana**  
**Missoula, Montana**

Conducted graduate research on the behavioral ecology of Calliope Hummingbirds (*Stellula calliope*). Established daily activity budgets for territorial males and determined factors influencing courtship success. Presented research in regional and national meetings.

As a teaching assistant instructed both undergraduate and graduate level laboratories in general biology, zoology, human anatomy and physiology, marine zoology, comparative vertebrate anatomy, stream ecology, and animal field ecology.

**Preparator**  
**February 1987 - July 1987**

**Wildlife and Fisheries Museum**  
**University of California**  
**Davis, California**

Prepared museum skins of birds and mammals, and prepared and articulated skeletons for teaching collection. Maintained fisheries collection. Computerized avian collection data base. Developed educational exhibit for campus-wide open house.

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### EDUCATION

M.A., Zoology, University of Montana, Missoula, 1990  
B.S., Zoology, University of California, Davis, 1987

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### TRAINING

EG&G General Employee Training for Subcontractors, 1993

**Mark C. Lewis, Ph.D.**  
*Senior Biologist*  
DOE "Q" Clearance (Active)

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**AREAS OF EXPERTISE**

Aquatic Ecology  
Toxicology  
Environmental Risk Assessment

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**SUMMARY OF QUALIFICATIONS**

Dr. Lewis has 10 years of experience in research and consulting with an emphasis in ecology, toxicology, and risk assessment. He has extensive professional experience in biochemistry, physiology, and aquatic ecology. Dr. Lewis was a research fellow at the National Institutes of Health, Michigan State University, and Marine Biology Laboratory at Woods Hole, Massachusetts. He has been the project manager and technical lead for environmental risk assessments for both government and private clients.

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**EXPERIENCE**

**Senior Biologist**  
**May 1990 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Served as principal contributor to the design and execution of ecological risk assessments (ERA) in support of the RCRA and CERCLA investigations at the U.S. Department of Energy (DOE) Rocky Flats Plant. Developed the ERA work plans for three operable units and managed the implementation of ERAs at five high-priority operable units. These tasks included management of field sampling operations, data compilation and analysis, and report preparation. Responsible for making several technical presentations to federal and Colorado state regulatory agencies and played a key role in negotiations with the agencies. Successfully managed preparation of the Operable Unit 1 (881 Hillside) environmental evaluation (EE) report for EG&G, DOE's site manager, under intense state and federal scrutiny. Provided environmental risk assessment support to the environmental assessment for the proposed residue drum storage facility at Rocky Flats.

Serves as technical lead for the OU7 and OU11 RFI/RI human health risk assessments. Responsible for preparation of technical memoranda on development of methods for estimation of exposure, environmental fate and transport modeling, selection of contaminants of concern, and toxicity assessments for contaminants of concern. Also responsible for coordinating technical staff at Stoller and subcontractors in implementation of risk assessment.

Instrumental in developing standard operating procedures for ecological and toxicological sampling at Rocky Flats. Provided critical technical support in responding to DOE and

regulatory agency comments on several documents, including those mentioned above. Provided technical support in developing selection criteria for contaminants of concern, target analytes, and target species for use ecological risk assessments at Rocky Flats.

Served as task manager for an ecotoxicological investigation and risk assessment conducted for a major mining client in conjunction with a remedial investigation being conducted at an inactive lead/zinc mine in New Mexico. The primary task is to develop innovative and scientifically sound methods for risk assessment and risk management for a native brown trout fishery in a river protected under the Wild and Scenic Rivers Act. The issues include estimating exposure of aquatic and terrestrial wildlife to metals in sediments, soils and mine waste material, and vegetation.

Provided support to a major mining company in review of an EPA-conducted ecological risk assessment at an inactive gold mine near Lead, South Dakota. At issue were the methods used by EPA's consultant to calculate exposures and estimate risk to local wildlife populations and vegetation communities.

**Post-doctoral Fellow**  
**January 1989 - April 1990**

**Michigan State University**  
**East Lansing, Michigan**

Held joint appointment in the departments of Zoology, Pharmacology, and Toxicology. Position and research funded by the National Institutes of Health. Conducted research on basic function of ion channels in nerve and muscle cell membranes. Emphasis was on the effect of cell membranes in parasites. Other research focussed on environmental and physiological mechanisms controlling behavior of infective parasite larvae in natural systems.

**Post-doctoral Fellow**  
**June 1988 - January 1989**

**National Institutes of Health**  
**Bethesda, Maryland**

Acquired training and conducted research in electrophysical methods for studying the function of proteins in animal cell membranes. Research focused on characterizing biophysical properties of natural ionosphere toxins.

**Research Assistant and Research Fellow**  
**January 1983 - June 1988**

**University of Kentucky**  
**Lexington, Kentucky**

Graduate student and research fellow in the Comparative Physiology Group. Conducted research in various aspects of environmental physiology and ecology of parasites and their hosts. Studies and publications focused on physiological mechanisms controlling parasite behavior and nutrition. Examined environmental factors affecting population dynamics of parasites in freshwater fish and mollusks. Also conducted research in the effects of acid deposition on blood chemistry and ion regulation mechanisms in freshwater crayfish.

### EDUCATION

Ph.D., Biology, University of Kentucky, Lexington, 1988  
M.S., Biology, Eastern Kentucky University, Richmond, 1983  
B.S., Biology, Buena Vista College, Storm Lake, Iowa, 1980

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### TRAINING

40-Hour Hazardous Waste Site Health and Safety Training  
8-Hour Hazardous Waste Site Supervisor Health and Safety Training  
8-Hour Radiation Safety Training

**Robert C. Lundeen**  
*Technician I*

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**AREAS OF EXPERTISE**

Business Development  
Contract Administration  
Project Management

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**SUMMARY OF QUALIFICATIONS**

Mr. Lundeen has over 18 years of business management experience in several different industries. His professional background includes extensive business development, project management, contract negotiation and administration, and financial analysis. He has coordinated field activities, developed and reviewed proposals and deliverables, budgets, and schedules. In conjunction with project management responsibilities, he has extensive knowledge of resource coordination and job performance controls.

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**EXPERIENCE**

**Project Coordinator**  
March 1991 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Developed, reviewed, and updated the Sanitary Waste component of the 1992 Rocky Flats Plant Roadmap. The Roadmap is an issue-based planning process used by the DOE to determine activities necessary for achieving final waste disposal and for bringing waste operations into compliance. Preparation of this document involved identifying pertinent regulatory requirements impacting the Sewage Treatment Plant and Sanitary Landfill, developing logic/process diagrams, and formulating the issues, activities, and resolution to the issues that inhibit achieving the operational objectives.

As Stoller's primary point of contact with other team firms included in our Rocky Flats Plant Basic Ordering Agreement, administered coordination of correspondence, contracts, proposal preparation, and work order status reporting. Organized meetings with EG&G technical personnel to clarify statements of work, prepared timely and complete technical and cost proposals, and prepared supporting documents required in the final proposals to EG&G. Subsequent efforts include negotiation to expedite the contract awards.

Developed several of the Activity Data Sheets and Task Description Documents for the Environmental Restoration and Waste Management Five-Year Plans (FY94-98) at the Rocky Flats Plant. These documents were prepared for the Waste Minimization and WIPP Support

Robert C. Lundeen

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groups and for the 1994 corrective activity phase for the Saltcrete and Air Monitoring groups. The five-year planning documents involved the coordination of budgetary, regulatory, task, scheduling, milestone, and manpower factors for presentation to DOE and Congress.

Currently, pursuing private sector business development along the Colorado Front Range by promoting client awareness of Stoller's capabilities and services. Actively involved in environmental committees such as the Boulder Chamber of Commerce, Greater Denver Chamber of Commerce, and Colorado Association of Commerce and Industry.

**Financial Consultant**  
**July 1986 - July 1990**

**Merrill Lynch**  
**Boulder, Colorado**

Responsible for the financial management of 400 investment and retirement accounts, both individual and institutional. Managed approximately \$13 million in assets.

**Project Manager/Corporate Secretary/  
Office Manager**  
**1984 - 1986**

**Robinson Mechanical Systems**  
**Boulder, Colorado**

Coordinated office personnel and general business operations. Responsible for project budgeting, bidding, management, and cost controls on large projects. Wrote a computer program for automation of project/job billing. Worked directly with field operations as liaison with office/administration personnel.

**Manager, Crude Oil Acquisition**  
**1982 - 1984**

**Asamera Oil (U.S.) Inc.**  
**Denver, Colorado**

Managed the purchase, transportation, and contract negotiation for supplying approximately 10,000 barrels per day of raw crude oil to the Denver Refinery. Required extensive computer activity and maintaining working relationships with all levels of company and customer personnel.

**Manager - Natural Gas Liquids Marketing**  
**1981 - 1982**

**Western Gas Processors, Ltd.**  
**Northglenn, Colorado**

Primary function was to manage the marketing of all natural gas liquids produced at ten natural gas fractionation plants throughout the Rocky Mountain Region. Participated in the negotiation and purchase of pipeline right-of-way. Acquired natural gas supplies and established economic feasibility studies.

Robert C. Lundeen  
Page 3

District Manager  
1974 - 1982

Crude Oil Supply, Trades and Exchanges  
Western Crude Oil, Inc.  
Denver, Colorado

Directed the acquisition of raw crude oil supplies and subsequent marketing and distribution efforts. Responsibilities included extensive contract negotiation involving substantial volumes of oil and dollar sums. procured new oil producer/supplier contracts and maintained business relationships. Acted as coordinator between field transportation personnel and administrative functions.

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### EDUCATION

B.S., Business Administration, University of Colorado, Boulder, 1973

**Stephen M. Lynn**  
*Geologist II*

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**AREAS OF EXPERTISE**

Geology  
Remedial Investigations  
Environmental Assessments

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**SUMMARY OF QUALIFICATIONS**

Mr. Lynn has three years of professional experience performing soil gas sampling, two years of experience with geographic information systems, and two years of experience performing remedial investigations/feasibility studies at Rocky Flats.

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**EXPERIENCE**

**Associate Geologist**  
**March 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently site supervisor of field operations on Operable Unit 7 (Present Landfill) and Operable Unit 11 (West Spray Field) RFI/RI field investigations at Rocky Flats. Responsible for day-to-day field operations, including sonic drilling, groundwater sampling, soil sampling, borehole drilling, and well installation. Coordinate and supervise field activities, interface with client and subcontractors on technical and procedural issues, maintain project field data files, and perform quality assurance checks of field files.

Provided geologic support to EA's RFI/RI at Ellsworth Air Force Base in South Dakota. Responsibilities included borehole drilling, surface and soil sampling, and soil gas sampling.

Provided technical support to the evaluation of the monitoring well network at Rocky Flats. Responsibilities included management of data bases for historical groundwater quality data and water-level measurements, ARC/INFO computer plotting and contouring of contaminant isopleth maps, interpretation of geochemical data, and report preparation.

Provided geologic and hydrologic support to the Phase I Operable Unit 7 RFI/RI at Rocky Flats. Responsibilities included field support (borehole drilling; core logging; well installation; sampling of groundwater, borehole soil, sediments, and surface water; and performance of aquifer tests), management of sample shipping and tracking, data analysis, and report preparation.

Provided technical support by auditing groundwater and surface water investigations for compliance with the National Pollutant Discharge Elimination System (NPDES), U.S.

Stephen M. Lynn  
Page 2

Environmental Protection Agency (EPA), Colorado Department of Health (CDH), U.S. Department of Energy (DOE), and EG&G standards.

Provided field and sample management support for the Multimedia Monitoring program at RFP. Support for this project includes sampling of groundwater, surface water, soils, sediments, and other environmental media.

**Field Geologist**  
**July 1990 - March 1992**

**North East Research**  
**Lakewood, Colorado**

Conducted preliminary environmental investigations of groundwater contamination at industrial sites with the Petrex Soil Gas Technic. Interpreted gas chromatograph mass spectrometer data to determine migration pathways and extents of contaminant plumes. Identified individual contaminants with a mass spectra fingerprinting technique. Compiled comprehensive reports of volatile organic compound present in soil gas for preliminary environmental assessments.

**Project Manager**  
**October 1987 - July 1990**

**Q.C. Data**  
**Denver, Colorado**

Responsible for oversight and quality control on a geographic information system project for the United States Geologic Survey (USGS). Supervised 10 digitizers compiling USGS 7½-minute quadrangles for input into a digital format.

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## EDUCATION

B.A., Geologic Science, University of Colorado, Boulder, 1986

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## TRAINING

RFP General Employee Training, EG&G Rocky Flats, 1994  
RFP Waste Generator Qualification, EG&G Rocky Flats, 1994  
National Groundwater Well Association Short Course - Principles of Groundwater Hydrology, 1993  
OSHA 1910  
RFP Respirator Indoctrination and Fit Test Training, EG&G Rocky Flats, 1993  
RFP Radiation Worker II, EG&G Rocky Flats, 1993  
Photovac Portable Gas Chromatograph, Stoller, 1992

**Gary J. Magno**  
*Senior Biologist*  
Active "Q" Clearance

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**AREAS OF EXPERTISE**

Air Permitting  
Air Emission Inventories  
Operating Permit Management  
Prevention of Significant Deterioration of Air Quality Issues  
Regulatory Compliance Assessment and Planning  
Continuous Emission Monitoring

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**SUMMARY OF QUALIFICATIONS**

Mr. Magno has 15 years of air quality management and environmental compliance experience. He has directed air quality permitting, monitoring, and compliance programs for both a U.S. Department of Energy (DOE) facility and a coal-fired electric utility. His primary focus has been in evaluating applicable air quality regulations and implementing programs to meet these requirements. As a consultant, Mr. Magno also directed source testing programs and air pollution control equipment evaluations for utility and industrial clients. He has also chaired and participated on several technical committees concerning both air quality and anadromous fish restoration issues for the electric utility industry.

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**EXPERIENCE**

**Senior Air Quality Specialist**  
April 1994–Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Manages projects related to air quality for industrial clients, including air quality compliance assessments, emission inventories, monitoring, and permitting. Serves as staff consultant for air permitting issues. Oversees field technicians on air monitoring projects. Serves as regulatory liaison with regulatory agencies for clients.

**Principal Environmental Engineer**  
September 1990–November 1992  
April 1993–April 1994

**EG&G Rocky Flats, Inc.**  
Golden, Colorado

Provided technical supervision on numerous air quality permitting and emission monitoring projects for a DOE nuclear weapons plant. Managed the strategic planning and development of an operating permit program for a DOE facility. Reviewed all new emission sources for applicability to Prevention of Significant Deterioration regulations. Prepared air pollutant emission notices and permit applications associated with various plant processes and operations.

**Caren L. McMahan**  
*Technician II*

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**AREAS OF EXPERTISE**

Geography  
Cartography  
Geology

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**SUMMARY OF QUALIFICATIONS**

Ms. McMahan has four years of experience with geographic information systems (GIS), working primarily in municipal and industrial applications of environmental science and engineering. She has 10 additional years of experience as a cartographer and technical drafter, working specifically in land use planning, engineering/surveying, and geologic applications.

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**EXPERIENCE**

**GIS Specialist**  
May 1993 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Assists in GIS operations by providing technical skills for geologic, hydrogeologic, and ecologic applications in Colorado and New Mexico. Supports the scientific and engineering staff by supplying digital data capture, geographic data analysis, and map production for project reports. Communicates with clients regarding the use of GIS as appropriate to their projects.

**GIS Technician/GIS Marketing Representative**  
February 1990 - January 1993

**GeoSpatial Solutions**  
Boulder, Colorado

Assisted in GIS and remote sensing operations, including vector data capture and analysis using ARC/INFO and image processing and raster data analysis using ERDAS. Projects included local and regional data base development; storm water management studies; and geologic, hydrologic, and topographic mapping in the Northeast and Southwest regions of the United States. Additional responsibilities included manual preparation and drafting of map information, field confirmation of data, quality control of product output, data acquisition, and interpretation of aerial photography. Directly involved in proposal preparation, report writing, project planning and scheduling, and the hiring and training of new employees.

Researched the status of GIS use in the state of Colorado. Focused efforts on building relations with current and potential clients, community, and media. Developed geographic data bases for

Caren L. McMahan  
Page 2

ArcView and presented demonstrations to clients. Designed marketing materials, prepared proposals, and responded to inquiries.

**Technical Drafter**  
May 1985 - March 1986

**Atech**  
Anchorage, Alaska

Assisted with the development, drafting, and design of a full-color regional atlas relating to resources, land status, history, and topography. Designed presentation and report graphics specific to land use planning, engineering/surveying, and geologic applications. Drafted subdivision plats and road, water, and sewer plan and profile sheets. Developed graphics and assisted with drafting of local hydroelectric project.

**Civil Engineering Drafter**  
October 1984 - April 1985

**Datum Engineering and Surveying**  
Anchorage, Alaska

Developed standard detail drawings for water, sewer, fencing, railroad crossings, and pavement markings. Prepared plot plans, as-builts, and subdivision plats. Assisted with drafting and design of projects, including site grading, underground utilities, and streets.

**Civil Survey Drafter**  
June 1984 - September 1984

**International Technology Ltd.**  
Anchorage, Alaska

Compiled information to develop as-built plan and profile sheets of the Trans-Alaska pipeline. Plotted and drafted topographic maps of waste disposal and material sites from survey notes. Used Koh-i-noor Automated Graphic System.

**Planner Intern**  
1983 - 1984

**Weber County Planning Commission**  
Ogden, Utah

Responsible for drafting and reproduction departments. Developed and updated cadastral, zoning, and land use maps; property descriptions; drawings; and artwork.

**Cartographic Draftsperson**  
October 1981 - January 1982

**Air Data Systems**  
Fortuna, California

Constructed final drafts of topographic maps photogrammetrically compiled using a Kesh Plotter.

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**EDUCATION**

B.A., Geography, Geology minor, California State University Humboldt, 1981

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**TRAINING**

Advanced ARC/INFO, June 1993

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**HARDWARE AND SOFTWARE CAPABILITIES**

Software

ARC/INFO  
Microsoft Word  
ERDAS  
AutoCAD

Hardware

Sun SPARC Station 2  
IBM compatible PCs  
Calcomp pen plotters  
Calcomp digitizing tablets  
Hewlett-Packard pen plotter  
Tektronix ink jet plotter  
Storage Dimensions optical  
Qualstar 9-track tape

**Carron A. Meaney, Ph.D.**  
*Biologist I*

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**AREAS OF EXPERTISE**

Terrestrial Ecology  
Mammalogy

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**SUMMARY OF QUALIFICATIONS**

Dr. Meaney has ten years of professional experience in ecological research, education, and curation. She designed and conducted small mammal studies at a major Superfund site, and she currently participates in environmental evaluations and risk assessments at Rocky Flats.

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**EXPERIENCE**

**Senior Ecologist**  
**January 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Principal investigator for small mammal studies in support of RCRA/CERCLA activities at Rocky Flats. Key participant in environmental risk assessments for three high-priority operable units, based on small mammal community data, habitat quality, contaminant concentrations in biotic and abiotic media, and food web models.

**Curator of Mammalogy/  
Collections Interpreter**  
**July 1983 - January 1992**

**Denver Museum of Natural History,**  
**Zoology Department**  
**Denver, Colorado**

Expert resource in the distribution and identification of mammals. Developed a data base of locality records for Colorado. Author/editor for 1991 Colorado Mammal Distribution Latilong Study published jointly by the Colorado Division of Wildlife and the Denver Museum of Natural History. Coauthor of *Mammals of Colorado*, an extensive treatment of the mammals of this state, to be published in 1993 by the University Press of Colorado and the Denver Museum of Natural History. Served as expert witness for U.S. District Attorney.

Curator of Mammalogy at the Denver Museum of National History. Curated 7,700 mammal specimens; conducted research in zoogeography, behavior, and ecology; trapped small mammals for museum collections; supervised student interns and volunteers; planned and developed exhibit interpretation in major diorama halls; taught adult education classes; presented slide programs on numerous topics, including Ecosystems of Colorado, Mammals in Colorado, and African Mammals; and led field trips to Africa for museum members.

Carron A. Meaney, Ph.D.  
Page 2

Principal investigator for lagomorph (cottontail and jackrabbit) studies at the Rocky Mountain Arsenal. Designed and implemented a program to document species occurrence, distribution, and relative abundance in different habitat types.

Teaching Assistant  
September 1978 - May 1983

University of Colorado, Department of E.P.O.  
Biology and the Center for Interdisciplinary Study  
Boulder, Colorado

General Biology, Animal Behavior, Mammalogy, Biostatistics, and Biology: A Human Approach.

Research Assistant  
Summer 1981 -

Institute of Arctic and Alpine Research  
Ward, Colorado

Long Term Ecological Research project on Niwot Ridge, Colorado. Research on population biology of mammals, including small mammals, pikas, and yellow-bellied marmots.

Research Assistant  
Summer 1978

Grand Teton National Park  
Jackson, Wyoming

National Science Foundation project on behavioral ecology of coyotes. Research on social behavior of coyotes in relation to food resources. Results published as cover article in *Scientific American*.

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## EDUCATION

Ph.D., Biology, University of Colorado, Boulder, 1983  
M.A., Biology, University of Colorado, Boulder, 1983  
B.A., Biology, University of Colorado, Boulder, 1978

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## TRAINING

40-Hour Hazardous Waste Site Health and Safety Training, 1991  
8-Hour Supervisory Training, Denver Museum of Natural History, 1990

**Katharine A. Miskin**  
*Biologist II*

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**AREAS OF EXPERTISE**

Risk Assessment  
Environmental Engineering - Water Treatment  
Regulatory Compliance and Permitting  
Environmental Science - Aqueous Geochemistry, Microbiology

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**SUMMARY OF QUALIFICATIONS**

Ms. Miskin's diverse background includes toxicology and risk assessment, environmental engineering, contaminant fate and transport modeling, sampling design, and statistical analysis. She designed and evaluated a bench scale microbiological water treatment process for heavy metal removal as a research assistant. Her background, which supports all phases of risk assessment, is complemented by a thorough knowledge of environmental law and permitting at the federal and state levels.

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**EXPERIENCE**

**Environmental Scientist**  
**August 1993 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provides technical support for ecological and human health risk assessments. Performed manipulation and statistical analyses of chemical data for OU1, OU2, and OU6 environmental evaluations. Also evaluated contaminant concentration for potential toxicity to ecological receptors. Supported development of exposure scenarios and methods for exposure estimations for OU11 human health risk assessment.

**Research Assistant/Teaching Assistant**  
**May 1992 - July 1993**

**Division of Environmental Science and  
Engineering, Colorado School of Mines**  
**Golden, Colorado**

As a research assistant for the Division of Environmental Science and Engineering at the Colorado School of Mines was responsible for start up, maintenance, and evaluation of a sulfate-reducing bioreactor for heavy metal removal, including organic carbon source evaluations. Performed extensive sulfate reduction literature search, stoichiometry calculations and estimates, and cost estimates for full-scale reactor operation. Determined kinetic parameters for scale up of process. Evaluated metal removal kinetics.

As a teaching assistant for a graduate-level ecology course, wrote and graded ecology and soils quizzes and exams, graded atmospheric chemistry and geomorphology homework and exams,

Katharine A. Miskin  
Page 2

and held office hours to answer students' questions related to the lectures and reading assignments.

**Physical Science Aide**  
**October 1991 - May 1992**

**U.S. Geological Survey**  
**Lakewood, Colorado**

Performed pollen extractions (palynology) on sediment samples, including independent determination of appropriate laboratory techniques in support of a paleoclimate survey of Alaska and Northern Canada. Also mounted pollen samples for photography. Performed some library research in support of the principal investigator.

**Teaching Assistant**  
**January 1991 - May 1991**

**University of Colorado**  
**Boulder, Colorado**

Taught freshmen-level biology laboratory. Prepared lectures and labs and administered quizzes.

**Co-op Research Assistant**  
**May 1988 - December 1988**

**Geophysics Department**  
**Colorado School of Mines**  
**Golden, Colorado**

Prepared gravity and TEM equipment for the field. Performed geophysical gravity field survey and assisted with transient electromagnetic (TEM) field survey in upstate New York. Resolved and analyzed the gravity data and co-wrote the report of findings for the New York Gas Group (NYGAS).

**Student Research Assistant**  
**August 1986 - May 1988**

**EPICS Engineering Project Team**  
**Colorado School of Mines**  
**Golden, Colorado**

Analyzed non-point source nitrate contamination of shallow drinking water aquifers (groundwater) and proposed alternatives to partially alleviate the problem.

Analyzed vacuum insulated containers for constant temperature storage. Assisted with market development for these containers.

Analyzed the design of a fluidized bed hazardous waste incinerator and proposed design alterations to improve efficiency.

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## EDUCATION

M.S., Environmental Science and Engineering,  
Colorado School of Mines, Golden, (In Progress)

B.A., Environmental, Population, and Organismic Biology,  
University of Colorado, Boulder, 1991

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### TRAINING

Chemical Safety, a laboratory safety training course, Colorado School of Mines, 1991

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### HARDWARE AND SOFTWARE CAPABILITIES

#### Software

Mathematicad  
AutoCAD  
Lotus 1-2-3  
QuattroPRO  
Excel  
Wingz  
Paradox  
Grapher  
CricketGraph  
Surfer  
Statgraphics  
Wordstar

#### Hardware

IBM PC compatibles  
Macintosh  
Next  
VAX/VMS  
RS 6000/AIX (UNIX)

WordPerfect 5.1  
PowerPoint  
Canvas  
Prodraw  
MS Word  
MS-DOS  
Windows

#### Programming Languages

Visual Basic  
Quick Basic  
BASIC  
FORTRAN

**Virgil M. Palencia**  
*Biologist II*

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**AREAS OF EXPERTISE**

Industrial Hygiene  
Chemical and Biological Air Sampling  
Radiological Monitoring and Sampling

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**SUMMARY OF QUALIFICATIONS**

Mr. Palencia has five years of experience in the anticipation, recognition, evaluation, and control of work place hazards. Industrial hygiene experience includes chemical and biological air sampling, radiological monitoring and sampling, real-time air monitoring, indoor air surveys, noise dosimetry, and comprehensive lead paint and building inspections.

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**EXPERIENCE**

**Health and Safety Manager**  
April 1994 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

As a health specialist, determines necessary protection levels, manages medical surveillance programs, and provides field health and safety support. Responsible for health and safety compliance for The S.M. Stoller Corporation. Prepares health and safety plans for site evaluations, identifies and evaluates worksite hazards, recommends appropriate controls, and administers industrial hygiene and safety.

**Industrial Hygienist/Health & Safety Officer**  
October 1990 - March 1994

**James P. Walsh & Associates**  
Boulder, Colorado

As industrial hygienist/health and safety officer, managed employee health and safety files, performed industrial hygiene services, and developed and administered health and safety plans, environmental site assessments, technical report evaluations, building inspections, and supervised health and safety instruments.

As health and safety officer to S.M. Stoller during field investigation of Operational Unit No. 7 at Rocky Flats, performed air sampling for volatile organic compounds, heavy metals, asbestos, particulates, and radiological monitoring and sampling as well as site health and safety duties.

Provided health and safety support to the Ecological Monitoring Program at Rocky Flats. Performed site health and safety duties, including field monitoring.

Virgil M. Palencia  
Page 2

Acted as quality assurance officer for Colorado Department of Transportation at Hanging Lake Bridge Remediation Project. Performed air sampling for lead dust and environmental health and safety supervision.

As industrial hygiene consultant to COHBI, Occupational & Preventive Health Care Clinic, performed litigation and regulatory research and review for occupational exposure cases.

As health and safety officer to Colorado Department of Transportation on various construction projects, performed air monitoring duties, soil sampling, and water sampling for hazardous substances and provided employees with appropriate personal protective equipments. Projects included I-70/I-25 Interchange, Boulder Turnpike Interchange, CDOT Headquarters, I-25 Corridor, Santa Fe Corridor, 23rd Street Viaduct, and I-76 Corridor.

As industrial hygiene consultant to AMAX, performed total aluminum dust and total nuisance dust air sampling in their semi-solid operations.

As project manager/building inspector to the City of Arvada and the Arvada Urban Renewal Authority, managed and performed building surveys in their Phase II remediation projects.

As industrial hygiene consultant to the U.S. Corps of Engineers at the Rocky Mountain Arsenal, performed air sampling in the Basin A region for nerve gas agents, including mustard gas while wearing level B protection.

**Industrial Hygienist**  
**June 1989 - October 1990**

**Spence-Geiger Associates, Inc.**  
**Lakewood, Colorado**

As industrial hygiene consultant to U.S. West, performed air monitoring services in U.S. West buildings throughout the Denver Metro area.

As industrial hygiene consultant to Sandia National Laboratories, provided complete building surveys in their highly secured areas.

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### EDUCATION

B.S., Environmental Health, Colorado State University, Fort Collins, 1988

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### TRAINING

40-Hour OSHA Hazardous Waste Site Health and Safety Training

**David C. Palmer**  
*Senior Biologist*  
DOE "Q" Clearance (Active)

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**AREAS OF EXPERTISE**

Health Physics/Radiological Protection  
Risk Analysis  
NEPA Documentation and Compliance  
Environmental Documentation

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**SUMMARY OF QUALIFICATIONS**

Mr. Palmer has more than 22 years of professional management experience in health physics and environmental monitoring and analysis. He has been involved in management of radioactive protection and environmental monitoring programs for both mixed radioactive waste sites and the nuclear power industry, National Environmental Policy Act (NEPA) documentation, and exposure pathway analysis, including personnel exposure and risk analysis, for both radioactive material and hazardous chemicals. He was in charge of the health physics programs at two nuclear power reactor facilities where he directed the environmental monitoring program and was responsible for the plant health physics program during preparations for decommissioning the reactor. Included in this task was removal and shipment of all reactor fuel assemblies to Europe for reprocessing, removal, and disposal of all irradiated reactor control rods, and other general activities to prepare for the complete dismantling of the nuclear supply system. As the first radiation protection manager of a large, two-unit commercial nuclear power station, Mr. Palmer hired and supervised the health physics staff and designed and supervised the operation of the Radiation Protection, Internal and External Dosimetry, and Environmental Monitoring programs during plant construction and the first ten years of operation. Since joining the S.M. Stoller Corporation, he has been involved in a variety of projects, providing both project management and technical expertise in environmental impacts, risk analysis, and environmental documentation.

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**EXPERIENCE**

**Manager, Health Physics**  
**August 1985 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Principal contributor in the project to identify, develop, and produce Conduct of Operations (COOP) procedures for Technology Development at the U.S. Department of Energy's Rocky Flats Plant. This included development of a cross-index between DOE orders, the RFP COOP Manual, the Technology Development (TD) Handbook, and recommended procedures to be written. It also involved development of a documentation program for TD operations, a useful procedure format, and an example procedure for TD process equipment.

David C. Palmer

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Project manager for the design, installation, and testing of the second generation Radiation Exposure and Management (RE&M) System for the Arkansas Power and Light Company at the Arkansas Nuclear One (ANO) Power Plant. Customized the original RE&M system for integration into the ANO operation and integrated the Stoller dosimetry system into the RE&M system.

Principal contributor to the Air Pollution Emission Notice (APEN) reports for the Rocky Flats Plant. This involved quantitative estimation of airborne emissions of hazardous, criteria, and toxic materials from production facilities and storage tanks. The analysis entailed both evaluation of operational processes and application of engineering judgment to determine sources, pathways, and potential release rates of pollutants.

Principal contributor for a study evaluating all onsite and offsite transportation risks associated with full production operations at the Rocky Flats Plant. The resulting document was designed to serve as a technical resource to evaluate transportation impacts in the proposed Site-Wide Environmental Impact Statement (SWEIS). The risk assessment involved pathway and exposure analysis and dispersion modeling of radiological and hazardous materials.

Provided the operational health physics portion of the pre-operational quality assurance audit of the health physics program at the Waste Isolation Pilot Plant (WIPP). This included audits of the operational plans and practices, as well as a general assessment of the health physics program to identify those elements of the program requiring supplementation or improvement when compared to program requirements, applicable standards, good health physics practices, and actions that might be taken to limit the potential for future legal challenges.

Project manager and principal contributor for a study of the economic benefits of dose reduction programs as perceived by U.S. nuclear utilities. Included were assessments of both direct (reduced outage times, etc.) and indirect (improved employee relations, etc.) benefits as well as effectiveness of specific programs used by the utilities.

Project manager and principal contributor for preparation of an Environmental Assessment (EA) of form and content to comply with the requirements of the National Environmental Policy Act (NEPA) for the Rocky Flats Plant Hillside 881 Waste Management Action.

Project manager and principal contributor for preparation of the Action Description Memorandum (ADM) and EA to comply with NEPA requirements and risk assessment documentation to comply with CERCLA requirements for the Rocky Flats Plant remedial actions at the 903 Pad, Mound, and East Trenches areas. Environmental and public health analyses were provided for each selected alternative action to aid in the selection of the proposed remedial action.

Project manager for the analysis of injury and fatality frequency rates to be applied to the transportation of wastes from the U.S. EPA Denver Radium Superfund Site to the appropriate

David C. Palmer

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disposal site. Calculated estimates of the number of injuries and fatalities for various transportation modes and routes, including truck and rail transportation combinations.

Project manager for the installation of the Stoller dosimetry system at the Lawrence Berkeley Laboratories (LBL). Coordinated the obtaining and incorporation of user-supplied dose calculation algorithms and ensured that LBL personnel were adequately trained in the use of the system.

Project manager for revising NEPA documentation for the 881 Hillside Remedial Action at the Rocky Flats Plant. The project included writing a draft Finding Of No Significant Impact (FONSI), responding to all Department of Energy comments on both the FONSI and EA, and revising both documents to be consistent with the comments.

Project manager and principal contributor for preparation of a comparison between the U.S. EPA "Interim Recommendations on Doses to Persons Exposed to Transuranium Elements in the General Environment" with the Colorado Department of Health plutonium in soil standard. The study included a multiple pathway analysis of the risk to persons living in a hypothetical residential development on soil contaminated to the levels proposed in the two standards.

Supported the assessment of radiological risks associated with transportation accidents included in the Supplemental Environmental Impact Statement (SEIS) for WIPP.

Principal contributor to the preparation of an EA of the Supercompactor and Repackaging Facility (SARF) and the TRU Waste Shredder (TWS) at the Rocky Flats Plant, with specific responsibilities including evaluation of radiological exposures to workers and the public from routine operations and potential accidents.

Reviewed the BEIR V Report with particular emphasis on the differences between the report and the BEIR III Report and the ways those differences might be important to risk analyses performed for the Rocky Flats Plant.

Principal contributor to the NEPA Risk Assessment incorporated into the Surface Water Interim Measures/Interim Remedial Action Plan and Decision Document - 903 Pad, Mound, and East Trenches Areas (Operable Unit 2) for the Rocky Flats Plant. Performed the risk calculations, including potential release during construction, operation, and accident conditions as they might affect both workers and the general public. Potential releases included volatile organic chemicals and both radionuclides and inorganic chemicals potentially found in fugitive dust.

Principal contributor to the field surveys for the Waste Stream and Residue Identification and Characterization Program for the Rocky Flats Plant. This involved analysis of numerous classified production and process systems and operations, and the generation of unclassified descriptions of those systems to allow identification and characterization of both waste streams and non-waste material flow.

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David C. Palmer

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Wrote the procedure for operation and calibration of a field instrument to detect low energy radiation (FIDLER) for WIPP. The instrument is designed to detect low-level surface contamination by alpha emitters and uses a microcomputer-based, portable radiation survey instrument with digital readout and data logging capabilities. The procedure included set-up, operation, and both full geometry and single point calibrations aided by a special computer program incorporated into the procedure.

Project manager for the peer review of Section 8 (Alternatives to the Proposed Action) of the Engineering and Emissions Data Base (EEDB) for the Recovery Modification Project (RMP) for the recovery of plutonium from residues at the Rocky Flats Plant. The EEDB was to be written as a reference document to be used by the Oak Ridge National Laboratory (ORNL) to prepare an Environmental Impact Statement (EIS) for the RMP. The task involved reviewing the document to assure that all feasible alternatives had been addressed, suggesting possible alternatives, and reviewing the description and evaluation of eight alternatives included in the draft EEDB.

Principal contributor to the assessment of radiological and hazardous chemical risks for inclusion in the EA for the partial closure of the Solar Pond Activities at the Rocky Flats Plant.

Principal contributor to the Safety Evaluation for the Supercompactor and Repackaging Facility (SARF) at the Rocky Flats Plant. Responsibilities included identification of potential radiological and toxicological hazards, development of methodologies for analysis of the hazards, including failure mode and effects analysis, and evaluation of the probability of occurrence and potential consequences of the hazards identified.

**Plant Radiation Protection Supervisor**  
**February 1971 - August 1985**

**Indiana & Michigan Electric Company**  
**Bridgeman, Michigan**

Served as the Radiation Protection Manager of the Indiana & Michigan Electric Company facility, beginning at the plant's very early stages of construction. Responsible for the design and implementation of the entire Health Physics program at the plant, including writing the original Radiation Protection Manual. Along with the normal technical and administrative responsibilities as the Radiation Protection Manager, directly involved and responsible for the following special activities:

Installation of the environmental radiation monitoring program, including equipment design, statistical analyses of pre-operational results to assure representative sampling, and analysis of post-operational results to quantify the effects of plant releases as well as other phenomenon (such as the effects of atmospheric testing of nuclear devices).

Design and administration of the personnel dosimetry, respiratory protection, and personnel internal contamination monitoring programs.

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David C. Palmer

Page 5

Design and administration of the radiological assessment portion and control portions of the emergency response plan for the plant. Included were the writing and implementation of all radiation protection related emergency procedures, development of both manual and computerized decisional aids for use by plant operations personnel and health physics technical personnel, formation and direction of all onsite and offsite radiological assessment teams, and formulation and distribution of recommendations for offsite protective actions to the appropriate federal and state agencies during the course of an emergency. Served as the primary contact with all state and federal agency personnel for all matters of radiological or environmental matters during formation of the emergency plan and during numerous drills and exercises.

Directed all Radiation Protection activities in startup of both 1100 MW reactor plants and all subsequent refuelings, including the first 10-year in-service inspection outage for Unit 1. During this time, the Cook Plant established itself as having one of the lowest man-Rem per megawatt ratings in the nation for plants of its size.

Design, installation, calibration, and pre-operational testing of the in-plant Radiation Monitoring System. Was also similarly involved in the conversion of that system from the original analogue to a computer-based digital system.

Functioned as the utility technical representative in the design, installation, and testing of the first computer-based system to control personnel exposures, radiation work permits, and physical access to radiation areas.

Integrated personal computers into the operational Radiation Protection Program at the plant for such tasks as tracking and reporting collective doses, personnel contamination events, facility contamination levels, and effectiveness of facility decontamination efforts.

Selected all portable and laboratory equipment for the radiation survey, contamination control, and personnel dosimetry programs. This included direct responsibility for procedures to control use, operation, and calibration of the equipment to assure compliance with applicable standards and guides as well as the plant QA/QC program.

Designed and established the Radiation Protection instrument control program to assure that all instruments used for survey and/or analysis were properly calibrated and response checked at proper intervals and provided auditable documentation linking such instruments to the surveys or analyses with a minimum of interference with those performing the work.

**Health Physics Supervisor**  
May 1969 - January 1971

**Rural Co-operative Power Association**  
Elk River, Minnesota

At Elk River, directed the environmental monitoring program and was responsible for the plant health physics program during preparations for decommissioning the reactor. Included in this task were removal and disposal of all irradiated reactor control rods and other general activities to prepare for the complete dismantling of the nuclear supply system.

### EDUCATION

M.S., Environmental Health Sciences (Radiological Health), University of Michigan,  
Ann Arbor, Michigan, 1969  
B.S., Engineering Physics, University of Michigan, Ann Arbor, Michigan, 1967

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### TRAINING

Health and Safety Course for Hazardous Waste Site Worker Training (40-Hour), March 1991  
Pathway Analysis and Risk Assessment, Health Physics Society Summer School, 1989  
The Fundamentals of Groundwater Contamination, Geraghty & Miller, 1988  
Compliance with the New 10CFR20, Technical Management Services, 1986

**Martha Plank**  
*Technician II*  
U.S. Citizen

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### AREAS OF EXPERTISE

Database Management  
Spreadsheets  
Computer Graphics/Desktop Publishing  
Document Production

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### SUMMARY OF QUALIFICATIONS

Ms. Plank has more than seven years of experience in computer applications and document production. For the past two years, she has provided computer expertise for many Rocky Flats Plant environmental and waste management programs. She has extensive knowledge of software packages on both PC and Macintosh computer systems and experience in all phases of document design, layout, and production.

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### EXPERIENCE

**Computer Specialist**  
**January 1993 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Creates and administers computer databases in dBase IV for Rocky Flats Plant environmental investigations, including Operable Units 1, 2, 5, 6, and 7; the Well Evaluation Report; and the TRU waste project. Develops and administers databases in dBase IV for a mine reclamation project in New Mexico. Evaluates raw data, designs database structures, and writes database programs. Processes complex requests for data extractions and performs mathematical and statistical calculations. Identifies problems that may exist in data extractions and develops alternative methods of handling data. Responsible for integrity of data by verifying accuracy of programs, extractions, mathematical results, and statistical calculations and confirming data consistency after frequent changes and updates. Data sets have included chemical and physical data for soils, groundwater, surface water, biota, and TRU wastes.

Generates and updates complex, linked cost spreadsheets for competitive proposals. Manipulates data and creates charts, graphs, and databases in Microsoft Excel. Performs tasks in Logger, a database program that compiles and generates well and borehole information, and @Risk, a risk analysis and modeling add-in for Excel.

Provides software expertise, training, and troubleshooting. Assists in report and proposal production.

Martha Plank  
Page 2

**Graphics Specialist**  
**October 1991 - January 1993**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provided graphics support to the production of many DOE documents, including CTMP; Roadmap; Five-Year Plan; Site-Specific Plan; and Quarterly, Mid-Year, and Year-End Reviews. This support included desktop publishing and creating complex logic, milestone, and issues diagrams.

Created and modified presentations, spreadsheets, databases, flow charts, organization charts, reports, charts and graphs, technical drawings, marketing brochures, newsletters, business forms, and 35-mm slides.

Performed image and text scanning, file conversion, proofreading, and word processing backup duties.

**Publications Specialist**  
**January 1991 - October 1991**

**Front Range Community College**  
**Westminster, Colorado**

Responsible for all phases of college catalog and schedule production, including scheduling, incorporating changes, proofreading, layout and design, desktop publishing, photography, camera-ready copy, printing, and distribution. Designed and produced a variety of complex documents, including 4-color marketing brochures, program information briefs, reports, and business forms.

As Adjunct Instructor for Front Range Community College, taught introductory desktop publishing course. Worked with department instructors to customize the curriculum and text for college students. Served on the Society for Technical Communications (STC) advisory board. Evaluated new textbooks, discussed possible program changes, and recommended changes in course curricula.

As a freelance desktop publisher, designed and created brochures, newsletters, reports, charts, and other documents for various individuals and businesses.

**Registrar**  
**June 1988 - April 1990**

**Boulder Valley Technical Education Center**  
**Boulder, Colorado**

Responsible for database of student records at secondary and post secondary vocational school. Verified accuracy of student data, researched information, and corrected discrepancies in current and past records. Coordinated student registration each quarter, processed students' personal and demographic information, organized and performed a detailed attendance tracking process, and updated the computerized system of records management.

Martha Plank  
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**Editorial Assistant**  
**January 1985 - June 1988**

**Merg Analytica**  
**Boulder, Colorado**

As Editorial Assistant for the *Journal of Arab Affairs*, assisted the managing editor in a variety of duties, including subscription database management; design and layout; editing; proofreading; data verification and bibliographic research; creating charts, tables, and graphs; word processing; and mailing.

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### EDUCATION

Master of Computer Information Systems, University of Denver, In Progress  
B.A., English, University of Colorado, Boulder, 1988

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### TRAINING

Commercial Design coursework, University of Colorado, 1991  
Desktop Publishing and Technical Communications coursework, Front Range Community College, Westminster, Colorado, 1990

**Daniel C. Reeder**  
*Geologist II*  
DOE "Q" Clearance (Active)

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**AREAS OF EXPERTISE**

Hydrogeology  
Analytical and Numerical Groundwater Modeling  
Aqueous Geochemistry  
Vadose Zone Hydrology

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**SUMMARY OF QUALIFICATIONS**

Mr. Reeder has more than five years of experience in the geological and environmental sciences. He has a strong background in groundwater hydrology, analytical and numerical groundwater modeling, geology, aqueous geochemistry, and vadose zone hydrology. As a graduate student at Colorado State University, he conducted research on the hydrogeochemistry and groundwater quality of the Laramie-Fox Hills Aquifer. As a hydrogeologist with Stoller, Mr. Reeder is actively involved with environmental monitoring and restoration programs at the Rocky Flats site including Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) investigations.

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**EXPERIENCE**

**Hydrogeologist**  
**April 1990-Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Provided technical support to the 1993 RCRA Groundwater Monitoring Report at Rocky Flats. Duties included the detection of groundwater contamination downgradient of RCRA regulated units using parametric and non-parametric ANOVA analyses and combined Shewhart-CUSUM charts.

Coordinated radiological monitoring, geologic drilling, and monitoring well installation activities in support of the Operable Unit 7 (Weapons Storage Area) Phase I Remedial Investigation (RI)/Feasibility Study (FS) at Ellsworth Air Force Base, South Dakota.

Assessed sitewide groundwater contamination in support of the 1993 Well Evaluation Report at Rocky Flats. Responsibilities included the delineation and migration of contaminant plumes and evaluation of seepage through earthen dams.

Served as assistant site manager of the Operable Unit 7 (OU 7) Phase I RCRA Facility Investigation (RFI)/RI at Rocky Flats. Coordinated the following data acquisition activities: surficial soil and borehole sampling, monitoring well installation, cone penetrometer testing/*in situ* groundwater sampling, soil gas surveys, surface water and groundwater sampling, pond

Daniel C. Reeder

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sediment sampling, and aquifer testing. In addition, analyzed the acquired data using inferential statistical methods to identify contamination in subsurface geologic materials, groundwater, surface water, and pond sediments. Other responsibilities included the interpretation of the hydrology and nature and extent of contamination.

Acted as project leader of the Multimedia Monitoring program at Rocky Flats. Responsibilities included the organization and implementation of field activities in support of RCRA/CERCLA investigations including sampling of groundwater, surface water, soils, sediments, and other industrial media.

Served as project leader of the Technical Surveillance program at Rocky Flats. The scope of the project focused on the oversight and evaluation of the environmental sampling programs at Rocky Flats.

Performed fate and transport modeling to assess the persistence of organic chemicals in the vadose zone. The modeling was used in support of the "no further action" justification document for Operable Unit 16, Low-Priority Sites, at Rocky Flats.

Coordinated geologic drilling, borehole sampling, pump-in packer testing, borehole geophysical surveys, and monitoring well installation activities in support of the Phase II Geological Characterization at the Rocky Flats site.

Performed statistical and aqueous geochemical analyses of surface water data in support of the "1989 Rocky Flats Surface Water Monitoring Report." In addition, interpreted hydrogeologic data in support of work plans relevant to RCRA/CERCLA investigations.

Developed and managed an environmental data base system used for tracking field data generated by the monitoring programs at the Rocky Flats site. Coordinated quality assurance data evaluation of the Rocky Flats Environmental Database System (RFEDS). Specialized reports were generated using Standard Query Language (SQL) programs in an oracle data base environment to assess the validity of the field and analytical data in RFEDS. Provided specifications for the design and implementation of a computerized field data capturing system used for the environmental monitoring programs at Rocky Flats.

Provided technical support in assessing the nature and extent of contamination caused by leaking underground storage tanks.

**Physical Science Technician**  
**May 1988–March 1990**

**United States Geological Survey**  
**Arvada, Colorado**

At the United States Geological Survey (USGS) National Water Quality Laboratory, performed aqueous chemical analyses of inorganic parameters using the following techniques: inductively coupled plasma and atomic absorption mass spectrophotometry, colorimetry, ion chromatography, and second derivative titrations.

Daniel C. Reeder  
Page 3

**Geologist**  
**June 1984–April 1986**

**Young Exploration, Inc.**  
**Aurora, Colorado**

As a geologist for Young Exploration, Inc., interpreted geophysical data used in mapping the subsurface geology of subcrop zones in the Charles and Mission Canyon formations of the Williston Basin. Mapped paleochannels in the Tyler Formation of the Central Montana Basin. Wrote a preliminary hydrocarbon prospecting report that describes the depositional environments, stratigraphic correlations, and economic potential of the Mississippian Madison Group in the Williston Basin, North Dakota and southeast Saskatchewan.

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### **EDUCATION**

M.S., Hydrogeology, Colorado State University, Fort Collins, 1993  
B.A., Geology/Earth Sciences, University of Northern Colorado, Greeley, 1985

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### **TRAINING**

Radiation Safety Training, EG&G Rocky Flats, 1991  
Core Logging Course, EG&G Rocky Flats, 1991  
40-Hour Hazardous Waste Site Health and Safety Training, Urie Environmental, 1990  
First Aid, Red Cross, 1989

**Karen M. Schneider**  
*Geologist II*

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**AREAS OF EXPERTISE**

Geology  
Database Management  
Programming

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**SUMMARY OF QUALIFICATIONS**

Ms. Schneider has nine years of professional experience in geology, database management, and computer programming. She has extensive experience in using, maintaining, and operating technical computer software and designed several training programs and materials for industry-specific databases and software. Ms. Schneider also has extensive experience writing technical end-user documentation.

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**EXPERIENCE**

**Data Manager**  
**June 1993 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Served as database manager for the 1993 Well Evaluation Report and OU 7 Phase I RFI/RI Report. Responsible for management, manipulation, and tabulation of all hydrologic and geochemical data.

Task leader for data validation and computer support to EG&G for the Rocky Flats Environmental Database System (RFEDS). Responsibilities include updating the database to incorporate corrections, locating and rectifying sources of data discrepancies, and constructing a new data tracking table.

Designs, creates, and manages in-house databases for various projects within the Environmental Geosciences Group.

Writes software programs to create data consistency for statistical use, generates summary statistics, analyzes data for precision and completeness, interprets lab qualifiers for EPA analytical methods and validation codes from independent data validators, generates reports, and provides data to users.

**Database Administrator**  
**August 1992 - June 1993**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Served as task leader for database support to EG&G for RFEDS. Worked onsite with client as extended staff. Created new and modified existing data checking routines to ensure data quality

Karen M. Schneider

Page 2

and consistency. Researched and rectified data discrepancies and suggested additional use of existing hardware and network to increase productivity. Uploaded data obtained during field investigations into RFEDS, maintaining stringent quality control to ensure a high degree of accuracy. Automated reporting tasks allowing greater detail and provided analytical, survey, and field data to end users.

**Consultant**

**January 1992 - August 1992**

**Self-Employed  
Boulder, Colorado**

Wrote computer software end-user documentation and company newsletters. Assisted small businesses in selecting computer hardware and software. Programmed a custom billing system.

**Technical Writer/Support**

**January 1989 - September 1991**

**Diversified Computer Systems, Inc.  
Boulder, Colorado**

Utilized, updated, and maintained a proprietary customer database. Wrote programs to test new software features and controlled all phases of end-user documentation and marketing materials. Provided telephone support for text and graphics terminal emulation software.

**Technical Training Specialist**

**May 1987 - August 1988**

**SISCOM  
Boulder, Colorado**

Designed a training program and materials for real-time textual database directed at broadcast newsrooms. Conducted extensive in-house testing during software development and writing of end-user documentation. Provided onsite training sessions, and served as the company representative for vendor and industry trade shows.

**Technical Trainer/Customer Service Manager**

**July 1984 - September 1986**

**Green Mountain Geophysics, Inc.  
Boulder, Colorado**

Designed training program and materials for intensive geophysical software used for refraction statics corrections to seismic data. Conducted onsite software installations and training. Served as company representative at industry trade shows.

Created a reporting/tracking system for client problems and suggestions. Implemented a new product/release distribution procedure for increased quality control. Managed in-house processing staff. Wrote end-user documentation.

**Geologic Technician**

**November 1983 - May 1984**

**United States Geological Survey  
Golden, Colorado**

Provided general descriptions and modal analyses of igneous rocks from thin-section analysis and point count.

Karen M. Schneider  
Page 3

Prepared geologic maps for publication, and designed layout of visual materials for lecture series.

**Geologic Field Assistant**  
**June 1983 - September 1983**

**University of Colorado**  
**Irwin, Idaho**

Obtained field measurements and oriented samples from Idaho/Wyoming overthrust belt for a structural geology graduate student.

**Research Assistant**  
**June 1981 - November 1983**

**Institute of Arctic & Alpine Research**  
**Boulder, Colorado**

Performed preliminary foraminifera identification and statistical analyses for paleoclimatic investigation. Prepared maps, graphics, diagrams, and tables for research publications and convention presentations.

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### EDUCATION

B.A., Geology, University of Colorado, Boulder, 1983

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### TRAINING

Computer Security Training, EG&G Rocky Flats, 1993  
General Employee Training for Subcontractors, EG&G Rocky Flats, 1992

**Constance Hayden Scott**  
*Geologist I*

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**AREAS OF EXPERTISE**

Geology  
Clay Mineralogy  
Aqueous Geochemistry  
Remedial Investigations

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**SUMMARY OF QUALIFICATIONS**

Ms. Hayden Scott has more than five years of professional experience in environmental geology and geological research and investigation, with an emphasis on remedial investigations and feasibility studies at RCRA sites. Her expertise includes investigating the magnitude and extent of soil and groundwater contamination, researching remedial alternatives for RCRA sites, and evaluating remediation systems. Ms. Hayden Scott has researched clay mineral and geochemical variations in shale sequences and lacustrine sediments using x-ray diffraction, x-ray fluorescence, and petrographic techniques. She is experienced in field sampling and logging, design and installation of monitoring and recovery wells, design and orchestration of aquifer and slug tests, and in preliminary and Phase II environmental site assessments. Ms. Hayden Scott has been recognized for excellent technical writing, organization, and communication skills and has been the principal author of several technical reports submitted to various state agencies.

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**EXPERIENCE**

**Geologist**  
**March 1994 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently evaluating the nature and extent of metal, radionuclide, and organic contamination in surface soils, groundwater, and pond sediments for the Phase I RFI/RI at Operable Unit 7 - Present Landfill at Rocky Flats Plant.

Provides technical support on the sitewide Geoscience Characterization Study at Rocky Flats. Responsibilities include supervision of mineralogical and petrographic analyses, data interpretation, and report writing.

**Geologist**  
**July 1992 - March 1994**

**Wenck Associates, Inc.**  
**Maple Plain, Minnesota**

Conducted remedial investigations, feasibility studies, and environmental site assessments for corporate clients with groundwater and soil pollution problems. Investigated pollution-prevention strategies and remedial alternatives; assisted with the design and installation of remediation systems. Obtained various permits for corporate clients, including NPDES permits.

Constance Hayden Scott  
Page 2

Field experience included the design and construction of monitoring and recovery wells; design, orchestration, and analysis of aquifer and slug tests; surface water, groundwater, and soil sampling; and lithological descriptions of core samples. Managed and conducted field work for underground storage tank removal and corrective action design projects. Supervised drilling activities using hollow-stem auger, air rotary, mud rotary, and roto-sonic techniques. Authored several remedial investigation and feasibility study reports and other technical reports for clients and state agencies.

**Research Assistant**  
**September 1989 - May 1992**

**University of Massachusetts**  
**Amherst, Massachusetts**

Analyzed and interpreted the clay mineralogical and geochemical variations of a 700-meter thick stratigraphic section of the Mancos Shale (Upper Cretaceous), southwestern Colorado. Conducted an investigation of the clay mineralogy, geochemistry, and grain-size variations of lacustrine sediments obtained from Lake Molawi, Africa. Data were obtained with x-ray diffraction, x-ray fluorescence, petrographic, sedigraph, and conventional sieve techniques.

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### **EDUCATION**

M.S., Geology, The University of Massachusetts, Amherst, 1992  
B.A., Geology, The Colorado College, Colorado Springs, 1988

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### **TRAINING**

OSHA 40-Hour Hazardous Waste Operations and Emergency Response Training,  
SEC Donohue, Inc., 1992

**Susan P. Serreze**  
*Senior Geologist*

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**AREAS OF EXPERTISE**

Geology  
Remedial Investigations/Feasibility Studies  
Field Mapping  
Project Management

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**SUMMARY OF QUALIFICATIONS**

Ms. Serreze has over 10 years of experience in waste and environmental management, geology, and project management. As Manager of Technical Programs, she is responsible for the management of Remedial Investigation/Feasibility Study (RI/FS) and waste management projects and provides technical support to program management tasks. She has budgeted and scheduled RI/FS activities at Superfund sites and developed technical work plans. Ms. Serreze has extensive experience in developing and providing technical support to DOE planning documents. Her geologic experience includes field mapping and oceanographic research.

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**EXPERIENCE**

**Manager, Technical Programs**  
February 1990 - Present

**The S.M. Stoller Corporation**  
Boulder, Colorado

Currently serving as Assistant Project Manager for the implementation of the Phase I RFI/RI Work Plan for Operable Unit No. 7, Present Landfill. Responsibilities include development of monthly status and variance reports, cost and schedule control, and subcontractor liaison.

Served as Stoller's Project Manager for the Geologic Data Acquisition Program. This program included borehole drilling and geophysics and the Geologic Mapping Task. Acted as Task Manager for the Geologic Mapping Task, which focused on the structure and stratigraphy of a 60-square-mile area around the Rocky Flats Plant. Responsible for day-to-day progress, oversight, and technical quality of the project.

Project Manager for the Risk-Based Budget Prioritization. This project uses a cost-benefit analysis of risks, remediation, characterization, and regulatory compliance to compare DOE sites for funding purposes. Involved in this project since its inception and has represented Rocky Flats to DOE-HQ, other DOE sites, and local government agencies.

Participated in the development of the sanitary portion of the Rocky Flats Plant Roadmap document. Through frequent interaction with the client, key issues, regulations, and milestones were developed. This information was used in the development of the FY94-FY98 Five-Year Plan.

Susan P. Serreze

Page 2

Developed the Action Plan to Address the Governor's Rocky Flats Scientific Panel on Monitoring Recommendations. Development of this plan included researching monitoring procedures, determining the technical validity of the Panel's recommendations, and determining the feasibility of implementing the recommendation.

Provides technical and management support for geotechnical and program management activities for the RCRA/CERCLA and Waste Management Programs at the Rocky Flats Plant.

**Project Coordinator**  
**August 1988 - January 1990**

**Harding Lawson Associates**  
**Denver, Colorado**

Served as Project Coordinator for the Lowry Landfill RI/FS, Shallow Groundwater and Subsurface Liquids Operable Unit and Deep Groundwater Operable Unit. Responsible for project management activities associated with the day-to-day administration of the project. Developed schedules and budget estimates, developed planning documents and responses to regulatory comments, reviewed technical reports, and developed project management systems.

Attended negotiating meetings between EPA and the client, maintained frequent client contact, and researched and answered client project questions.

Developed and updated schedules for RI/FS as needed (Primavera), resource loaded schedules, developed budget estimates, justified budget estimates and increases, researched and resolved billing problems, approved billing for project, and maintained cost control for project.

Coordinated report preparation, edited technical reports to assure a "consistent" tone, prepared responses to regulatory agency comments, and revised the Project Management Work Plan and Data Management Work Plan.

Participated in development of the Initial Data Evaluation Work Plan and the Treatability Study Work Plan, examined core, and initiated and maintained the Administrative Record.

Developed dBASE system for Administrative Record; interacted with clients, regulatory agencies, and city governments; and interacted frequently with support staff and accounting staff.

As project coordinator on the Marshall/Boulder Landfill Remediation project, developed and maintained schedules, developed the Community Relations Plan, participated in the development of other planning documents, researched and resolved billing problems, approved all billing for projects, and coordinated report preparation.

Responsible for schedule and budget preparation for proposals.

Susan P. Serreze  
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**Technical Coordinator**  
**April 1987 - July 1988**

**Laidlaw (formerly GSX)**  
**Boulder, Colorado**

As Technical Coordinator, responsible for technical and project management aspects of developing, building, and starting a 1,000-acre nonhazardous landfarm. Wrote permit applications and prepared monthly reports to regulatory agencies. Developed all work plans, operating plans and procedures, and closure plans for the site. Developed geotechnical and environmental documentation and developed a waste loading monitoring system.

Maintained State of Louisiana and NPDES permits, developed cost control system for construction of landfarm, approved all billing, and reviewed all payments. Resolved financial problems with corporate comptroller.

Developed project plans, manifest and procedures, waste loading monitoring system, and technical documentation, including geotechnical, environmental, and climatological characteristics.

Developed closure and post-closure plans, waste screening and acceptance criteria and procedures, Surface Water Management Plan, and Health and Safety Contingency Plan.

Developed day-to-day operating procedures, marketed the GSX Landfarm to industry and engineers, marketed Brisco-Maphis sludge injector parts, and ordered and billed all part requests.

**Senior Research Assistant**  
**September 1977 - August 1986**

**Lamont-Doherty Geological Observatory**  
**Palisades, New York**

Responsible for all scientific aspects of a deep-sea core and dredge repository. Duties included the supervision of core laboratory personnel and the maintenance of core integrity. Documented and described deep-sea cores and participated in research projects. Responsible for the coordination of oceanographic equipment at sea, and managed coring, describing, and curating activities.

Conducted sedimentological analysis of deep-sea cores, researched vulcan glass stratigraphy in deep-sea cores, and described core lithologies and structures.

Prepared core description reports, photographed and X-rayed cores, and coordinated equipment for core sampling at sea. Served as lead piston coring technician at sea; coordinated and managed coring, describing, and curating at sea; developed the Core Descriptor's manual; developed data base frameworks for core lab data; developed displays and presentations for schools, funding agencies, and the general public.

Participated in proposal writing, budgeting, and research projects.

### EDUCATION

Ph.D., Geochemistry, State University of New York at Albany, Incomplete  
M.A., Geology, Queens College of the City University of New York, 1982  
B.A., Geology, Queens College of the City University of New York, 1977

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### TRAINING

Geostatistical Analysis of Hazardous Waste Sites, 1988  
Aquifer Test Selection Design and Basic Analytical Techniques, 1989  
Primavera Project Management, 1989  
Remote Sensing Systems and Lineament Analysis, 1989  
40-Hour Hazardous Waste Site Worker Health and Safety Training, 1990 (refresher courses annually)

**Sheryl B. Shapiro**  
*Technician I*

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**AREAS OF EXPERTISE**

Project Coordination  
Technical Editing

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**SUMMARY OF QUALIFICATIONS**

Ms. Shapiro has seven years of professional experience in technical editing, project coordination, and computer applications in various fields.

Ms. Shapiro has two years of technical editing experience in environmental projects, in addition to project coordination experience with environmental engineering firms. She has extensive experience in reviewing project management documentation, and has become familiar with various health and safety plans, Air Pollution Emission Notice (APEN) documents, and geologic characterization reports, and is the copy editor for the company newsletter. Ms. Shapiro was also responsible for producing a monthly environmental compliance action report and contributed to several ongoing planning documents for Rocky Flats Plant. She has coordinated projects for Lowry Landfill, tracking budgets, cost accounting, and billing. She also developed schedules for workload and staffing needs and edited technical reports.

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**EXPERIENCE**

**Technical Coordinator**  
**July 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

As the technical coordinator for the Environmental Services (ES) group, interfaces between ES project managers and support staff to ensure timely completion of deliverables. Familiar with health and safety plans, feasibility studies, site characterization reports, technical proposals and other documents. Provides QA/QC on deliverables, ensuring that the necessary components are included.

Two years of technical editing experience in environmental projects. Has extensive experience in reviewing project management documentation and has become familiar with various health and safety plans, APENs documents, and geologic characterization reports. Serves as the copy editor for the company newsletter.

Primary technical editor for Stoller's Program Management Services group and has experience in reviewing project management documentation. Also provided technical editing for other Stoller departments as needed. Responsible for ensuring that all documents are correct in terms of spelling, grammar, sentence structure, format, completeness, and terminology. Familiar with technical reports such as geologic characterization reports, health and safety plans, APENs,

Sheryl B. Shapiro  
Page 2

reports on quality assurance oversight of field sampling projects as well as multi-volume planning documents such as Roadmap, the Site-Specific Plan, and the Five-Year Plan.

Instrumental in ensuring that all Program Management Services documents prepared for EG&G comply with the client's request that documents undergo technical editing and with Stoller's policy for delivering high-quality products. Assists the project managers in selecting appropriate terminology for a variety of audiences and works with the graphics staff to create relevant and aesthetically pleasing visuals for reports and presentations. Ensures that presentation materials are prepared in such a way that the information is clear and understandable for the designated audience. Worked directly with the client to recommend appropriate terminology, visual layout, and format for various documents and presentations.

Responsible for producing a monthly environmental compliance action report.

Prior to joining the technical editing staff, was responsible for coordinating the Rocky Flats Plant (RFP) Base Programs report, which included gathering and statusing budget, milestone, and applicable requirements information as well as interfacing with EG&G and DOE personnel. Also compiled and edited the RFP Monthly Environmental Compliance Action Report, monitoring changes in scheduling and current environmental issues. She also contributed to the RFP Five-Year Plan, Site-Specific Plan, Long-Range Master Plan, and other ongoing projects.

**Assistant Project Coordinator**  
**August 1989 - February 1990**

**Harding Lawson Associates**  
**Denver, Colorado**

Tracked budgets, cost accounting and billing for various projects. Developed schedules for workload and staffing needs on Primavera software. Created organizational flowcharts. Designed spread sheets and proofread/edited technical reports.

**Associate Real Estate Appraiser/Technical Assistant**  
**February 1988 - February 1990**

**Lafayette Group Advisors**  
**Denver, Colorado**

Responsible for research and compilation of data used in the valuation of commercial property and vacant land. Close interaction with all levels of city and county government and clients. Edited all reports and correspondence for grammar, content, and style. Responsible for smooth work flow through various phases of production. Primary computer programmer/operator for company.

**Administrative Assistant**  
**June 1985 - February 1988**

**Manpower**  
**Denver, Colorado**

Worked through temporary agency in long-term assignments for major Denver corporations. Positions included commercial loan associate at Mellon Financial Services, executive assistant for public affairs department at Mountain Bell's corporate headquarters, sales assistant at

Sheryl B. Shapiro  
Page 3

Eastman Kodak's regional sales office, and office manager for an independent real estate company in Colorado Springs.

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### EDUCATION

B.A., Journalism, University of Wyoming, 1983

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### TRAINING

Nuclear Criticality Safety, EG&G, 1991  
Industrial Safety, EG&G, 1991  
Basic Radiation Safety, EG&G, 1991  
RCRA, EG&G, 1991  
Computer Security User, EG&G, 1991  
GET Training, EG&G, 1991  
24-Hour OSHA Training

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**Kathryn J. Tegtmeyer, Ph.D.**  
*Senior Geologist*

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**AREAS OF EXPERTISE**

Isotope Geochemistry  
Analytical Geochemistry  
Remedial Investigations  
Field Geology/Stratigraphy

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**SUMMARY OF QUALIFICATIONS**

Dr. Tegtmeyer has over six years of experience in geologic research and field studies as well as a doctorate in Geology/Geochemistry. She has designed and conducted geological and geochemical investigations in support of RCRA and CERCLA compliance programs at the Rocky Flats Plant and for confidential private-industry clients. Dr. Tegtmeyer has acted as lead geologist and principal investigator for the geologic data acquisition program at Rocky Flats. She also has professional experience in geologic mapping, drilling and well installation, core logging, and groundwater geochemistry and monitoring programs related to hazardous waste investigations.

Dr. Tegtmeyer also has expertise in the field of radiogenic isotope geochemistry and methods for isotopic analysis. She has designed and conducted research in isotope geochemistry, made frequent presentations at professional association meetings, and published several articles in technical journals.

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**EXPERIENCE**

**Geochemist**  
**November 1990 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Technical advisor for the 1993 Well Evaluation Report, a sitewide evaluation of the groundwater monitoring program at the Rocky Flats Plant. Prepared chemical isoconcentration maps to describe the nature and extent of groundwater contamination at the site and to evaluate contaminant fate and transport. Integrating groundwater chemistry and hydrogeologic data to develop the design of a sitewide monitoring well network.

As Assistant Project Manager for an RI/FS at an abandoned metals mine near Pecos, New Mexico, provides technical oversight for and coordination of field investigations, data analysis, and document preparation. Designed remedial investigation and monitoring programs for determining the nature and extent of contamination in groundwater, surface water, sediments, and soils. Also designed a field investigation of flow in the unsaturated zone to provide data for predictive modeling of contaminant fate and transport.

Kathryn J. Tegtmeier, Ph.D.

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Provides project management support for site characterization tasks and long-term environmental monitoring programs at an abandoned tailings-disposal site near Pecos, New Mexico. Designed long-term compliance monitoring programs for groundwater and surface water quality.

Serves as technical advisor for a sitewide evaluation of groundwater monitoring programs at the Rocky Flats Plant. Prepares chemical isoconcentration maps to describe the nature and extent of groundwater contamination at the site and to evaluate contaminant fate and transport. Integrating groundwater chemistry and hydrogeologic data to develop the design of a sitewide monitoring well network.

Prepares geologic and geochemical investigation reports for NEPA, RCRA, and CERCLA support at the Rocky Flats Plant. Conducted data analysis for 1991 and 1992 Annual RCRA Groundwater Monitoring Report including statistical evaluation of groundwater quality data and evaluation of contaminant distribution and migration. Possesses in-depth knowledge of sitewide geologic setting, site-specific geomorphology, surficial geology, and bedrock stratigraphy.

Provides project management support and technical oversight to the Operable Unit 7 (Present Landfill) Phase I RFI/RI at the Rocky Flats Plant. Directed field implementation of the work plan. As the data management coordinator, evaluates analytical data quality, assesses data usability, and conducts statistical analyses and statistical comparisons of onsite and background geochemical data to determine the extent of contamination at the site. Also responsible for defining comparable background data and defensible methods for conducting background comparisons. As task leader for hydrogeologic investigations, directs data analysis and interpretation and provides technical oversight for the Phase I RFI/RI Report.

Conducted geochemical and environmental fate and transport modeling of historical chemical releases to support a No Further Action Justification Document for Operable Unit 16 (Low-Priority Sites) at the Rocky Flats Plant.

Completed a geologic mapping program at Rocky Flats. Compiled a geologic map of a 60-square-mile area that includes Rocky Flats as part of the sitewide Phase II Geologic Characterization. Described the stratigraphy and sedimentology of the Upper Cretaceous sedimentary rocks underlying the plant site. Prepared the Phase II Geologic Characterization Report on Surface Geologic Mapping at Rocky Flats, which details the stratigraphy and structure of bedrock in and around Rocky Flats. The report also includes a conceptual model for sitewide geologic setting of the plant.

Provided geologic data analysis for development of Phase I RFI/RI Work Plan for OU 7 (Present Landfill). Surface and subsurface geologic data were analyzed to develop a site-specific geologic model.

Designated as an essential stratigrapher for the OU 1 881 Hillside geologic characterization drilling program. Examined and logged drill core from more than 60 boreholes and monitor wells.

Kathryn J. Tegtmeyer, Ph.D.  
Page 3

Installed groundwater monitor wells and supervised geologic drilling as part of the sitewide geologic characterization program at Rocky Flats. Also supervised installation of gas-vent wells in landfill materials at the Present Landfill.

**Research Assistant**  
**January 1986 - August 1990**

**University of Colorado,  
Cooperative Institute for Research  
in Environmental Science (CIRES)**

At the Cooperative Institute for Research in Environmental Sciences (CIRES), conducted geochemical studies of silicic volcanics from sites across the western United States (including the Nevada Test Site - Yucca Mountain area) using radiogenic isotopes as tracers in petrogenesis. Also conducted high-precision strontium isotopic analyses of bivalve shells for a geochronology study of Arctic marine deposits, and managed the clean-room and mass-spectrometry facilities at CIRES.

**Geologist**  
**Summer 1984 - Summer 1986**

**U.S. Geological Survey  
Menlo Park, California**

As a geologist for the U.S. Geological Survey, conducted geologic field mapping and mineral resource assessments of five Bureau of Land Management Wilderness Study Areas in Oregon and Idaho. The resultant maps were published by the U.S. Geological Survey.

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## EDUCATION

Ph.D., Geological Sciences, University of Colorado, Boulder, 1990  
B.A., Geology, Hamilton College, Clinton, New York, 1984

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## TRAINING

40-Hour Hazardous Waste Site Health and Safety Training, Urie Environmental Health, March 1991 (updated yearly)  
CPR, 4-Hour Class, Red Cross, December 1992  
Radiation Safety Training, 8-Hour Class, EG&G, April 1991  
Modeling of Chemical Reactions in Groundwater, 40-Hour Short Course, International Groundwater Modeling Center, August 1992  
Core Logging Course, 8-Hour Class, EG&G, May 1991

**Mark Tullius**  
*Geologist I*

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**AREAS OF EXPERTISE**

GIS Applications  
AMLL Programming  
C Programming  
Data Base Development  
Computer Hardware Maintenance

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**SUMMARY OF QUALIFICATIONS**

Mr. Tullius has 10 years of geologic experience with five years specializing in geographic information system (GIS) software including GEOBASED, INTERGRAPH, GRASS, and ARC/INFO. He has extensive knowledge of workstation ARC/INFO on the Sun SPARC station and DEC 3100 platforms. He utilizes his geologic background to produce maps that clearly illustrate geologic formations and contaminants. He has a thorough knowledge of ARC Macro Language and basic knowledge of C programming and its implementation in developing menu interfaces for non-technical users, as well as developing routines for more efficient use of ARC/INFO GIS.

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**EXPERIENCE**

**GIS Specialist**  
**September 1992 - Present**

**The S.M. Stoller Corporation**  
**Boulder, Colorado**

Currently supporting the scientific and engineering staff by providing map production and data analysis/interpretation for project reports. Responsible for ongoing map generation for the Rocky Flats Plant contract. Developing 3-D surface models for mining reclamation using ARC/INFO TIN capabilities, including cut/fill operations to determine volumetric calculations and surface recontouring for presentation of future scenarios. System administration duties include maintaining and upgrading a SUN UNIX workstation. Installing and upgrading GIS software packages such as ARC/INFO, ArcCAD, AutoCAD, and ArcVIEW.

**GIS Specialist**  
**August 1991 - August 1992**

**Geographics Environmental Consultants, Inc.**  
**Lakewood, Colorado**

Designed and managed GIS applications for natural resource management. Oversaw technical operations involved in project design, data base development, and data conversion. Provided programming expertise and consulting services as needed by clients involved in GIS development. Successfully managed and completed a bathymetric mapping project for National Oceanic Survey in which antiquated linen sounding sheets were updated to a digital form for three-dimensional modeling of Lake Michigan and the Chesapeake Bay.

Mark Tullius  
Page 2

**Scientist**  
**July 1990 - July 1991**

**ManTech Environmental Technology, Inc.**  
**Lakewood, Colorado**

Involved in the research, design, and implementation of geographic information systems for use by environmentally concerned utility, energy, and governmental institutions. Provided geographic expertise as a team member in solving technical and applicational needs of GIS research. Reviewed and provided recommendations for future marketing proposals and developed models for potential GIS customers. Successfully completed the Puget Sound Power and Light Co. project which involved the development of a customized menu interface of ARC/INFO for use by forest and wildlife managers in making land use decisions.

**Cartographic Technician III**  
**June 1988 - July 1990**

**Q.C. Data, Inc.**  
**Denver, Colorado**

Developed digitized seismic surface location maps for oil companies using in-house data capture software. Joined the GIS department and learned various software packages used primarily for the digitization of pre-existing base maps for the U.S. Forest Service and the U.S. Geological Survey. Was one of the initial trainees for ARC/INFO GIS in projects involving the Bureau of Indian Affairs for the management of reservations throughout the country. Responsibilities included project estimation, tracking, quality control, transmittal writing, and final deliveries. Became highly efficient in writing ARC Macro Languages (AMLs) for streamlining project turnaround.

**Geologist**  
**June 1981 - May 1985**

**GEO Seismic Services**  
**Oklahoma City, Oklahoma**

Processed and analyzed seismic data from the Wind River Basin area of Wyoming. Helped implement a surface refraction static program for use in enhancing the quality of seismic profiles. Gained knowledge of the VAX/VMS operating environment and associated hardware platform.

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## EDUCATION

B.S. Geology, Oklahoma State University, Stillwater, Oklahoma, 1980

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## TRAINING

Well Log Analysis for Geophysicists, Geoquest International, Houston, TX, 1982  
Advanced ARC Macro Language, ESRI, Boulder, Colorado, 1991  
C Programming, Red Rocks Community College, 1991

## HARDWARE AND SOFTWARE CAPABILITIES

### Software

GEOBASED  
INTERGRAPH  
Grass  
ARC/INFO

### Hardware

Calcomp  
DEC workstation  
SUN workstation  
Altek digitizing tablets  
Tektronix terminals  
IBM compatible PCs  
VAX/VMS  
SunSPARC  
DEC 3100

**WATKINS-JOHNSON ENVIRONMENTAL, INC.  
KEY PERSONNEL**

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**Brian L. Myller**  
**Project Manager**  
**U.S. Citizen**

***Areas of Expertise***

Mr. Myller, a project manager of multidisciplinary environmental projects, has directed remedial investigations, base closures, preliminary assessments, remediation research, and large-scale monitoring programs. He has worked with WJE for over eight years, and has applied his technical and management capabilities at a broad range of contaminated sites involving chemical warfare agent spills, underground missile silos, leaking sewer systems, disposal basins, contaminated lake sediments, waste and product storage vessels, burial trenches, and landfills. With expertise in hydrogeology, he served as the project manager for one of the largest groundwater monitoring programs in the country, and has extensive experience assessing complex contaminated aquifer systems, researching contaminant fate and transport in aquifers, and evaluating the performance of aquifer remediation systems. He also managed the RI report of one of the most contaminated and politically sensitive areas at the Rocky Mountain Arsenal. In addition to project management, Mr. Myller provides technical guidance, analysis, design, technical presentations, and regulatory negotiation support.

***Experience***

- U.S. Army, Program Manager, Rocky Mountain Arsenal, CO – Project Manager of the Groundwater Element of the Comprehensive Monitoring Program, a \$7.5 million, five year project that monitored groundwater contamination and hydraulics over a 45 square mile area. He coordinated the design of cost-effective well networks, considering more than 2000 existing wells, technical requirements, and RCRA, CERCLA, NEPA, state and local regulations. He supervised the quarterly collection of approximately 1200 groundwater elevations, and between 80 and 800 water quality samples. As project manager, Mr. Myller was responsible for project scheduling, development of work plans, worker health and safety, subcontractor management, budget control, and technical quality. He directed and contributed to the preparation and delivery of annual reports which assessed aquifer hydraulics, contaminant distribution, and characterized sources (including landfills, sewers, disposal basins, and surface releases), and contaminant migration. Moreover, this project also included surveys of background water chemistry, age-dating groundwater (using tritium studies), and evaluations of remediation system performance and the effects of remedial actions.
- U.S. Department of Energy (EG&G Rocky Flats) – Project Manager of a group of hydrogeologists, who, under subcontract to the S.M. Stoller Corporation, are developing recommendations designed to maximize the technical, regulatory, and cost effectiveness of groundwater monitoring efforts at the Rocky Flats Plant. This process involves assessing existing geologic, hydraulic, and chemical data to provide a site-wide understanding of contaminant fate and transport in groundwater. Well locations, screened lithologies, construction quality, yield, and chemical and hydraulic dynamics, are evaluated with respect to contaminant distribution/migration and the technical and regulatory requirements particular to the site. Well locations (existing and new), sample frequencies, and analyte suites which provide information needed to effectively support the cleanup and meet regulatory requirements are recommended, while wells and the associated efforts which produce superfluous information are eliminated.
- U.S. Army, Program Manager, Rocky Mountain Arsenal, CO – Project Manager of a team of leading researchers that developed and implemented a pilot-scale method to obtain actual, in-situ aquifer remedial parameters. The method applied a flux of organic-free water to a highly contaminated aquifer and monitored the removal and recovery rates of over 40 contaminants from various strata. Potential sorption-reducing mechanisms including mobile colloids, surfactants, and co-solvents, were also identified and evaluated using both bench and pilot scale studies. Information gained from the study 1) allows an

evaluation of whether complete restoration should be attempted, or if plume control is more appropriate; 2) supports the selection of appropriate control or cleanup alternatives; and, 3) facilitates effective design of the chosen alternative. Mr. Myller managed technical aspects of the study including remediation system design, installation, and testing; pump/piping design and installation; groundwater modeling; well network design and installation; analytical program design; trouble shooting a computer controlled semi-automatic on-site gas chromatograph; laboratory sorption studies; data management and interpretation; report preparation, and technical presentations. He also coordinated the efforts of several universities and government organizations participating in the study.

- U.S. Army Toxic and Hazardous Materials Agency, UT — Project Manager for closure and realignment of Ft. Douglas under the Total Environmental Program Support Contract. Mr. Myller directs RI/FS-based evaluations of both natural media and buildings (including asbestos and lead paint). He manages the environmental investigations, risk assessments, and remedial alternatives analyses. His responsibilities also include the characterization and disposal of investigative-derived wastes.

- U.S. Army Program Manager, Rocky Mountain Arsenal, CO — Project Manager of the RI report for the South Plants Study Area. This report assimilated over 10 years of data from a myriad of historical and current programs and assessed contamination in soils, surface water, vadose and saturated zone sediments, groundwater, air, sewers, landfills, buildings, and biologic media. Mr. Myller was a primary author, managed budgets and schedules, coordinated personnel, and provided technical guidance and review. He also delivered technical presentations during regulatory negotiations for this highly contaminated and politically sensitive site.

- Confidential Industrial Client — Project manager of a groundwater screening program to characterize contributions of evaporation basins, settling ponds, aeration basins, landfills, and raceways to groundwater contamination. Evaluated the impact of contaminated groundwater recharging into local surface water bodies. Designed the investigative approach and managed the financial and technical aspects of the project.

- U.S. Army Program Manager, Rocky Mountain Arsenal, CO — Site Manager of the Comprehensive Monitoring Program. Set up and supervised the field operations portion of a \$24 million program that monitored contamination in groundwater, surface water, air, and biota. Directed the development of a computerized sample tracking system which increased efficiency and effectiveness of the field and laboratory personnel. Supervised and coordinated site personnel and subcontractors, field program setup, sampling logistics, and QA/QC of field data. Managed and supervised numerous single- and multiple-cased monitoring and production well installation programs.

- U.S. Navy, China Lake Naval Weapons Center, CA — Supported field program coordination. Developed a well sampling system which increased crew efficiency by 100%. Served as rig geologist for drilling and well installation using innovative air percussion techniques.

- U.S. Army Toxic and Hazardous Materials Agency, CO — Participated in a preliminary assessment of an underground Titan Missile Complex. Prepared a video documentary of the site, detailing environmental risks.

- U.S. Army Program Manager, Rocky Mountain Arsenal, CO — Over a three year period, performed numerous field activities to investigate groundwater and soil contaminated by chemical warfare agents, pesticides and herbicides, rocket fuels, solvents, metals, and unexploded ordinance. Designed and conducted numerous soil gas studies, well drilling and soil boring programs, and waste product characterization surveys. Served as lead hydrogeologist on floating drill rigs that sampled contaminated lake sediments. Also participated in sewer dye investigations, well development and sampling programs, and disposal basin dimension studies.

***Education***

B.S. Environmental Geology, Institute of Technology, University of Minnesota, 1984.  
Short Courses on groundwater remediation, contaminant fate and transport, field sampling techniques, communications/public speaking.

***Training***

40 Hour Hazardous Waste Site Health and Safety Training  
Hazardous Waste Communications Training  
Supervisors Training  
8 Hour Refresher Update

# Kent Glover

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## Education:

B.S., Watershed Sciences, 1975

## Background and Experience:

Mr. Glover has 17 years experience solving groundwater hydrology and contaminant migration problems. His areas of technical expertise include evaluations of contaminant migration, development of numerical and statistical models of hydrogeologic systems, design and analysis of hydraulic tests and tracer tests, applied research in fractured-rock hydrology, and investigations of stream-aquifer relations. He serves as principal ground-water modeler for WJE and has applied hydrologic modeling in support of site characterization, human health and ecological risk assessments, remediation alternatives evaluations, remedial design, water-resource management and well-field design. Mr. Glover also has successfully developed, managed and completed several large hazardous-waste and water-resources projects. These projects have included remedial action planning (RI/FS), design and implementation, water resources planning and management, and environmental characterization.

- *U.S. Army Environmental Center, Western U.S.*—Program Manager for a broad range of environmental services provided under a \$16 million, 4 year TEPS contract. Mr. Glover served as technical and operational leader for remedial action, RI/FS and base closure support provided at installations in California, Colorado, Nebraska, and Utah. In addition to responsibilities for budgets, subcontracts, schedules, and deliverables, Mr. Glover has had significant personal involvement in technical investigations, regulatory negotiations and public meetings required at each installation.
- *U.S. Army Environmental Center, Cornhusker Army Ammunition Plant, NE*—A large groundwater plume of RDX and other explosive compounds has migrated several miles away from the installation and has contaminated more than 180 private wells in subdivisions of Grand Island. Mr. Glover has applied groundwater flow and contaminant transport models in support of Risk Assessment and Feasibility Study. Three-dimensional models were required in order to account for the vertically stratified nature of contamination. Flow modeling was conducted to identify regional discharge points and travel times for the plume. Objectives of transport modeling included predicting long-term changes in concentration at domestic and municipal wells.
- *U.S. Army Environmental Center, Presidio of San Francisco, CA*—Project Manager for a multiple site, multiple contaminant RI/FS. Sources of contamination include landfills, motor pool areas, storage tanks and laundry facilities. Contaminants detected in groundwater and soils during an extended field program included PCBs, pesticides, metals, chlorinated solvents and petroleum compounds. During Mr. Glover's tenure as project manager, the initial field program was conducted, RI and Risk Assessment reports were prepared identifying several areas requiring remedial action, and a Feasibility Study report was completed. Interim Remedial Action was begun at a site adjacent to San Francisco Bay with soil and groundwater contamination by chlorinated solvents and petroleum compounds.
- *U.S. Army Environmental Center, Presidio of San Francisco, CA*—The Army is conducting an Interim Remedial Action of a chlorinated solvent plume in groundwater adjacent to the San Francisco Bay. As part of this project, Mr. Glover has conducted both areal and cross-sectional flow modeling to evaluate changing flow paths under the influence of tidal fluctuations and to describe the potential for contaminant discharge to the bay. A field program was conducted to characterize hydraulic conditions and water quality. Aquifer characteristics were estimated by well testing and analysis of water-level changes in response to tides. Transient flow analysis including variable density effects used to characterize complex areal and vertical heterogeneity in the aquifer and to evaluate potential for contaminant discharge to the bay. The modeling effort will form a basis for designing appropriate remediation systems.

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# Kent Glover

- **U.S. Army Corps of Engineers, Rocky Mountain Arsenal, CO**—Mr. Glover served as principal author of the Water Remedial Investigation report which assessed groundwater contamination throughout the Rocky Mountain Arsenal and adjacent off-post areas. Groundwater at the Rocky Mountain Arsenal has been contaminated extensively by a complex set of petroleum products, chlorinated solvents, pesticides, metals, and chemical agents. The report evaluated groundwater flow, identified contaminant plumes and characterized migration pathways. Mr. Glover conducted extensive regulatory negotiations to address issues related to groundwater modeling and the extent of contamination in bedrock. As a result, the report was well received by the Army, other parties and regulatory agencies. Characterization of vertical extent of contamination and contaminant migration mechanisms in bedrock were particularly sensitive topics to all organizations. Mr. Glover obtained consensus on these topics by identifying a reasonable technical approach to addressing the topics and consulting frequently with each organization as the technical information was developed.
- **U.S. Department of Energy, Yucca Mountain Project**—Mr. Glover served as Principal Investigator for fractured-rock hydrology at the Nations proposed high-level radioactive waste disposal site. Mr. Glover assembled and coordinated a multiple-discipline technical staff from a team of consulting organizations. He directed aquifer characterization activities, developed a quality assurance program for aquifer testing and modeling, participated in public meetings, and prepared and managed project budget and schedule. In addition to project management responsibilities, he planned and conducted applied research to evaluate concepts of flow and transport in fractured rock. Hydraulic-stress tests and tracer tests in deep wells were conducted and interpreted. A series of numerical and stochastic models were developed and applied to interpret hydrogeologic data at well-test and subregional scales.
- **U.S. Department of Energy, Southwest WY**—Mr. Glover served as project manager of a prototype investigation to characterize groundwater contaminant migration from an in situ oil-shale facility. Mr. Glover and a staff of hydrologists, chemists, geologists and technicians conducted an extensive field program, developed and evaluated sampling protocols for organic contaminants, and characterized the nature and extent of contaminants. The field program included monitor-well drilling to depths of 1,000 ft, water-quality sampling, geophysical logging, and hydraulic testing. As part of the project, Mr. Glover developed a three-dimensional finite-element model for simulating flow and solute transport in dual-porosity rock and used a nonlinear least-squares technique for estimating aquifer properties and assessing model reliability. The model was used to predict contaminant migration rates and contaminant concentrations at discharge points.
- **Wyoming State Engineer, Bear River, Western WY**—As part of a water-resource planning and management project, Mr. Glover developed a finite-element model for concurrent simulation of streamflow and groundwater flow. Following a one-year field program, the model was calibrated and used to address interstate compact issues along the Bear River of Idaho, Utah, and Wyoming.
- **Wyoming State Engineer, Central WY**—Mr. Glover developed a water-resource management model for administering groundwater rights associated with the Bates Creek alluvial aquifer. Surface water in Bates Creek is fully appropriated and water shortages are common. The model was developed following a two-year data collection program that required Mr. Glover to obtain a wide variety of surface water, groundwater and land use data.
- **Bureau of Land Management, Powder River Basin, WY**—As part of water resource and reservoir siting studies conducted to plan for mining and population growth, Mr. Glover modeled the risk of reservoir-storage failure due to water shortage or spillage. The model was developed specifically for use with ephemeral streams in semiarid regions and used queuing probability theory to perform the risk analyses. The project consisted of code development and application along the Belle Fourche, Cheyenne and Little Powder Rivers.

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## Kent Glover

- *Bureau of Land Management, WY*—As part of a team of hydrologists, Mr. Glover developed a computer model for simulating salinity loading of streams in Wyoming. Multivariable regression techniques were used to relate seasonal variations in stream discharge to various water-quality parameters. The resulting harmonic relationships were used to estimate stream-salinity loads during periods when water-quality data were not available. The model was used to estimate daily, monthly, and annual salinity loads at numerous sites along the Big Horn, Green, and Powder Rivers of Wyoming. This information was used by the client for water-resource planning resulting from growth in coal and oil-shale mining.
- *Office of Surface Mining, Powder River Basin, WY*—Mr. Glover developed a three dimensional groundwater flow model of the shallow (Tertiary) aquifer system to evaluate the cumulative hydrologic impact of coal mining. Previous models of the shallow aquifer system had been developed to describe regional flow patterns in the Powder River Basin of Wyoming and Montana. However, these models were not sufficiently detailed to predict regional water-level declines due to coal mine dewatering. Utilizing aquifer property estimates obtained in larger regional modeling, Mr. Glover developed a numerical model capable of simulating both mine dewatering and subsequent water-level recovery in reclaimed mine spoils. The model was used to identify and evaluate regional impacts of coal development in the eastern Powder River Basin under a variety of mining scenarios.
- *U.S. Geological Survey, Upper Colorado River Basin, CO, WY, and UT*—Mr. Glover served as project manager of a team of hydrologists, geologists, and geochemists characterizing flow and water quality in Tertiary-age rocks of the Uinta, Piceance, Green River and Great Divide Basins. As part of this effort, Mr. Glover developed regional groundwater flow models for the Uinta Basin, Utah and the Green River Basin, Wyoming. Results of the investigation were described in a formal series of reports and papers including a hydrogeologic atlas.
- *U.S. Geological Survey, Powder River Basin, MT and WY*—As part of a project to characterize regional hydrogeology of the Powder River Basin, Mr. Glover developed a three-dimensional model of groundwater flow in the Dakota aquifer system. Drill-stem test data and other information obtained from the petroleum industry were used to augment the hydrogeologic data base in deep parts of the basin where more traditional sources of hydrologic information were unavailable. These data were used to prepare potentiometric surfaces, geologic isopachs, hydraulic conductivity maps, and a water budget. Mr. Glover calibrated the flow model and applied the model to characterize leakage between the underlying Madison aquifer system and the shallow Tertiary aquifer system.

# Michael A. Boubin

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## Education:

M.S., Geology, University of Nebraska--Lincoln, 1989  
B.S., Geology, University of Northern Iowa, 1987

## Registration:

Professional Geologist, Wyoming (#PG-2175)  
Groundwater Professional, Iowa (#1126)

## Background and Experience:

Michael Boubin has over four years of experience in hydrogeology, including environmental site assessments and hydrogeologic site characterizations which resulted in remedial system design and implementation. He has experience in field investigations, report writing, and regulatory compliance. He has performed aquifer test design, completion, and data reduction. Aquifer pumping tests and slug tests were used to determine aquifer parameters for site characterization and remedial system design. Aquifer test results were used to determine system specifications and pumping rates for capture zones. He has designed monitoring wells and monitoring well networks. Mr. Boubin supervised numerous auger and rotary drilling, and wire-line rock coring crews during monitoring well installation. He performed soil sampling and created soil maps for hydrogeologic site assessments and geotechnical suitability studies. He has determined groundwater sampling suites, developed sampling programs, and wrote reports for periodic sampling. He has supervised the installation of free-product recovery systems, and the excavation of petroleum impacted soils. He determined the horizontal and vertical extent of petroleum-impacted soils and groundwater, recommended and implemented remediation systems. He has provided technical assistance and performed field work for geophysical surveys. He performed field work and data reduction for electromagnetic surveys to determine heavy metals plumes and locations of buried tanks and structures. He also gave technical support for shallow seismic surveys, to create geologic maps, and to determine depth to bedrock.

- *U.S. Army Environmental Center, Cornhusker Army Ammunition Plant, Grand Island, NE*—As a staff hydrogeologist Mr. Boubin planned, executed and completed aquifer testing, performed soil and groundwater sampling, supervised monitoring well installation, assisted with the preparation of a groundwater flow model and wrote final reports.
- *U.S. Department of Energy, Rocky Flats Plant, CO*—As a staff hydrogeologist performed data interpretation and preparation of maps for a monitoring well sampling evaluation program.
- *U.S. Army Environmental Center, Presidio of San Francisco, CA*—As a staff hydrogeologist performed field work for quarterly sampling.
- Project Manager for initial and detailed UST site assessments, and associated reports for the Nebraska Department of Environmental Control and the Iowa Department of Natural Resources.
- Project Manager for planning and implementing Phase I and Phase II Environmental Site Assessments (ESAs) for regulatory compliance and property transactions. He wrote proposals, work plans, and final reports, and performed field investigations.

**Michael Boubin**  
Additional Information

Years Experience:

With this firm: 1.5      With other firms: 2.5

**Work History**

1992 - present	Watkins-Johnson Environmental, Inc.
1989 - 1992	Geotechnical Services, Inc.
1987 - 1989	University of Nebraska

**Professional Affiliations**

Association of Groundwater Scientists and Engineers  
Colorado Groundwater Association

**Publications, Papers, Seminars and Lectures**

Boubin, M.A., 1989, Petrology of Eolian Carbonates Upper Hermosa Formation, Southeastern, Utah, Masters Thesis, University of Nebraska.

Boubin, M.A., and Loope, D.B., 1989, Petrology of Eolian Carbonates, Upper Hermosa Formation, Southeastern Utah, American Association of Petroleum Geologist, abs, XXXXX

Initial and Detailed UST site assessments submitted to the Nebraska Department of Environmental Quality, and the Iowa Department of Natural Resources

Fall 1993, attended a semester-long advanced hydrogeology course at the Colorado School of Mines.

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**JAMES P. WALSH & ASSOCIATES  
KEY PERSONNEL**

## **Stanley C. Spencer Principal, Senior Geoscientist**

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B.S. Natural Resources, University of Maine, 1977  
Continuing education in hydrogeology and hazardous waste management

REM, Registered Environmental Manager  
CGWP, Certified Ground Water Professional

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### **Experience**

Mr. Spencer has 16 years of professional experience including nine years as an environmental project manager and principal investigator for hydrologic investigations. Mr. Spencer is currently the project manager for remedial action at the Department of Energy National Renewable Energy Laboratory. He is the WALSH Program Manager for the remedial investigation/feasibility study (RI/FS) at Rocky Flats Plant. He also serves as the WALSH Project Manager for the U.S. Environmental Protection Agency (EPA) Preliminary Assessment/Site Investigation Program under contract to the Colorado Department of Health.

His technical expertise includes: hydrogeology, ground and surface water monitoring, geophysical surveys, solid and hazardous waste site assessment, underground storage tank (UST) management, and remediation.

Mr. Spencer has served as project manager for numerous UST investigations under the EPA Leaking UST Trust program. Projects have included soil gas surveys, soil and ground water assessment, identification of responsible parties, risk assessment, corrective action plans, and remedial design and implementation.

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### **Hydrogeology Hazardous Waste**

He served as the site manager for the comprehensive water quality/quantity monitoring program (Task 4) for the U.S. Army RI of the Rocky Mountain Arsenal Superfund site involving over 1,200 monitor wells and surface water stations. Mr. Spencer was responsible for technical planning, supervising operations, overseeing quality control audits, and data compilation.

He has provided site assessments and Hazard Ranking System evaluations on abandoned mine sites and landfills for the U.S. Forest Service. Other projects have included hydrogeologic assessments entailing monitor well design and installation, aquifer testing, geochemical sampling and geophysical evaluation.

### **Key Personnel**

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**Thomas H. Furst Ph.D., Soil Scientist**

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Ph.D., Soil Science, Utah State University, 1990  
M.S., Agronomy-Soil Science, Mississippi State University, 1985  
B.S., Range Science, Texas A&M University, 1980

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**Experience**

Dr. Furst is presently in charge of conducting soil surveys and environmental investigations for WALSH. He has recently completed soil surveys at the California Gulch CERCLA site in Leadville, Colorado, and the Anaconda/Butte/Silver Bow CERCLA site in Montana. He currently is working on a soil characterization and metal speciation study of a former lead smelter site in Kansas City, Kansas, and is actively involved in WALSH soil surveys in Vail, Colorado, and Peru, South America. Dr. Furst is responsible for the development of the WALSH geographic data system which involves applying geographic information systems (GIS) technology to catalog and solve environmental problems. He has also completed the OSHA 40-hour hazardous waste safety course and is experienced in personal protection up to Level B.

Areas of technical expertise focus on environmental and natural resource management and include soil science, soil survey, soil taxonomy and classification, soil identification and interpretation, soil mineralogy, surficial geology, plant taxonomy, and mine site and wetlands assessments. Supporting areas of expertise include the integration of GIS technology, global positioning systems, and image processing and analysis techniques towards solving scientific problems in environmental management.

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**Soil Science**

Dr. Furst has 12 years professional experience as a soil scientist and consultant, specializing in soil surveys and soil sampling projects for clients in the southeastern and western United States. His soil survey experiences range from private consulting agreements to serving as the Utah Agricultural Experiment Station Representative to the National Cooperative Soil Survey. He has taught and conducted research at the University level. His projects have ranged from short-term, small site (less than 10 acres), intensive investigations to long-term, regional soil surveys. Dr. Furst has worked intensively with soil surveys of subtropical areas, temperate regions, arid and semiarid regions, and high altitude soil regions. His work in this area has led him to cover a wide variety of projects that includes evaluation and remediation of hazardous waste and mine sites, land use and management surveys for agriculture, forestry, range, and urban areas, and wetlands delineation and identification.

**Key Personnel**

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**David Buscher****Ecological Engineer/Soil Scientist**

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M.S., Ecological Engineering, Colorado School of Mines, 1992  
B.S., Geological Engineering, South Dakota School of Mines and Technology, 1982.  
B.S., Wildlife Management and Biology, South Dakota State University, 1978.

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**Experience**

Mr. Buscher has 10 years of professional experience, six years as a geologist, two years as a soil scientist with the U.S. Soil Conservation Service (SCS), and two years as a soil scientist/environmental engineer. For Getty Mining Company, Mr. Buscher was assistant head field geologist for a gold exploration project. He also supervised all reclamation activities of drilling pads, access roads, and trenches. He conducted a research project on mercury contamination in gold mining areas in south central Brazil. His research included studying the geochemistry of mercury and mercury compounds in river sediments and water.

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**Soil Science**

For WALSH, he assisted in an intensive Order 2 soil survey at the California Gulch CERCLA site in Leadville, Colorado. He also assisted in an Order 3 soil survey at the Anaconda Smelter CERCLA site in Anaconda, Montana in support of a vadose zone investigation. His specific tasks for these soil surveys included soil mapping, defining survey map units, classifying soils, describing and sampling representative soil pedons, describing the nature and extent of mine waste material, and compiling and simplifying existing SCS mapping units. He was project manager for a soil investigation for a major ski area in Colorado where he mapped and delineated ecological units based on soil type, land type, and plant community. Mr. Buscher was field coordinator for a soil and dust sampling project at the CERCLA site in Leadville. He conducted a soil sampling program at the Hope Butte mining site in Ontario, Oregon. He was task leader for an attorney/client privileged soil sampling and description program. He was also task leader and soil specialist for a smelter investigation at the California Gulch CERCLA site in Leadville and for an operable unit of a Phase I RFI/RI at the DOE facility at Rocky Flats.

Additionally, he assisted in the development of a smelter work plan and a soil mapping work plan as part of the remedial investigation/feasibility study for the CERCLA site in Leadville. He assisted in the development of a QAPP, standard operating procedures, sampling and analysis plan, and work plan for a metal speciation program. Mr. Buscher also developed a soil inventory work plan for the CERCLA site in Anaconda, Montana. He has written several detailed soil reports for major mining CERCLA sites in the western U.S.

Mr. Buscher is a Certified Associate Soil Scientist (ARCPACS No. 03276) and a Certified Professional Geologist of the State of Wyoming (PG-2065).

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**Key Personnel**

## Harvey C. Johnson Industrial Hygienist

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B.A. Psychology, DePauw University, 1982

B.S. Environmental Health, Colorado State University, 1989

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### Experience

Mr. Johnson has four years of consultation experience in the anticipation, recognition, evaluation, and control of work place hazards. He has provided industrial hygiene services to small businesses, municipalities, and the Federal government. Industrial hygiene services include chemical and biological air sampling, radiological monitoring and sampling, ventilation surveys, noise dosimetry, and comprehensive asbestos services.

During the field investigation of Operable Unit 7 at Rocky Flats Plant (1992 to 1993), he was responsible for chemical and radiological monitoring and sampling. He insured that the required level of personal protective equipment was used and that all equipment and personnel followed appropriate decontamination procedures.

Mr. Johnson has conducted over 80 indoor air quality (IAQ) surveys. IAQ services include ventilation assessments, chemical monitoring, bioaerosol sampling, occupant interviews, reporting, and recommendations.

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### Health and Safety

Mr. Johnson writes and administers health and safety plans for clients performing work at potentially hazardous work sites. At potentially contaminated sites, his duties have included real-time air monitoring and air sampling for chemical contaminants. He is trained to perform radiation monitoring and sampling of personnel and equipment according to Department of Energy requirements.

Mr. Johnson has experience in comprehensive building assessment, including radon, lead, asbestos, and general IAQ measurements. He is specially trained to investigate and sample for biocontamination if suspected. Mr. Johnson is able to interpret bioaerosol laboratory results and write a report of the findings with recommendations to improve the building IAQ. Mr. Johnson is experienced in evaluating building ventilation systems as they relate to building occupant health.

**Key Personnel**

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## **Robert C. German Environmental Scientist**

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M.S., Environmental Science, Colorado School of Mines, 1991  
M.Sc., Geology, University of Canterbury (New Zealand), 1976  
B.S., Geology, Duke University, 1973

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### **Experience**

Mr. German has over 10 years of national and international experience as an environmental scientist and geologist. His areas of expertise include stratigraphy, sedimentology, and hazardous waste management.

Mr. German has conducted a radon soil gas survey for the Boulder County Department of Health and identified several areas with elevated readings appropriate for further study. He is currently participating in a shallow soil gas investigation of one of the operational units at the Rocky Flats Plant.

Mr. German is experienced in all aspects of a ground-water treatment system installed for the Colorado Department of Transportation. He has also participated in underground storage tank closures, laboratory packs, Phase I environmental site assessments, and air and soil monitoring at construction and excavation sites.

Mr. German has conducted geological field mapping in Colorado, Utah, Nevada, and New Zealand. As a petroleum geologist with Union Pacific Resources, he proposed wells which substantially contributed to the company's resources.

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**Key Personnel**

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**Heather Gabriel      Geologist**

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B.A., Geology, University of Colorado, 1993  
Certified Professional Geologist (C.P.G. 8861)

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**Experience**

Ms. Gabriel has one year of experience as a geologist. Her experience includes environmental and underground storage tank (UST) sites. She is presently involved in soil gas surveys at the Department of Energy Rocky Flats Plant and environmental site assessments for leaking USTs. Her UST experience includes site assessment and monitoring.

Ms Gabriel is experienced in soil, ground-water, and surface water sampling standard operating procedures. She is familiar with quarterly monitoring programs involving surface and ground-water sampling of volatile organic compounds, semi-volatile organic compounds, total metals, and dissolved metals including proper sampling technique, sample preservation, sample chain-of-custody requirements, field documentation, and instrumentation.

She has current Occupational Safety and Health Administration Hazardous Waste Operator training and medical monitoring.

**Key Personnel**

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**Bret P. Goss**

**Environmental Technician**

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**Experience**

Mr. Goss is an environmental technician currently engaged in remedial investigations/ feasibility studies at the Department of Energy (DOE) Rocky Flats Plant. His duties include soil gas vapor surveys, surficial and subsurface soil and water sampling, and data compilation. He is familiar with a variety of U.S. Environmental Protection Agency field sampling protocols and DOE standard operating procedures for Rocky Flats Plant.

Mr. Goss conducted environmental management assignments while at Aerotech Environmental where he recently designed, modified, and installed a vapor extraction system for the Evergreen Jeffco Library Project.

While serving in the U.S. Marine Corps, Mr. Goss identified and treated air and ground nuclear contamination sites. He coordinated all logistical considerations in providing simulated radiological, biological, and chemical training scenarios as well as supervising up to eight trainers. He provided qualifications training for up to 800 students.

Mr. Goss has technical expertise in the areas of detecting and treating air and ground sites, identifying agents, determining the extent of contamination, remediation and restoration of sites, and designing and modifying protective equipment. Mr. Goss has administration/ management expertise in the areas of supervising management level personnel; preparing training schedules and monitoring training activities; creating standard operating procedure manuals; monitoring inventory and initiating purchases; inspecting facilities operations; preparing and maintaining records and reports; researching, compiling, and conducting presentations. In the teaching area, Mr. Goss has expertise conducting training in detection, evaluation, monitoring, surveying, remediation, protective measures, first aid, and equipment usage; creating and administering written and practical application tests, and operating simulated-agent testing facilities.

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**Key Personnel**

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