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PROGRAM SUPPORT BUREAU  
91 DEC 30 PM 2:18

December 30, 1991

New Mexico Environment Department  
Program Support Bureau  
Room S4300, Cliff Hawley, Chief  
P.O. Box 26110  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110

Dear Mr. Hawley:

**New Mexico Environment Department Request for Proposal for RCRA Permit Application and Other Technical Documents Review**

ERC Environmental and Energy Services, Co., Inc. (ERCE) is pleased to present our proposal to provide support to the New Mexico Environment Department for expertise in the review of the RCRA permit application and other technical documents submitted to the State of New Mexico for the DOE Waste Isolation Pilot Plant. We are confident that we have unique capabilities required to complete the projects as defined in the subject Request for Proposal. We are confident that our technical abilities will provide the Environment Department with a very cost-efficient means of processing the permit application and other technical documents relating to WIPP.

We have submitted an original and five (5) copies of the proposal as required in the RFP. We appreciate the opportunity to present our capabilities and look forward to being a part of the success of the New Mexico Environment Department.

If you have any questions, please call me at the above number.

Regards,

David M. Ericson, Jr.  
Manager  
Safety & Risk Assessment

911205



Figure 2.1  
 Personnel Proposed for RCRA Part B Application Review  
 and Review of Other Related Technical Documents

Individual	Degree(s)	Yrs Exp	Prof Reg	DOE Q	Air Soil Water Modeling	Civil Eng	Chem Eng	Comp Review	Elec Eng	Env Science	Health Physics	Hydrogeology	Mech Eng	QA/QC	Risk Assess	Security & Emerg Plan	Waste Mgt
Susan Coker	MS, Agricultural Economics, Western Kentucky University BS, Agriculture/Business Administration, Western Kentucky University	6		X				X		X					X		X
David Ericson	PhD, Nuclear Engineering, University of Michigan MS, AF Institution of Technology BS, Chemical Engineering, Pennsylvania State University	33		X	X		X	X			X		X	X	X	X	X
Kenneth Fleming	MS, Nuclear Environment Systems Engineering, Clemson BS, Microbiology, Clemson	10	CHP	X	X			X		X	X				X		X
Dwight Flynn	MS, Wildlife/Fisheries Science, University of Tennessee BS, Forestry, University of Tennessee	22		X				X		X		X		X			X
Brian Fredrick	BS, Civil Engineering, Virginia Tech	12	PE (6 states)	pend.	X	X		X									X
Denise Gallegos	BS, Biology (Chemistry), New Mexico Highlands University	6	CHM							X							X
John Hockert	PhD, Nuclear Physics, University of NY at Stony Brook MA, Physics, State University of New York BS, Physics (cum laude), California Institute of Technology	22		X	X						X			X	X	X	
Thomas Kitchings	MS, Ecology, New Mexico Highlands University BA, Biology, Centre College	25		X	X			X		X	X			X	X		X
John Lague	MS, Meteorology, Massachusetts Institute of Technology BS, Physical Sciences, University of California, Davis	21			X			X			X		X	X			X
Carl Lipp	BS, Geology, Colorado College	3	PE (2 states)	X	X			X				X					X
Carlos Naranjo	BS, Mining Engineering, University of Arizona	16	PE (2 states)					X		X							X
Michael Norris	MS, Electrical Engineering (pending), New Mexico State University BS, Electronic Engineering, Chapman College	16		pend.	X				X		X			X	X		
Dennis Peek	MA, Political Science/Environmental Policy, University of Georgia BS, Mechanical Engineering, Georgia Institute of Technology	4	EIT	pend.						X			X		X		X
Richard Stephans	MS, Mechanical Engineering, New Mexico State University BS, Chemical Engineering, Purdue University	25	PE; QA Auditor	X			X	X		X	X		X	X	X	X	X
John Teel	MBA, University of New Mexico BS, Electrical Engineering, New Mexico State University BS, Chemical Engineering, New Mexico State University	8	EIT	X			X	X	X	X					X		X
Stephan Wright	BS, Nuclear Engineering (pending), University of New Mexico	2			X			X			X						

**WIPP Library**



**ERC  
Environmental  
and Energy  
Services Co.**

**RCRA Part B Permit Application  
and Other Technical Documents Review**

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**PROPOSAL**

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**Submitted by:  
ERC Environmental and Energy Services Co. (ERCE)**

**Submitted to:  
New Mexico Environment Department  
Program Support Bureau  
Santa Fe, New Mexico**

**December 30, 1991**

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**Albuquerque, NM**

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**ERCE Proposal 91-EP-0307**

**RCRA Part B Permit Application  
and Other Technical Documents Review**

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**PROPOSAL**

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**December 30, 1991**

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**Albuquerque, NM**

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## 1.0 INTRODUCTION

ERC Environmental and Energy Services Co. (ERCE) is pleased to provide this proposal to support the New Mexico Environment Department reviews of Resource Conservation and Recovery Act (RCRA) Part B permit applications and other technical documents submitted to the State of New Mexico for the Department of Energy Waste Isolation Pilot Plant (WIPP). [Note: After January 1, 1992, ERCE will be known as Ogden Environmental and Energy Services.] ERCE proposes to provide appropriate technical staff to support completeness determinations, technical evaluations (including evaluation of engineering components and applicant responses), decision analysis, and other activities related to the WIPP applications. ERCE provides the Environment Department with access to a large group of highly qualified, experienced professionals to support work in each of these areas. Our corporate commitment to high-quality, our history of responsive support to our clients in government and industry, our facilities in Albuquerque, and our senior project management strength ensure that assigned tasks are performed efficiently and professionally. Ms. Denise Gallegos, Staff Consultant (Environmental), will serve as Project Manager for this effort. Technical Review will be provided by Mr. J. Thomas Kitchings, Senior Project Manager. Management oversight will be provided by Dr. David M. Ericson, Jr., Manager of the Albuquerque Office.

Following a brief introduction to our firm, this section of the proposal summarizes some of the key points that demonstrate our unique qualifications to provide the required support and provides an overview of the organization of this proposal.

### 1.1 ERCE Skills and Services

As a responsible environmental and energy services firm, ERCE provides a comprehensive range of environmental science, engineering, and health and safety services to industrial and commercial companies, utilities, and government agencies. The firm was recently selected by *Forbes Magazine* as one of the "200 Best Small Companies in America." The *Engineering News-Record* in 1990 ranked ERCE as number 73 in its list of the top 500 American design firms. ERCE employs over 1000 professional personnel and had 1990 revenues in excess of \$80 million. In addition to our Albuquerque office, ERCE maintains over 25 offices nationwide. In the last 20 years, ERCE and its predecessor companies have conducted thousands of engineering, waste management, environmental, safety, health, and risk assessment studies for over 1000 clients.

ERCE's professional staff includes personnel with expertise in a wide variety of scientific, engineering, and planning disciplines and specialties, including the following:

Environmental Engineering	Safeguards and Security
Public Health	Air Quality
Industrial Hygiene	Risk Assessment
Health Physics	Toxicology
Safety Analysis	Nuclear Engineering
Civil Engineering	Chemistry
Chemical and Process Engineering	Ecology
Hydrology	Geology
Geotechnical Engineering	Environmental Inspections
Training	Radiation Protection
Emergency Planning	Waste Management

ERCE's technical services include hazardous, radiological, and mixed waste contamination assessment, analysis, and characterization; environmental restoration investigation and design; National Environmental Policy Act (NEPA) document preparation; public health and safety studies; industrial hygiene; health physics; radiation protection; air quality and air toxics; and regulatory compliance. ERCE's engineering services include environmental, civil, and geotechnical engineering; quality assurance; nuclear systems design and evaluation; nuclear safety and risk assessment; safeguards and security planning and analysis; waste minimization; and hazardous, mixed, and radioactive waste management.

## **1.2 Key Points of Response to the Request for Proposal (RFP)**

### **Insurance Coverage**

As a professional services company, ERCE maintains both general liability and professional services insurance. Certifications of this coverage are provided in Section 5.0 of the cost section of this proposal. (The coverage amount includes the increased requirement as of July 1992.)

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## **Personnel Experience and Training**

The ERCE staff has both experience and training in the broad range of disciplines applicable to the environmental and energy fields. As noted above, and as outlined in more detail in Section 2.0 and Appendix A, several of our staff members hold advanced degrees and have many years of experience. Figure 2.1 provides an overview of the skills and experience of those individuals selected to provide primary support to this program.

## **Project Understanding and Approach**

ERCE's clients have included both the public (at Federal, State, and local levels) and private sectors.

ERCE has assisted industrial clients in the preparation and implementation of permitting strategies for industrial development projects. The services we provide include comparative site evaluation studies; assessment of hazard control technology requirements; preparation of development plans, engineering descriptions, and permit applications; regulatory/policy analysis; and presentation of expert testimony. ERCE has also assisted municipal and county governments in the review and evaluation of such permits for a wide range of facilities, such as landfills. Based on this experience, ERCE is thoroughly familiar with the requirements of Federal and state regulatory guidance and with how these requirements are applied to permit applications. The ERCE approach to the work requirement is outlined in Section 3.0 and our prior experience is described in Section 4.0.

## **Prior Work in RCRA Part B Permit Applications and Technical Reviews**

Descriptions of ERCE's recent work in the review of RCRA Part B permit applications and the review of other technical documents is provided in Section 4.0. Most significantly, ERCE developed, previewed, and submitted 17 RCRA Part B permits for the Army Corps of Engineers and three such permits for the Oak Ridge National Laboratory.

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## **Contract Costs**

ERCE has applied its standard costing practices in the preparation of this proposal using rates that are currently accepted by the Federal agencies (e.g., DOE). The total proposed price, on a "Time and Materials" basis, is less than \$200,000 per year. The details of the costs are provided in Section 5.0.

## **Local Office**

The ERCE Albuquerque Office of ERCE was opened in September 1983 with a staff of three and has since grown to become a multi-disciplinary staff of 21. The company is committed to growth and to maintaining its New Mexico presence by providing significant and long-term services to the State of New Mexico, Los Alamos National Laboratory, and Sandia National Laboratories. The Albuquerque Office also serves the DOE K-25 Plant and the DOE Pantex Plant. ERCE, through its predecessor companies, has been in business since the mid-1970s. The Albuquerque Office (i.e., available equipment, materials, and services offered) is discussed in more detail in Appendix B.

## **Contract References**

Recent corporate experience in RCRA permit activities and other technical review activities are documented in Section 4.0.

## **Subcontractors**

ERCE does not propose to use subcontractors in this effort at this time. All tasks are planned to be performed by ERCE staff members.

## **Conflict of Interest/Compliance with Applicable Laws**

ERCE does not have a Conflict of Interest related to the performance of this work. We have not been involved with the preparation of any permits for WIPP-related activities. Also, because of

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our extensive contractual efforts for Federal government agencies, we are an Equal Opportunity Employer. The necessary certificates are provided in Section 5.0.

### **Standard Operating Procedures**

ERCE does not maintain an overall procedures manual. Rather, corporate procedures for recurring tasks are contained in the respective manuals for the work area. For example, the ERCE Health and Safety Program Manual has, along with sections on Regulatory Requirements, Program Management, Guidelines, Communications, Analysis, Discipline, and Training, a section containing a half-dozen ERCE-specific health and safety procedures. ERCE's multiple manuals are available for examination and review in the Albuquerque Office.

### **1.3 Understanding WIPP**

ERCE personnel have served as members of a nuclear safety and oversight committee during evaluations of the DOE WIPP facility. We also have considerable experience with other DOE-owned, contractor-operated sites. As noted in Section 4.0, ERCE has recent and ongoing work directly related to the assurance of safety to the public, the site personnel, and to the environment at several DOE facilities.

ERCE personnel are committed to supporting the New Mexico Environmental Department and understand the mission of WIPP. ERCE is aware that one prominent area of technical concern at WIPP is the potential for gas to be generated during biological and radioactive decay and metallic corrosion. Once WIPP operations are complete (i.e., after approximately 25 years), the underground areas will be backfilled and sealed. Predicting the effects of the decay process in a closed environment for 10,000 years presents a great technical challenge. The tests, the data received, and the calculations leading to those predictions must be closely scrutinized and evaluated.

ERCE is also familiar with Public Law 96-164, the "Department of Energy Authorization Act of 1980," which describes the provision for consultation and cooperation between the DOE and the State of New Mexico in paragraph (b), section 213. This section requires that the DOE and

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the State of New Mexico cooperate to resolve any concerns the state may have about public health and safety. While there are several standing committees at the state and Federal levels, the day-to-day interaction with WIPP regarding technical and regulatory issues is conducted by the state Environment Department.

Within the Environment Department, the Environmental Improvement Division (EID) regulates WIPP activities under the New Mexico Hazardous Waste Act, the New Mexico Water Quality Act, and the New Mexico Air Control Act. State permits for various activities, including waste generation and disposal, are issued by the EID.

In responding to the Environment Department's RFP, we reviewed such documents as the "Final Environmental Impact Statement" (October 1980), the initial 5-volume "Safety Analysis Report" (May 1986) and the "Final Safety Analysis Report" (May 1990). We are also aware of the eight parts of Volume IX of the 1980 Bechtel "Title I Design Report," which is devoted to calculations. Thus, we are aware of both the immensity of work that has gone into WIPP and the enormous responsibility the Environment Department has to protect the health and safety of the people and the environment of New Mexico.

As noted by Congressman Joe Skeen during his testimony in April, 1991, "While WIPP is being designed and built primarily for the disposal of defense-generated transuranic wastes, it will also be one of the world's premier research and development facilities to study the safe disposal of nuclear waste. WIPP will provide invaluable data needed to determine how to safely handle, transport, and dispose of defense wastes, here in the United States and around the world."

#### **1.4 Proposal Organization**

Section 1.0 provides an introduction to the proposal and addresses each of the 12 components required by the RFP.

Section 2.0 of this proposal provides detailed information on the experience and qualifications of the ERCE personnel identified to support the Environment Department. Section 3.0 describes

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the technical approach to the permit and technical document review activities, Section 4 provides contract reference contacts and project experience, and Section 5.0 contains the cost certifications.

Appendix A contains resumes for all personnel proposed to support this effort. Appendix B outlines ERCE's New Mexico (Albuquerque) facilities, including equipment, materials, and services offered.

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## 2.0 QUALIFICATIONS OF KEY PERSONNEL

The key personnel identified for this project have extensive experience in technical documentation review, waste management, RCRA Part B permitting, interacting with the New Mexico Environment Department, engineering data assessment, environmental and safety risk analyses, and the presentation of technical information to the public.

The broad experience of our personnel ensures that those individuals proposed will assess the requirements of the tasks assigned under this contract and perform the related technical reviews needed to successfully complete the work on time and within budgeted costs. ERCE personnel have exceptional qualifications in supporting the technical areas of air, water, and soil modeling; Civil, Chemical, Electrical, and Mechanical Engineering; Environmental Science; Health Physics; Hydrogeology; Quality Assurance/Quality Control (QA/QC); safety and risk assessment; security and emergency planning; and waste management, as well as detailed knowledge of the regulatory guidance applicable to each of these areas.

The personnel proposed, their technical credentials, and their specific qualifications are shown on Figure 2.1. The areas of expertise indicated for each of the personnel listed on the matrix also indicate the specific work that each will perform in the support of this effort. Detailed resumes are provided in Appendix A. The overall project will use the listed individuals, as required, to support the various technical review tasks.

### **Denise Gallegos**

The proposed Project Manager for this effort is Ms. Denise Gallegos. Ms. Gallegos is a Staff Consultant (Environmental) with ERCE's Albuquerque Office and is currently managing an environmental compliance project for Santa Fe Pacific Minerals. Ms. Gallegos holds a B.S. in Biology (Chemistry Minor) from New Mexico Highlands University. Her experience includes two years as the Program Manager of the New Mexico Abandoned Mine Land Bureau, where she was responsible for managing the Bureau's \$2.6 million per year construction and administrative grants as well as the day-to-day supervision of a staff of nine professionals.

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Ms. Gallegos has six years of experience as an Environmental Coordinator/Reclamation Specialist, specializing in mine reclamation, and working with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the National Environmental Policy Act (NEPA), the National Pollutant Discharge Elimination System (NPDES), the Clean Water Act (CWA), the Clean Air Act (CAA), and the Surface Mining and Reclamation Act (SMCRA). In her tenure at the Abandoned Mine Bureau, Ms. Gallegos was a member of the Western Energy Board and the National Abandoned Mine Land Association.

Ms. Gallegos is preparing a paper entitled "RCRA Part B Permit Assessments," which has been accepted for presentation during the Environmental Technology portion of the 1992 "Ideas in Science and Electronics" Conference.

Ms. Gallegos will have corporate-wide technical personnel resources available as needed to support this effort. The ERCE "matrix management" concept ensures that these corporate resources are accessible to project managers to meet project objectives. The flexibility of this system allows ERCE to provide the most appropriate expertise in a timely and economic way, which ensures a truly professional product.

### **J. Thomas Kitchings**

Mr. J. Thomas Kitchings will provide the technical review for all project activities. Mr. Kitchings has a broad background in environmental regulatory activities and holds an M.S. in Ecology from New Mexico Highlands University. He began his career with the Environment Sciences Division of the Oak Ridge National Laboratory (ORNL), where he served as task and group leader for environmental compliance. His professional activities also included the development of protocols and procedures for the environmental sampling and monitoring required to meet Federal directives and regulations for both radiological and chemical contaminants. As ERCE Project Manager for both the ORNL and Rock Flats Plant Remedial Investigation/Feasibility Study (RI/FS) projects, he has been involved in the preparation and implementation of remedial investigation work plans. These efforts involved the coordination of a multi-disciplinary staff in evaluating current site conditions, preparation of sampling plans, and

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conducting field activities in accordance with those plans. Mr. Kitchings played a primary role in the continuous interaction between the subcontractor, ORNL, the Department of Energy, and both the Environmental Protection Agency and the Tennessee Department of Health and Environment.

**Dr. David M. Ericson, Jr.**

Management oversight of this project will be provided by Dr. David M. Ericson, Jr., Manager of ERCE Safety and Risk Assessment Services and the Albuquerque Office. Dr. Ericson has over 33 years of experience in the management and conduct of nuclear technology programs. Most recently this includes over fifteen years in nuclear safety and security assessment and technology. His overall experience encompasses systems modeling and analysis, vulnerability assessment, accident progression analysis, consequence analysis, and safety criteria development. He has a solid background in directing multi-year, high value projects, including responsibility for technical content, personnel management, resource allocation, schedules, and quality control. Dr. Ericson will serve as the principal liaison to ensure that the appropriate corporate resources are available to the Project Manager.

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### 3.0 TECHNICAL APPROACH

ERCE is committed to support the New Mexico Environment Department in the assurance of a safe and secure habitat for the people and the flora and fauna of New Mexico. The technical efforts to support the Environment Department will be organized according to the following plan.

#### 3.1 RCRA Part B Application Review

An initial review of the permit application will be conducted to ascertain whether or not the applicant has submitted the appropriate and sufficient information to conduct the technical evaluation. ERCE will use on-hand state-of-the-art computer-based tools, such as the HOTSPOT and EPI codes, to efficiently review and verify the technical basis of the submitted application. However, we also realize that the majority of the effort will involve manual computations and references to science and engineering texts and handbooks to validate the assumptions and verify the calculations presented. In addition, we will be alert to more recent innovations in the field so that if a new methodology or technique is applicable and proven acceptable for use, it will be incorporated. The use of new techniques will be coordinated with the State Permit Project Officer (SPPO) prior to their implementation.

#### Introduction

The initial completeness review will be conducted using the checklists provided by the New Mexico Environment Department. The review will be performed by a team led by the Project Manager that will include a Chemical and Mechanical Engineer to provide recommendations as to the adequacy and completeness of the RCRA Part B Permit Application. The judgement of adequacy and completeness will be based upon the requirements specified in the New Mexico Waste Management Regulations (HWMR-6), Part IX, and the Code Of Federal Regulations, Part 40, Sections 270.14(b), "Contents of Part B, General Requirements," and 270.23, "Specific Part B Information Requirements for Miscellaneous Units," and upon the collective experience of the team. In addition to the checklists, a summary highlighting any concerns or perceived deficiencies will be provided. The entire report will be submitted in both hard copy and electronic copy (i.e., word processing diskette, specifically WordPerfect 4.2). The completeness

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review will be accomplished and reported upon within 60 days of the receipt of the permit package by ERCE.

### **Technical Evaluation Review**

The technical evaluation review is the most important and key portion of this work for the Environment Department. It forms the basis for subsequent WIPP interactions with local and Federal government agencies and with the people of New Mexico. ERCE has allotted the highest technical support level of effort to this phase of the overall work, i.e., more than 1000 hours per year.

A meeting will be scheduled with the SPPO to coordinate ERCE's effort with that of the Environment Department regarding the Part B Completeness Review. (To accomplish this task, ERCE may require access to the Administrative Review portion of the RCRA Part B Permit Application, which is being acted upon in a separate effort). ERCE will adhere to the following procedure in reviewing all RCRA Part B Permit Applications requiring review by the Environment Department.

Upon receipt of a permit from the Department, ERCE will conduct an initial review to ascertain information completeness and to identify specific areas of expertise for ERCE personnel. As previously stated, ERCE will report upon the technical completeness of the permit application within 60 days of receipt. ERCE will assure the quality control of all the products produced under this contract prior to submission to the Environment Department. Brief monthly project status reports will be submitted if the duration of any review process is longer than one month.

After the checklist review is completed, ERCE will meet with the SPPO to discuss any deficiencies the Environment Department may have found during the Administrative Review, i.e., deficiencies which have a potential impact on the review being conducted by ERCE, and to discuss ERCE findings with the SPPO both to clarify any issues and to support the decision as to completeness of the application. ERCE will prepare an Initial Review Report containing these findings.

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After the determination is made that the application is complete, ERCE will provide technical evaluation reviews to assist the Environment Department in establishing whether or not the facility meets, or will meet, the RCRA permitting standards as defined in HWMR-6, Part V, and the Code of Federal Regulations, Part 40, Environment, Part 264. ERCE will undertake a review process that will entail a technical evaluation, evaluation of engineering components, evaluation of responses from the applicant, decision analysis, and the technical evaluation of other WIPP documents. (See Figure 3.1 for an overview of the technical review process ERCE will follow.)

The initial activity in this review will be a joint decision by the SPPO and ERCE as to the specific time frame in which the evaluation will be conducted. Once the schedules are established, the evaluation will begin with a second checklist review. The completed checklists and a summary of the findings will be provided to the SPPO in hard copy and in electronic copy (i.e., on word processing diskette) after the findings have been discussed with the SPPO. ERCE will be available to evaluate any Applicant Responses as requested by the SPPO.

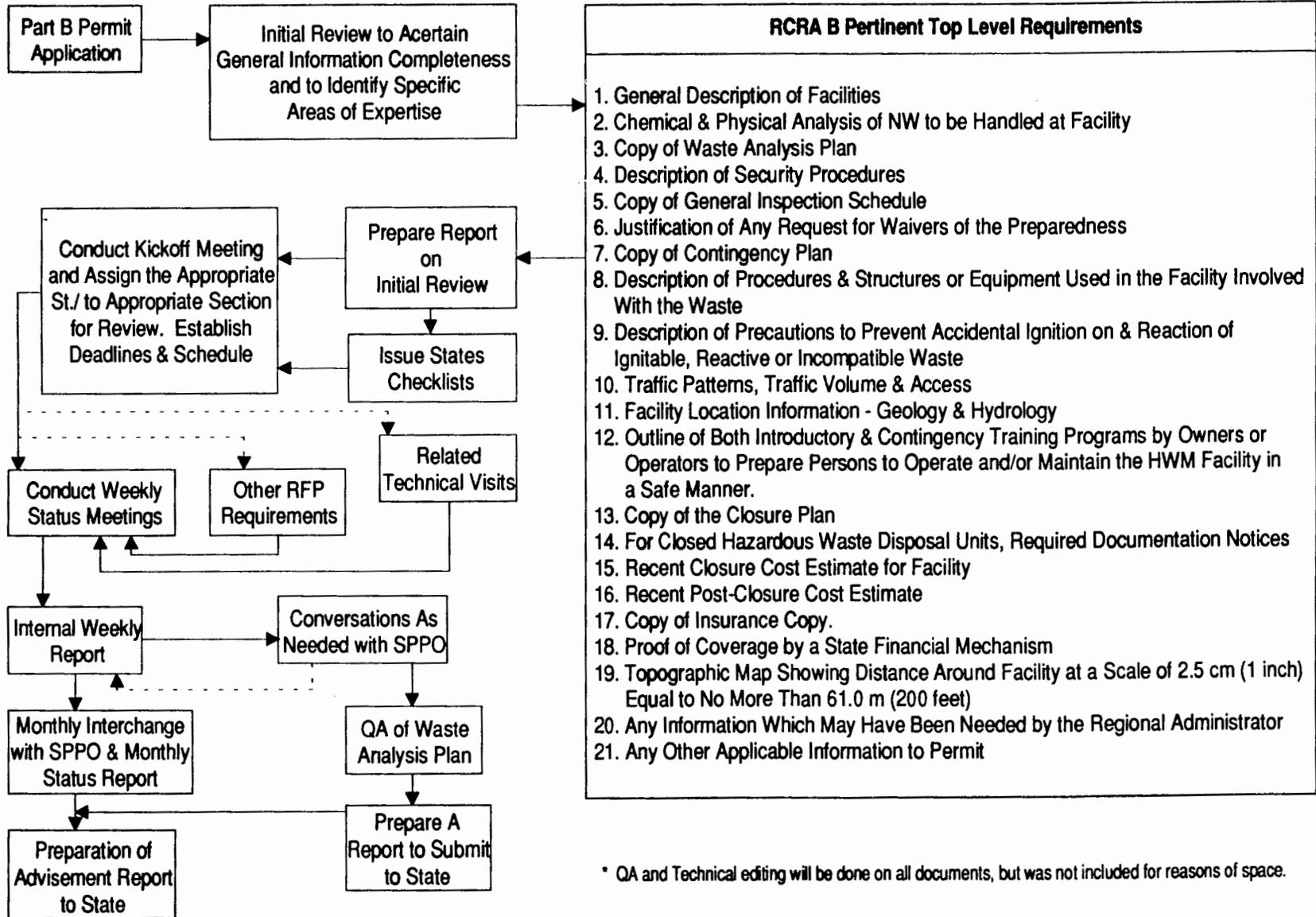
Appropriate sections will be reviewed by ERCE professionals in their respected fields of expertise. For example, chemical analysis will be reviewed by the chemical engineer and other personnel with experience in this field. The Project Manager will assign the individual sections for review to the appropriate staff member and will conduct a "kick off" meeting with those individuals involved. Deadlines, time schedules, and any potential project difficulties will be discussed during this meeting. Weekly status meetings will be conducted by the Project Manager at the ERCE offices in Albuquerque to anticipate the potential for unforeseen difficulties that might arise in the project and as a means of reporting vital information. The Project Manager will prepare an internal report to be submitted to the ERCE Technical and Management Reviewers on a weekly basis. ERCE expects to adhere to a twelve-month turn-around time on permit reviews, although additional time may be required on difficult permits or in situations where the delay is beyond the control of ERCE (e.g., missing information, slow response from applicant).

ERCE personnel will conduct field visits to the appropriate waste generator site and to WIPP on an "as needed basis," to be determined by ERCE. The purpose of these visits will be to field-verify information and documents submitted as part of this proposal.

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**Figure 3.1**



ERCE is committed to maintaining frequent and open communication between the ERCE Project Manager and the SPPO. ERCE is located within easy driving distance of Santa Fe, therefore personnel are available to deal quickly with any difficulties that may be encountered. Additionally, because ERCE is located in Albuquerque and centrally located in the state, personnel can easily and cost effectively travel to any city in New Mexico for public meetings. ERCE will conduct monthly interchange meetings with the SPPO if the duration of any review process is longer than one month. ERCE will immediately inform the SPPO of any major deficiencies found in any reviewed material.

After the review of permit is completed, the ERCE Project Manager will request a meeting with the SPPO prior to the writing of the final advisement report for the New Mexico Environment Department. This meeting will be held to discuss the findings of the permit review.

ERCE will review the applicant submitted waste analysis plan provided to the Environment Department. Attention will be focused on quality assurance and quality control, particularly on those sections that are associated with the sampling and analysis functions being performed at a generating site. ERCE will provide recommendations as to whether the waste characterization is adequate for all waste transported to WIPP. ERCE will prepare a report on the proposed waste analysis plan, including the quality assurance/quality control procedures, and will submit it to the Department. The Project Manager will schedule a meeting with the SPPO to discuss ERCE's recommendations prior to finalizing the report.

ERCE will also review applicant submitted data provided to the Environment Department and will evaluate the logical progression of the information and any assumptions involved in the permit application. Particular attention will be paid to data contained in tables, figures, technical and engineering drawings and to the verification of the calculations supporting the application.

Detailed plans and engineering reports will be reviewed in accordance with HWMR-6, Part IX, Section 270.23(a), to determine whether the unit has been located, designed, constructed, operated, maintained, monitored, inspected, and closed as required by HWMR-6, Part V, Sections 264.601 and 264.602. ERCE assures that all engineering reports, materials, and data will be reviewed by a registered professional engineer.

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ERCE will review the conclusions drawn by the applicant to ensure their compatibility with the data presented and to ensure the validity of the proposed conclusions.

At the request of the SPPO, ERCE will evaluate responses from the applicant following application revisions requested by ERCE or the Environment Department in technical review letters.

ERCE will support the New Mexico Environment Department in preparing for and conducting meetings or conference calls with applicants responding to the completeness and technical reviews. This task can be performed expeditiously and efficiently due to the proximity of ERCE's Albuquerque Office to the Environment Department Office in Santa Fe. ERCE personnel are experienced in conducting public meetings, giving expert testimony, and have conducted meetings in hospitable, as well as in hostile, environments.

ERCE will prepare reports on both the completeness and technical reviews, which will provide the basis for permit issuance or denial. The report will contain sufficient detail for the SPPO to determine 1) whether sufficient information exists to support the continuation of the permitting process following the completeness review, and 2) whether the technical information is adequate to provide support for the continuation of the permitting process following the technical review. ERCE will furnish a recommendation for or against continuation of the permit process at the time of the submission of the completeness review and the technical review reports.

### **Applicant Response Review**

ERCE will review any application revisions made in response to their written requests or to any written requests made by the Environment Department.

ERCE will support the Environment Department in their preparation for and in conducting meetings or conference calls with applicants regarding comments provided by ERCE to the state following the technical review.

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The support ERCE will lend to the Environment Department will include, but is not limited to, developing agendas for meetings, providing summaries of the major issues to be discussed, and reviewing the relevant regulations and guidance that may be discussed at the meetings.

It is understood that the Environment Department will conduct all meetings; however, ERCE personnel will be prepared to respond to any comments or questions, as directed by the SPPO.

### **Decision Analysis**

After completion of the RCRA Part B completeness and technical reviews, a decision analysis and report, which supports the recommendation for issuance or denial of the permit, will be prepared. Because nearly one third of all RCRA Permit Applications for open landfills since 1986 have been denied (*Hazmat World*, December 1991), this is a very important review phase. The decision analysis must be based on the facts submitted and requirements associated with the application process.

ERCE's approach to the decision analysis process is to use a requirements matrix of all of the major Part B requirements, along with a means of identifying the sufficiency of submitted data. Based on previous ERCE "lessons learned," this phase of the project requires coordination with the SPPO and approved ERCE sufficiency guides so that "yes/no" decisions are possible.

It is equally as important to document the basis for any permit approval as it is to document the basis for a permit denial. We realize that there are strong feelings in New Mexico about the Waste Isolation Pilot Plant and the storage and transportation of radioactive waste, regardless of the demonstrated safeguards associated with that waste. Therefore, documentation of the basis to ensure that it will withstand extremely close scrutiny is required. The CH TRU (or Contact-Handled Transuranic) waste is radioactive material that has been contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years and in concentrations greater than 100 nanocuries per gram of waste material. As noted in the RFP, shipments of the CH TRU will be from DOE generator sites to the WIPP site.

As part of the technical review, ERCE will prepare a report that provides a basis for permit issuance/denial decisions. The report will detail whether enough information exists to support

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the continuation of the permitting process and whether or not adequate technical information had been provided to support continuation of the permitting process following the technical review. This report will be submitted at the time the technical report is submitted.

### **Administrative Permit Processing Support**

ERCE will provide close coordination and technical review of permitting activities during the latter stages of permitting, including securing and furnishing expert/factual witnesses, coordinating public involvement activities, and performing applicant response evaluations.

In addition, ERCE will provide the Environment Department with a compliance checklist for use in the enforcement of the reviewed permit. The compliance checklist will be derived from the ERCE requirements matrix, as discussed above. The checklist format and level of detail will be coordinated with the SPPO, as will the schedule for delivery.

### **3.2 Other WIPP Technical Documents Review**

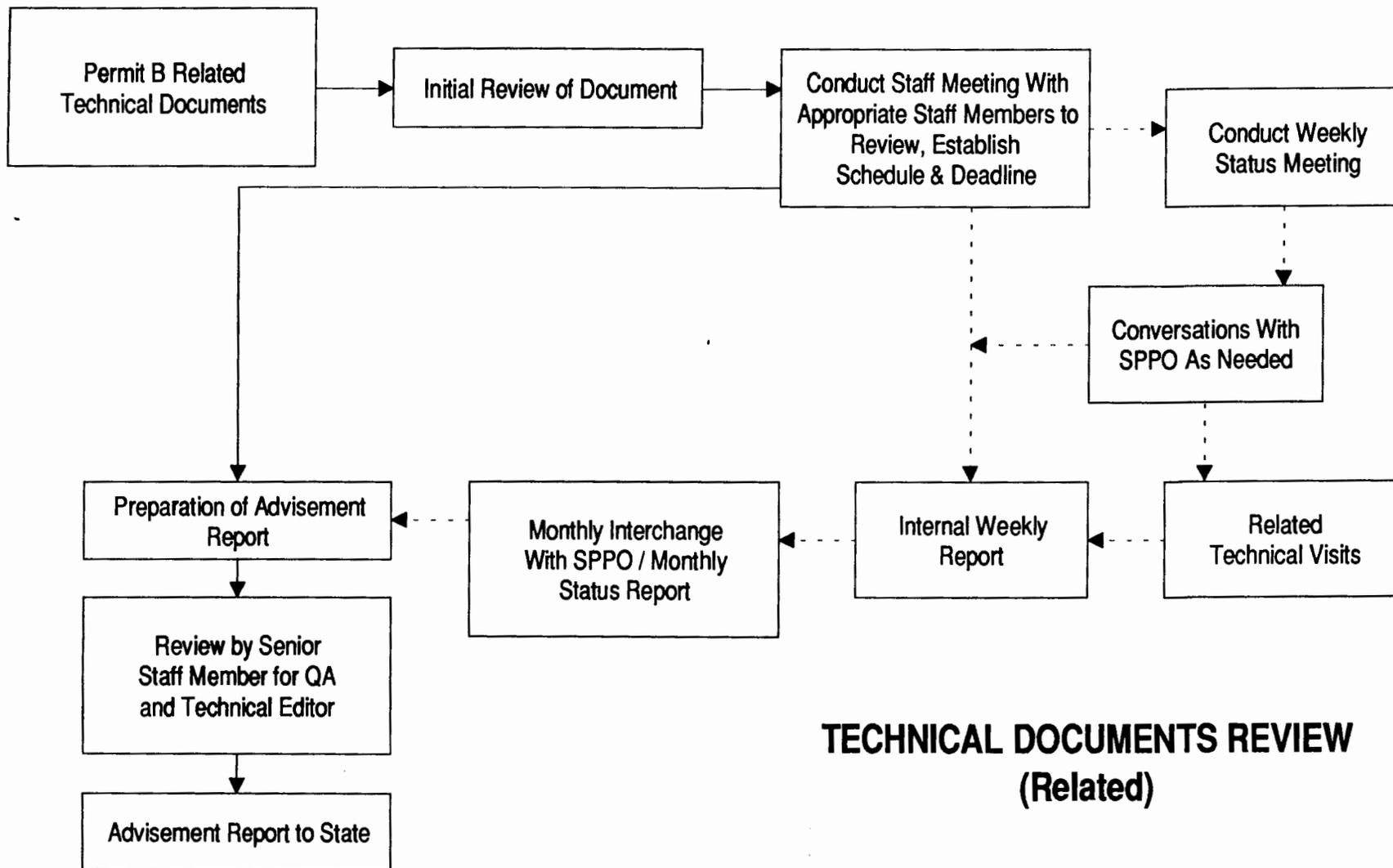
ERCE, upon receipt of other technical documents related to WIPP, will conduct an initial review of the document (see Figure 3.2). The purpose of this procedure will be to determine which professional discipline or disciplines should conduct the detailed review. The Project Manager will confer with the SPPO to define the Department's requirements in the review of the particular document. After the appropriate ERCE personnel have familiarized themselves with the document, the Project Manager will conduct a meeting to establish schedules and deadlines, to clarify the Environment Department's requirements, and to discuss any potential problems that may be encountered in the review process.

The ERCE Project Manager will conduct weekly status meetings with assigned ERCE personnel, if the review process is longer than two weeks in duration. An internal report detailing the content of these meetings will be submitted to the Technical and Management Reviewers.

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Figure 3.2



**TECHNICAL DOCUMENTS REVIEW  
(Related)**

\* Broken line signifies an as needed or perhaps situation. Some documents may be reviewed in a few days and not require weekly status meetings.

ERCE will maintain an open line of communication with the SPPO throughout the period review of these documents and will immediately notify the SPPO of any critical inadequacies found in any document.

ERCE will review any data submitted and will evaluate its logical progression, along with any assumptions which may have been made. Tables, figures, technical and engineering drawings, and calculations will be reviewed and the design drawings, specifications, and engineering studies will be reviewed by a registered professional engineer.

The conclusions in any document will be reviewed to ensure their compatibility with the data presented and to ensure their validity.

ERCE will schedule a meeting with the SPPO upon the completion of the technical evaluation of any submitted document to discuss the findings of the review team. It is understood that the SPPO will make the final determination regarding any proposed action or conclusions.

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## **4.0 ERCE CORPORATE RELATED TECHNICAL EXPERIENCE**

ERCE is fully qualified to provide the requested technical services for RCRA Part B Application Reviews and other technical document reviews. This qualification is based on corporate experience, which is characterized by the following:

1. Numerous work projects exhibiting performance in the areas of desired expertise
2. An array of satisfied customers in both the public and private sectors
3. A sequence of successful projects over a period of nearly 20 years completed on time and within controlled cost.

ERCE brings a complete set of the needed skills and expertise for all areas of RCRA Part B Application Reviews and other technical document reviews. Additional ERCE corporate technical resources are available, if required.

### **4.1 RCRA Part B Application Review**

The projects listed below relate to the development, review, and assessment of various RCRA Part B Permit Applications and related tasks. The table provides a summarized listing of clients, including client name and telephone number for ease of contact, each of which can verify the type of work performed and its quality. We welcome your contact with each identified client.

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<b>Contract</b>	<b>Client</b>	<b>Phone Number</b>
RCRA Part B Permit Applications Development at Multiple Sites	Corps of Engineers, Huntsville, Alabama (Jack Boswell)	(205) 955-5190
Several RCRA Part B Permit Applications at Oak Ridge	Oak Ridge National Laboratory, Tennessee (Carroll Nix)	(615) 574-7363
RCRA Part B Permit Application for Mound Laboratory	EG&G Mound Applied Technologies, Miamisburg, Ohio (Larry Klinger)	(513) 865-3078
Remedial Investigation/Feasibility Studies	Oak Ridge National Laboratory, Tennessee (Carroll Nix)	(615) 574-7363
RCRA Part B Permit Updates for the Navy	U.S. Navy, Public Works Center, San Diego, California (Kurt Swart)	(619) 556-7998

### **RCRA Part B Permit Applications Development At Multiple Sites under 40 CFR 264**

ERCE prepared revised RCRA Part A Permits and prepared complete RCRA Part B Permit applications for Open Burning/Open Detonation facilities at the following U.S. Army installations:

- Navajo Depot; Bellemont, Arkansas
- Savanna Army Depot Activity; Savanna, Illinois
- Seneca Army Depot; Romulus, New York
- Sierra Army Depot; Herlong, California
- Umatilla Army Depot Activity; Hermiston, Oregon
- Tooele Army Depots (N&S); Tooele, Utah
- Anniston Army Depot; Anniston, Alabama
- Fort Wingate Depot Activity; Gallup, New Mexico
- Letterkenny Army Depot; Letterkenny, Pennsylvania
- Lexington-Bluegrass Army Depot; Richmond, Kentucky
- Jefferson Proving Grounds; Madison, Indiana
- Yuma Proving Grounds; Yuma, Arizona
- Aberdeen Proving Grounds; Maryland
- Camp Bullis; San Antonio, Texas

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- Fort Indiantown Gap; Annville, Pennsylvania
- Yakima Firing Range; Yakima, Washington
- Fort Irwin; Barstow, California

ERCE successfully developed and prepared these permit application documents on an accelerated schedule, thus allowing the U.S. Army to meet their statutory deadline for Environmental Protection Agency and State submittals. This project demonstrates ERCE's ability to effectively perform and review large, multi-discipline, multi-task, and multi-site projects. The project was completed on time and within budget.

### **RCRA Part B Permit Applications at Oak Ridge National Laboratory**

ERCE tasks included the development and preparation of the RCRA permit applications for mixed waste at Oak Ridge National Laboratory, Oak Ridge, Tennessee. The permit applications were for the following facilities:

- Existing Remote-handled Transuranic Concrete Cask Storage Facility (Building 7855) and Processed Transuranic/Solid Low-level Waste Storage Facility
- Transuranic Retrievable Waste Storage Facilities (Buildings 7823, 7826, and 7834, and the RH-TRU Retrievable Storage Area)
- Cell 4 Solid Storage Facility

### **Preparation of RCRA Part B Permit Applications for the Mound Laboratory**

Through subcontract to EG&G Mound Applied Technologies, plant-wide RCRA Part B Permit applications were developed and processed to include required reviews. The facilities within Mound Laboratory for permit included the following facilities:

- Building 72 (hazardous waste storage)
- Building 23 (mixed waste storage)
- Glass Melter located in Waste Disposal Building

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- Building 90 and Burn Area, which includes Magazine 53, Open Burning Area, Retort, Thermal Treatment, Pyrotechnic Waste Storage, and Pyrotechnic Waste Conversion Unit
- Former Building 72 (hazardous waste storage)
- Building 24 (water treatment)
- Building 57 (sanitary sewage disposal)
- Retention Basin (storm drainage control)
- Closed Landfill (refuse and hazardous waste)
- Building 98 (fire station)

### **Remedial Investigation/Feasibility Study (RI/FS)**

ERCE performed multiple waste management-related review tasks for the Oak Ridge National Laboratory (ORNL). One of these tasks was a leak testing program for 40 liquid low-level tanks, which included preparing procedures and implementing the leak testing. Additionally, a closure plan for a mixed waste storage tank (Tank 7860A) and an integrity assessment for a mixed waste storage tank (Tank 7830A) were prepared in support of a RCRA Part B Application. Other responsibilities included the preparation of program plans for ORNL in compliance with the Federal Facilities Agreement.

### **RCRA Part B Hazardous Waste Permit Update, U.S. Navy, Public Works Center**

ERCE updated original RCRA Part B Applications for three hazardous waste storage facilities located at Naval bases in San Diego. The project involved a review of the current permit applications, existing waste generation data, and operating conditions for incorporation into the revised permit applications. Project personnel also reviewed current California hazardous waste management regulations to ensure that the facilities and permit applications were in compliance with all agency requirements.

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## 4.2 Other WIPP Technical Documents Review

The projects listed below relate to the review and assessment of other technical documents and associated tasks. The table provides a summarized listing of clients, including client name and telephone number for ease of contact, each of which can verify the type of work performed and its quality. We welcome your contact with each identified client.

<b>Contract</b>	<b>Client</b>	<b>Phone Number</b>
Safety Analysis Reviews, Pantex Plant	Jacobs Engineering Group, Albuquerque, New Mexico (Dr. Raymond Bennett)	(505) 845-5704
Radiological Hazard Assessment, Pantex Plant	Battelle, Columbus (Dick Burke)	(806) 477-5006
K-25 Tiger Team Preparation Support	DOE K-25 Facility, Martin Marietta Energy Systems, Oak Ridge, Tennessee (Bill Altman)	(615) 574-9565
Risk Management and Prevention Program for the Gaviota Marine Terminal	Texaco (Dan Mihalik)	(805) 966-3114
Waste Minimization for the Pinellas Plant	General Electric Neutron Devices, Systematic Management Services, Pinellas, Florida (Tom Donovan)	(813) 530-1877

### Safety Analysis Reviews for the DOE Pantex Plant

ERCE, under subcontract to Jacobs Engineering Group (JEG), is currently performing safety analysis reviews of facilities at the DOE Pantex Plant. As a subcontractor to JEG for the Mason & Hanger - Silas Mason Co., Inc. (the operating contractor of the Pantex Plant), ERCE has the lead role in (1) characterizing the Pantex site and its operations, and (2) analyzing the potential risks involved in the manufacture and disposal of nuclear weapons, and all ancillary activities, at the Pantex Plant. The principal objectives of the safety analysis reviews are to perform a technical assessment and document the level of safety of specific Pantex facilities and to determine facility level of compliance with governing safety and environmental requirements. A dozen 300-page technical analysis reports have been submitted during this task to date.

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As part of this ongoing effort, ERCE has thoroughly characterized the weapon- and nonweapon-related activities at those Pantex facilities whose operations could significantly impact safety. Information such as building layout, operating procedures, quantity of hazardous material, waste management, and the location and function of essential safety systems is identified. ERCE has also documented the demographic, meteorological, hydrological, and seismic characteristics of the area surrounding the plant. This information is used to assess the magnitude of potential natural phenomena and also to estimate the number of people that may be exposed to postulated accidents.

ERCE is also conducting detailed probabilistic analyses of the hazards associated with the facility operations. Events such as natural phenomena, explosions, criticality events, fires, operator error, and several other internal and external events are analyzed. Fault tree, event tree, and failure mode and effects analysis techniques are used to characterize postulated events. Frequency estimates are developed using historical data, similar industry statistics, and analytical models. Consequences are estimated using a variety of techniques, including computer modeling and historical data. Using these techniques, an overall assessment of the risk due to the operations in each Pantex facility can be made, and a historical baseline can be established by which future facility modifications can be measured for safety.

### **Pantex Radiological Hazards Assessment**

ERCE, under subcontract to Jacobs Engineering Group, assisted the Mason & Hanger - Silas Mason Co., Inc., in the preparation of a radiological hazards assessment for the Pantex facility to support radiological emergency planning and response. This effort involved the review of all radiological operations at the Pantex Plant and the development of a simple, but comprehensive, set of radiological hazard classes to be applied to each Pantex facility within which radiological operations are conducted. The hazard classification scheme involved the development of hazard indices that make it possible to assign facilities and onsite transportation to hazard classes based upon the type and form of radioactive material in use, and the location of the facility or transportation activity. The hazard classification scheme developed is compatible with the DOE-mandated emergency classes for operational emergency events, which enhances its usefulness to the emergency preparedness staff as a tool for promptly and accurately categorizing emergency

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events. The effort included the identification of the facility or operation, within each hazard classification, for which a credible bounding accident or event would have the most severe radiological consequences. Based upon the analyses of bounding accidents or events, a proposed prompt exposure (plume or puff) emergency planning zone, consistent with the EPA protective action guidelines, was designated. This effort also included the development of an automated personal computer database, using the HOTSPOT model, for use by emergency response personnel classifying operational emergency events, as required by DOE orders. The project also included the estimation of the probabilities and consequences of a criticality accident in representative operations with fissile materials. Project presentations and personal contacts were made at several levels, including at the State of Texas Department of Health.

### **K-25 Tiger Team Preparation Support**

ERCE provided multi-disciplinary technical support to assist the Martin Marietta Energy Systems K-25 Site in Oak Ridge, Tennessee, to prepare for the DOE Headquarters Tiger Team assessment in November and December 1991. This support included assistance in conducting health and safety self-assessments, including the development of self-assessment policies and procedures, root cause analysis procedures, training materials, and data collection forms. Leadership for the entire effort was provided from the Albuquerque Office and support for the effort was provided by personnel from the ERCE offices located in Philadelphia, Pennsylvania, and Nashville and Oak Ridge, Tennessee. ERCE also supported the K-25 ES&H Transition Task Force staff in developing briefing materials for Plant Management and DOE. This effort also included the presentation of self-assessment training. ERCE also supported the K-25 staff in the planning and conduct of factual accuracy reviews with Tiger Team members. ERCE also supported the K-25 ES&H Transition Task Force staff in drafting the site self-assessment report (*Environment, Safety, and Health Self-Assessment Report for the Oak Ridge K-25 Site, Oak Ridge, Tennessee*), playing a lead role in the development of introductory materials, the discussion of key findings and root causes, and the site-level health and safety findings. ERCE also supported the K-25 Site in the development and review of the topical action plans needed to demonstrate K-25's commitment to resolve environment, safety, and health protection problems and in the integration of these plans into a draft corrective action report.

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## **Risk Management and Prevention Program Plan for Marine Terminal**

ERCE prepared a risk management and prevention program (RMPP) plan for Texaco's Gaviota Interim Marine Terminal in Santa Barbara County, California. Preparation of the plan, as mandated under California Assembly Bill 3777, was based upon results of a hazard and operability study and an offsite consequence analysis. ERCE conducted a review of the facility's operating equipment, procedures, and emergency response plan to develop probable hazardous release scenarios. ERCE then performed air dispersion modeling for each of the release scenarios, and completed a human health risk assessment as part of the offsite consequence analysis. Additional spill prevention and control measures were then developed to mitigate the impacts associated with the release of a hazardous substance.

Additionally, ERCE has full responsibility for the design and operation of a three-station air quality and meteorological continuous monitoring network, as required by permit conditions, for a new crude oil marine terminal near Gaviota (Santa Barbara County), California. The program scope includes all equipment maintenance, data processing, and reporting functions, as specified by the air quality monitoring protocol of the Santa Barbara County Air Pollution Control District. The initial program phase involved procurement, checkout, and installation of monitoring equipment; site preparation; and preparation of monitoring and quality assurance plans for each station. Parameters monitored include gaseous and particulate pollutants as well as meteorological variables. Continuous measurements of ozone, total hydrocarbons, sulfur dioxide, nitrogen dioxide/nitrous oxide/oxides of nitrogen, wind speed, wind direction, and vertical temperature difference are supplemented by twice-weekly grab samples of reactive hydrocarbons for laboratory specification, and filter sampling of total and fine particulates every sixth day. A total of 50 parameters are measured continuously by the three-station network. Program goals of 90% valid data capture for meteorological parameters and 80% data capture for pollutant concentrations are routinely achieved.

## **Waste Minimization Program Plan for GEND Pinellas Plant**

The ERCE Albuquerque Office developed a Waste Minimization Program Plan for the General Electric Neutron Devices (GEND) Pinellas Plant, St. Petersburg, Florida, which is one of the

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DOE's critical nuclear weapons complex facilities. As background for the development of the plan, ERCE reviewed the current Pinellas Plant waste minimization activities, both completed and planned; plant general operating procedures; plant environmental, safety, and health standards; waste management plans; environmental reports; waste generation reports for previous years; the DOE Tiger Team report and GEND's response to it; applicable DOE Orders; and various EPA and state environmental regulations and guidance documents.

As part of the Waste Minimization Program Plan, ERCE outlined a Pollution Prevention Awareness program for the site. ERCE drafted both a policy statement on waste minimization and pollution prevention for inclusion in the plant general operating procedures and a statement on waste minimization and pollution prevention that was issued by the plant General Manager in the corporate weekly newsletter. ERCE provided detailed documentation of all of the commitments made in the Waste Minimization Program Plan for inclusion in the plant commitments tracking system.

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**PROPRIETARY INFORMATION**

PROPOSAL TO PROVIDE:

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**RCRA PART B PERMIT APPLICATION AND OTHER TECHNICAL  
DOCUMENTS REVIEW**

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**ERCE Proposal No. 91-EP-0007**

**SECTION 5.0 COST PROPOSAL**

Submitted to:

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**NEW MEXICO ENVIRONMENT DEPARTMENT  
PROGRAM SUPPORT BUREAU  
Santa Fe, New Mexico**

**In response to RFP Issued November, 1991**

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December 30, 1991

**\*\*NOTICE\*\***

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5.1 SECTION 5.1 - PROPOSAL PRICING INFORMATION

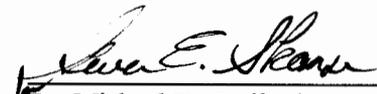
5.1.1 Compensation Schedule

<u>DESCRIPTION</u>	<u>BILLING RATE</u>
Prof. Level I	35.00
Prof. Level II	40.00
Prof. Level III	45.00
Prof. Level IV	50.00
Prof. Level V	55.00
Prof. Level VI	60.00
Prof. Level VII	65.00
Prof. Level VIII	70.00
Prof. Level IX	75.00
Prof. Level X	80.00
Prof. Level XI	85.00
Prof. Level XII	90.00
Prof. Level XIII	95.00
Prof. Level XIV	105.00
Prof. Level XV	115.00
Prof. Level XVI	130.00
Technician I	20.00
Technician II	25.00
Technician III	30.00
Admin./Cler. I	20.00
Admin./Cler. II	25.00
Admin./Cler. III	30.00
Admin./Cler. IV	35.00

The above hourly rates are payable for all hours worked.

Travel and Other Direct Costs are reimbursable at actual direct cost and General and Administrative expense at the fixed rate of 18.5%. (New Mexico Gross Receipts Tax is not included in the above rate, Please note Section 5.2.5 of this proposal.)

Offeror: ERC Environmental and Energy Services Co., Inc.

  
By: Michael D. Stafford  
Vice President, Contracts

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**5.1.2 Exhibit A - Summary of Estimated Cost by Year**

NAME	Description (Government)	Prof. Lvl	Billing Rate	Estimated Hours Technical Review	Estimated Hours Doc.&Pro Review	Estimated Hours Othr Tech. Review	Total Est. Hours	1992 Total Est. Cost	1993 Total Est. Cost	
Lague	J. Professional	Level XVI	616	130.00	160		160	20,800	21,840	
Ericson	D. Professional	Level XV	615	115.00		50	50	5,750	6,038	
Hockert	J. Professional	Level XV	615	115.00		50	50	5,750	6,038	
Fleming	K. Professional	Level XIV	614	105.00	160		160	16,800	17,640	
Stephans	R. Professional	Level XIII	613	95.00	320		360	34,200	35,910	
Frederick	B. Professional	Level XII	612	90.00	160	40	160	14,400	15,120	
Naranjo	C. Professional	Level VIII	608	70.00	160		160	11,200	11,760	
Lipp	C. Professional	Level VI	606	60.00	160		160	9,600	10,080	
Gallegos	V. Professional	Level V	505	55.00	160	200	360	19,800	20,790	
Norris	M. Professional	Level V	505	55.00	160		160	8,800	9,240	
Peek	D. Professional	Level IV	504	50.00		120	120	6,000	6,300	
Wilkins	T. Admin/Cler.	III	643	30.00	80		80	2,400	2,520	
Miller	M. Admin/Cler.	III	643	30.00	80		80	2,400	2,520	
Wright	S. Technician	I	632	25.00			40	1,000	1,050	
				1,600	100	400	2,100	158,900	166,845	
Total Estimated Travel								10,824	10,824	
Estimated Other Direct Costs (ODC's) @ 0.24 /hour								500	500	
								11,324	11,324	
General & Administrative Expense Of estimated travel and ODC's								18.50%	2,095	2,095
Total estimated Travel and ODC's									13,419	13,419
NMGRT @								5.75%	9,908	10,365
Total Estimated Cost per year								182,227	190,629	
* Weighted Average hourly Rate								=	75.67	
Average ODC's per hour with G&A								=	0.28	
Average Travel per hour with G&A								=	6.11	

\* Above averages are used in estimating costs by subparagraph in Exhibit C.

5.1.3 Exhibit B - Estimated Travel by Year

EXHIBIT B - TRAVEL

Origination/Destination	No. of People/ Trip	Days/ Trip	No. of Trips	--- Airfare ---		---- Per Diem ----			- Car Rental -			- Local Mileage/Prkng -			- Total -	
				Round Trips	Cost /RT	Est. Cost	Days	Cost/ Day	Est. Cost	Days	Cost/Est. Day Cost	Miles/ Trip	Rate/ Mile	Est. Cost	Est. Cost	
Albuquerque/Rocky Flats	2	3	1	2	652	1,304	6	95	570	6	39	234	20	0.25	5	2,113
Albuquerque/Idaho Falls	2	3	1	2	730	1,460	6	66	396	6	39	234	20	0.25	5	2,095
Albuquerque/WIPP	3	2	12	1	0	0	72	78	5,616	72	0	0	80	0.25	240	5,856
Congressional Districts	3	1	4	0	0	0	12	0	0	12	0	0	400	0.25	400	400
State Permit Project Officer	2	1	12	0	0	0	24	0	0	24	0	0	120	0.25	360	360
				5		2,764	120		6,582	120		468	640		1,010	10,824

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5.1.4 Exhibit C - Estimated Cost by Subparagraph

EXHIBIT C -- ESTIMATED COST BY RFP SUBPARAGRAPH

	Estimated Contract Average Rate/Hour *****	Est. Hours *****	Total Estimated Labor *****	Total Est. ODC's* *****	Total Est. Travel* *****	Total Est. NMGR @ 5.75% *****	Total Est. Cost *****
<b>A. (Not Required per Clarifications to Questions)</b>							
<b>B. TECHNICAL EVALUATION</b>							
(1) Meeting with SPPD	75.67	12	908	3	73	57	1,041
(2) Checklist Review	75.67	60	4,540	17	366	283	5,206
(3) Technical Review	75.67	1,038	78,542	293	6,340	4,898	90,072
		-----	-----	-----	-----	-----	-----
		1,110	83,990	313	6,780	5,237	96,320
<b>C. EVALUATION OF RESPONSES</b>							
(1) Applications Revisions Review	75.67	20	1,513	6	122	94	1,735
(2) Support Preparation/ Conduct of Meetings	75.67	80	6,053	23	489	377	6,942
(3) Agendas, Minutes, Summaries, Reviews at Meetings	75.67	80	6,053	23	489	377	6,942
(4) Meeting Responses	75.67	20	1,513	6	122	94	1,735
		-----	-----	-----	-----	-----	-----
		200	15,133	56	1,222	944	17,355
<b>D. DECISION ANALYSIS</b>							
(1) Permit Issuance/Denial Basis Report	75.67	50	3,783	14	305	236	4,339
(2) Report Detail	75.67	250	18,917	71	1,527	1,180	21,694
(3) Furnish Report	75.67	0	0	0	0	0	0
(4) Department Decision	75.67	0	0	0	0	0	0
		-----	-----	-----	-----	-----	-----
		300	22,700	85	1,832	1,415	26,032

\* Estimated ODC's and Travel are based on an estimated average hourly cost. Please note Exhibit A for development of the average hourly rates used in this exhibit.

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5.1.4 Exhibit C - Estimated Cost by Subparagraph - Continued

EXHIBIT C -- ESTIMATED COST BY RFP SUBPARAGRAPH

	Estimated Contract Average Rate/Hour =====	Est. Hours =====	Total Estimated Labor =====	Total Est. ODC's* =====	Total Est. Travel* =====	Total Est. MNGRT @ 5.75% =====	Total Est. Cost =====
E. ADMIN. PERMIT PROCESSING							
(1) General Permitting Assistance	75.67	90	6,810	25	550	425	7,810
		-----	-----	-----	-----	-----	-----
		90	6,810	25	550	425	7,810
OTHER TECHNICAL DOCUMENT REVIEW							
A. Overall Review	75.67	60	4,540	17	366	283	5,206
B. Review Data and Verify Calculations	75.67	90	6,810	25	550	425	7,810
C. P.E. Review	75.67	90	6,810	25	550	425	7,810
D. Conclusions Compatability and Validity	75.67	90	6,810	25	550	425	7,810
E. SPPO Meeting	75.67	20	1,513	6	122	94	1,735
F. Response Review	75.67	50	3,783	14	305	236	4,339
		-----	-----	-----	-----	-----	-----
		400	30,267	113	2,443	1,887	34,710
TOTAL ALL TASKS		2,100	158,900	593	12,826	9,908	182,227
		=====	=====	=====	=====	=====	=====

\* Estimated ODC's and Travel are based on an estimated average hourly cost. Please note Exhibit A for development of the average hourly rates used in this exhibit.

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

## 5.2 SECTION 5.2 - BASIS OF PROPOSED COSTS

### 5.2.1 General Proposal Information

ERCE proposes to provide professional services to the State of New Mexico in response to the States RFP issued in November, 1991. The enclosed Time and Materials proposal consists of one base year, and one option year. ERCE's proposal is based on a start date of January 31, 1992.

ERCE's cost accounting system has been accepted for "cost" type contracts with the Department of Energy, Sandia and Los Alamos National Laboratories, the Federal Emergency Management Agency, and the Nuclear Regulatory Commission. ERCE's fiscal year follows the calendar year.

This proposal is submitted by ERCE's Consulting and Engineering Division.

Specific discussion of individual cost elements is contained below.

### 5.2.2 Compensation Schedule

As funds allow, ERCE will perform services as described in the statement of work of the subject RFP.

In consideration of said services, ERCE will be reimbursed in accordance with the Compensation Schedule incorporated in Section One, Item 1.1 to the proposal. The proposed hourly rates are paid for all hours worked under the subject effort. No New Mexico Gross Receipts Tax (NMGRT) is included in the Compensation Schedule. Please note Item 2.5 of this section for addition information regarding NMGRT.

### 5.2.3 Development of Labor Estimate

The estimated labor is based on the estimated effort for the proposed individuals and the category rates which are specified in the Compensation Schedule (Note Section One of this proposal). The estimate is based on the assumed contract start date of January 31, 1992.

**5.2.3 Development of Labor Estimate - Continued**

ERCE annual salary reviews are effective on January 1. For the option year, escalation of 5% is applied to the previous year's billing rate. The escalation does not change the category billing rates, but is intended to reflect changes in the category at which an individual is billed which may occur as the result of the salary review.

ERCE's annual salary reviews consist of merit and cost of living raises. The proposed escalation is based on experience from previous reviews.

**5.2.4 Other Direct Costs/Travel**

Other direct costs such as communications, reproduction and travel are reimbursable at actual direct cost and General and Administrative expenses of 18.5% and New Mexico Gross Receipts Tax. The proposed G&A is consistent with ERCE's Government accepted accounting system.

Subsistence is reimbursable at fixed rates equal to the prevailing maximum per diem rates for the continental United States as set forth in the Federal Travel Regulations in effect at the time the costs are incurred.

**5.2.5 New Mexico Gross Receipts Tax (NMGRT)**

For evaluation purposes ERCE has applied the prevailing City of Albuquerque tax rate of 5.75% as a line item applied to the total estimated cost.

ERCE understands that the rate will be factored into the Compensation Schedule when the Contract is negotiated.

**5.2.6 Subcontractors**

ERCE's proposal includes no Subcontractors.

Should use of Subcontractors be required during contract performance, such subcontractors will be required to comply all pertinent local, state and federal laws, rules, regulations, and executive orders.

**5.3 SECTION 5.3 - ADDITIONAL PROPOSAL INFORMATION**

**5.3.1 Proposal Expiration**

ERCE's proposal is valid for a period of 120 calendar days after the closing date of the RFP.

**5.3.2 Organizational Conflicts of Interest**

As certified in the attached Representations, ERCE is aware of no possible Conflict of Interest. The statements are hereby incorporated as Attachment 1 to this solicitation.

**5.3.3 Professional Services Liability Insurance**

ERCE elects to substitute professional services liability insurance for a performance bond. Proof of said insurance will be provided within 24 hours upon notice of award.

**5.3.4 General Liability Insurance**

ERCE's current certificate of Insurance is incorporated as Attachment 2 to this proposal. In accordance with the RFP, ERCE's insurance policies will reflect the limits required by the Tort Claim Acts which will change July 1, 1992.

**5.3.5 Equal Employment Opportunities**

ERCE agrees to abide by all federal and state laws, rules, regulations, and executive orders pertaining to equal employment opportunities.

**5.3.6 Exceptions/Deviations**

ERCE takes no exception or deviations to the terms and conditions as outlined in the solicitation document.

**5.3.7 Authorized Representatives**

ERCE's authorized representative for technical matters is:

David M. Ericson (505) 881-9228  
ERC Environmental and Energy Services Co., Inc.  
7301-A Indian School Road, N.E.  
Albuquerque, New Mexico 87110

ERCE's contractual point of contact is:

Irene P. Pritchard (703) 246-0565  
Contract Administrator  
ERC Environmental and Energy Services Co., Inc.  
3211 Jermantown Road  
P. O. Box 10130  
Fairfax, VA 22030

**5.4 LIST OF ATTACHMENTS**

**5.4.1 Representations - Conflicts of Interest (2 pages)**

**5.4.2 Certificate of Insurance**





BRUCE KING  
GOVERNOR

State of New Mexico  
**ENVIRONMENT DEPARTMENT**  
Harold Runnels Bulding  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, New Mexico 87502  
(505) 827-2850

JUDITH M. ESPINOSA  
SECRETARY

RON CURRY  
DEPUTY SECRETARY

**CONFLICT OF INTEREST  
PERSONS ON RETAINER OR ON CONTRACT**

The Contractor warrants that it does not hold any other Contract with the Department of Energy for the writing and/or review of the Part A and Part B applications for the permit required by the Resource Conservation and Recovery Act or any other WIPP activities related to these applications. The Contractor also assures the same for its Subcontractors working on this Contract.

Stafford                      Michael                      D.  
-----  
Last Name                      First Name                      Middle Initial

Vice President, Contracts  
-----  
Title

ERC Environmental and Energy Services Co., Inc. (ERCE)  
-----  
Corporation Name

3211 Jermantown Road, P.O. Box 10130, Fairfax, Virginia 22030  
-----  
Corporation Address:    Number    Street                      City                      Zip Code

*Steve E. Rouse*  
-----  
Signature

December 27, 1991  
-----  
Date

**CERTIFICATE OF INSURANCE**ISSUE DATE (MM/DD/YY)  
12/20/91

PRODUCER

Alexander & Alexander of New York, Inc.  
1185 Avenue of the Americas  
New York, New York 10036

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

**COMPANIES AFFORDING COVERAGE**

COMPANY LETTER	<b>A</b>	NATIONAL UNION FIRE INSURANCE CO.
COMPANY LETTER	<b>B</b>	INSURANCE CO. OF STATE OF PA.
COMPANY LETTER	<b>C</b>	AMERICAN HOME ASSURANCE COMPANY
COMPANY LETTER	<b>D</b>	LANDMARK INSURANCE COMPANY
COMPANY LETTER	<b>E</b>	

INSURED

ERCE  
3211 JERMANTOWN ROAD, P.O. BOX 10130  
FAIRFAX, VA 22030

ATTN: CONTRACTS

**COVERAGES**

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

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIABILITY LIMITS IN THOUSANDS	
					EACH OCCURRENCE	AGGREGATE
<b>A</b>	<b>GENERAL LIABILITY</b>	RMGL 3258139 A/S	08/31/91	08/31/92		
<b>A</b>	<input checked="" type="checkbox"/> COMPREHENSIVE FORM	RMGL 3258140 TX.	08/31/91	08/31/92	BODILY INJURY	\$
	<input checked="" type="checkbox"/> PREMISES/OPERATIONS UNDERGROUND EXPLOSION & COLLAPSE HAZARD				PROPERTY DAMAGE	\$
	<input checked="" type="checkbox"/> PRODUCTS/COMPLETED OPERATIONS				BI & PD COMBINED	\$ 10000
	<input checked="" type="checkbox"/> CONTRACTUAL					\$ 10000
	<input checked="" type="checkbox"/> INDEPENDENT CONTRACTORS					
	<input checked="" type="checkbox"/> BROAD FORM PROPERTY DAMAGE					
	<input checked="" type="checkbox"/> PERSONAL INJURY				PERSONAL INJURY	\$
<b>A</b>	<b>AUTOMOBILE LIABILITY</b>	RMCA 1427962 A/O/S	08/31/91	08/31/92	BODILY INJURY (PER PERSON)	\$
<b>A</b>	<input checked="" type="checkbox"/> ANY AUTO	RMCA 1427963 TX.	08/31/91	08/31/92		
<b>A</b>	<input checked="" type="checkbox"/> ALL OWNED AUTOS (PRIV. PASS) (OTHER THAN PRIV. PASS)	RMCA 1427964 (MA, HI, VA)	08/31/91	08/31/92	BODILY INJURY (PER ACCIDENT)	\$
	<input checked="" type="checkbox"/> HIRED AUTOS				PROPERTY DAMAGE	\$
	<input checked="" type="checkbox"/> NON-OWNED AUTOS				BI & PD COMBINED	\$ 10000
	<input type="checkbox"/> GARAGE LIABILITY					
	<b>EXCESS LIABILITY</b>				BI & PD COMBINED	\$
	<input type="checkbox"/> UMBRELLA FORM					\$
	<input type="checkbox"/> OTHER THAN UMBRELLA FORM					
<b>D</b>	<b>WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY</b>	RMWC 1232761 LA.			STATUTORY	
<b>A</b>		RMWC 1232758 A/O/S	08/31/91	08/31/92		\$1000 (EACH ACCIDENT)
<b>A</b>		WC 1232763 CA.	08/31/91	08/31/92		\$1000 (DISEASE-POLICY LIMIT)
<b>C</b>		RMWC 1232760 TX.				\$1000 (DISEASE-EACH EMPLOYEE)
<b>A</b>	<b>OTHER</b>	RMWC 1232762 (AZ, ID, MD, OR, VA)				
<b>E</b>		RMWC 1232759 (CT, FL, GA, IL, MA, MN)				

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

EXPERTISE IN REVIEW OF THE RCRA PERMIT APPLICATION AND OTHER TECHNICAL DOCUMENTS SUBMITTED TO THE STATE OF NEW MEXICO FOR THE WASTE ISOLATION PILOT PLANT.

**CERTIFICATE HOLDER**

NEW MEXICO ENVIRONMENTAL DEPT, PROGRAM SUPPORT  
P.O. BOX 26110, 1190 ST FRANCIS DRIVE, ROOM S4300  
SANTA FE, NM 87502-6110  
ATTN: CLIFF HAWLEY

**CANCELLATION**

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

AUTHORIZED REPRESENTATIVE

*William H. Kucera*

**APPENDIX A**

**RESUMES**

**SUSAN WALTER COKER**  
Risk Assessment Project Manager



## **SUMMARY OF QUALIFICATIONS**

Ms. Coker currently serves as the group leader for health-based risk assessment, safety analysis, and probabilistic risk analysis. She has directed a human health evaluation for a waste area grouping at Oak ridge National Laboratory (ORNL) and was also responsible for the exposure and toxicity assessments in the ongoing RI/FS at ORNL. Ms. Coker has compiled detailed files of toxicity characteristics for compounds present at DOE mixed waste sites. She has evaluated dose-response data, and has prepared detailed toxicity and exposure assessments for mixed waste sites. Ms. Coker has experience conducting Phase I, II, and III environmental site assessments in Alabama, Arizona, Illinois, Kansas, Kentucky, Ohio, and Indiana. Ms. Coker also has extensive knowledge of the regulations under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Clean Water Act (CWA), and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

## **EDUCATION**

M.S., Agricultural Economics, Western Kentucky University, Kentucky, 1987  
B.S., Agriculture and Business Administration, Western Kentucky University, Kentucky, 1985  
Specialized training:  
OSHA Training (29 CFR 1910.120)

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

DOE "Q" Clearance  
Society for Risk Analysis

## **PROFESSIONAL EXPERIENCE**

**Safety Analysis Reports - Mason & Hanger-Silas Mason Co., Pantex Plant, Amarillo, Texas.**  
Ms. Coker was lead Analyst in the preparation of safety analysis reports (SARs) for high explosives processing facilities at Pantex. Experience includes facility characterization, FMEA, event-tree analysis, definition of Limiting Conditions for Operation and Operational Safety Requirements, hazards analysis, and fire analysis.

**Human Health Evaluation - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.**  
Ms. Coker was responsible for the direction of a Human Health Evaluation for a waste area grouping at a mixed waste site. Also evaluated exposure scenarios, toxicity assessments, exposure point concentrations, and dose-response relationships. Her responsibilities also included conducting the toxicity assessment portion of an environmental evaluation, including the

development of toxicity values/profile with respect to fauna. She also conducted a demographic study which was used to evaluate potential pathways and receptor in support of the Baseline Human Health Assessment and Environmental Evaluation. Evaluated tentatively identified compounds (TICs) for use in a Baseline Human Health Assessment. Evaluated ARARs, TBCs, RFDs, SFs, MCLs and MCLGs, EPA Drinking Water Health Advisories, Water Quality Criteria, and State Standards for Water Quality and Drinking Water to support the Baseline Human Health Assessment.

In addition, Ms. Coker was responsible for reviewing a probabilistic risk assessment (PRA) for Martin Marietta Energy Systems, including fault-tree analyses, accident scenarios, and time scheduling. PRA dealt with PCBs, radiological, asbestos, and inorganic hazards.

**Environmental Evaluation - EG&G, Rocky Flats Plant, Golden, Colorado.** Ms. Coker assisted in preparation of environmental evaluation for OU5 and OU6. Ms. Coker coordinated the acquisition and synthesis of radionuclide cycling and radiation effects literature dealing with the Rocky Flats site. This data covers a period of approximately 30 years and involved acquiring documents from Colorado State University and the Rocky Flats site as well as from ERCE's library. The synthesis document was included in the OU5 evaluation. She has also provided support for the surface water sampling program.

**Environmental Site Assessments - First Environment.** Dayton Superior - AZ, IL, KS, and OH; Phase I, II, and III ESAs site investigation, sampling and analysis, and preliminary risk assessment.

**Environmental Site Assessments - Roy Drinkard & Associates, Alabama and Kentucky.** Phase I and II ESAs including site investigation and sampling analysis. Horne Properties, Inc. - Phase I ESAs.

**Database Development - ENSCO, Little Rock, Arkansas.** Ms. Coker developed database files for use in computer models, including the soil parameters, climatological factors, meteorological factors, demographic factors, and chemical factors used in risk analysis. She supported the performance of a probabilistic risk assessment of toxic materials. Modeling experience includes the use of SESOIL, FOODCHAIN, TERREX, ISCST, ISCLT, SARAH, and AT123D.

**Database Development and Risk Assessment - Beatrice Company, Chicago, Illinois.** Ms. Coker developed database files for use in computer models. She supported the performance of a probabilistic risk assessment for the evaluation of releases of toxic compounds. Responsible for fate and transport modeling of contamination through soil media. She was also responsible for the in-house laboratory, including field analytical capabilities. She worked extensively with portable photoionization detection and electron capture detection gas chromatograph and managed an onsite field laboratory and was responsible for QA/QC of all analytical results.

**Site Investigation and Remediation - Cooper Industries, Grove City, Pennsylvania.** Ms. Coker served as a member of numerous site investigation and remediation task teams. Her responsibilities included surface and soil sampling, groundwater sampling, surface water sampling, and monitoring well installations.

**Compliance Management - Pullman Company, New York, New York.** Ms. Coker served as a member of numerous task teams working to ensure compliance with regulations under CERCLA, RCRA, TSCA, CWA, and SARA.

**DAVID M. ERICSON, JR., Ph.D.**  
Manager, Safety & Risk Assessment  
Principal Consultant



## **SUMMARY OF QUALIFICATIONS**

Dr. Ericson has over 33 years of experience in the management and conduct of nuclear technology programs. Most recently this includes over fifteen years in nuclear safety and security assessment and technology. This experience encompasses systems modeling and analysis, vulnerability assessment, accident progression analysis, consequence analysis, and safety criteria development. He has a solid background in directing multiyear, multimillion-dollar projects, including technical content, personnel management, resource allocation, schedules, and quality control.

## **EDUCATION**

Ph.D., Nuclear Engineering, University of Michigan, 1969  
M.S., Nuclear Engineering, Air Force Institute of Technology, 1959  
B.S., Chemical Engineering, Pennsylvania State University, 1955

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

American Nuclear Society  
Institute for Nuclear Materials Management  
Sigma Xi  
DOE "Q" Clearance

## **PROFESSIONAL EXPERIENCE**

**Preparation of Facility Specific Safety Analysis Reports (SARs) - Pantex Plant.** Program manager for the ERCE effort to develop and prepare SARs for 13 non-reactor nuclear facilities, high explosive facilities, and similar hazardous operations at the Pantex Plant in Amarillo, Texas. Provides overall guidance and direction and supports the definition and quantification of potential accident sequences. Reviews all ERCE-developed documentation for consistency, accuracy, completeness, and compliance with contract standards.

**Probabilistic Risk Assessment/Test Control and Safety - Sandia National Laboratories.** Currently supporting Sandia in the application of probabilistic risk assessment techniques to advanced nuclear power systems. This includes adaptation of commercial nuclear power reactor methodologies and demonstration of their applicability to these advanced systems and their specialized test facilities.

**Development of General Design Criteria for the New Production Reactor - Los Alamos National Laboratory.** Reviews ERCE-developed material for consistency with DOE directives (e.g., 5480 series DOE Orders, safety policy statements, etc.). Responsible for reviewing ERCE efforts to ensure consistency with client and company quality standards.

**Preparation of Training Materials - Sandia National Laboratories.** Prepared training modules for the Area V reactor operations staff. Training material covers technical areas germane to reactor operations, e.g., reactor theory, heat transfer, radiation protection, etc. The effort included preparation of learning objectives, technical text, review questions, and qualifying examinations. Material was designed to be in compliance with applicable DOE Orders, e.g., 5480.5, 5480.6, 5481.1B, and 5480.11.

**Study of Severe Accident Risks - Sandia National Laboratories.** Supported Sandia in the Nuclear Regulatory Commission (NRC)-sponsored study, Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants, NUREG-1150. This included review and critique of the core melt frequency assessment methodology, and preparation of a summary report on that methodology. He was also responsible for responses to public comments on this methodology.

**Technical Safety Appraisal - Sandia National Laboratories.** Assisted Sandia with the Technical Safety Appraisal (TSA) of the Technical Area V pulsed reactors. This included identifying potential safety issues based upon evaluations against Department of Energy guidance, monitoring the appraisal process, providing quick turn-around analyses of key issues, and preparing initial responses to the TSA team concerns. Prepared criticality analyses for selected storage facilities at the Area V reactors.

**Decay Heat Removal Requirements Documentation - Sandia National Laboratories.** Assisted Sandia in the final documentation of the research program for USI A-45, Decay Heat Removal Requirements. Finalized individual plant case study documentation, program summary report, and the Regulatory Analysis for resolution of the issue. Interacted with industry and NRC personnel in a related industry study to identify differences and resolve technical issues.

**Space Nuclear Power - Sandia National Laboratories, Advanced Nuclear Power Systems Safety Division.** Managed technology programs to enhance the radiation damage resistance components for the control and instrumentation of multimegawatt space power systems and to examine the feasibility of high reactivity change rate controllers for space nuclear power applications.

**Space Nuclear Power - Sandia National Laboratories, Advanced Nuclear Power Systems Safety Division.** Led an independent safety assessment program for the SP-100 space nuclear power system for the Department of Energy, including thermal-hydraulic and neutronic analyses of potential accident scenarios with prediction of phenomenology and consequences. Also managed independent safety assessment efforts for a special purpose defense nuclear reactor.

(The Sandia programs cited above represent approximately \$2 million annual expenditures and 10 staff members.)

**Investigation of Decay Heat Removal Requirements - Sandia National Laboratories.** Principal investigator for technical efforts for resolution of Unresolved Safety Issue A-45, Decay Heat Removal Requirements, for the U.S. Nuclear Regulatory Commission. Responsible for program management that included resource allocation, schedules, technical content, and subtask integration for the conduct of six limited-scope probabilistic risk assessments. Integrated consultant activities dealing with uncertainty and non-quantifiable issues in value-impact methodology into the overall study. Program represents \$6 million effort over five years, averaging six in-house staff members.

**Sabotage Analysis - Sandia National Laboratories.** Managed a spectrum of programs dealing with sabotage consequences at by-product facilities, analysis of locks and lock systems, safety significance of equipment and activities at reactor facilities, and human factors in alarm/annunciator systems.

**Interaction of EMP with Commercial Nuclear Power Plants - Sandia National Laboratories.** Provided overall technical direction for study involving three large subcontractor efforts. Assimilated analytical and experimental results for an example plant into a final report; developed general conclusions for all operating plants.

**Design Measures for Sabotage Protection - Sandia National Laboratories.** Project manager for multiyear, multidiscipline effort which demonstrated a variety of ways by which design changes (e.g., plant compartmentalization, added safety equipment redundancy, and increased tamper resistance) could enhance plant security and improve response to degraded conditions.

**MX Basing Safety Studies - Sandia National Laboratories.** Reviewed generic safety issues related to electric power supply options for the MX Deep Underground Basing Option.

**Reactor Safeguards Systems Assessment and Design - Sandia National Laboratories.** Applied sabotage fault-tree analysis to examine the effectiveness of existing and postulated nuclear plant safety systems.

**Potential Consequences of Sabotage on Transportation of Radionuclides in Urban Environs - Sandia National Laboratories.** Investigated potential sabotage tactics on commercial shipping containers and, using modified CRAC reactor consequence model and METRAN consequence model, the potential health effects of release of radioactive materials in urban environments.

**Accident Descriptions for Emergency Response Exercise Scenarios - Sandia National Laboratories.** Used the CRAC accident consequence model to develop a series of anticipated radiological environments from postulated accidents; results, in graphical form, used by emergency response agencies in preparing training exercises.

## **SELECTED PUBLICATIONS**

Ericson, D.M., Jr., and G.B. Varnado, "Basic Elements of a Risk Management Program," in Risk Management - Expanding Horizons in Nuclear Power and Other Industries, Hemisphere Publishing Corporation, 1990.

Analysis of Core Damage Frequency: Internal Events Methodology, Volume 1, Revision 1, NUREG/CR-4550, SAND86-2084, Sandia National Laboratories, January 1990. (Editor)

Ericson, D.M., Jr., et al., 1989. Shutdown Decay Heat Removal Analysis: Plant Case Studies and Special Issues, Summary Report, NUREG/CR-5230, SAND88-2375, Sandia National Laboratories, April.

Ericson, D.M., Jr., et al., 1989. Proposed Draft General Design Criteria for the Low Temperature Heavy Water Production Reactor, ERCE-R-89-32, ERC Environmental and Energy Services Co., Albuquerque, NM, June.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - Westinghouse 2-Loop Pressurized Water Reactor Case Study, NUREG/CR-4458, SAND85-2496, Sandia National Laboratories, March.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - Westinghouse 3-Loop Pressurized Water Reactor Case Study, NUREG/CR-4710, SAND86-2377, Sandia National Laboratories, March.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - Babcock and Wilcox Pressurized Water Reactor Case Study, NUREG/CR-4713, SAND86-1832, Sandia National Laboratories, March.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - General Electric BWR3/Mk1 Case Study, NUREG/CR-4448, SAND85-2373, Sandia National Laboratories, March.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - Combustion Engineering 2-Loop Pressurized Water Reactor Case Study, NUREG/CR-4710, SAND86-1797, Sandia National Laboratories, July.

Ericson, D.M., Jr., et al., 1987. Shutdown Decay Heat Removal Analysis - General Electric BWR4/Mk1 Case Study, NUREG/CR-4767, SAND86-2419, Sandia National Laboratories, July.

Ericson, D.M., Jr., et al., 1983. "Observations on Physical Protection Methods for Protecting Against Unauthorized Acts by An Insider," INMM Proceedings, Vol. XII, July 10-13.

Ericson, D.M., Jr., et al., 1982. Interaction of Electromagnetic Pulse with Commercial Nuclear Power Plant Systems, NUREG/CR-3069, SAND82-2738, February.

Ericson, D.M., Jr., et al., 1981. Nuclear Power Plant Design Concepts for Sabotage Protection, NUREG/CR-1345, SAND80-0477, January.

**KENNETH N. FLEMING, CHP**  
Health Physics Program Manager



## **SUMMARY OF QUALIFICATIONS**

Mr. Fleming has over six years of experience as an applied Health Physicist at both DOE and NRC-licensed facilities. He is currently responsible for all health physics aspects of the Remedial Investigation/Feasibility Study taking place at the Oak Ridge National Laboratory. Mr. Fleming has been responsible for the regulatory compliance of the air sampling, radiological contamination control, and respiratory protection programs at a high enrichment uranium fuel fabrication facility. At a DOE-owned, depleted uranium metal fabrication facility, Mr. Fleming served as the responsible operational health physicist. He has also performed radiation worker and general employee training for several DOE-contracted organizations.

## **EDUCATION**

M.S., Nuclear Environmental Systems Engineering, Clemson University, 1989  
B.S., Microbiology, Clemson University, 1981

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

Certified (Comprehensive) Health Physicist  
Registered, National Registry of Radiation Protection Technologies  
Health Physics Society (Plenary)  
East Tennessee Chapter of the Health Physics Society  
DOE "Q" Clearance

## **PROFESSIONAL EXPERIENCE**

**Bechtel National, Inc. - Oak Ridge, Tennessee.** Project Health Physicist responsible for procedure initiation/development, training, dosimetry investigations/reporting, and safety plan development for the Remedial Investigation/Feasibility Study (RI/FS) project at Oak Ridge National Laboratory (ORNL).

**CDM Federal Programs Corporation - Golden, Colorado.** Consultant Health Physicist for the closure of two Radioactive Waste Disposal sites at Tinker AFB, Oklahoma City, Oklahoma.

**Advanced Sciences, Inc. - Fernald, Ohio.** Site safety officer for the Fernald RI/FS project; responsible for safety plan development, program management, training, penetration permit issuance/approval, and procedural development.

**Martin Marietta Energy Systems, Inc., Portsmouth Gaseous Diffusion Plant - Piketon, Ohio.** Provided project Health Physics services during the structural inspection of a submerged storage tank containing mixed-hazardous waste.

**Martin Marietta Energy Systems, Inc., Paducah Gaseous Diffusion Plant - Paducah, Kentucky.** Project Manager for the characterization of radiological contamination in radiological uncontrolled areas onsite. Also, performed an assessment of the site Health Physics program.

**Advanced Sciences, Inc. - Fernald, Ohio.** Responsible for the validation of radiological samples to ensure that accurate analytical results were used in generating reports for the RI/FS at Fernald.

**Rust Engineering Company - Oak Ridge, Tennessee.** Developed and presented Radiation Worker Training to several maintenance organizations at the Y-12 plant.

**Babcock and Wilcox, Naval Nuclear Fuels Division - Lynchburg, Virginia.** Health Physicist responsible for air sampling, radiological contamination control, and respiratory protection at the site. Redirected the respiratory protection program to be in compliance with the requirements contained in NUREG-0041. Served as the primary safety contact for radiological emergencies that occurred on the plant site after hours.

**Westinghouse Materials Company of Ohio - Fernald, Ohio.** Health Physicist responsible for the external dosimetry program. This included the investigation of abnormal external dosimetry results, DOELAP testing and compliance, training, and the use of an extrapolation chamber to calculate beta absorbed dose rates.

**Westinghouse Materials Company of Ohio - Fernald, Ohio.** Health Physicist responsible for all health physics activities in a production facility that converted uranium tetrafluoride (depleted) to uranium metal. This included developing the air sampling and contamination control programs and directing plant health physics technicians in the performance of their daily duties.

## **PUBLICATIONS**

Fleming, K.N., 1989. "Particle Charging in High Electric Field Strength Using Ionizing Radiation in Dielectric Liquids" (Master's Thesis), January.

**DWIGHT C. FLYNN**  
Senior Environmental Scientist



## **SUMMARY OF QUALIFICATIONS**

Mr. Flynn has over 18 years of experience as an environmental scientist with respect to Federal, state, and local environmental regulatory compliance and coordination. He is a specialist in the preparation of National Environmental Policy Act (NEPA) documents and has prepared numerous Resource Conservation and Recovery Act (RCRA) Part A and Part B permit applications; National Pollution Discharge Elimination System (NPDES) permit applications as required by the Clean Water Act (CWA); and numerous Air Quality permit applications as required by the Clean Air Act (CAA). Mr. Flynn's regulatory experience also includes compliance actions with respect to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA); Toxic Substance Control Act (TSCA) and Nuclear Regulatory Commission (NRC) licensing requirements. Additionally, he is a specialist in the environmental assessment of waste disposal operations containing hazardous, radioactive, and mixed wastes.

## **EDUCATION**

M.S., Wildlife and Fisheries Science, University of Tennessee, 1976

B.S., Forestry, University of Tennessee, 1969

Special Training:

Remote Sensing, U.S. Air Force, 1970

Computer Programming, U.S. Air Force, 1971

OSHA 29 CFR 1910.120, Health and Safety Training for Hazardous Materials and Medically Monitored

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

DOE "Q" Clearance

NRC "Q" Clearance

DOD "Top Secret SSIR" (Inactive)

## **PROFESSIONAL EXPERIENCE**

### **Resource Conservation and Recovery Act (RCRA) Projects**

**Preparation of RCRA Part B Application - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist for the preparation of the RCRA Part B application for the existing Remote-handled Transuranic Concrete Cask Storage Facility (Building 7855) and proposed Transuranic/Solid Low-Level Waste Staging Facility (mixed waste) located at the U.S. Department of Energy's Oak Ridge National Laboratory.

**Preparation of RCRA Part B Application - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist for the preparation of a RCRA Part B application for the Cell 4 Solid Storage Facility (mixed waste) located at the U.S. Department of Energy's, DOE Oak Ridge National Laboratory.

**Preparation of Closure Plan - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Environmental Scientist and Principal-in-Charge for the preparation of the U.S. Department of Energy, Oak Ridge National Laboratory Transuranic Retrievable Waste Storage Facilities (Building 7823, 7826, and 7834 and the RH-TRU Retrievable Storage Area) Closure Plan.

**Preparation of RCRA Part A and Part B Applications - U.S. Corps of Engineers, Huntsville, Alabama.** Senior Project Manager for the preparation, revision and update of Resource Conservation and Recover Act (RCRA) Part A and Part B permit applications for open burning/open detonation at the following U.S. Army facilities:

- o Navajo Depot; Bellemont, AZ
- o Savanna Army Depot Activity; Savanna, IL
- o Seneca Army Depot Activity; Hermiston, OR
- o Tooele Army Depot (North); Tooele, UT
- o Tooele Army Depot (South); Tooele, UT
- o Anniston Army Depot; Anniston, AL
- o Fort Wingate Depot Activity; Gallup, NM
- o Letterkenney Army Depot; Letterkenney, PA
- o Lexington-Bluegrass Army Depot; Richmond, KY
- o Jefferson Proving Grounds, Madison, IN
- o Yuma Proving Ground; Yuma, AZ
- o Aberdeen Proving Ground; Aberdeen, MD
- o Camp Bullis, San Antonio, TX
- o Fort Indiantown GAP; Annville, PA
- o Yakima Firing Range; Yakima, WA
- o Fort Irwin; Barstow, CA.

**Preparation of RCRA Part B Applications - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist for the preparation of RCRA Part B applications for open detonation at the following U.S. Department of Energy Oak Ridge National Laboratory:

- o Chemical Detonation Facility
- o Gas Cylinder Vending/Radioactive Chemical Disposal Area.

**RCRA Facility Investigation - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist for the preparation of a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for East Fork of Poplar Creek watershed and The City of Oak Ridge, TN Sewer Beltway. Work plan concentrated on contaminants originating from

the U.S. Department of Energy Y-12 Weapons Facility Plant during its 45 year operation and discharged into a 12 mile section of the East Fork of Poplar Creek. The RFI Work Plan addressed the 12 mile creek segment, the 100 year floodplain, and the nine mile segment of the City of Oak Ridge Sewer Beltway that had been backfilled with soils from the 100 year floodplain of the East Fork of Poplar Creek. Conducted under a subcontract with PEER Consultants, P.C. of Oak Ridge, TN.

**RCRA Facility Investigation - Kansas Army Ammunition Plant, Parsons, Kansas.** Senior Scientist and Principal-in-Charge of the preparation of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for over 150 Solid Waste Management Units (SWMUs) associated with facility operations and covered in the Facility Assessment (RFA) prepared by the U.S. Environmental Protection Agency. Conducted for the U.S. Army Corps of Engineers, Huntsville Division.

**RCRA Facility Investigation - White Sands Missile Range, White Sands, New Mexico.** Senior Scientist and Principal-in-Charge of the preparation of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for over 150 Solid Waste Management Units (SWMUs) associated with military activities and operations covered in the Facility Assessment (RFA) prepared by the U.S. Environmental Protection Agency. Conducted for the U.S. Army Corps of Engineers, Huntsville Division.

**Environmental Assessment & Corrective Action Plan - MEDIC Regional Blood Center, Knoxville, Tennessee.** Principal-in-Charge of the Environmental Assessment Plan (EAP), Corrective Active Plan (CAP) and implementation of the CAP of a hazardous waste site containing hydrocarbons, lead and copper. All tasks were initiated after the hazardous waste site was discovered during construction of a new regional facility. Remediation efforts and regulator coordination were phased so as not to interrupt the construction effort.

**Underground Storage Tank Removal & Remediation - Levi Strauss, Knoxville, Tennessee.** Senior and Principal-in-Charge of the removal of gasoline and diesel fuel tanks, soil sampling and analysis, remedial actions, and regulatory coordination at textile production plants located at Maryville, Johnson City, and Mountain City, TN.

**Waste Storage Tanks Remedial Action Plan - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist for preparation of the Waste Storage Tanks Remedial Action Plan (RAP) for U.S. Department of Energy's Oak Ridge National Laboratory. RAP required a historical file search and new CAD drawings of 34 inactive waste storage tanks. Furthermore, the RAP required discussions of each tank, including mixed waste contents; remedial action objectives and governing regulations; project management requirements, typical closure options with identifications of special problems; criteria for choosing closure options and preliminary budget and schedules. Project management responsibilities included cost estimating and scheduling.

**Gasoline Spill Abatement - U.S.A. Business Brokers, Knoxville, Tennessee.** Senior Scientist and Principal-in-Charge of the Corrective Action Plan (CAP) and implementation of the CAP for a 300 gallon unleaded gasoline spill in Farragut, TN. Abatement action resulted in an unconditional state release of the contaminated site with respect to soil and ground-water contamination.

**Gasoline Contamination Remediation - Tryon Investment Society, Charlotte, North Carolina.** Senior Scientist and Principal-in-Charge of the remedial action regulatory coordination and remediation supervision of unleaded gasoline soil contamination remediation at the "Old Arnold Palmer Cadillac" site located on South Tryon Street in Charlotte, NC.

#### National Environmental Policy Act (NEPA) Projects

**Environmental Report/Preliminary Safety Analysis Report - All Chemical Isotope Enrichment, Inc., Oak Ridge, Tennessee.** Principal-in-Charge of the preparation of the Environmental Report (ER) and Preliminary Safety Analysis Report (PSAR) for U.S. Nuclear Regulatory Commission (NRC) licensing of the Centrifuge Plant Demonstration Facility (CPDF) at Oak Ridge Gaseous Diffusion Plant (ORGP) for private commercial production of non-fissile isotopes. NRC license required due to radioactive contaminated centrifuge machines and non-proliferation of centrifuge technology. Project management responsibilities also included cost estimation and scheduling.

**Petition Evaluation/Environmental Impact Statement - U.S. Department of Interior, Knoxville, Tennessee.** Senior Scientist for the U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement preparation of OSMRE-PE-8 and OSMRE-EIS-22; Rock Creek Watershed, Tennessee Petition Evaluation Document/Environmental Impact Statement (subcontract with Labat-Anderson, Inc.).

**NEPA Compliance Management - U.S. Department of Energy, Office of NEPA Project Assistance, Washington, DC.** Senior Scientist for technical and analytical support to the U.S. Department of Energy, Office of National Environmental Policy Act Project Assistance in support of its activities ensuring DOE compliance with the National Environmental Policy Act (subcontract with Labat-Anderson, Inc.)

**Permit Decision Analysis - U.S. Department of Interior, Washington, DC.** Senior Scientist for the U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement preparation of OSM-EIS-18: "Comprehensive Impacts of Permit Decisions under Tennessee Federal Program" (subcontract with Labat-Anderson, Inc.).

**Environmental Report - All Chemical Isotope Enrichment, Inc., Oak Ridge, Tennessee.** Principal-in-Charge for the preparation of the Environmental Report for U.S. Nuclear Regulatory Commission licensing of the non-fissile isotope centrifuge production facility at Oliver Springs, Tennessee.

**Petition Evaluation/Environmental Impact Statement - U.S. Department of Interior; Knoxville, TN - Senior Scientist for the U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement preparation of OSMRE-PE-9 and OSMRE-EIS-23: "North Chickamauga Creek, Tennessee, Petition Evaluation Document/Environmental Impact Statement" (subcontract with Labat-Anderson, Inc.).**

**Environmental Coordinator for Site Selection - Defense Nuclear Agency, Washington, DC.** Environmental Coordinator and Site Selection Advisory Committee member for the Superconducting Magnetic Energy Storage - Engineering Test Model (SMES-ETM) Project. The SMES-ETM is a demonstration program with respect to an SDIO dedicated power source network.

**Draft Environmental Impact Statement - U.S. Army Corps of Engineers, Louisville, Kentucky.** Principal-in-Charge for the preparation of the Draft Environmental Impact Statement (DEIS) and Final Environmental Impact Statement (FEIS) in support of the realignment and closure action of Lexington-Bluegrass Army Depot, Kentucky, to Tobyhanna Army Depot and Letterkenny Army Depot, Pennsylvania and Redstone Arsenal, Alabama as described by the Secretary of Defense's Commission on Base Realignments and Closure in compliance with the Base Realignment and Closure Act of 1989.

**Environmental Assessment - U.S. Army Corps of Engineers, Nashville, Tennessee.** Senior Project Manager for the preparation of the National Environmental Policy Act (NEPA) environmental assessment (EA) document for the location, design, and operation of a new solid waste landfill in karst geology at Fort Campbell, Kentucky.

**Regulatory Compliance Management - Strategic Defense Initiative Office, Pentagon.** Senior Environmental Advisor for regulatory compliance of the TOPAZ II (TSET) Test Site in Albuquerque, NM. The TOPAZ II test is the evaluation/validation of a Soviet, space based nuclear reactor and is a part of a technology transfer program between the United States and the Soviet Union. Participating United States Agencies include the U.S. Air Force, U.S Department of Energy, Strategic Defense Initiative Office and the University of New Mexico.

**Cultural Resource Survey - Tennessee Department of Transportation, Nashville, Tennessee.** Principal-in-charge of Level I and II cultural resource survey; threatened and endangered species survey; flora and fauna (terrestrial and aquatic); surface water quality sampling and analysis; and construction impact determination of associated with a 500 foot corridor required for the construction of a new eight mile highway (realignment) within very rugged terrain of the

Cherokee National Forest in Polk County, Tennessee. All field activities were in compliance with U.S. Forest Service, U.S. Fish and Wildlife Service, and Federal Highway Administration guidelines. Major area of concern was the impact of the aquatic ecosystem due to possible leachate from highly pyritic soils and rock formations.

Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Projects

**Preliminary Assessments and Site Investigations - Defense Logistics Agency, Alexandria, Virginia.** Senior Environmental Scientist and Project Manager for the preparation of Preliminary Assessments (PA) and Site Investigations (SI) for four U.S. Defense Logistic Agency (DLA) facilities located in with respect to hazardous waste investigations required by U.S. Environmental Protection Agency. Work conducted for the U.S. Corps of Engineers, Huntsville Division. The DLA facilities were:

- o Defense Construction Supply Center - Columbus, OH
- o Defense Personnel Support Center - Philadelphia, PA
- o Defense Industrial Plant Equipment Facility - Atchison, KS
- o Defense Electronics Supply Center - Dayton, OH

**Preliminary Assessments and Site Investigations - Defense Fuel Supply Center, Alexandria, Virginia.** Senior Environmental Scientist and Project Manager for the preparation of Preliminary Assessments (PA) and Site Investigations (SI) for 14 U.S. Defense Fuel Supply Center fuel support points with respect to hazardous waste investigation required by U.S. Environmental Protection Agency. Work conducted for the U.S. Army Corps of Engineers, Huntsville Division. The DFSC facilities were:

- o Defense Fuel Support Point - Verona, NY
- o Defense Fuel Support Point - Lynn Haven, FL
- o Defense Fuel Support Point - Mukilteo, WA
- o Defense Fuel Support Point - San Pedro, CA
- o Defense Fuel Support Point - Casco Bay, ME
- o Defense Fuel Support Point - Cincinnati, OH
- o Defense Fuel Support Point - Estero Bay, CA
- o Defense Fuel Support Point - Escanaba, MI
- o Defense Fuel Support Point - Grand Forks, ND
- o Defense Fuel Support Point - Melville, RI
- o Defense Fuel Support Point - Newington, NH
- o Defense Fuel Support Point - Searsport, ME
- o Defense Fuel Support Point - Norwalk, CA
- o Defense Fuel Support Point - Ozol, CA
- o Defense Fuel Support Point - Tampa, FL

**Remedial Investigation/Feasibility Study - North Carolina Department of Transportation, Raleigh, North Carolina.** Senior Scientist and Principal-in-Charge for Remedial Investigation and Feasibility Study (RI/FS) activities concentrating on TCE contamination in soil and groundwater at the Vulcan Quarry in Enka, NC.

**Remedial Investigation - Southern Division Facilities Naval Engineering Command, Charleston, South Carolina.** Senior Scientist and Principal-in-Charge for Remedial Investigation Planning (FS) activities at over 60 solid waste management units at Air Naval Station Memphis located in Millington, TN.

**Preliminary Assessments - U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama.** Senior Scientist and Principal-in-Charge of the preparation of the Preliminary Assessment (PA) for nine Formally Utilized Defense Sites (FUDS) near Miami, FL. Each of the nine sites had been previously used as NIKI missile sites in response to the Cuban Missile Crisis in the 1960's.

#### General Environmental Projects

**Environmental Investigation - City of Oak Ridge Sports Complex, Oak Ridge, Tennessee.** Principal-in-Charge of the environmental investigation and conceptual design of The City of Oak Ridge Tennessee's proposed West End Sports Complex which is proposed to be built atop a 40 year old abandoned municipal landfill.

**Construction Plan Review - Centre City Development Corporation, San Diego, California.** Senior Scientist responsible for construction plan review of proposed projects within the downtown San Diego Redevelopment Program with respect to mitigation of geo-environmental contamination migration into the basements of the proposed structures.

**Quality Assurance/Quality Control, Groundwater Monitoring Wells - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Principal-in-Charge of construction management and QA/QC of over 100 groundwater monitoring well installations and 100 groundwater monitoring well plug and abandonment actions at the U.S. Department of Energy's Y-12 Weapons Facility. The project included field supervision, health and safety monitoring (VOC and radiation) and detailed report preparation.

**Health & Safety Monitoring - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.-** Senior Scientist and Principal-in-Charge of health and safety monitoring (VOC) during the Closure and Post Closure Activity (CAPCA) of hazardous and mixed waste sites at the Department of Energy's Y-12 Weapons Facility.

**Geohydrologic Characterization - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist and Principal-in-Charge of the preliminary geohydrologic site characterization and proposed water quality well locations for Waste Area Grouping 2, 11 and 17 at the U.S. Department of Energy's Oak Ridge National Laboratory under the Environmental Restoration and Facilities Upgrade (ERFU) Program.

**QA/QC of RCRA Monitoring Wells - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Scientist and Principal-in-Charge of third party QA/QC of installation for over 500 piezometers and Resource Conservation and Recover Act (RCRA) groundwater monitoring wells at the U.S. Department of Energy's Oak Ridge National Laboratory.

**NPDES Implementation Guidance - U.S. Environmental Protection Agency, Region IV, Philadelphia, Pennsylvania.** Principal Author of the preparation of a decision guidance document for implementation of the National Pollutant Discharge Elimination System (NPDES) concerning instream coal mining activities in U.S. Environmental Protection Agency, Region III.

**Radon Compliance Program Management - Humana, Inc., Louisville, Kentucky.** Principal-in-Charge of Humana's radon compliance program at 18 hospitals in Florida. The compliance program requires annual actions with respect to hospital engineering staff coordination for radon investigations and regulatory coordination with the State of Florida Department of Health and Rehabilitative Services. The 18 hospitals includes:

- o Lucerne Hospital; Orlando, FL
- o Palm Beaches Hospital; West Palm Beach, FL
- o Cypress Hospital; Pompano Beach, FL
- o St. Petersburg Hospital; St. Petersburg, FL
- o Sun Bay Hospital; St. Petersburg, FL
- o Pimbrook Pines Hospital; Pimbrook Pines, FL
- o Sebastian Hospital; Sebastian, FL
- o Northside Hospital; St. Petersburg, FL
- o Tampa Women's Hospital; Tampa, FL
- o Destin Hospital; Destin, FL
- o Kissimmee Hospital; Kissimmee, FL
- o Pasco Hospital; Dade City, FL
- o Bennett Hospital; Plantation, FL
- o Daytona Beach Hospital; Daytona Beach, FL
- o Orange Park Hospital; Orange Park, FL
- o Brandon Hospital; Brandon, FL
- o South Broward Hospital; Orlando, FL
- o Biscayne Hospital; Miami, FL

## **PUBLICATIONS**

Flynn, D.C., M.C. McDonald, and B. Thacker, 1989. *A Decision Makers Guide On Instream Structures*, U.S. Environmental Protection Agency, Region III. Philadelphia, Pennsylvania.

Flynn, D.C., and M.C. McDonald, 1986. *Environmental Assessment; Fort Campbell, Kentucky; Sanitary Landfill Montgomery County, Tennessee*, U.S. Department of Defense-U.S. Army Corps of Engineers, Nashville District, October.

Flynn, D.C., and M.C. McDonald, 1986. *North Chickamauga Creek, Tennessee Petition Evaluation Document/Environmental Impact Statement*, OSMRE-PE-9 and OSMRE-EIS-22," U.S. Department of the Interior - Office of Surface Mining, Reclamation and Enforcement, Washington, DC, September.

Flynn, D.C., and M.C. McDonald, 1986. *Rock Creek Watershed, Tennessee: Petition Evaluation Document/Environmental Impact Statement*, OSMRE-PE-8/OSMRE-EIS-22, U.S. Department of the Interior - Office of Surface Mining, Reclamation and Enforcement, Washington, DC, September.

Flynn, D.C., and M.C. McDonald, 1985. *Comprehensive Impacts of Permit Decisions Under Tennessee Federal Program: Environmental Impact Statement OSM-EIS-18*, U.S. Department of the Interior-Office of Surface Mining, Reclamation and Enforcement, Washington, DC, March.

Kintingham, M.J., M.R. Pelton, and D.C. Flynn, 1981. "Use of the Pellet Counting Techniques for Determining Densities of Deer in the Southern Appalachians," *Proceedings of Annual Conference of Southeast Association of Fish and Wildlife Agencies*.

## **Presentations**

"Environmental Risks Associated with Real Estate Transactions," 1990. Tennessee Bar Association - Real Estate Continuing Legal Education Program. Presented to the Nashville and Knoxville, Tennessee chapters.

"Environmental Risks Associated with Real Estate Transactions," 1991. Presented to Bank of East Tennessee; Knoxville, Tennessee.

"Environmental Risks Associated with Real Estate Transactions," 1989. Presented to Third National Bank; Knoxville, Tennessee.

"Environmental Risks Associated with Real Estate Transactions," 1989. A one day seminar presented to the Tennessee Chapter of the National Association of Real Estate Appraisers.

**"A History of Coal Mining Regulations in Tennessee," 1984. U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement, Fall Meeting of Inspection and Enforcement Division, Sweetwater, Tennessee.**

**"A Discussion of Surface Mine Permitting in Tennessee," 1985. Facts About Coal in Tennessee (FACT) Annual Convention, Gatlinburg, Tennessee.**

**"An Aspect of Abandoned Mine Land," 1983. Pike County Area Coal Expo-1983 (PACE), Pikeville, Kentucky.**

**"Why Should We Open This Mine?" 1982. Guidelines for Financing Mineral Ventures, Maryville, Tennessee.**

**"Current and Future Demands of the Mineral Industry on our Forest Resources," Winter Meeting of Kentucky/Tennessee Section of Society of American Foresters, Knoxville, Tennessee, 1983.**

**BRIAN A. FREDERICK**  
Civil Engineer



## **SUMMARY OF QUALIFICATIONS**

Mr. Frederick has over ten years of experience in engineering design and construction. He is familiar with the design aspects of structural, mechanical, and environmental systems. He has provided project management and technical support for all phases of environmental projects, including field investigation, remedial design, and remedial actions for private and government-owned facilities. His projects have encompassed the investigation and remediation of underground storage tanks; evaluating the presence of toxic, hazardous, radioactive, and mixed wastes in soils and groundwater; and the preparation of regulatory compliance documents. In addition to his technical skills, Mr. Frederick is also responsible for numerous managerial functions, including project tracking and cost scheduling.

## **EDUCATION**

B.S., Civil Engineering, Virginia Polytechnic Institute and State University,  
Blacksburg, Virginia, 1979

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

Registered Professional Engineer (TN, AL, IA, IL, FL, AR)  
DOE "L" Clearance ("Q" Clearance pending)

## **PROFESSIONAL EXPERIENCE**

**Remedial Investigation/Feasibility Study (RI/FS) - Oak Ridge National Laboratory (ORNL), Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Environmental Engineer responsible for development of leak testing program for 40 liquid low-level tanks, which included preparing procedures and implementing the leak testing. Task Leader for the preparation of a closure plan for a mixed waste storage tank (7860A) and integrity assessment for a mixed waste storage tank (7830A) in support of a RCRA Part B application. Other responsibilities included preparation of program plans for ORNL in compliance with the Federal Facilities Agreement.

**Petroleum Storage Tank Program - ORNL, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Environmental Engineer responsible for development of environmental assessment plans and remedial action plans for petroleum underground storage tanks (USTs).

**RCRA Part B Application - EG&G Mound Applied Technologies, Miamisburg, Ohio.** Assisted in the preparation of a RCRA Part B permit application for the Mound Laboratory.

**RI/FS - Feed Materials Production Center, Westinghouse Materials of Ohio, Fernald, Ohio.** Project manager for the K-64 Storage Silos radon mitigation and dome reinforcement design project and integrity testing of USTs.

**Environmental Restoration Program - Pullman Company, New York, New York.** Engineer for numerous projects including: removal of USTs at three facilities, performing environmental audits of industrial facilities, preparing and reviewing engineering drawings and specifications for groundwater treatment, and design of an *in situ* air stripping unit for volatile organic compounds.

**Site Remediation - Potter Company.** Engineer for site investigation under the Toxic Substances Control Act (TSCA), including field sampling for polychlorinated biphenyls (PCBs) and preparation of isopleth maps of chemical concentrations, drum sampling, and disposal.

**Service Station Remediation - FINA Oil Company, Florida.** Engineer for preparing remedial action plan for the remediation of gasoline in soil and groundwater from a UST leak. Projects included groundwater pumping, treatment, and *in situ* air stripping at two sites.

**Engineering Alternatives for East Fork Poplar Creek - U.S. Department of Energy, Oak Ridge, Tennessee.** Engineer responsible for preparing remedial alternatives study for mercury-contaminated soil in the East Fork Poplar Creek flood plain.

**Site Remediation - Airspace Industries, Alabama.** Senior Engineer for site investigation, closure plan preparation, and site remediation under the requirements of RCRA.

**Site Investigation - Pullman Company.** Senior Engineer for site investigation under the requirements of CERCLA of a metal plating facility. Directed interim removal actions involving metal plating sludges and abandoned hazardous materials (trichloroethylene [TCE], sulfuric acid).

**V. DENISE GALLEGOS**  
Environmental Staff Consultant



## **SUMMARY OF QUALIFICATIONS**

Ms. Gallegos has six years of experience as a Reclamation Specialist with the New Mexico Department of Energy, Department of Minerals and Natural Resources. She was appointed as Program Manager of the New Mexico Abandoned Mine Land Bureau in July 1989. Ms. Gallegos also has two years of experience as a chemist, chemical technician, and engineering technician with the State of New Mexico and private engineering and consulting firms. She also has one year of experience as a university research assistant in a wildlife biology laboratory, working with avian and small mammal studies.

## **EDUCATION**

B.S., Biology (Chemistry minor), New Mexico Highlands University,  
Las Vegas, New Mexico, 1987

### **Inservice Training:**

OSHA Certification in Hazardous Materials, April 1991

## **REGISTRATIONS/AFFILIATIONS/CLEARANCES**

National Abandoned Mine Land Association  
Western Energy Board  
Rocky Mountain Elk Foundation  
Wild Turkey Federation

## **PROFESSIONAL EXPERIENCE**

**ERC Environmental and Energy Services Co. (ERCE), Safety and Risk Assessment Group - Environmental Staff Consultant.** Responsible for performing evaluations of former mining sites for reclamation. Also responsible for designing and managing the implementation of mining reclamation projects.

**New Mexico Department of Energy, Minerals and Natural Resources, Abandoned Mine Land Bureau - Program Manager.** Responsible for the daily supervision of a staff of nine, including two engineers, a geologist, a biologist, an administrator, and four reclamation specialists. Managed the bureau's combined construction and administrative budget of \$2.6 million per year, at a ratio of 70% construction to 30% administrative. The bureau designed and completed \$3.7 million of reclamation work during her tenure. Also responsible for compiling

the bureau's funding grants and for assuring the bureau's compliance with the Surface Mining Control and Reclamation Act, along with the applicable portions of the National Environmental Policy Act (NEPA), the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Clean Air Act (CAA), the National Pollutant Discharge Elimination System (NPDES). Rewrote the *State of New Mexico Reclamation Plan* and wrote amendments to the SMCRA. Ms. Gallegos was also responsible for coordinating the bureau's project development and project management. Her position required daily interaction with U.S. Fish and Wildlife, the Environmental Protection Agency, the Office of Surface Mining, the state Environment Department, and numerous mining companies.

**New Mexico Department of Energy, Minerals and Natural Resources - Reclamation Specialist III/Environmental Coordinator.** Responsible for conducting environmental audits on abandoned mine sites, for the purpose of identifying hazardous materials such as polychlorobiphenyls (PCBs), asbestos, and chemicals used in mining practices. Audits also included the identification of hazards and environmental degradations such as open adits, shafts, mine fires, and the hazardous wastes associated with mining, such as uranium tailings.

Also responsible for compiling the environmental assessment for each mine site and for coordinating its clearance to the point of obtaining a Finding of No Significant Impact, as well as for conducting the bureau's biological studies and coordinating all the bureau's environmental responsibilities.

Served as Project Manager on projects considered environmentally sensitive, including \$8.5 million of reclamation projects in the Raton, Madrid, Chama, Las Cruces, Farmington, and Gallup, New Mexico areas.

Also responsible for project design and for developing the project specifications on projects that were estimated to be less than \$50,000.

Gained a strong working knowledge of the requirements of the National Environmental Policy Act (NEPA), the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Clean Air Act (CAA), the National Pollutant Discharge Elimination System (NPDES), the Endangered Species Act, and the National Historic Preservation Act.

**New Mexico Highway and Transportation Department - Chemical Technician.** Primarily responsible for quality control of paint- and petroleum-based products used in highway construction. Responsible for the quality control of the steel products used and verified steel quality using carbon testing. On a daily basis, employed applicable procedures of wet chemistry, atomic absorption, gas chromatography, and infrared spectroscopy using Perkin-Elmer instrumentation.

**General Technology Corporation - Production Chemist.** Responsible for the quality control of classified materials produced by General Technology Corporation for various organizations, including the national laboratories (e.g., Sandia National Laboratories, Los Alamos National Laboratory).

**Fox and Associates Engineering and Consulting Firm - Engineering Technician.** Responsible for the testing of construction materials, bituminous and non-bituminous, according to ASTM testing procedures. Supervised five engineering technicians on a large testing project, commonly referred to as "Fountain Creek."

**New Mexico Highlands University - Research Assistant.** Credited with developing a workable karyotype for birds. Research also involved six months of small mammal and avian trapping in the Pecos Wilderness. The research received an Honorable Mention at the "Science in the 80's" Science and Engineering Fair in 1983.

**JOHN W. HOCKERT, Ph.D.**  
Principal Consultant



## **SUMMARY OF QUALIFICATIONS**

Dr. Hockert has 26 years of experience in the analysis of technical and regulatory issues involving the safety of nuclear facilities, including: development of safety criteria; regulatory reviews; nuclear plant systems analysis, encompassing fault-tree development and analysis, data base development, risk management, and development of analytical methods; and radiological emergency planning.

## **EDUCATION**

Ph.D., Nuclear Physics, State University of New York at Stony Brook, 1975

M.A., Nuclear Physics, State University of New York at Stony Brook, 1971

B.S., Physics (cum laude), California Institute of Technology, 1969

### **Inservice training:**

University of Tennessee, Short Course on Modular High Temperature  
Gas-Cooled Reactors: Commercial and Production Reactor Versions, 1989

U.S. Nuclear Regulatory Commission, PWR Technology, 1980

U.S. Nuclear Regulatory Commission, BWR Technology, 1980

U.S. Nuclear Regulatory Commission, Probabilistic Safety and Reliability  
Analysis Techniques, 1980

U.S. Civil Service, Selected Techniques in Operations Analysis, 1978

U.S. Nuclear Regulatory Commission, Human Factors Engineering, 1976

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

Institute for Nuclear Materials Management

Tau Beta Pi

DOE "Q" Clearance

DoD "SECRET" Clearance (inactive)

## **PROFESSIONAL EXPERIENCE**

**K-25 Preparation for DOE Tiger Team Assessment - Martin Marietta Energy Systems.**

Currently managing ERCE program to provide multi-disciplinary technical assistance to the Martin Marietta Energy Systems K-25 Site in preparing for, and responding to, a DOE Headquarters Tiger Team Assessment. The effort has included the development of self-assessment program plans, procedures, and instructions, development of root cause analysis training materials, conduct of self-assessment training sessions, development of guidance for

corrective action planning, support to the K-25 health and safety self-assessment, support in preparing the *Environmental, Safety, and Health Self-Assessment Report for the Oak Ridge K-25 Site Oak Ridge, TN*, and a limited review of DOE Orders for applicability to K-25 site operations. The K-25 Site Self-Assessment program was judged to be a noteworthy practice during the recent Tiger Team assessment of the K-25 Site.

**New Production Reactor Safety Requirements Development - Los Alamos National Laboratory.** Directing ERCE support to Los Alamos National Laboratory in the development of general safety requirements and safety analysis format and content guides applicable to the three design concepts proposed for the new DOE nuclear materials production reactor. This effort includes the identification, definition, and application of: 1) DOE policies and Orders (e.g., 5480.5, 5480.6, 5481.1B, and 6430.1A); 2) NRC rules and regulatory guides; 3) INPO guidelines; and 4) foreign government and international standards for safety and security reviews.

**Radiological Hazards Assessment, Pantex Plant - Mason & Hanger-Silas Mason Co.** Managed the ERCE project to perform a radiological hazards assessment of the DOE Pantex Plant, managed by the Mason & Hanger-Silas Mason Co., in Amarillo, Texas. This project included a review of all radiological operations at the Pantex Plant and, based upon the estimated consequences of possible accidents, the development of a comprehensive set of radiological hazard classes for application to all Pantex facilities. This effort also included reviews of criticality safety and the estimation of the potential consequences of nuclear criticalities for Pantex operations involving fissile material. The hazards assessment also included the technical analyses to support the designation of a proposed prompt exposure (plume or puff) emergency planning zone, consistent with EPA protective action guidelines.

**Development of Generic Emergency Action Levels - Nuclear Management and Resource Council (NUMARC).** Member of a team that developed generic Emergency Action Level (EAL) guidelines for use by the nuclear industry. This effort included interviewing personnel from 10 nuclear power stations, reviewing the Emergency Preparedness Requirements and EALs from over 30 stations, and performing a detailed analysis of the NRC regulations and implementing guidance that cover emergency plan requirements.

**Environmental Impact Evaluation - San Luis Obispo County, California.** Evaluated the potential environmental impacts of the U.S. Nuclear Regulatory Commission "Below Regulatory Concern (BRC) Policy Statement" on the potential expansion of the Cold Canyon Landfill.

**Uncertainty Analysis Methodology - Sandia National Laboratories.** Developed the uncertainty analysis methodology employed in NUREG/CR-5381, Economic Risk of Contamination Cleanup Costs Resulting from Large Nonreactor Nuclear Material Licensee Operations.

**Safeguards and Security Planning - Lawrence Livermore National Laboratory.** Assisted Lawrence Livermore National Laboratory in safeguards and security planning and analysis. Included development of a safeguards risk management program, encompassing establishment of a risk-based SNM theft and radiological sabotage protection strategy, development of a statistically-based safeguards program performance validation methodology, and development of risk-based protection strategies for classified information and material, computing resources, and other DOE property.

**Evaluation of Production Risk in the Nuclear Weapons Complex - Sandia National Laboratories.** Played a key role in the extension of traditional risk assessment methodology to a complex production network. Developed methodology and supporting computer algorithm for a systematic method to maximize cost-effectiveness in the reduction of production risk.

**Evaluation of Alert and Notification Systems - Federal Emergency Management Agency.** Supported Federal Emergency Management Agency (FEMA) in development of guidance for evaluation of alert and notification systems at all nuclear power plants throughout the United States. Developed statistical sampling methodology for telephone surveys conducted as a part of these evaluations and served as survey statistician.

**Evaluation of Offsite Radiological Emergency Preparedness - Edison Electric Institute.** Developed and validated a method of determining the relative importance of various aspects of offsite radiological emergency preparedness for use by the Federal Emergency Management Agency in allocating resources to the evaluation of nuclear utility emergency preparedness exercises.

**Expert Witness - Long Island Lighting Company.** Provided expert testimony to an NRC Licensing Board on the scope and adequacy of the Shoreham Nuclear Station pre-licensing radiological emergency preparedness exercise.

**Development of Ingestion Pathway Protective Actions - Edison Electric Institute.** Developed a proposed guidance memorandum for use by the Federal Emergency Management Agency to assist State and local governments in developing emergency plans to protect the public from radiation exposure via the ingestion pathway.

**Review of Radiological Emergency Preparedness Program - Public Service Electric & Gas Company (PSE&G).** Assisted PSE&G in meeting a regulatory commitment to the NRC by performing an independent review of the Salem Nuclear Power Station radiological emergency preparedness program and recommending corrective actions for deficiencies identified.

**Preparation and Evaluation of Emergency Response Plans - Sandia National Laboratories/Federal Emergency Management Agency/Nuclear Regulatory Commission.** Supported Sandia, FEMA, and NRC in the development of criteria for preparation and evaluation of radiological emergency response plans and preparedness for fuel cycle facilities and nuclear material licensees.

**Security Incident Response - Wells Fargo Guard Services Company.** Supported the development of scenarios and exercise inputs for security incident response exercises; conducted such exercises, involving up to 1000 individual participants, at the Department of Energy Strategic Petroleum Reserve.

**Vital Area Analysis - Sacramento Municipal Utility District.** Performed a NUREG-1178 vital area analysis, using fault tree and success tree analysis approaches, for the Rancho Seco Nuclear Station.

**Senior Safeguards Technical Analyst - U.S. Nuclear Regulatory Commission.** Responsible for:

**Safeguards Program Evaluation.** Including assessing the effectiveness of safeguards programs at licensed nuclear fuel cycle and power reactor facilities, including: on-site evaluation of the impact of safeguards requirement on plant safety and emergency response; development of evaluation techniques, such as enhancement of the vital area analysis fault tree techniques to identify critical radiological sabotage targets; on-site validation of vital area analysis results, encompassing rapid determination of the affect of system modifications and equipment relocation on vital area configurations.

**Review of Safeguards Requirements Against Malevolent Acts.** Included reviewing technical bases for NRC requirements to safeguard against malevolent uses of special nuclear materials in dispersal and nuclear explosive devices, including: liaison with the Department of Energy and the national laboratories for exchange of atomic weapon data; preparing and providing expert testimony before an NRC licensing Board on those sections of the supplemental environmental statement for the Clinch River Breeder Reactor which address radiological sabotage and the utility of plutonium in dispersal and improvised nuclear explosive devices.

**Analysis and Evaluation of Safeguards Operational Data.** Included establishing the NRC program for analysis and evaluation of safeguards operational data, including: developing microcomputer data bases of safeguards events; and creating programs to provide daily and weekly reports of safeguards events, daily plant status reports, and reports of allegations affecting licensing actions.

**Review of Licensee Security Plans.** Included reviewing licensee-submitted security plans and amendments against regulatory requirements and guidance and branch technical positions, as a part of a special Post-TMI licensing backlog reduction task force, with the objective of reducing the backlog by 25% in three months. Played a major role in the virtual elimination of the entire backlog in less than two months.

**Theoretical Nuclear Physics Research - State University of New York at Stony Brook, Postdoctoral Research Associate.** Responsible for theoretical nuclear physics research, including application of quantum field theoretic methods to analyze the medium energy nucleon-nucleon interaction.

## **AWARDS**

U. S. Nuclear Regulatory Commission Special Achievement Awards in 1976, 1978, and 1980

## **SELECTED PUBLICATIONS**

Environmental, Safety, and Health Self-Assessment Report for the Oak Ridge K-25 Site, Oak Ridge, Tennessee, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1991. (Contributing author)

Oak Ridge AT/K-25 Site Environment, Safety, and Health Self-Assessment Program Implementation Plan, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, October 1991. (Contributing author)

Radiological Hazards Assessment for the Pantex Plant Amarillo, Texas, Jacobs Engineering Group in conjunction with ERC Environmental and Energy Services Co., Albuquerque, New Mexico, August 1991. (Principal author)

Proposed U.S. Department of Energy Safety Analysis Format and Content Guide for Nonreactor Nuclear Facilities, Los Alamos National Laboratory, Los Alamos, New Mexico, November 1990. (Contributing author)

General Safety Requirements Document for the New Production Heavy Water Reactor, LA-NPR 4, Revision 2, Los Alamos National Laboratory, Los Alamos, New Mexico, November 1990. (Contributing author)

General Safety Requirements Document for the New Production Modular High Temperature Gas-Cooled Reactor, LA-NPR-5, Revision 2, Los Alamos National Laboratory, Los Alamos, NM, November 1990. (Contributing author)

Methodology for Development of Emergency Action Levels, NUMARC/NESP-007, Nuclear Management and Resources Council, Inc., Washington, DC, April 1990. (Contributing author)

Hockert, J.W., 1990. Review of DOE Orders for Applicability to NPR Safety Requirements Development, ERCE-R/90-31, ERC Environmental and Energy Services Co., Albuquerque, New Mexico, March.

Hockert, J.W., 1989. "Optimizing the Cost-Effectiveness of Risk Reduction," Proceedings of the International Topical Meeting on Probability, Reliability, and Safety Assessment, American Nuclear Society, La Grange Park, Illinois, April.

Hockert, J.W., et al., 1989. A Vulnerability Analysis of the Nuclear Weapon Production Process, SAND88-0891, Sandia National Laboratories, Albuquerque, New Mexico, February. (Report S/RD Title U)

Hockert, J.W., et al., 1989. Control Room Safety Requirements Definition Issues for the New Production Reactor, ERC Environmental and Energy Services Co., Albuquerque, New Mexico, January.

Hockert, J.W., et al., 1988. Vital and Protected Area Analysis for the Rancho Seco Nuclear Generating Station, ERCI-8853, ERC Environmental and Energy Services Co., Albuquerque, New Mexico, July. (Report Safeguards Information Title Uncontrolled)

Hockert, J.W., 1985. Importance Ranking of Various Aspects of Offsite Radiological Emergency Preparedness, IEAL-R/85-98, ERC Environmental and Energy Services Co., Fairfax, Virginia, December.

Hockert, J.W., et al., 1983. Standard Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants, FEMA-43, Federal Emergency Management Agency, Washington DC, September.

Report of the Committee to Review Safeguards Requirements at Power Reactors, NUREG-0992, U.S. Nuclear Regulatory Commission, Washington, DC, May 1983 (Staff Contributor).

Hockert, J.W., 1981. People-Related Problems Affecting Nuclear Security in the Licensed Nuclear Industry, NUREG-0768, U.S. Nuclear Regulatory Commission, Washington, DC, March.

Hockert, J.W., 1977. "NRC Operating Assumption on the Relative Ease of Fabricating a Clandestine Fission Explosive," U. S. Nuclear Regulatory Commission, Washington, DC, August.

**J. THOMAS KITCHINGS**  
Senior Project Manager



## **SUMMARY OF QUALIFICATIONS**

Mr. Kitchings has a broad background in environmental regulatory activities and presently is the Office Manager for the Denver Office. He has 20 years of environmental research and regulatory compliance experience. He began his career with the Environmental Sciences Division at the ORNL in 1966. From 1983-1987, he served as a task and group leader for environmental compliance at ORNL. This position involved the supervision of fifteen employees, budget planning, cost allocation, and spending projection. Activities also included development of protocols and procedures for environmental sampling and monitoring required to meet various Federal directives and regulations for both radiological and chemical contaminants. As ERCE Project Manager for both the Oak Ridge National Laboratory (ORNL) Rocky Flats Plant RI/FS projects he has been involved in preparation and implementation of remedial investigation (RI) work plans. These efforts involved coordination of a multi-disciplinary staff in evaluating current site conditions, preparation of sampling plans, and conducting field activities in accordance with those plans. He played a primary role in the continuous interfacing between the subcontractor, ORNL, DOE, and both EPA and the Tennessee Department of Health and Environmental.

## **EDUCATION**

M.S., Ecology, New Mexico Highlands University, 1965  
B.A., Biology, Centre College, 1964  
Special training:  
    OSHA Trained (29 CFR 1910.120)

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

DOE "Q" Clearance (Active)

## **PROFESSIONAL EXPERIENCE**

**Environmental Remediation - EG&G, Rocky Flats Plant, Golden, Colorado.** Provides management and technical support for implementation of environmental remediation efforts at the Rocky Flats Plant. He has been involved in preparation of the Phase I RFI/RI Work Plan for the present landfill and inactive hazardous waste storage area, including summarization of existing data, development of the site conceptual model, preliminary identification of remedial actions and Applicable or Relevant and Appropriate Requirements (ARARs), and development of Data Quality Objectives (DQOs) for the subsequent field sampling activities. Because of his previous experience in dealing with DOE mixed waste sites, he is currently providing both senior

management and technical support for development of Phase I RFI/RI Work Plans for a number of other operable units at the RFP.

In addition he is Senior Peer Review for implementation of the monitoring associated with the RFP NPDES permit.

**Remedial Investigation - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Project Manager for the Remedial Investigation (RI) Plan for Oak Ridge National Laboratory Waste Area Groupings (WAGs) 3, 4, 5, 6, and 7. Managerial responsibilities include: coordinating 7-person RI Team activities, organizing RI Plan contents, maintaining schedules and budgets, coordinating liaison between RI Team and ORNL Staff, and Implementation of Field Sampling activities. Technical contributions include: assessment of existing technical data, development of RI data quality objectives, development of environmental sampling plans, preparation of rationale for data acquisition efforts, preparation of RI task descriptions, work breakdown structure and schedules, and direction of field sampling activities.

**RCRA Facility Investigation - Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.** Senior Ecologist for the preparation of a RCRA Facility Investigation (RFI) work plan for East Fork of Poplar Creek. Work plan concentrated on contaminants originating from the Y-12 Weapons Facility Plant.

**Environmental Compliance Management - Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Leader for Environmental Compliance group which was charged with the preparation of appropriate compliance documents required by the Clean Water Act, Clean Air Act, RCRA, CERCLA, NEPA, and DOE Orders.

This group also served as the primary focal point for interaction with regulatory agencies and contractors involving environmental issues at Oak Ridge National Laboratory. Responsibilities included scheduling of work assignments, review of technical documents and evaluation of performance.

Supervised the development and implementation of an environmental monitoring system to meet regulatory requirements at Oak Ridge National Laboratory. This effort involved the establishing of protocols and procedures for meeting NPDES and RCRA permitting and monitoring requirements; developing environmental monitoring activities for both radiological and chemical effluents to meet DOE orders and directives; and *ad hoc* planning and preparation of sampling plans in support of project needs, i.e., siting of new facilities, evaluation of technological fixes, and analysis of hazardous and mixed waste effluent streams.

Aided in developing reconnaissance evaluation of groundwater contamination at two-level radioactive waste disposal sites (the U.S. ecology facility at Sheffield, Illinois, and the Chem-Nuclear facility at Barnwell, South Carolina). A similar effort was conducted at a uranium mill

tailings pond at the Petrotonics Uranium Mill at Shirley Basin, Wyoming. These efforts were performed for the Nuclear Regulatory Commission (NRC) as a part of their program to determine the presence of RCRA-regulated constituents at facilities operated under NRC mandate.

Participated in developing remedial action strategies for Oak Ridge National Laboratory facilities falling under RCRA and CERCLA regulatory requirements for active and inactive hazardous waste sites. The majority of these facilities were essentially mixed waste sites where the majority of material was radioactive with hazardous constituent components resulting from research and/or developmental operations.

Involved in preparation of Remedial Investigation plans for facilities at both the Oak Ridge Y-12 plant and Oak Ridge National Laboratory. This effort has included evaluation of radiological and hazardous waste source terms, identification and contaminant migration pathways and receptors, and consideration of remedial action alternatives.

**Environmental Assessment - U.S. Department of Energy, Oak Ridge, Tennessee.** Ecologist for the Environmental Assessment for recycling of contaminated scrap metal from DOE facilities at Oak Ridge, Tennessee; Paducah, Kentucky; and Fernald, Ohio. Responsibilities include evaluation of proposals to decontaminate and recycle scrap metals, site characterization, and assessment of the potential effects on human health and the environment.

**Compliance Document Preparation - Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Environmental Scientist responsible for preparation of compliance documents required by NEPA.

**Environmental Sampling - Oak Ridge National Laboratory, Oak Ridge, Tennessee.** Headed the Oak Ridge National Laboratory technical sampling team in support of the environmental survey presently being conducted by DOE of all facilities nationwide. Participated in the development of strategy for approaching the sampling needs of the survey; prepared portions of the "Field Sampling Protocols and Guidance Manual"; assisted in the environmental survey efforts at the Rocky Flats Plant, Pantex Plant, and Lawrence Livermore and Sandia Livermore Laboratories; and prepared the sampling plans for Rocky Flats and Argonne National Laboratory for sampling low-level radioactive, hazardous, and mixed wastes.

## **PUBLICATIONS**

Kitchings, J. T., and B. T. Walton. Fauna of the North American Temperate Deciduous Forest. Ecosystems of the World. Elsevier Press (in press).

Owenby, R. K., D. M. Runyon, J. T. Kitchings, and S.W. Coker. "Use of Geoprocessing Techniques in Quantifying Radiological Exposure Assessments," in Proceedings Waste Management 91, Tucson, Arizona, February 1991. (in press).

Kitchings, J. T., T. W. Oakes, and H.M. Braunstein, 1984. "ORNL and the Environment: Views of State and Federal Regulations," ORNL Review, 18 (2): 48-55.

Kitchings, J. T., and J. D. Story, 1984. "Movement and Dispersal of Bobcats in East Tennessee," J. Wild. Mgmt., 43 (3): 957-961.

Mann, L. K., and J. T. Kitchings, 1982. Resource Data Inventory System for the Oak Ridge National Environmental Research Park, ORNL/TM-7941, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Kitchings, J. T., and D. J. Levey, 1981. "Habitat patterns in a Small Mammal Community," J. Mammal., 62(4): 814-820.

Klopatek, J. M., J. T. Kitchings, R. J. Olson, and K. D. Kumar, 1981. "A Hierarchical System for Evaluating Regional Ecological Resources," Biological Conservation 20:271-290.

Kitchings, J. T., and J. D. Story, 1979. "Home Range and Diet of Bobcats in Eastern Tennessee," in Proceedings of the Bobcat Research Conference, Front Royal, Virginia, October 1979. Nat'l Wildl. Fed. Sci. and Tech. Series 6.

Shugart, H. H., T. M. Smith, J. T. Kitchings, and R. L. Kroodsma, 1978. "The Relationship of Non-Game Birds to Southern Forest Types and Successional Stages," pp. 5-17, in DeGraaf, R. M. (ed.), Proceedings of the Workshop Management of Southern Forests for Non-Game Birds, Forest Service Gen. Tech. Rpt. SE-14. U.S. Department of Agriculture, Southeast For. Exp. Sta., Asheville, North Carolina.

Kitchings, J. T., L. K. Mann, D. J. Joslin, and R. C. Bunnell, 1977. "Approaches to Natural Resource Inventory and Analysis on the Oak Ridge Environmental Research Park," pp. 148-163, in Kitchings, J. T. and N. E. Tarr (eds.), National Environmental Research Park Symposium: Natural Resource Inventory, Characterization and Analysis, ORNL-5304. Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Kitchings, J. T., D. DiGregorio, and P. Van Voris, 1977. "Radionuclide Transfer in Terrestrial Animals," Health Physics, Vol. 34: 3-31.

Kitchings, J. T., D. DiGregorio, and P. Van Voris, 1976. "A Review of the Ecological Parameters of Radionuclide Turnover in Vertebrate Food Chains," pp. 301-310, in Cushing, C. E., Jr. (ed), Radioecology Problems Associated with the Development of Energy Sources, Fourth Natl. Radioecology Symp., Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pennsylvania.

Kitchings, J. T., 1976. "Responses of Populations of Small Mammals to Ionizing Radiation," Proc. Symp. of Small Populations Under Natural Conditions, May 14-16, 1976, Pymatuning, Pennsylvania. Special Pub. Series Vol. 5, Pymatuning Laboratory of Ecology, Univ. of Pittsburgh, Pittsburgh, Pennsylvania.

Schreiber, R. K., W. C. Johnson, J. D. Story, J. T. Kitchings, and C. Wenzel, 1976. "Effects of Powerline Rights-Of-Way on Small Non-Game Mammal Community Structure," pp. 265-273, in Symposium on Environmental Concerns in Right-Of-Way Management, Mississippi State University, Starkville, Mississippi.

Kitchings, J. T., H. H. Shugart, and J. D. Story, 1974. Environmental Impacts Associated with Electric Transmission Lines, Environmental Sciences Division, ORNL/TM-4498, 100 pp.

Kitchings, J. T., 1973. "Land-Use Planning," pp. 238-239, in McGraw-Hill Encyclopedia of Science and Technology, McGraw-Hill.

Dunaway, P. B., J. T. Kitchings, and J. D. Story, 1972. "Radiation Effects and Radionuclide Excretion in a Natural Population of Pine Voles," Vol. 2, pp. 1055-1064, Radioecology, Proc. 3rd Natl. Symposium, Oak Ridge, Tennessee. CONF-710501.

**JOHN S. LAGUE**  
Senior Air Quality Consultant



## **SUMMARY OF QUALIFICATIONS**

Mr. Lague has worked exclusively in the air quality field since 1972. At ERCE, he has technical and administrative responsibility for all of the firm's air quality project work, and line management authority for all air quality staff. His technical specialties include permitting support for industrial development projects, air quality impact assessments, air toxics evaluations, air quality and meteorological monitoring, and applied research programs.

Since 1978, Mr. Lague has been heavily involved in permitting and compliance programs for major oil and gas industry developments in the western U.S. and offshore of southern California. These projects have typically involved all or most of the following elements: development of permitting strategies consistent with client objectives and regulatory constraints, negotiations with responsible regulatory agencies, participation in project design as it relates to air quality concerns, preparation of permit applications and supporting technical materials, operation of preconstruction and postconstruction air monitoring networks, design of programs to comply with environmental permit conditions, and presentation of expert witness testimony at hearings, workshops, legal proceedings, and public information meetings.

Mr. Lague has also provided similar consulting support for many other industries, including permitting for pulp and paper, nonferrous smelting, utilities, chemical, electronics, manufacturing, publishing, cogeneration, aggregate materials, and waste disposal facilities.

## **EDUCATION**

M.S., Meteorology, Massachusetts Institute of Technology, 1973  
B.S., Physical Sciences, University of California, Davis, 1970

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

Air and Waste Management Association  
American Meteorological Society

## **PROFESSIONAL EXPERIENCE**

**Evaluation of Area Source/Volume Source Dispersion Models - American Petroleum Institute and Chemical Manufacturers Association.** In 1990-1991, Mr. Lague managed a comprehensive research project to evaluate the area source and volume source dispersion models currently used to address the air toxics impacts of industrial sources. Major project elements include: identification and testing of available models to determine the reasonableness of their

simulation of basic physical processes, identification of candidate field program data sets for use in a performance evaluation study for selected models, and execution of the performance evaluation using appropriate data sets.

**Gaviota Marine Terminal Project - Texaco Trading and Transportation, Inc.** For this project, which involves the expansion of a small existing crude oil terminal to accommodate a 100 MBBL/day throughput from new Santa Barbara Channel production, Mr. Lague managed all air permitting and compliance activities. Principal technical issues included onshore air pollutant impacts due to marine tanker emissions, hydrocarbon removal efficiency of vapor control system during tanker landing, identification of candidate emissions offset sources within the project area, innovative emission control measures for project construction equipment and marine terminal support vessels, and cumulative impacts with other oil and gas projects in the Santa Barbara Channel area. Mr. Lague was responsible for preparation of permit applications, negotiations with agency personnel and offset source operators, operation of a multistation air quality monitoring network, and the design and implementation of compliance programs in response to 65 air quality permit conditions. Mr. Lague has been involved with this project since 1983.

**Hercules Project - Shell Western Exploration and Production, Inc.** This project involved the installation of a new offshore platform in the state tidelands adjacent to Santa Barbara County, oil and gas pipelines to transport produced oil and gas to shore, and the conversion of an existing gas processing plant to handle 30,000 BBL/day of crude oil and 80 to 100 MMCFD of produced gas. Under Mr. Lague's direction, ERCE worked with the project design engineers to anticipate and avoid potential air quality concerns, prepared air quality permit applications and supporting technical documents, operated preconstruction air quality monitoring stations, conducted negotiations with responsible agencies, and reviewed and commented on the project's environmental impact report. Mr. Lague was involved from 1985 to 1988.

**Air Quality Permitting for the Trans-Alaska Gas System - Yukon Pacific Corporation.** Beginning in late 1990, Mr. Lague managed all aspects of air quality permitting for a major gas pipeline development project in Alaska. The project will consist of a gas conditioning plant on the North Slope, an 800-mile buried and chilled natural gas pipeline with up to 10 large compressor stations along the route, and an LNG production facility and marine terminal near Valdez. Permitting activities for this development included consulting support for a system of multiple meteorological towers, analysis of meteorological data to provided design conditions for project facilities, preparation of BACT analyses, air quality impact analyses, and permit application materials for various project installations, and negotiations with air pollution agency staff.

**Northern Tier Pipeline Project - Northern Tier Pipeline Company.** From 1978 to 19821, Mr. Lague managed all aspects of the air quality permitting process for this project, which included a new crude oil marine terminal and tank farm in Port Angeles, Washington, and a 1500-mile pipeline from the marine terminal to Minnesota. Mr. Lague was responsible for

preparing the PSD application to EPA Region X, operation of a multiple station monitoring network in Port Angeles, preparation of a complete air quality impact assessment for the application to the Washington Energy Facility Site Evaluation Council (EFSEC), and presentation of expert testimony at the public hearing held by EFSEC on the project. Although the project was never built, Mr. Lague's effort was successful in securing the required PSD permit for the marine terminal and the necessary air quality approvals for the pump stations along the pipeline route.

**Expert Testimony on Behalf of a Washington State Industrial Facility - INTALCO Corporation.** Mr. Lague was retained by INTALCO in 1985 to conduct modeling studies to investigate the expected air quality impacts of its Ferndale, Washington, aluminum reduction facility. This study drew upon information from a previous PSD permitting project Mr. Lague had conducted for the nearby ARCO refinery. The results were presented before the Washington Air Quality Hearing Board to demonstrate that the restrictive permit conditions attached to INTALCO's PSD permit were unnecessary to protect air quality in the surrounding area. This testimony helped INTALCO to obtain relief from these permit conditions.

**Development of a Site-Specific Air Quality Dispersion Model - Hawaiian Electric Company.** In the mid-1980s, Mr. Lague managed an applied research program to develop a site-specific air quality dispersion model for the 800 MW Kahe Generating Station. The intent was to incorporate the effects that local conditions on the west coast of Oahu have on the atmospheric dispersion of the power plant's stack plumes. In particular, standardized methods for characterizing atmospheric stability and, hence, turbulent mixing rates, were found to apply poorly at Kahe. The developed model was validated with extensive air monitoring data to determine its performance versus other regulatory-approved models.

**Air Quality Assessment of Alternate Sludge Disposal Technologies - Alaska Lumber and Pulp, Inc.** Mr. Lague managed this project in 1984 to evaluate the air pollutant emissions associated with various candidate approaches for the disposal of water treatment sludge at ALP's pulp mill near Sitka, Alaska. Use of the sludge to generate additional electricity for in-plant consumption and steam for plant processes was considered, as well as pure incineration. Air emissions for each alternative were calculated based on combustor design and sludge composition, and screening model calculations were conducted to estimate the impacts of each system for comparison with applicable standards and PSD increments.

**Preconstruction Air Quality Monitoring for Propose Oil and Gas Development Projects - Various Oil Companies.** Under Mr. Lague's direction, ERCE air quality staff conducted monitoring programs of at least one year's duration for a number of different oil companies with proposed developments in the Santa Barbara Channel. These projects, which involved installation, operation, and reporting for one to three monitoring stations during 1985-1987, were conducted for Phillips Petroleum, Shell Western E&P, Chevron USA, and Texaco Trading and Transportation.

**Analysis of Emissions Offsets Needs and Availability - Shell Western E&P, Inc.** Mr. Lague recently managed a study to identify opportunities to obtain emissions offsets by application of control measures at all SWEPI facilities in Santa Barbara and Ventura counties in California. In addition, the projected offset requirements for planned development and reactivation projects were addressed and compared with those available at existing SWEPI facilities. Effects of regulatory changes that would affect offset availability and amounts were addressed.

**CARL F. LIPP, PE**  
Hydrogeologist



## **SUMMARY OF QUALIFICATIONS**

Mr. Lipp has over two years experience in supervising groundwater and surface water sampling programs at Rocky Flats. This work required close supervision of sampling techniques and methods to remain in compliance with the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Colorado Department of Health (CDH). This work included the collection and shipping of samples to the appropriate laboratories in a timely manner. Mr. Lipp has organized and managed extensive research and exploration programs which have resulted in major mineral discoveries. He has planned and implemented many drilling and mining projects, and has also been responsible for water well drilling, logging core, drill cuttings and supervising drilling programs. Mr. Lipp has completed an intensive twelve-week course in Hazardous Waste management for Project Managers at the Colorado School of Mines.

## **EDUCATION**

B.S. Geology, Colorado College, Colorado Springs, Colorado

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

American Institute of Mining Engineers (AIME)  
American Institute of Professional Geologists (AIPG)  
Registered Professional Engineer and Land Surveyor in Colorado and Utah  
Listed in *Who's Who in the West*  
Colorado Ground Water Association  
DOE "Q" Clearance

## **PROFESSIONAL EXPERIENCE**

**Surface Water Sampling Program - EG&G, Rocky Flats Plant, Golden, Colorado.** Mr. Lipp currently serves as the field supervisor for the surface water program at Rocky Flats, a Department of Energy (DOE) facility located near Golden, Colorado. These duties consist of overseeing the samples that are collected from the ponds and streams and shipped to the appropriate labs in a timely manner. He has also supervised groundwater sampling programs for Rocky Flats.

**Groundwater Sampling - International Technology Corporation, Denver, Colorado.** Mr. Lipp was a site supervisor for the groundwater sampling program at Rocky Flats and was also responsible for the activities and safety of 10-15 people who collected groundwater samples and

new well development. Mr. Lipp provided an accident free environment for all employees, maintained an excellent rapport with clients, and completed each quarter on time and within budget constraints.

**Surface Water and Groundwater Sampling - Chen-Northern, Denver, Colorado.** Mr. Lipp was responsible for the collection of groundwater and surface water samples at Rocky Flats, Colorado. Additional responsibilities consisted of QA/QC review of groundwater data.

**Hazardous Material Remediation Projects - Jacobs Engineering Group, Denver, Colorado.** Mr. Lipp supervised asbestos removal, radiation monitoring, and site reclamation for Jacobs Engineering in Weldon Springs, Missouri.

**Consulting Engineer-Geologist, Denver, Colorado.** Mr. Lipp managed all phases of drilling projects, including coring and air and mud rotary to depths in excess of 1,000 feet. Both surface and underground work included logging core, drill cuttings and electric log interpretation. Mr. Lipp's duties also included mine abandonment and reclamation.

**Mining Operations Management - Minerals Recovery Corporation, Denver, Colorado.** As Manager of Operations, Mr. Lipp supervised all mining operations and many drilling programs, which included determining manpower and equipment requirements for all drilling and mining projects. His work included preparing annual budgets for drilling and mining programs. Mr. Lipp interviewed, hired, and trained professional people (geologists and engineers) and organized them into smoothly functioning teams. In addition, he worked closely with various state and Federal agencies (MSHA, BLM, USFS) on drilling and reclamation projects. Mr. Lipp was promoted to Manager of Operations shortly after joining the company and successfully operated many mining and drilling operations.

**Vice President - Hershey, Wooderson & Lipp, Canon City, Colorado.** As Vice President, Mr. Lipp managed all exploration projects, property evaluations, acquisitions, ore reserve estimates and drilling programs. His responsibilities also included surveying, property negotiations, ore reserve estimates, land acquisition, mine rehabilitation, water well drilling, and conducting pump tests.

**Consulting Engineer-Geologist, Grand Junction, Colorado.** Mr. Lipp supervised drilling programs, mine rehabilitation, mine mapping, surveying, property negotiations, ore reserve estimates and land acquisition. In addition, his responsibilities also included research and report writing on potential properties in the San Juan mountains.

**Exploration and Mining Project Management - Cordero Mining Company, Grand Junction, Colorado.** As Senior Geologist, Mr. Lipp supervised and managed exploration and mining projects for uranium, precious metals and coal in several western states. His work also included ore reserve estimates, property appraisals and acquisitions, and directing drilling programs.

**Mine Planning and Permitting - Cotter Corporation, Grand Junction, Colorado.** As District Geologist, Mr. Lipp was responsible for production, development, contract negotiations and mine permitting. His duties included mine planning, costs, estimates, manpower requirements and report writing. He also supervised drilling programs, land and title research and negotiating land leases for Cotter Corporation with farmers and ranchers.

**Exploration Geology - Climax Uranium Company, Grand Junction, Colorado.** Mr. Lipp was employed as an exploration geologist managing drilling programs, property evaluations and acquisitions. He coordinated the efforts of employees in the field and organized them into smoothly functioning teams.

**CARLOS R. NARANJO, PE**  
Mining/Environmental Engineer



## **SUMMARY OF QUALIFICATIONS**

Mr. Naranjo has 16 years of experience in mining engineering, environmental site assessments, underground storage tank assessments, National Pollutant Discharge Elimination System (NPDES) permitting, landfill design, and remedial action planning and design. His responsibilities include managing projects and personnel, conducting site investigations, preparing reports, and performing site assessments for leaking underground storage tanks. Mr. Naranjo is also responsible for landfill design. His qualifications include a combination of practical experience and formal education in mining engineering and the environmental field. His qualifications also include an extensive knowledge of the requirements of the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), and numerous Federal, state, and local laws and regulations as they relate to the environmental and mining disciplines.

## **EDUCATION**

B.S., Mining Engineering, University of Arizona, 1975

Specialized training:

OSHA 29 CFR 1910.120 Health and Safety Training for Hazardous Materials and Medically Monitored

OSHA 29 CFR 1910.120 Health and Safety Training for Hazardous Materials for Supervisors

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

Registered Professional Engineer (KY, TN)

American Institute of Mining Engineers

American Electroplaters & Surface Finishers

## **PROFESSIONAL EXPERIENCE**

### General Environmental Projects

**Wastewater Monitoring - TRW Koyo, Vonore, Tennessee.** Responsible for compliance wastewater monitoring and reporting.

**Compliance Audit - CSX, Raceland, Kentucky.** Performed site assessments for existing facilities that included chemical inventories, risk assessment, and site evaluation.

### Landfill Projects

**Sanitary Landfill Design - McMinn County, Athens, Georgia.** Project Engineer for McMinn County landfill extension including performing the hydrogeologic study and karst investigation for inclusion into the Operations and Maintenance Manual section of their permit application. Effort included the design and permitting of the sanitary landfill.

**Sanitary Landfill Design - Cocke County, Newport, Tennessee.** Project Manager for Cocke County's new landfill. Effort included site characterization and assessment, landfill design, hydrogeologic study, groundwater evaluation, and serving as local government liaison.

**Flyash Landfill Design - Holston Defense Corporation, Kingsport, Tennessee.** Project Engineer for the design and permitting of a Class II flyash landfill.

**Special Waste Landfill Design - Metal Resources, Inc., London, Tennessee.** Project Manager for Special Waste Landfill; developed design and specifications, leachate collections system design, geosynthetic liner design, and closure/post-closure plans.

### Underground Storage Tank (UST) Projects

**UST Assessment - Earl Rainwater, Knoxville, Tennessee.** Responsible for the development and implementation of an Environmental Assessment Plan to determine the presence of hydrocarbon contamination; developed and implemented the Corrective Action Plan for the identified hydrocarbon contamination.

**UST Assessment - Commonwealth of Virginia, State Water Control Board, Richmond, Virginia.** Responsible for the development of Corrective Action Plans for two sites, which involved the site-specific corrective action of hydrocarbon spills, remediation planning and cost estimates, design of a groundwater withdrawal system, and treatment design.

**UST Assessment - TVA Leasing Company, Knoxville, Tennessee.** Project Engineer in charge of Environmental Assessment Plan for underground storage tanks. Developed a Corrective Action Plan to implement and outline possible petroleum contamination. Performed a groundwater remediation evaluation for Corrective Action Plan.

**UST Assessment - Hackney Petroleum, Inc., Alcoa, Tennessee.** Project Engineer in charge of Hackney Petroleum's Underground Storage Tank Management Program. Effort included the development of a workable time-related plan to get all USTs in compliance with new regulations, and the development of several Corrective Action Plans for reported hydrocarbon spills.

**UST Assessment - APAC-Tennessee, Inc., Knoxville, Tennessee.** Developed Environmental Assessment Plan for reported spill. Outlined remedial measures to be included in a Corrective Action Plan (CAP) submitted to the Tennessee Department of Health & Environment (TDHE) and implemented the CAP.

**UST Assessment - City of Alcoa, Tennessee.** Developed an Environmental Assessment Plan for the city garage to be submitted to TDHE.

**UST Assessment - Exxon Company, USA, South Pittsburgh, Tennessee.** Performed initial site assessment for hydrocarbons, and developed the Environmental Assessment Plan for hydrocarbon contamination.

### Mining Projects

**Mine Planning, Design, and Permitting - Little Rock Mining, Inc., Williamsburg, Kentucky.** Responsible for the design and development of all mining plans, including all hollow fill and backfill designs, mining feasibility studies, geologic studies, site evaluations, and surface and groundwater assessments. Responsibilities also included serving as regulatory liaison with the Mine Safety and Health Administration (MSHA) and the Occupational Safety and Health Administration (OSHA), Kentucky Department of Mines and Minerals, Kentucky Department for Surface Mining, and OSM.

**Mine Planning, Design, and Permitting - Brenda Coal, Inc., Corbin, Kentucky.** Mine Consultant for strip operations in Whitley and Knox Counties, Kentucky. Served as regulatory liaison for surface water and groundwater monitoring and compliance. Responsible for regulatory coordination under NPDES.

**Mine Planning, Design, and Permitting - Daniel Brothers Coal Co., Inc., Williamsburg, Kentucky.** Responsible for developing and obtaining several coal mine permits in Whitley and Knox Counties, Kentucky. Performed geologic studies, reserve studies, and surface water and groundwater assessments and compliance for the following companies: W.H. Bowling Co., Campbell County, KY; Black Gold Sales, Inc., Hazard, KY; Gatliff Coal Co., Nevisdale, KY; Responsible Coal Co., Harrogate, TN; Black Hole Coal Co., Williamsburg, KY; and Plastics Universal Corp., Barbourville, KY. Developed and obtained several coal mine permits in Eastern Kentucky.

**Mine Planning, Design, and Permitting - Leeco, Inc., London, Kentucky.** Assistant Contract Administrator for \$4.5 million Bureau of Mines contract entitled "Longwall Mining in Thin Seams." Effort included the following responsibilities: outlining drilling and exploration program; outlining and drafting proposed equipment specifications, production rates, and plans; performing ventilation volume studies and pressure control splits; rock mechanics; report writing;

developing the mine design and performing haulage surveys; developing manpower utilization and training schedules; and writing job descriptions and job responsibilities for all longwall equipment for this contract. Served as regulatory and vendor liaison.

**Mine Planning, Design, and Permitting - W.H. Bowling Co., Campbell County, Tennessee.** Project Manager/Engineer in Charge of the following: preparation of all surface mine design, access and haul road, sedimentation pond design, reclamation and revegetation plan, blasting plan, state surface mine permitting, NPDES permit, hollow fill design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Black Gold Sales, Inc., Williamsburg, Kentucky.** Project Manager/Engineer in Charge of the following: preparation of all surface mine design, access and haul road, sedimentation pond design, reclamation and revegetation plan, blasting plan, state surface mine permitting, NPDES permit, hollow fill Design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Gatliff Coal Co., Nevisdale, Kentucky.** Project Manager/Engineer in Charge of the following: preparation of the surface mine design, access road, sedimentation pond design, reclamation and revegetation plan, blasting plan, state surface mine permit, NPDES permit, hollow fill design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Responsible Coal Co., Harrogate, Tennessee.** Project Manager/Engineer in Charge of the following: preparation of the surface mine design, access road, sedimentation pond design, reclamation and revegetation plan, blasting plan, state surface mine permit, NPDES permit, hollow fill design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Black Hole Coal Co., Williamsburg, Kentucky.** Project Manager/Engineer in Charge of the following: preparation of the surface mine design, access road, sedimentation pond design, reclamation and revegetation plan, blasting, plan, state surface mine permit, NPDES permit, hollow fill design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Plastics Universal Corporation, Barbourville, Kentucky.** Project Manager/Engineer in Charge of the following: preparation of the surface mine design, access road, sedimentation pond design, reclamation and revegetation plan, blasting, plan, state surface mine permit, NPDES permit, hollow fill design, mining operation plan, and regulatory liaison during mining operations.

**Mine Planning, Design, and Permitting - Leeco, Inc., London, Kentucky.** Assistant Contract Administrator for \$4.5 million Bureau of Mines contract entitled "Longwall Mining in Thin

Seams." Effort included the following responsibilities: outlining drilling and exploration program; outlining and drafting proposed equipment specifications, production rates and plans; performing ventilation volume studies and pressure control splits; rock mechanics; report writing; developing the mine design and performing haulage surveys; developing the manpower utilization and training schedules; and writing job descriptions and job responsibilities for all longwall equipment for this contract. Served as regulatory and vendor liaison.

**MICHAEL C. NORRIS**  
Staff Consultant



## **SUMMARY OF QUALIFICATIONS**

Mr. Norris has over 16 years of experience in the planning, development, and implementation of safety procedures in accordance with Federal guidance and standards. His expertise includes developing and supervising training programs, developing and implementing on-the-job training procedures, and directing quality assurance operations. Mr. Norris also has a broad range of experience with complex computer hardware and software (including IBM XT/AT/386 computers using the Microsoft Disk Operating System and application packages, including WordPerfect 5.1, Lotus 1-2-3, MathCad, AutoCad, File Express, dBase IV, Paradox 3.5, Ryan/McFarland FORTRAN 77, Turbo C++, and 80x86 Assembly Languages), and has performed extensive research in the field of laser optics. Mr. Norris also currently serves actively in the U.S. Air Force Reserve.

## **EDUCATION**

M.S., Electrical Engineering/Communication Systems, New Mexico State University,  
expected 1992

B.S., Electronic Engineering, Chapman College, 1984

Inservice training, U.S. Air Force:

Safety, Quality Assurance, Data Acquisition, Lasers, Optics, Explosives

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

Society of Photo-Optical Instrumentation Engineers (SPIE)

Institute of Electronic and Electrical Engineers (IEEE)

Systems Safety Society (SSS)

DoD "TOP SECRET" Clearance

## **PROFESSIONAL EXPERIENCE**

**Safety Analysis Reports, Pantex Plant - Mason & Hanger-Silas Mason Co., Inc.** Currently supporting the development of safety analysis reports for numerous facilities, including high explosive and radioactive process facilities, at the Department of Energy (DOE) Pantex Plant in Amarillo, Texas. This effort includes the evaluation of facilities and systems for compliance with established safety criteria and practices, estimation of the consequences of abnormal operations and accidents, and the characterization of the low-level, mixed, and hazardous waste streams produced by the operations conducted within the facility.

**Computer Modeling of Release Plume, Radiological Hazards Assessment - Mason & Hanger-Silas Mason Co., Inc.** Modeled the aerosol and particulate dispersion of radioactive materials into the atmosphere following postulated accidents at the DOE Pantex Plant by using the Gaussian distribution dispersion model, HOTSPOT (a radioactive dispersion model), and EPI (Emergency Prediction Information) Codes.

**Computer Model Development, Radiological Hazards Assessment - Mason & Hanger-Silas Mason Co., Inc.** Developed a database computer program to catalog, track, and calculate hazard indices for the hazardous and radioactive materials located throughout the Pantex Plant.

**Computer Model Development - Strategic Defense Initiative Office.** Developed advanced computer models for strategic Acquisition, Tracking, and Pointing of Directed Energy Weapon systems. The models simulate parameters such as orbital dynamics, platform jitter, booster dynamics and laser propagation. Developed digital filters to reduce the effects of the physical perturbations. Developed computer model to analyze and design proposed laser radar (ladar) experiments. The model simulated atmospheric turbulence, refraction, and propagation of a laser beam through the atmosphere. The atmospheric turbulence variables modeled were  $C_n^2$  and  $R_0$ , and dispersion factors caused by aerosols and particulates. Other models frequently modified and used included the Free Electron Lasers, Cloud Clearing by High Energy Lasers, Thermal Analysis of High Energy Laser Windows, and a Non-Linear Differential Equation solver.

**Explosives Handling, Safety, and Training - U.S. Air Force Reserve.** During Reserve duty, has had extensive experience handling, instrumenting, and detonating high explosives for various experiments. Instrumented and evaluated new research high explosives. Instrumented structures and reduced and analyzed data from different tests involving high explosives. Designed microprocessor-controlled data acquisition equipment for acquiring time-of-arrival signals during high explosives testing. Required to survey and model each site before high explosive tests could be conducted. Surveys and models included (but were not limited to) Soil Mechanics, Environmental Issues, Water Supply and Drainage, and Atmospheric Dispersion. Soil Mechanics included grain size, classification of soils, Atterberg limits, soil permeability, internal friction and cohesion, vertical pressures, and soil bearing capacity.

**Atlas Space Booster Quality Assurance - U.S. Air Force.** Directed the quality assurance operations and activities of 22 personnel for the \$8 million Atlas vehicle. Responsible for the analysis of test data gathered during the checkout and processing of all missile instrumentation and guidance systems. Evaluated all Standard Operating Procedures, Engineering Test Instructions, and Procedure History Sheets.

**Advanced Quality Control - Graduate Study.** Successfully completed graduate-level course in Statistical Quality Control. Studied Probability Models, Stabilizing and Improving a Process with Control Charts, Attribute Control Charts, Variables Control Charts, Out-of-Control Patterns,

Diagnosing a Process, Specifications, Process Capability and Improvement, Taguchi Methods, Deming's 14 points and Reduction of Variation, and Design of Experiments.

**Reliability Theory - Graduate Study.** Successfully completed graduate-level course in Reliability Theory. Studied Poisson reliability models, Gamma Distribution model, Weibull Distribution model, Lognormal Distribution, and the Bathtub reliability model. Also studied reliability of multicomponent systems, standby redundancy, life testing, planning and conducting reliability tests, and availability and maintainability.

**Solvent Replacement Research - U.S. Air Force.** Researched potential substitutes for freon-113 that could be used for optical component cleaning. Substitutes had to be non-toxic, non-corrosive, environmentally safe, comply with the Clean Air Act (CAA), comply with the Toxic Substance Control Act (TSCA) and comparable to freon's cleaning characteristics. Followed the Montreal Protocol and the National Environmental Policy Act (NEPA) to ensure the new cleaner would comply.

**Personnel & Laboratory Safety - U.S. Air Force.** Responsible for the safety of personnel and equipment at the Air Force Weapons Laboratory, Albuquerque, New Mexico. Planned, developed, and implemented safety procedures for laser, chemical, and electrical hazards. Developed safety procedures in accordance with OSHA and Air Force Occupational Safety and Health Standards. Conducted chemical hazards assessments that pertained to the laser laboratory. Conducted laser safety assessment for the Laboratory and all experimental efforts conducted in the Laboratory. Conducted facility safety and fire assessments and inspections.

**Personnel Training - U.S. Air Force.** Successfully completed the Air Force Technical Instructor Course and certified as a Master Instructor. Receive extensive training in Nuclear Safety and Hazards. Developed lesson plans and training programs for new personnel on the Minuteman ICBM system. Supervised and monitored students' performance on the Minuteman ICBM system. Responsible for lesson plan preparations and presentations to students so that they could proficiently analyze and correct faults.

**Training Program Development - U.S. Air Force.** Developed and implemented on-the-job procedures and training programs for new personnel. Training programs developed include printed circuit board design and manufacture, an introductory microprocessor course, and range safety and procedures that pertained to the Western Test Range.

**Outgoing Wavefront Sensor Experiment - Strategic Defense Initiative Office.** Performed experimental laboratory setup, optical alignment, and data analysis of an Advanced Outgoing Wavefront Sensor experiment. The experiment correlated an aberrated wavefront with computer generated holograms in order to reconstruct the wavefront. Derived and developed software for the Fresnel Transform.

**Optical Measurement and Analysis - Kirk-Mayer, Inc.** Performed optical measurements and analysis on deformable mirrors. Measurements characterized the mirrors ability to correct for atmospheric aberrations. Performed the precision measurements of precise actuator locations, the system gains, actuator coupling response, maximum zonal control and actuator voltage limits, and the mirrors' ability to flatten and correct for atmospheric aberrations.

**Digital Heterodyne Interferometer Design - U.S. Air Force Weapons Laboratory.** Coordinated a 10-member Digital Heterodyne Interferometer design team. Designed data acquisition and microprocessor interface circuits. Programmed microprocessors. Received a patent for the Digital Phase Metering Circuit. Completed the design of closed loop control for adaptive optics. Provided state-of-the-art equipment to characterize optics.

**Circuit Design - U.S. Air Force Weapons Laboratory.** Designed fast analogue-to-digital and digital-to-analogue circuits supporting directed energy weapons and nuclear technology. Contributed to PLZT holographic research, earning five World Firsts. Designed control circuitry for wavefront correction experiments.

**Thermal Absorption Evaluation - U.S. Air Force Weapons Laboratory.** Evaluated thermal absorption of optical components using laser optic calorimeters. The devices performed measurements in the 40-60 ppm range.

**Development of Laser Optic Calorimeter - U.S. Air Force.** Lead engineer in the research and development of a state-of-the-art laser optic calorimeter. Sensitivity of 10 ppm and variable angle of incidence categorizes it as the most sensitive optical measurement device. Designed and built high vacuum systems capable of pressures to  $10^{-6}$  Torr. Designed a thermistor bridge and amplifier network capable of detecting a 10 microdegree temperature change.

**Proposal Preparation - Advanced Sciences, Inc.** Supported the Boeing Aerospace Division in writing a proposal for a contract involving the Free Electron Laser.

**DENNIS W. PEEK**  
Staff Engineer



## **SUMMARY OF QUALIFICATIONS**

Mr. Peek has experience in plant and project engineering, including projects related to environmental compliance. He has been responsible for mechanical systems design, layout coordination for a new production line, productivity studies, and mechanical design. Mr. Peek also has seven years of experience on personal and mainframe computers, including programming and database management. Mr. Peek's graduate study was financed by a competitively awarded graduate research position at the Center for East-West Trade Policy.

## **EDUCATION**

M.A., Political Science (Public Policy and International Relations, emphasis in Environmental Economics), University of Georgia, 1991

B.Mech.Eng., Georgia Institute of Technology, 1988

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCES**

Engineer-in-Training (GA)  
American Society of Mechanical Engineers

## **PROFESSIONAL EXPERIENCE**

**Safety Analysis Reports, Pantex Plant - ERCE for Mason & Hanger-Silas Mason Co., Inc.** Currently supporting the development of Safety Analysis Reports (SARs), including quantitative and qualitative safety analyses, for several facilities at the Department of Energy (DOE) Pantex Plant in Amarillo, Texas.

**Temporary Mechanical Engineer - Seaboard Farms.** Served as assistant to the plant engineer at this food processing plant. Performed layout coordination for a new production line, productivity studies, and mechanical design.

**Mechanical Design Engineer - Barrett, Woodyard, & Associates.** Responsible for the design of mechanical systems for schools and office buildings, and for project management for this engineering consulting firm.

**Engineering Intern - Monsanto Co.** Performed mechanical design and quality control engineering at a plastics manufacturing plant. Wrote the software package for Statistical Process Control.

**PUBLICATIONS**

Peek, D.W., 1991. The Effect of Pollution Control Regulation on the International Competitiveness of the American Chemical Industry, Master's Thesis, University of Georgia.

**RICHARD A. STEPHANS**  
Principal Consultant



## **SUMMARY OF QUALIFICATIONS**

Mr. Stephans has 28 years of experience in the evaluation and management of nuclear, chemical, and environmental programs. His management experience encompasses the supervision of ordnance, chemical, safety, quality assurance, and logistics personnel, as well as the management of a government-owned, contractor-operated chemical plant. Mr. Stephans has also managed acquisition projects for nuclear weapons components and ancillary devices. He has technical specialty in systems safety and advanced planning for quality assurance operations, and spent more than 15 years performing nuclear and other quality audits. Mr. Stephans' expertise also includes environmental analysis and pollution control. He has received formal training in hazardous waste disposal, has performed impact assessments and prepared impact statements, has conducted safety analyses, and is familiar with the requirements of the Environmental Protection Agency, the Department of Transportation, the Federal Emergency Management Agency, the Nuclear Regulatory Commission, the Occupational Safety and Health Administration, the Department of Defense, and the Department of Energy. Mr. Stephans is also an explosives and munitions expert. In addition to receiving specific ordnance munitions technical training, he has hands-on experience with a variety of conventional, chemical, and nuclear devices.

In addition, Mr. Stephans has actively followed progress on the Waste Isolation Pilot Project/Plant (WIPP) since 1980. For example, as a student at the National Defense University, he authored a paper on waste management policies, pursued studies in the nuclear production specialty area, and attended onsite DOE presentations about WIPP. While assigned to the Defense Nuclear Agency, he was involved with joint DOE-DOE emergency planning activities and response exercises, and responded to an actual nuclear weapons accident (ICBM silo in Damascus, Arkansas).

## **EDUCATION**

M.S., Mechanical Engineering, New Mexico State University, 1964

B.S., Chemical Engineering, Purdue University, 1957

Air War College, U.S. Air Force, 1974

Industrial College of the Armed Forces, 1979

### **Specialized Training:**

Nuclear Weapons Maintenance Training - Defense Nuclear Agency

CNWDI, SONAC, NWOA, Security Training - DOD Nuclear Weapons School

Operations Research - Army Logistical Management College

System Safety Engineering - University of Southern California

Radiological Waste Management, Quality Assurance - Sandia National Laboratories

Detonator Course - Los Alamos National Laboratory

DOE/DOD Joint Nuclear Weapons Accident Exercises

Strategy of Arms Control - National War College  
Nuclear Weapons Production - Industrial College of the Armed Forces  
Hazardous Materials Handling - J.T. Baker  
Laser Safety - University of Maryland  
TRU Waste Handling Course Certification - DOE, Rocky Flats Plant

### **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

Certified Lead Nuclear Quality Assurance Auditor (NQA-1a) (Trainer and Certifier of QA Auditors)  
Registered Professional Engineer, California  
Fellow, American Institute of Chemists  
American Society for Quality Control (Senior Member)  
American Society of Mechanical Engineers  
Society for Risk Analysis  
System Safety Society (Senior Member)  
New Mexico Engineering Societies Presidents' Council  
Who's Who in Technology, 1986  
DOE "Q" Clearance  
DOD "TOP SECRET," Critical Nuclear Weapon Design Information (CNWDI) (inactive)

### **PROFESSIONAL EXPERIENCE**

**Facility Safety Assurance - Los Alamos National Laboratory.** Assisted in formulating and developing a program for the safety assessment of DOE government-owned, contractor-operated (GOCO) non-reactor nuclear facilities. The work focused on personnel staffing to assure the safe and efficient conduct of operations and maintenance at these facilities. In addition, the work provided technical requirements input and a checklist methodology for the conduct of facility audits to assess staffing adequacy.

**Safety Analysis Review - Battelle Columbus.** Provided review, onsite evaluation, and analysis of a high explosives machining facility at the DOE Pantex Plant in Amarillo, Texas. The project included extensive onsite research; evaluation of a multiple bay, large capacity facility for explosive component assembly/disassembly, quality assurance, computer-controlled remote machining with lathes, saws, milling machines, and water jet cutters; facility waste processing; and overall design as each related to the safety and health of the workers, the public, and the environment. The resulting safety analysis report, prepared according to the requirements of DOE/AL Order 5481.1B, "Safety Analysis and Review System," consisted of 18 chapters and 6 appendices containing qualitative and quantitative analyses, and included the use of probabilistic and deterministic analysis techniques.

**Radiological Hazards Assessment - Mason & Hanger-Silas Mason Co., Inc.** Supported the assessment of radiological hazards the Pantex Plant, Amarillo, Texas. The project included developing a hazard index for use by the Emergency Operations Center, preparing a complete inventory of radiological materials, computing worst case effects and probabilities, and performing criticality evaluations.

**Rocky Flats Plant Safety Operations - U.S. Department of Energy.** Mr. Stephans provided quick reaction support to the DOE Nuclear Safety Branch in the areas of safety action monitoring/reporting, coordination of scientific contractor assistance, and integration of branch assessment of operating contractor safety status. These efforts were accomplished during a particularly turbulent period of plant restoration operations related to safety and health.

**Chemical Engineering - Public Service Electric and Gas, Harrison, New Jersey.** Provided entry-level chemical engineering support to a gas manufacturing plant that produced a mixed gas by using multiple production units. Production units included catalytic cracking of natural gas, coke ovens, and other coal fueled units.

**Factual/Expert Witness - Volunteer Army Ammunition Plant.** Provided testimony about air and water pollution at a chemical plant during a suit hearing before a Federal judge. The testimony, in part, resulted in a settlement between the Federal Government and the county that brought the suit.

**Analysis of Effects of Releases of Radioactive Materials - Defense Nuclear Agency.** Directed a project to assess and provide near real-time analysis of the effects of accidental non-nuclear explosion- or burning-induced scatter of radioactive material at various Department of Defense locations. Project required the use of theoretical and historical site-specific data, as well as actual conditions in order to plot the path of the radioactive plume. Provided project presentations to the Assistant Secretary of Defense and the Director of the Federal Emergency Management Agency.

**Toxic Waste Disposal - U.S. Army.** Coordinated and assisted in a study of the disposal of a particularly toxic by-product of TNT production known as "red water." His input enhanced the design, construction, and successful operation of a red water thermal incineration facility.

**Hazardous Waste Management - Air Force Airborne Laser Laboratory, Kirtland AFB, New Mexico.** Managed the analysis, packaging, and placement of hazardous waste in more than 50 55-gallon drums. These drums were later identified, properly marked, and disposed of according to authorized procedures, including transport to a disposal facility.

**Quality Assurance and Reliability Audits - Atomic Energy Commission/Department of Energy.** Served the Albuquerque Operations Office as a Quality Assurance Engineer and conducted QA and reliability audits of production and quality operations at the General Electric

Company, Union Carbide, DuPont, Monsanto Chemical, Rockwell International, Mason & Hanger-Silas Mason Co., Inc., and the Bendix Corporation nuclear production facilities. Also supported reviews of design laboratories to ensure proper translation of component and assembly design to the finished product.

**Development and Implementation of System Safety Program Plan - Westinghouse Electric Corporation.** Served as Senior System Safety Engineer at the Air Force Rail Garrison program for Peacekeeper ICBM basing. Duties included co-writing a system safety program plan, performing preliminary and subsystem/system hazard analyses of the missile launch car, and participating in various technical interchange meetings and program reviews during the full-scale engineering development program phase. Also provided software safety analysis and a nuclear surety launch action study.

**System Safety and Effectiveness Program - U.S. Air Force Airborne Laser Laboratory.** For three years, managed three other engineering professionals, performed various safety analyses, assisted the chief of safety of the Air Force Weapons Laboratory (now Phillips Laboratory) system safety-related efforts, including environmental issues, and supervised the quality assurance program. Also, upgraded the safety engineering efforts for the Sandia Optical Range, the Peacekeeper (MX) program, and the White Sands Missile Range National Laser Test Range. These efforts included hazard analysis methods such as fault tree and logic tree analysis.

**Chemical Plant Explosion Investigation - U.S. Army.** Directed a team of technical experts over a three-month period in the investigation of a \$20 million chemical plant explosion at the Hercules plant in Radford, Virginia. The investigation resulted in the exact determination of cause and resulted in more than 30 corrective actions.

**B2 Software System Safety - U.S. Air Force.** Contributed to a formerly classified project in the emerging field of software system safety. The discipline was so new that much of the guidance documentation did not exist or was only available in early draft form. Through extensive study and evolution, the team of computer scientists and safety engineers was able to establish one of the first (if not the first) software system safety program.

**System Safety Engineering and Environmental Engineering Support - Private Classified Client.** Provided support to a client initiating a very advanced technology prototype manufacturing program. Authored several documents, including a system safety program plan, an environmental assessment, and a company hazard communications handbook.

**Analysis of Resources and Technology Program - Tooele Army Depot.** Responsible for safety, security, chemical surety, and quality assurance analyses. The project assessed the "as-is" status, determined needs, analyzed depot operations using IDEF (Integrated Computer Aided Manufacture Definition) methodology, produced a technology matrix, and made recommendations for improvement in the form of a "to-be" analysis.

**Chemical Plant Management - U.S. Army.** Directed a \$150 million hardware construction and modernization project that converted manufacturing from batch processing to continuous computer-controlled processing. Construction and modernization projects included sulfuric acid regeneration units, an ammonia oxidation facility, and a direct strong nitric acid plant, as well as six 50-ton per day continuous nitration TNT production lines and the ancillary air and water pollution control facilities. Responsible for ensuring that proper design was incorporated into construction and that construction was completed on time and at, or below, projected cost. The chemical plant start-up was successfully completed and produced a quality product that met demanding military specifications at greater than anticipated production rates.

**Operations Support - U.S. Army Chemical Corps School.** Maintained technical familiarity with and planned the use of a full line of chemical warfare material for the Chemical Corps School. This material included a variety of live chemical agents, such as nerve gases, phosgene, and mustards; simulants of toxic chemical agents; containers, from 1-gallon land mines to projectiles, to 1-ton containers; individual and area decontamination equipment, including the power-driven decontamination apparatus; individual and collective protection devices, from full butyl rubber suits to permanent facilities; and chemical agent detection devices, including automatic alarms. Reviewed the operations and was briefed on chemical munitions disposal, as well as waste treatment and manufacturing facilities, at the Rocky Mountain Chemical Munitions Arsenal.

**Director of Ammunition Operations - U.S. Army, Okinawa.** Responsible for both conventional explosives and ammunition as well as special ammunition, such as chemical warfare agents stored in the Red Hat designated area. Chemical operations included munitions maintenance, decontamination, disposal, personnel safety, and emergency actions, including detection of leaking chemical munitions. When the inventory was moved to Johnston Atoll in the Pacific Ocean, Mr. Stephans coordinated with the Defense Nuclear Agency to establish emergency response plans, reviewed chemical maintenance and decontamination operations, and initiated site planning for the Johnston Atoll Chemical Agent Disposal Facility.

**Director of Plans and Operations, Field Command - Defense Nuclear Agency.** Commanded several military units, including a large overseas nuclear weapons storage and maintenance facility. Served as nuclear weapons development engineering liaison while assigned to the DOE Albuquerque Operations Office, and participated in a nuclear weapons production special program conducted at Washington, DC; Amarillo, Texas; and Albuquerque and Los Alamos, New Mexico. Interacted with every nuclear design laboratory and production facility, had onsite meetings at Strategic Air Command Headquarters and with the Joint Strategic Target Planning Staff. Participated in the planning of Joint DoD-DOE nuclear weapons accident exercises.

**Technical Inspector/Team Chief, Inspector General, Pentagon - U.S. Army.** In 3 years of worldwide nuclear inspection duty, Mr. Stephans inspected the majority of the Army's nuclear weapon storage, maintenance, and operational sites and tested units over a full range of technical,

security, safety, and administrative requirements. In addition to inspecting Army and DoD nuclear research reactors, he established procedures and headed a team that performed the final decommissioning inspection of a nuclear power reactor.

**Test Range Operations - White Sands Missile Range.** Responsible for all phases of test range operations, including test planning, conduct, and analysis of the Athena missile, a part of the Air Force Advanced Ballistic Missile Reentry System.

**Proposal, Management of Safety Issues - Marshall Space Flight Center.** During a 6-month period, gained familiarity with a full range of NASA policy and procedure documents. Supported unique NASA programs such as SAFE ALERT. The effort culminated in a "Best and Final" oral and written presentation to the highest levels of NASA management in Huntsville.

**Proposal, Design and Development of a Solid Rocket Booster - United Technologies Chemical Division.** Supported the development of a comprehensive proposal for the design and engineering development of a solid propellant, large booster for satellite launch. In conjunction with this effort, prepared the system safety program plan, wrote the safety section of the proposal, and defended both before a nationally recognized technical review committee.

**Methodology for Design Requirements Verification - Westinghouse Electric Corporation, U.S. Air Force Rail Garrison.** Responsible for developing the methodology to verify design requirements on a large systems acquisition program. Working with other systems engineers, evaluated various methods and tailored these into a system that would efficiently track and support the design specification verification. The method used scope sheets for each specification requirements paragraph, which, when filled in, provided the detailed method (test, analysis, examination, and/or demonstration) that would provide the evidence to verify the incorporation of the requirements into the design. The scope sheets formed the basis of the package that was developed for the functional configuration audit of the overall acquisition program.

## **SELECTED PUBLICATIONS**

Stephans, R.A., 1993. System Safety Analysis Handbook, to be published by the System Safety Society, Sterling, Virginia, July.

Stephans, R.A., 1990. "Simulation Modeling Application to System Safety Program Assessments," paper jointly written with W.W. Talso, Hazard Prevention, July/September.

Stephans, R.A., 1988. "Software System Safety Update," Reliability Review, June.

Stephans, R.A., 1985. "The New Field of Software Safety," Reliability Review, October.

Stephans, R.A., 1982. "Nuclear Stockpile Management," written with LCdr. M.E. Register, Army Logistician Magazine, May-June.

Stephans, R.A., 1981. "OKLO," article about a naturally occurring nuclear fission reactor, Technology and Analysis Report, Defense Nuclear Agency, March.

Stephans, R.A., 1974. "Quality Assurance for Nuclear Weapons," Army Logistician Magazine, May-June.

### Presentations

Stephans, R.A., 1992. "RCRA Permit Experience," jointly written with D. Gallegos, to be presented at the Science and Electronics Conference, May.

Stephans, R.A., 1991. "A Supplemental Safety Analysis Technique and Methodology Compendium," jointly written with W.W. Talso, presented at the Tenth International System Safety Conference, July.

Stephans, R.A., 1990. "Risk Analysis Methodology for the Peacekeeper Rail Garrison Missile Launch Car," joint presentation with S. Brown, Westinghouse Electric Corporation, Annual Risk Analysis Society Meeting, New Orleans, Louisiana, October. (Session Chairman)

Stephans, R.A., 1989. "Simulation Modeling Application to System Safety Program Assessments," jointly written with W.W. Talso, presented at the Ninth International System Safety Conference, Long Beach, California, July. (Judged a "Best Paper" of the more than 150 submissions.)

Stephans, R.A., 1988. "Contractor System Safety Experience," with W.W. Talso, presentation to a combined meeting of the Los Alamos Chapter and the New Mexico Chapter of the System Safety Society and the Los Alamos Chapter of the American Society of Safety Engineers, Los Alamos, New Mexico, January.

Stephans, R.A., 1987. "Winning System Safety Program Plans-- An Update," jointly written with W.W. Talso, presented at the Eighth International System Safety Conference, New Orleans, Louisiana, July.

Stephans, R.A., 1987. "IDEF Modeling Application to Quality Assurance Assessments," jointly written with D.A. Fox, presented at the 41st Annual Quality Congress, Minneapolis, Minnesota, May.

Stephans, R.A., 1986. "Software Safety for Nuclear Reactors," jointly written with Dr. G.W. McDonald and W.W. Talso, presented at the Joint American Nuclear Society/European Nuclear Society Topical Meeting entitled Operability of Nuclear Power Systems in Normal and Adverse Environments, Albuquerque, New Mexico, September.

Stephans, R.A., 1985. "Winning System Safety Program Plans," jointly written with W.W. Talso, presented at the Seventh International System Safety Conference, San Jose, California, July.

Stephans, R.A., 1983. "High Energy Laser Systems Protection Methodology and Operations, Air Force Airborne Laser Laboratory Experience," presented to the Fifth Joint Services Laser System Safety Working Group Conference, Edgewood, Maryland, November 15-17.

Stephans, R.A., 1983. "System Safety Lessons Learned -- 10 Years of the Airborne Laser Laboratory," presented at the Sixth International System Safety Conference, Houston, Texas, September.

Stephans, R.A., 1982. "Ground Launched Cruise Missile Test and Evaluation in a Nuclear Biological, and Chemical Environment," presented to the 49th Military Operations Research Society Symposium, June.

Stephans, R.A., 1974. "Major Explosion Investigation Management," presented to the Department of Defense Explosive Safety Board International Seminar, Hollywood, Florida, September.

Stephans, R.A., 1972. "Department of Defense Participation in the Quality Assurance of Atomic Energy Commission Produced Nuclear Weapons," presented to the Amarillo, Texas, subsection of the American Society for Quality Control, June.

**JOHN M. TEEL**  
Staff Consultant



## **SUMMARY OF QUALIFICATIONS**

Mr. Teel has been actively involved in the support of various Department of Energy (DOE) programs. Most recently, he has been managing the development of format and content guides and review plans for safety analysis reports for various types of DOE nuclear facilities. He has extensive knowledge of the DOE Order system and its requirements. Mr. Teel recently supported the development of safety analysis reports at the DOE Pantex and Pinellas Plants. He also made a significant contribution to the formulation of safety requirements for the Department of Energy's new nuclear material production reactor. Mr. Teel also has extensive experience in the design and development of electronic and software systems.

## **EDUCATION**

1991	MBA, Anderson School of Management, University of New Mexico
1984	B.S., Electrical Engineering, New Mexico State University
1983	B.S., Chemical Engineering, New Mexico State University

### **In-service Training:**

1989	Short Course on Modular High Temperature Gas-Cooled Reactors: Commercial and Production Reactors
1991	Short Course on Underground and Above Ground Storage Tanks

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

Engineer-in-Training (EIT) (1983)  
Member, American Institute of Chemical Engineers  
DOE "Q" Clearance

## **PROFESSIONAL EXPERIENCE**

**Support to DOE High-Level Waste Storage Tank Farms Working Group - Los Alamos National Laboratory.** Member of the high-level waste storage tank farm working group, under the direction of Los Alamos National Laboratory and DOE Headquarters. The effort includes helping define the acceptance criteria, safety envelope, and the requirements for a strong conduct of operations program at all DOE high-level waste storage tank farms. Participants in the group include personnel from Hanford, Idaho Falls, Savannah River, West Valley, and various DOE organizations.

**Safety Analysis Guides for DOE High-Level Waste Storage Tank Farms - Los Alamos National Laboratory.** Project manager in charge of developing, under the direction of Los Alamos National Laboratory, a Format and Content Guide for Safety Analysis Reports for the DOE High-Level Waste Storage Tank Farms. This project also includes the development of a Review Plan for the waste tank safety analysis reports. A format and content guide directs the writer of safety analysis reports in the types of analyses that should be conducted. The review plan provides a reviewer of the safety analysis reports with the requirements against which these reports are judged. This effort requires analyses of all relevant DOE, Nuclear Regulatory Commission (NRC), and Environmental Protection Agency (EPA) guidance and regulations, including the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This project originally began as a support role to Hanford Westinghouse and the waste tank farm facilities at the DOE facility in Hanford, Washington. The project has now expanded to become a DOE complex-wide program for developing safety analysis reports for the High-level Waste Tank Farms at West Valley, Savannah River, Idaho Falls, and Hanford.

**Safety Analysis Guides for DOE Nonreactor Nuclear Facilities - Los Alamos National Laboratory.** Lead author in the development of a Format and Content Guide for Safety Analysis Reports for DOE non-reactor nuclear facilities. This effort required a review of all pertinent regulations and guidance, including DOE, NRC, and industry documents. Also currently lead author in the development of the corresponding review plan for these safety analysis reports.

**Safety Analyses - Pinellas Plant.** Supported the development of an approach for conducting safety analyses at the DOE Pinellas Plant near Tampa, Florida.

**Safety Analysis Report, Pantex Plant - Mason & Hanger-Silas Mason Company.** Member of a team performing safety analysis studies and writing the Safety Analysis Reports for facilities at the Pantex Plant in Amarillo, Texas. This effort has included conducting blast effects analyses from explosions in adjacent facilities.

**New Production Reactor - Los Alamos National Laboratory.** Supported the development of safety requirements for the Department of Energy's New Production Reactors. Responsible for developing requirements for the various reactor design concepts, and for establishing their technical bases and their regulatory and policy relationships to DOE nuclear safety policy, the NRC regulatory base for commercial nuclear reactors, and International Atomic Energy Agency guidance. Also supported the development of a Format and Content Guide for Safety Analysis Reports for the New Production Reactor.

**Communications Network Development - EG&G Energy Measurements.** Responsibilities included developing a communications network to be used to monitor security training exercises, coordinating the development of a motion detection system for a military application, developing a microprocessor-based detection system used to detect laser coded messages, designing an

optical controller gun for use in a security training system, and acting as liaison to Data I/O Corp. and MOSAIC Systems, Inc., during the development of a silicon circuit board technology. Also, completed a technical feasibility study for developing a Fiber Optic Wavelength Division Multiplexing System.

**F15 Multi-Purpose Color Display - Sperry Flight Systems.** Served as direct link between engineering and manufacturing during production of the F15 Multi-Purpose Color Display (MPCD). Also served as liaison to the customer, McDonnell Douglas Aircraft. Responsible for troubleshooting all electrical and mechanical problems arising during production. Supported all repair activities and tracked all field failures associated with the MPCD.

**Development of Computer-Controlled Test Systems.** Responsible for the electrical and mechanical design and software development necessary to develop an automatic test station for PIN photodiodes. Developed initial monitoring system and software for photodiode burn-in/reliability. Developed an automatic test station for 1.3 m laser diodes and 1.3 m LEDs. Developed design for the automation of LPE furnaces in which epitaxial layers for devices were grown. Supervised all device test operations.

**Instructor, Electrical Engineering.** Instructed freshman-level computer engineering course with emphasis on FORTRAN programming, Boolean algebra, and basic logic design.

## **PUBLICATIONS**

Teel, J.M., et al., 1991. Department of Energy High-Level Waste Storage Tank Safety Issues Report, DOE High-Level Waste Tank Working Group, December.

Teel, J.M., et al., 1991. Categorized Safety Requirements for U.S. Department of Energy Non-reactor Nuclear Facilities, Los Alamos National Laboratory, Los Alamos, New Mexico, September.

Teel, J.M., et al., 1991. A Proposed Format and Content Guide for U.S. Department of Energy High-Level Waste Storage Tank Farms Safety Analysis Reports, Los Alamos National Laboratory, Los Alamos, New Mexico, February.

Teel, J.M., et al., 1990. A Proposed U.S. Department of Energy Safety Analysis Report Format and Content Guide for Nonreactor Nuclear Facilities, Los Alamos National Laboratory, Los Alamos, New Mexico, November.

Teel, J.M., et al., 1990. A Proposed U.S. Department of Energy Safety Analysis Report Review Plan for Non Reactor Nuclear Facilities, Los Alamos National Laboratory, Los Alamos, New Mexico, November.

Teel, J.M., 1990. Comparison of Three Candidate Safety Analysis Report Format and Content Guides for U.S. Department of Energy Nonreactor Nuclear Facilities, Los Alamos National Laboratory, Los Alamos, New Mexico, November.

**STEPHEN T. WRIGHT**  
Nuclear Engineering Intern



## **SUMMARY OF QUALIFICATIONS**

Mr. Wright is currently completing undergraduate coursework at the University of New Mexico in the field of Nuclear Engineering. He has studied principles of nuclear engineering, radiation safety and measurements, and engineering economic analysis. Mr. Wright is skilled in the use of the UNIX computer operating system, and has worked extensively with the FORTRAN, PASCAL, and BASIC computer languages. In addition, Mr. Wright was awarded a full tuition scholarship from the Waste Management Education and Research Consortium (WERC).

## **EDUCATION**

Currently completing coursework, B.S., Nuclear Engineering, University of New Mexico (College of Engineering Honor Roll, Spring 1991)

## **PROFESSIONAL REGISTRATIONS/AFFILIATIONS/CLEARANCE**

American Nuclear Society  
President, University of New Mexico Karate Club

## **PROFESSIONAL EXPERIENCE**

**Safety Analysis Reports, Pantex Plant - Mason & Hanger-Silas Mason Co., Inc.** Supporting the multiple facility safety analyses in progress at the Pantex Plant, Amarillo, Texas. This effort includes the comparison of the "as-built" features of each facility to the design criteria outlined in the DOE Orders, the calculation of blast effects on the facility of interest from explosions in adjacent facilities, preparing narrative descriptions of the structural characteristics of various facilities, and researching applicable Pantex Plant operating standards and guidelines.

**Safety Analysis Guides, Nonreactor Nuclear Facilities - Los Alamos National Laboratories.** Supporting the development of format and content guides for safety analysis reports for Department of Energy nonreactor nuclear facilities (processing facilities, waste storage tank farms). This effort includes a comparison of several guidance documents (NRC, DOE, and other industry documents) to determine the applicability of the issues addressed to the nonreactor nuclear facilities under consideration.

**Plant Life Extension (PLEX) Project - Sandia National Laboratories.** Currently supporting the PLEX project, including evaluating the effect of the age-related degradation of nuclear power plant structures, systems, and components on risk.

**PUBLICATIONS**

Wright, S.T., 1991. "Incorporation of Subjective Factors into the Computer Model Currently Used for the Routing of Hazardous Waste Materials," University of New Mexico, December.

**Presentations**

"Incorporation of Subjective Factors into the Computer Model Currently Used for the Routing of Hazardous Waste Materials," University of New Mexico, December, 1991.

## APPENDIX B

### ERCE Facilities Available in Albuquerque, New Mexico

The ERCE facility in Albuquerque, New Mexico, consists of offices for 25 personnel in two buildings at the Shaeffer office complex in the Northeast Heights. Resources include the following:

#### In-house Equipment

- Computers

- 16 - IBM PC type computers up to 486 turbo

- 1 - Lap Top PC

- 1 - Macintosh

- Computer-Associated Equipment

- 3 - Laser Printers

- 2 - Ink Jet Printers

- 1 - OCR Scanner (Pending award of this contract. To be purchased with overhead capital equipment dollars.)

- Reproduction

- Sharp SF 8200 Automatic Copy Machine

- Telephone Network

- Alarmed Classified Storage Vault Facility

- Microfiche Reader (Potentially for reading WIPP documents. We noted that the available 5 volume WIPP Part B Application has 55 microfiche cards.)

#### Materials

- Document Library - More than 2000 books and related documents, including the 400 page EPA "Permit Applicants Guide Manual," PB-89-115695. (Plus the individual libraries of the more than 20 technical personnel assigned, each of which ranges up to two dozen volumes.)

- **Software Library - More than 50 ERCE-owned software program packages with documentation and eight specific computer modeling programs for use in probabilistic risk assessment and related radiological calculations.**

**Services Offered - For specific services offered see:**

- **Section 2.0 for Personnel and Qualifications;**
- **Section 3.0 for Review Capabilities Approach and Technical Services offered for this RCRA Part B Permit Application review and the review of other WIPP technical documents; and**
- **Sections 1.0 & 4.0 for Corporate Capabilities and directly related experience.**

