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Center for Nuclear Waste Regulatory Analyses

P.O. DRAWER 28510 • 6220 CULEBRA ROAD • SAN ANTONIO, TEXAS, U.S.A. 78228-0F10
(512) 522-5160 • FAX (512) 522-5155

April 12, 1990
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U. S. Nuclear Regulatory Commission
ATTN: Ms. Sharon D. Mearse
Contract Administrator
Division of Contracts and Property Management
Mail Stop F-902
Washington, D. C. 20555

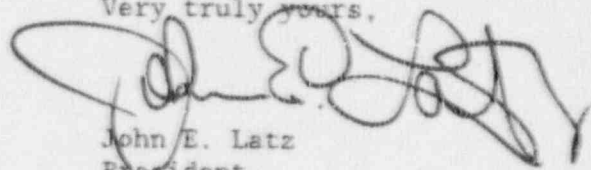
Subject: CNWRA Staffing Plan, Milestone 3702-073-220

Dear Ms. Mearse:

The revised subject Staffing Plan is provided in accordance with the "CNWRA FY90-91 Operations Plan for the Division of High-Level Waste Management," CNWRA Operations Program Element. This document has been prepared to fulfill the requirements of Center Operations Major Milestone 3702-073-220. It reflects revisions to the November 1989 Plan that were made in accordance with (a) the announced stretch-out in the DOE program, (b) changes in Center staff needs, and (c) hiring experience to date. We anticipate updating this plan annually, in accordance with the Operations Plan, or whenever major changes occur in the program staffing requirements.

Please contact me or W. C. Patrick if you have any questions regarding this matter.

Very truly yours,



John E. Latz
President

WCP/bsc

cc: See Attached Distribution List
CNWRA Directors
CNWRA Element Managers
S. Boyanowski

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Ms. Sharon D. Mearse
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Barbara Stiltenspole (23)
J. Funches
S. Fortuna
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Robert Browning
Robert Burnett
Mark Delligatti
Philip Altomare
Jerome R. Pearring
David Brooks
Pauline Brooks
James Kennedy
Russell Rentschler

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Mel Silberberg
Lawrence Shao
William Ott

STAFFING PLAN CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

Prepared for

Nuclear Regulatory Commission
Contract NRC-02-88-005

Prepared by

Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute

April 1990

**STAFFING PLAN
CENTER FOR NUCLEAR
WASTE REGULATORY ANALYSES**

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**Nuclear Regulatory Commission
Contract NRC-02-88-005**

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Southwest Research Institute**

April 1990

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STAFFING PLAN

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

INTRODUCTION

This Staffing Plan, now in its third revision, has been prepared to define the core and support staffing requirements in the various technical and professional disciplines for the Center for Nuclear Waste Regulatory Analyses (Center). Its principal purpose is to provide the Center with an internal baseline guidance document for its own use. In addition, it gives visibility of Center staffing plans to its client, the NRC. Both the currently identified and the projected scopes of work for the Center were used as a basis for this Plan. A five-fold rationale for estimating staffing needs is also presented. The planning horizon selected is the initial five-year contract duration, with the anticipation that this Plan will be updated from time-to-time as additional planning guidance and/or changes in scope of work occur.

LONG-TERM CENTER PROGRAM

The long-term program of the Center is defined broadly in its Contract, the Charter, and the budget, and is further expressed in the context of the NRC five-year program objectives. The importance of staffing has been further emphasized by the NRC in the Award Fee Plan. In establishing the Mission of the Center, the Charter emphasized the importance of staffing:

"... to provide sustained high quality technical assistance and research in support of NRC's high-level waste management program under the NWPA. The Center shall provide an organization which possesses high technical competence and is characterized by permanence, stability, and the capability of providing independent objective recommendations on complex technical issues." (Emphasis added by the authors of this Plan).

Both the Charter and the NRC's Five Year Objectives, as modified by the FY90-91 Program Element Plans and research directives, define the broad areas in which the Center must provide staff to execute the technical assistance and research activities that will be assigned to the Center. These are (1) waste systems engineering and integration, (2) geologic setting, (3) engineered barriers, (4) transportation, special projects and analytical investigations, (5) monitored retrievable storage and repository design, construction, and operation, (6) performance assessment, and (7) quality assurance. In addition, the Center requires certain skills in the areas of administration, database management, planning, etc. to manage its activities. This eighth area is designated as Center operations in subsequent tables and discussion. (Note that work related to the Monitored Retrievable Storage [MRS] facility has been postponed indefinitely until DOE plans regarding this element of the nuclear waste management system have been more clearly defined). The Center has identified the specific areas of technical expertise that are required to address each of these broad areas of endeavor.

Specific objectives and requirements are further defined and refined on a year-by-year basis through NRC programmatic guidance and consequent development of the Center Five-Year Plan, Operations Plans, and Project Plans. As these refinements and associated new staffing needs arise, the Staffing Plan of the Center will be revised accordingly. It is important to realize that the core staff of the Center will be established in those areas of expertise and experience which will be required on a long-term basis, with short-term needs being addressed by means of support technical staff drawn

from the Southwest Research Institute (the Institute), the Center's principal subcontractors, and a larger pool of subcontractors and consultants.

The Program Architecture, i.e., the system engineering approach and consequent system description for the high-level nuclear waste regulatory program, plays a key role in identifying staffing needs. As the Program Architecture defines and leads the development and execution of the Center scope of work, both essential and support areas of expertise are being identified and lodged in the Program Architecture database. Because the Program Architecture is currently in a developmental phase, it cannot be fully utilized to support this staffing plan. However, this Plan has been developed consistent with the current Program Architecture, particularly with the results of ongoing systematic regulatory analysis of 10 CFR Part 60, and has been formulated to provide staff to address uncertainties and program needs identified using the systems approach.

In that they define the scope of work and budget for the Center, these long- and short-term guidance documents provide the fundamental basis for determining the staffing requirements which the Center must meet to effectively execute its scope of work.

RATIONALE FOR ESTIMATING STAFFING NEED

A five-fold rationale was established for use in estimating the staffing needs for the Center over the five-year contract planning horizon. This rationale may be expressed as five questions which are addressed sequentially.

1. What Areas of Expertise and Experience are Required? This item is expressed as a technical or professional field in which a degree is granted or, in special cases where degrees are not granted in the area, the topical area of experience. In addition to the principal disciplines (such as geology), a number of subdisciplines are also identified. Only those subdisciplines which (a) require one or more core Center staff members and/or (b) are unlikely to be present as a subset of the skills of a principal discipline are listed here. Even with this limitation, nearly 70 areas of expertise and experience are addressed. Although a relatively large number of individual skill areas have been identified, there are nine areas of concentration or "centers of excellence" within which the Center will develop sufficient depth and breadth of expertise to provide support of high competence to the NRC Program. These are listed below. Note that where an area of expertise is related to more than one area of concentration, it is listed once under the area of concentration judged most applicable.

- **GEOCHEMISTRY**
 - Geochemistry
 - Radiochemistry & Isotope Geochemistry
- **HYDROLOGY/CLIMATOLOGY**
 - Hydrogeology
 - Hydrology
 - Meteorology/Climatology
 - Surface Water Hydrology
- **STRUCTURAL/TECTONICS**
 - Geology
 - Geomorphology & Quaternary Geology

- Geophysics
- Seismology
- Structural Geology & Tectonics
- Volcanology & Igneous Processes
- PERFORMANCE ASSESSMENT
 - Code Analysis
 - Geostatistics
 - Hazard Assessment/Analysis
 - Numerical Modeling
 - Performance Assessment
 - Risk Assessment/Analysis
- MATERIAL SCIENCES
 - Electrochemistry
 - Material Life Prediction
 - Material Sciences
 - Reliability
 - Waste Leaching
 - Welding/Fabrication Technology
- ROCK MECHANICS/MINING ENGINEERING
 - Crustal Geomechanics
 - Engineering Geology/Geological Engineering
 - Mining Engineering
 - Rock Mechanics
- MECHANICAL & FACILITIES ENGINEERING
 - Health Physics
 - Mechanical Engineering
 - Nuclear Engineering
 - Civil/Structural Engineering
- SYSTEMS ENGINEERING
 - Information Management Systems
 - Regulatory Analysis
 - Systems Analysis and Engineering
 - Transportation Analysis
 - Environmental Sciences
- ADMINISTRATION AND SUPPORT SERVICES
 - Administration
 - Database Management
 - Quality Assurance

Within each area of concentration, the Center is endeavoring to provide both a breadth of expertise and a range of experience. To the extent possible, a senior individual and an appropriate mix of intermediate and more junior level staff will be obtained for each area of concentration. Note, however, that not every area of concentration will be of sufficient size to permit the full range of experience to be available.

2. What Quantities of These Skill Levels are Needed? This item expresses the quantities of personnel which are needed on a year-by-year basis to accomplish the assigned scope of work. The assessment of need is purposely limited in this analysis by the currently identified levels of funding for the initial five-year contract period. Using planning factors that have been found to be appropriate for work of this type, as modified by our experience during the first two years of the contract, the following levels of core Center staffing are estimated to be supportable by the levels of funding identified in the Center contract. These estimated Full Time Equivalent (FTE) levels were calculated without the benefit of a detailed cost analysis, detailed knowledge of out year scope, or specific information on staff costs and, hence, are subject to change. Acquisition of staff has been slowed during FY90-91 (with respect to the previous plan) as a result of the recently announced DOE program stretch-out.

FY88	FY89	FY90	FY91	FY92
Year 1	Year 2	Year 3	Year 4	Year 5
21	28	42	51	51

3. When are These Skills Required? This item indicates when the expertise or experience is determined as being required to execute the anticipated scope of work. For the first two years of the contract (FY88-89), which have already been completed, this is expressed as the year in which the skill was acquired. For FY90, this is expressed as the quarter in which the skill is needed. For the out years, it is expressed as the year in which the skill is needed. Further delineation of the outyears will be provided in subsequent updates to this Plan.
4. For What Period of Time are These Skills Required? This is a measure of continuity of need for the expertise or experience. If the need is judged to be "continuous and long term", the Center intends to add that skill area to the core Center staff. For planning purposes, it is not important to know precisely the period of time. In general, personnel will be added to the core Center staff if they are anticipated to be needed full time for two or more years.
5. Where are These Personnel Best Located? This item makes a preliminary identification of where the expertise or experience will be located to be most effectively used by the Center in executing its mission. The Center currently operates offices in San Antonio, TX and Crystal City, VA. The possibility of staffing a small office in or near Las Vegas, NV is currently being considered and is addressed tentatively here. However, no staff acquisitions are planned for a Las Vegas office.

FIVE-YEAR CENTER STAFFING NEEDS

Applying the five-fold rationale outlined above, the five-year Center staffing needs profile was established as follows.

Table 1 expands the basic seven programmatic areas and the area of Center operations in accordance with Question 1 to identify the specific areas of expertise and experience that are anticipated to be needed. As noted, nearly 70 specific areas were identified. Each area of expertise and experience is designated as primary, secondary, or tertiary to the work of the seven programmatic areas.

Questions 2 through 4 were used to estimate the number of personnel, the approximate time when they will first be needed, and the time frame during which they will be needed (i.e., continuous versus intermittent use). The results of this analysis are shown in Table 2 for each of the areas of expertise and experience identified in Table 1. Note that where both "continuous" and "intermittent" are

indicated in Table 2, the first-occurring symbol applies to the first staff member in that area. Furthermore, the numbers associated with "continuous" need are in FTE, whereas the numbers associated with "intermittent" need represent the availability of a person for a currently indeterminate period of time.

The staffing for identified management positions is indicated in Table 3. These management personnel provide several areas of technical and professional expertise as well. The positions noted with asterisks are identified in the other tables as providing "Administration" expertise and experience, although they, too, provide direct technical and professional contributions to project work.

Finally, Question 5 was used to establish in which office of the Center the expertise or experience should reside for the most effective utilization (Table 4). "Continuous," "intermittent," and "occasional" relationships are shown for each office. In cases where a subdiscipline was judged likely to be present in a principal discipline or in another subdiscipline, the former is shown to be an "intermittent" need (e.g., corrosion science is noted as "intermittent" and materials science as "continuous"). An important change to the Plan has been the addition of geoscience expertise in the Washington Technical Support Office. The extensive Center research and technical assistance activities in this area require and will benefit greatly from close coordination and teaming with NRC. Because staffing a Las Vegas office is not part of the current baseline plan, expertise and experience needs are shown as "intermittent" or "occasional" at this time.

Based on the results of the analyses illustrated in Tables 1 through 4, the Center core staffing profile shown in Tables 5a through 5c was developed. These tables summarize full-time (continuous) staff needs for the Center as a whole and for the two active offices, respectively. All Element Managers, the Director of QA, and the Director of IMS are listed in Table 5 under their respective primary expertise. The other management personnel indicated by asterisks in Table 3 are identified by the expertise "Administration" in Table 5.

The various individual areas of expertise delineated in Table 5 are regrouped according to the broad areas of concentration in Table 6.

CURRENT CENTER STAFFING

Staffing needs identified using the rationale presented in the previous section may be met by core Center staff, SwRI support staff, principal subcontractors, and supplemental subcontractors and consultants. The extent to which each of these sources has been used to provide the currently available staffing is described in the following subsections.

Core Center Staff

The existing core professional staff of the Center is as presented in Table 7. The expertise codes used in this and subsequent tables are provided in Appendix A. The focus during start-up of the Center was the acquisition of the Directors and Element Managers for each of the principal areas of responsibility (a total of eleven staff). Each of these personnel possessed current technical expertise and experience in one or more of the areas identified above in the FIVE-YEAR CENTER STAFFING NEEDS. A Regulatory Analyst with legal experience was also part of the start-up staff. In addition, the Center made several significant additions to its technical staff, as noted in Table 7, to support technical assistance and research activities that were scheduled to commence during the first two years of the contract, thus bringing total professional staffing to 35 as of the writing of this report.

The Center has identified "back-up" personnel for each of the Center Directors and Element Managers to ensure continuity of high-quality management of contracted activities in the event that

these individuals were no longer available to the Center. The current list of back-up personnel and associated resumes for those who are not currently members of the Center staff are shown in Appendix B.

SwRI Support Staff

Southwest Research Institute has a staff of about 2300 personnel with a diverse range of expertise and experience. The Center has to date and will continue to call upon the appropriate Divisions of the Institute to provide personnel to assist it in the conduct of technical assistance and research. Table 8 identifies the principal personnel currently being used and the areas of expertise and experience which they are fulfilling in support of Center tasks and projects. These personnel are providing skills identified in Table 2 as being needed on an intermittent basis. In addition, other Institute staff members will be identified, as necessary, to provide other skills that may be needed on an intermittent or occasional basis (e.g., human factors engineering).

Principal Subcontractor Support Staff

At the time it submitted its proposal for this contract, SwRI established two principal subcontractors to provide specific support in the geological sciences and geoenvironmental engineering. Adrian Brown Consultants (formerly Nuclear Waste Consultants, Inc. [NWC]) provides consulting services in surface and groundwater hydrology and related disciplines. Itasca Consulting Group provides services in geomechanics, geoenvironmental engineering, modeling of underground structures, and related disciplines. Table 9 identifies the principal personnel and areas of expertise and experience that are currently being provided by these groups to support Center tasks and projects. Although these personnel are primarily providing skills identified in Table 2 as being needed on an intermittent basis, in the first two years several of them were used almost continuously.

Supplemental Subcontractor and Consultant Support Staff

The Center has become aware that a broad range of expertise and experience in many technical and professional areas will be needed to support the NRC from time-to-time. To meet this need, the Center has established a list of potential need areas and has begun to identify potential subcontractors and consultants to fulfill those needs, when they arise. The current list of areas and potential support contractors and consultants is provided in Appendix C. Table 10 identifies the supplemental subcontractor and consultant staff which currently provide support to the Center in its existing programs of technical assistance and research. These personnel are providing skills identified in Table 2 as being needed on an intermittent or occasional basis. In addition, other subcontractor and consultant staff will be identified, as necessary, to provide other skills that may be needed on an intermittent or occasional basis.

STAFF ACQUISITION PLAN

The priorities and schedules for meeting the remaining Center staffing needs are presented here in the context of the long-range plans for the Center and the rationale for particular staffing needs. Table 11 is the summary plan for hiring full-time core Center staff that will supply the expertise and experience needs identified in Table 5 which have not yet been fulfilled (as indicated in Table 7). Appendix D presents statement of requirements for currently open full-time Center staff positions. Similar statements will be developed for the remaining positions as the projected hiring dates are approached.

This is strictly a plan, based upon the established long-range objectives, scope of work and associated budget guidance, and rationale established herein. The specific order of hiring will depend on stability of funding levels, consistency of scope of work, success of the recruiting efforts, and various risk factors.

It is anticipated that the role of the principal subcontractors will evolve during the next year as the core Center staff is augmented. Beyond Year 3 of the contract (FY90), it is anticipated that the need for SwRI support, subcontractors, and consultants will continue in the areas identified in Tables 8 through 10. The extent of such involvement will be dependent upon the budgeted scope of work and program stability.

TABLE 1a. REQUIRED EXPERTISE/EXPERIENCE BY PROGRAM ELEMENT

EXPERTISE/EXPERIENCE	WSE&I	GS	EBS	TSPA&E	RDCO	PA	QA	CO
ADJUDICATORY HEARINGS	S	S	S	P	S	T	T	T
ADMINISTRATION	P	P	P	P	P	P	P	P
ALLOY/MET. PROCESS DEVELOPMENT	S	S	P	T	T	T	T	T
APPLIED MATHEMATICS	S	S	P	S	P	S	T	T
BOREHOLE GEOPHYSICS	T	P	T	T	P	T	T	T
CERAMIC ENGINEERING	T	T	P	T	S	T	T	T
CHEMISTRY/CHEM ENGINEERING	T	S	P	T	S	T	T	T
CIVIL/STRUCTURAL ENGINEERING	S	S	S	T	P	S	S	T
CODE ANALYST	S	P	P	S	P	P	T	T
CONSTRUCTION ENGINEERING	S	S	S	T	P	T	T	T
CORROSION SCIENCE	P	S	P	T	T	S	S	T
CRUSTAL GEOMECHANICS	T	P	T	T	P	S	T	T
DATA BASE MANAGEMENT AND DATA PROCESSING	P	S	S	P	S	P	S	P
EARTH SCIENCES	P	P	S	T	S	P	S	S
ELECTRICAL ENGINEERING	P	T	T	T	P	T	S	T
ELECTROCHEMISTRY	T	S	P	T	S	S	S	T
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING	T	P	S	T	P	S	T	T
ENV. ONMENTAL SCIENCES	S	S	T	P	P	T	T	T
ENVIRONMENTAL HEALTH (EPA, ETC.)	S	S	S	P	P	P	T	T
FUEL FABR. AND REPROCESSING	S	S	P	T	T	T	T	T
GEOCHEMISTRY	P	P	P	T	S	P	S	T
GEOGRAPHY	T	P	T	T	S	T	T	T
GEOHYDROLOGY/HYDROGEOLOGY	P	P	S	T	S	P	S	T
GEOLOGY	P	P	T	T	S	T	T	S
GEOMORPHOLOGY/QUATERNARY GEOLOGY	S	P	S	T	S	P	T	T
GEOPHYSICS	T	P	S	T	S	S	T	T
GEOSTATISTICS	P	P	S	T	P	P	T	T
GEOTECHNICAL/CIVIL ENGINEERING	P	S	T	T	P	S	S	T
HAZARD ASSESSMENT/ANALYSIS	P	P	P	P	P	P	S	T
HEALTH PHYSICS	S	T	T	P	P	P	T	T
HUMAN FACTORS ENGINEERING	P	S	S	P	P	S	T	T
HYDROLOGY	S	P	S	T	S	P	T	T
INDUSTRIAL SAFETY ENGINEERING	S	T	T	S	P	S	T	T
INFORMATION MANAGEMENT SYSTEMS	P	S	S	P	S	P	S	P
INSTITUTIONAL ISSUES (STATES & INDIAN TRIBES)	S	T	T	S	T	S	T	S
LICENSING SUPPORT	S	T	T	S	T	T	T	S
MATERIAL LIFE PREDICTION	T	S	P	T	S	P	T	T
MATERIAL SCIENCES	P	S	P	T	S	P	S	S

P = PRIMARY ROLE S = SECONDARY ROLE T = TERTIARY ROLE

TABLE 1b. REQUIRED EXPERTISE/EXPERIENCE BY PROGRAM ELEMENT

EXPERTISE/EXPERIENCE	WSE&I	GS	EBS	TSPA	RDCO	PA	QA	CO
MECHANICAL, INCLUDING DESIGN & FABRICATION	P	T	P	S	P	S	S	T
METEOROLOGY/CLIMATOLOGY	S	P	S	T	P	P	T	T
MINING ENGINEERING	P	S	S	T	P	S	S	T
MINING GEOLOGY	T	P	S	T	P	T	T	T
NATURAL RESOURCES	T	P	T	S	T	S	T	T
NDE TECHNOLOGY	S	S	P	T	P	T	T	T
NUCLEAR ENGINEERING	S	T	P	T	P	T	S	T
NUMERICAL MODELING	P	P	P	P	P	P	T	T
OPERATIONS RESEARCH	P	T	T	P	P	T	T	P
PERFORMANCE ASSESSMENT	P	P	P	S	P	P	S	S
QUALITY ASSURANCE	P	P	P	P	P	P	P	P
RADIOCHEMISTRY	S	S	P	S	S	S	T	S
REGULATORY ANALYSIS	P	S	S	P	S	S	S	T
RELIABILITY	P	S	P	P	P	P	S	T
RISK ASSESSMENT/ANALYSIS	P	P	P	P	P	P	S	S
ROCK MECHANICS	P	P	S	T	P	S	S	S
SECURITY SPECIALIST	S	T	T	S	P	T	T	S
SEISMOLOGY	S	P	S	T	P	P	T	T
SOCIOECONOMICS	S	T	T	P	T	T	T	S
SOIL MECHANICS	S	P	T	T	P	T	T	T
STATISTICS	P	P	P	P	P	P	S	S
STRESS ANALYSIS	T	T	P	T	P	T	T	T
STRUCTURAL GEOLOGY/TECTONICS	S	P	S	T	S	S	T	T
SURFACE WATER HYDROLOGY	S	P	T	T	P	S	T	T
SURVEYING/PAVEMENT TECHNOLOGY	S	T	S	S	P	T	T	T
SYSTEMS ANALYSIS	P	P	P	P	P	P	S	P
SYSTEMS ENGINEERING	P	P	P	P	P	P	P	P
THERMODYNAMICS	S	P	P	T	P	T	T	T
TRANSPORTATION ANALYSIS	S	T	S	P	S	T	S	S
VENTILATION ENGINEERING	S	T	S	T	P	T	T	T
VOLCANOLOGY/IGNEOUS PROCESSES	T	P	T	T	S	P	T	T
WASTE LEACHING	S	T	P	T	S	P	T	T
WELDING TECHNOLOGY	S	T	P	T	S	S	T	T

F = PRIMARY ROLE S = SECONDARY ROLE T = TERTIARY ROLE

TABLE 2a. REQUIRED NUMBER OF PERSONNEL, FIRST OCCURRENCE OF NEED AND CONTINUITY OF NEED

EXPERTISE/EXPERIENCE	FISCAL YEAR (A)								TOTAL REQUIRED	CONT. OF NEED (B)
	FY 88	FY 89	FY 90				FY 91	FY 92		
			1Q	2Q	3Q	4Q				
ADJUDICATORY HEARINGS	1	1	1	1	1	1		1	1	I
ADMINISTRATION	5	5	5	5	5	5	5	5	5	C
ALLOY/MET. PROC. DEVELOPMENT		1	1	1	1	1	1	1	1	I
APPLIED MATHEMATICS	1	1	1	1	1	1	2	2	2	I
BOREHOLE GEOPHYSICS			1	1	1	1	1	1	1	I
CERAMIC ENGINEERING		1	1	1	1	1	1	1	1	I
CHEMISTRY/CHEM ENGINEERING	1	1	1	1	1	1	1	1	1	I
CIVIL/STRUCTURAL ENGINEERING	2	2	2	2	2	2	2	2	2	I
CODE ANALYST			1	1	2	2	2	2	2	I/C
CONSTRUCTION ENGINEERING					1	1	1	2	2	I
CORROSION SCIENCE	1	1	1	1	1	1	1	1	1	I
CRUSTAL GEOMECHANICS		1	1	1	1	1	1	1	1	I
DATA BASE MANAGEMENT AND DATA PROCESSING	1	2	2	2	2	2	2	2	2	C
EARTH SCIENCES	3	6	6	7	7	7	7	7	7	I
ELECTRICAL ENGINEERING	1	1	1	1	1	1	1	1	1	I
ELECTROCHEMISTRY			1	1	1	1	1	1	1	C
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING						1	1	1	1	C
ENVIRONMENTAL SCIENCES		1	1	1	1	1	1	2	2	C/I
ENVIRONMENTAL HEALTH (EPA, ETC.)	1	1	1	1	1	1	1	1	1	I
FUEL FABR. & REPROCESSING		1	1	1	1	1	1	1	1	I
GEOCHEMISTRY	2	2	3	3	4	4	5	5	5	C
GEOGRAPHY		1	1	1	1	1	1	1	1	I
GEOHYDROLOGY/HYDROGEOLOGY		2	2	2	3	3	4	4	4	C
GEOLOGY	1	1	2	2	2	2	2	2	2	C
GEOMORPHOLOGY/QUATERNARY GEOLOGY		1	1	1	1	1	2	2	2	I/C
GEOPHYSICS			1	1	1	1	1	1	1	I
GEOSTATISTICS		1	1	1	1	1	1	1	1	I
GEOTECHNICAL/CIVIL ENGINEERING		1	1	1	1	1	1	1	1	I
HAZARD ASSESSMENT/ANALYSIS	1	1	1	1	1	1	1	1	1	I
HEALTH PHYSICS	1	1	1	1	1	1	1	1	1	C
HUMAN FACTORS ENGINEERING					1	1	1	1	1	I
HYDROLOGY	1	2	2	2	2	2	2	2	2	I
INDUSTRIAL SAFETY ENGINEERING					1	1	1	1	1	I
INFORMATION MANAGEMENT SYSTEMS	2	2	2	2	2	2	2	2	2	C
INSTITUTIONAL ISSUES (STATES & INDIAN TRIBES)		1	1	1	1	1	1	1	1	I
LICENSING SUPPORT	1	1	1	1	1	1	1	1	1	I
MATERIAL LIFE PREDICTION	1	1	1	1	1	1	1	1	1	I
MATERIAL SCIENCES	2	2	3	3	3	3	3	3	3	C

A = INDICATES QUARTER OF YEAR OF FIRST OCCURRENCE OF NEED
 B = "C" INDICATES CONTINUOUS NEED
 "I" INDICATES INTERMITTENT NEED

TABLE 2b. REQUIRED NUMBER OF PERSONNEL, FIRST OCCURRENCE OF NEED AND CONTINUITY OF NEED

EXPERTISE/EXPERIENCE	FISCAL YEAR (A)								TOTAL REQUIRED	CONT. OF NEED (B)
	FY 88	FY 89	FY 90				FY 91	FY 92		
			1Q	2Q	3Q	4Q				
MECHANICAL, INCLUDING DESIGN & FABRICATION	2	3	3	3	3	3	3	3	3	1/1/C
METEOROLOGY/CLIMATOLOGY					1	1	2	2	2	1/C
MINING ENGINEERING	1	1	1	1	1	1	1	1	1	C
MINING GEOLOGY		1	1	1	1	1	1	1	1	I
NATURAL RESOURCES		1	1	1	1	1	1	1	1	I
NDE TECHNOLOGY		1	1	1	1	1	1	1	1	I
NUCLEAR ENGINEERING	1	1	1	1	2	2	2	2	2	I
NUMERICAL MODELING			1	1	1	1	2	2	2	1/C
OPERATIONS RESEARCH	1	1	1	1	1	1	1	1	1	I
PERFORMANCE ASSESSMENT		1	1	1	2	3	4	4	4	C
QUALITY ASSURANCE	1	2	2	2	2	2	2	2	2	C
RADIOCHEMISTRY							1	1	1	C
REGULATORY ANALYSIS	2	2	3	3	3	3	3	3	3	C/I/I
RELIABILITY	1	1	1	1	1	1	1	1	1	C
RISK ASSESSMENT/ANALYSIS	1	1	1	1	1	1	1	1	1	I
ROCK MECHANICS	1	2	2	2	3	3	4	4	4	1/C/C/C
SECURITY SPECIALIST		1	1	1	1	1	1	1	1	I
SEISMOLOGY		1	1	1	1	1	1	1	1	I
SOCIOECONOMICS		1	1	1	1	1	1	1	1	I
SOIL MECHANICS		1	1	1	1	1	1	1	1	I
STATISTICS		1	1	1	1	1	1	1	1	I
STRESS ANALYSIS	1	2	2	2	2	2	2	2	2	I
STRUCTURAL GEOLOGY/TECTONICS		1	1	3	3	3	3	3	3	1/C/C
SURFACE WATER HYDROLOGY		1	1	1	1	1	1	1	1	I
SURVEYING/PAVEMENT TECHNOLOGY					1	1	1	1	1	I
SYSTEMS ANALYSIS	1	1	1	1	1	1	1	1	1	I
SYSTEMS ENGINEERING	1	1	1	1	1	2	2	2	2	C
THERMODYNAMICS	1	1	1	1	2	2	2	2	2	I
TRANSPORTATION ANALYSIS	1	1	1	1	1	1	1	1	1	I
VENTILATION ENGINEERING		1	1	1	1	1	1	1	1	I
VOLCANOLOGY/IGNEOUS PROCESSES				1	1	1	2	2	2	1/C
WASTE LEACHING	1	1	1	1	1	1	1	1	1	I
WELDING TECHNOLOGY		1	1	1	1	1	1	1	1	I

A = INDICATES QUARTER OR YEAR OF FIRST OCCURRENCE OF NEED
 B = "C" INDICATES CONTINUOUS NEED
 "I" INDICATES INTERMITTENT NEED

TABLE 3. CENTER MANAGEMENT POSITIONS

CENTER MANAGEMENT POSITIONS	FISCAL YEAR					TOTAL REQUIRED
	FY 88	FY 89	FY 90	FY 91	FY 92	
PRESIDENT*	1	1	1	1	1	1
TECHNICAL DIRECTOR*	1	1	1	1	1	1
DIRECTOR-ADMINISTRATION*	1	1	1	1	1	1
DIRECTOR-INFO. MGMT. SYS.	1	1	1	1	1	1
DIRECTOR-QA	1	1	1	1	1	1
DIRECTOR-SE&I*	1	1	1	1	1	1
DIRECTOR-WASH. OFFICE*	1	1	1	1	1	1
MANAGER EBS	1	1	1	1	1	1
MANAGER GS	1	1	1	1	1	1
MANAGER PA	0	0	1	1	1	1
MANAGER RDCO	1	1	1	1	1	1
MANAGER TSPAЕ	1	1	1	1	1	1
MANAGER WSE&I	0	0	1	1	1	1
TOTALS	11	11	13	13	13	13

* INDICATES POSITIONS THAT ARE IDENTIFIED AS PROVIDING "ADMINISTRATION" EXPERTISE/EXPERIENCE IN OTHER TABLES.

TABLE 4a. GEOGRAPHICAL LOCATION OF NEED FOR EXPERTISE/EXPERIENCE

EXPERTISE/EXPERIENCE	GEOGRAPHICAL LOCATION		
	SAN ANTONIO	WASHINGTON	LAS VEGAS
ADJUDICATORY HEARINGS	0	1	0
ADMINISTRATION	C	C	1
ALLOY/MET. PROC. DEVELOPMENT	1	0	0
APPLIED MATHEMATICS	1	0	0
BOREHOLE GEOPHYSICS	1	0	1
CERAMIC ENGINEERING	0	0	0
CHEMISTRY/CHEM ENGINEERING	1	1	0
CIVIL/STRUCTURAL ENGINEERING	1	0	1
CODE ANALYST	C	1	0
CONSTRUCTION ENGINEERING	1	0	1
CORROSION SCIENCE	1	0	1
CRUSTAL GEOMECHANICS	1	0	1
DATA BASE MANAGEMENT AND DATA PROCESSING	C	C	0
EARTH SCIENCES	1	1	1
ELECTRICAL ENGINEERING	1	0	0
ELECTROCHEMISTRY	C	0	0
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING	C	1	1
ENVIRONMENTAL SCIENCES	1	C	0
ENVIRONMENTAL HEALTH (EPA, ETC.)	1	1	0
FUEL FABR. AND REPROCESSING	1	0	0
GEOCHEMISTRY	C	0	1
GEOGRAPHY	1	0	0
GEOHYDROLOGY/HYDROGEOLOGY	C	0	1
GEOLOGY	C	1	1
GEOMORPHOLOGY/QUATERNARY GEOLOGY	C	0	1
GEOPHYSICS	1	0	1
GEOSTATISTICS	1	1	0
GEOTECHNICAL/CIVIL ENGINEERING	1	0	1
HAZARD ASSESSMENT/ANALYSIS	1	1	0
HEALTH PHYSICS	C	1	0
HUMAN FACTORS ENGINEERING	1	1	0
HYDROLOGY	1	0	1
INDUSTRIAL SAFETY ENGINEERING	1	0	1
INFORMATION MANAGEMENT SYSTEMS	C	C	0
INSTITUTIONAL ISSUES (STATES & INDIAN TRIBES)	1	1	0
LICENSING SUPPORT	1	1	0
MATERIAL LIFE PREDICTION	1	0	0
MATERIAL SCIENCES	C	1	0

C = CONTINUOUS NEED AT THIS LOCATION
 I = INTERMITTENT NEED AT THIS LOCATION
 O = OCCASIONAL NEED AT THIS LOCATION

TABLE 4b. GEOGRAPHICAL LOCATION OF NEEDED FOR EXPERTISE/EXPERIENCE

EXPERTISE/EXPERIENCE	GEOGRAPHICAL LOCATION		
	SAN ANTONIO	WASHINGTON	LAS VEGAS
MECHANICAL, INCLUDING DESIGN & FABRICATION	C	0	0
MEYEOROLOGY/CLIMATOLOGY	C	0	0
MINING ENGINEERING	C	0	I
MINING GEOLOGY	I	0	I
NATURAL RESOURCES	I	I	I
NDE TECHNOLOGY	I	0	0
NUCLEAR ENGINEERING	I	I	0
NUMERICAL MODELING	C	I	0
OPERATIONS RESEARCH	I	I	0
PERFORMANCE ASSESSMENT	C	C	0
QUALITY ASSURANCE	C	I	I
RADIOCHEMISTRY	C	0	0
REGULATORY ANALYSIS	C	C	0
RELIABILITY	C	I	0
RISK ASSESSMENT/ANALYSIS	I	C	0
ROCK MECHANICS	C	I	I
SECURITY SPECIALIST	I	0	0
SEISMOLOGY	I	0	I
SOCIOECONOMICS	I	I	0
SOIL MECHANICS	I	0	I
STATISTICS	I	I	0
STRESS ANALYSIS	I	0	0
STRUCTURAL GEOLOGY/TECTONICS	C	C	I
SURFACE WATER HYDROLOGY	I	0	I
SURVEYING/PAVEMENT TECHNOLOGY	I	0	0
SYSTEMS ANALYSIS	I	I	0
SYSTEMS ENGINEERING	C	C	0
THERMODYNAMICS	I	I	0
TRANSPORTATION ANALYSIS	I	I	0
VENTILATION ENGINEERING	I	0	I
VOLCANOLOGY/IGNEOUS PROCESSES	C	0	I
WASTE LEACHING	I	0	0
WELDING TECHNOLOGY	I	0	0

C = CONTINUOUS NEED AT THIS LOCATION
 I = INTERMITTENT NEED AT THIS LOCATION
 0 = OCCASIONAL NEED AT THIS LOCATION

TABLE 5a. CENTER CORE STAFF PROFILE--TOTAL

EXPERTISE/EXPERIENCE	FISCAL YEAR								TOTAL REQUIRED
	FY 88	FY 89	FY 90				FY 91	FY 92	
			1Q	2Q	3Q	4Q			
ADMINISTRATION	5	5	5	5	5	5	5	5	5
CODE ANALYST					1	1	1	1	1
DATA BASE MANAGEMENT AND DATA PROCESSING	1	2	2	2	2	2	2	2	2
ELECTROCHEMISTRY			1	1	1	1	1	1	1
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING						1	1	1	1
ENVIRONMENTAL SCIENCES		1	1	1	1	1	1	1	1
GEOCHEMISTRY	2	2	3	3	4	4	5	5	5
GEOHYDROLOGY/HYDROGEOLOGY		2	2	2	3	3	4	4	4
GEOLOGY	1	1	2	2	2	2	2	2	2
GEOMORPHOLOGY/QUATERNARY GEOLOGY							1	1	1
HEALTH PHYSICS	1	1	1	1	1	1	1	1	1
INFORMATION MANAGEMENT SYSTEMS	2	2	2	2	2	2	2	2	2
MATERIAL SCIENCES	2	2	3	3	3	3	3	3	3
MECHANICAL, INCLUDING DESIGN & FABRICATION		1	1	1	1	1	1	1	1
METEOR/CLIMATOLOGY							1	1	1
MINING ENGINEERING	1	1	1	1	1	1	1	1	1
NUMERICAL MODELING							1	1	1
PERFORMANCE ASSESSMENT		1	1	1	2	3	4	4	4
QUALITY ASSURANCE	1	2	2	2	2	2	2	2	2
RADIOCHEMISTRY							1	1	1
REGULATORY ANALYSIS	1	1	1	1	1	1	1	1	1
RELIABILITY	1	1	1	1	1	1	1	1	1
RISK ASSESSMENT/ANALYSIS	1	1	1	1	1	1	1	1	1
ROCK MECHANICS		1	1	1	2	2	3	3	3
STRUCTURAL GEOLOGY/TECTONICS				2	2	2	2	2	2
SYSTEMS ENGINEERING	1	1	1	1	1	2	2	2	2
TRANSPORTATION ANALYSIS	1								
VOLCANOLOGY/IGNEOUS PROCESSES							1	1	1
TOTAL REQUIRED	21	28	32	34	39	42	51	51	51

TABLE 5b. CENTER CORE STAFF PROFILE--SAN ANTONIO OFFICE

EXPERTISE/EXPERIENCE	FISCAL YEAR								TOTAL REQUIRED
	FY 88	FY 89	FY 90				FY 91	FY 92	
			1Q	2Q	3Q	4Q			
ADMINISTRATION	4	4	4	4	4	4	4	4	4
CODE ANALYST					1	1	1	1	1
DATA BASE MANAGEMENT AND DATA PROCESSING	1	2	2	2	2	2	2	2	2
ELECTROCHEMISTRY			1	1	1	1	1	1	1
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING						1	1	1	1
ENVIRONMENTAL SCIENCES									
GEOCHEMISTRY	2	2	3	3	4	4	5	5	5
GEOHYDROLOGY/HYDROGEOLOGY		2	2	2	3	3	4	4	4
GEOLOGY	1	1	2	2	2	2	2	2	2
GEOMORPHOLOGY/QUATERNARY GEOLOGY							1	1	1
HEALTH PHYSICS	1	1	1	1	1	1	1	1	1
INFORMATION MANAGEMENT SYSTEMS	2	2	2	2	2	2	2	2	2
MATERIAL SCIENCES	2	2	3	3	3	3	3	3	3
MECHANICAL, INCLUDING DESIGN & FABRICATION		1	1	1	1	1	1	1	1
METEOR/CLIMATOLOGY							1	1	1
MINING ENGINEERING	1	1	1	1	1	1	1	1	1
NUMERICAL MODELING							1	1	1
PERFORMANCE ASSESSMENT		1	1	1	2	3	4	4	4
QUALITY ASSURANCE	1	2	2	2	2	2	2	2	2
RADIOCHEMISTRY							1	1	1
REGULATORY ANALYSIS									
RELIABILITY	1	1	1	1	1	1	1	1	1
RISK ASSESSMENT/ANALYSIS									
ROCK MECHANICS		1	1	1	2	2	3	3	3
STRUCTURAL GEOLOGY/TECTONICS				1	1	1	1	1	1
SYSTEMS ENGINEERING	1	1	1	1	1	2	2	2	2
TRANSPORTATION ANALYSIS	1								
VOLCANOLOGY/IGNEOUS PROCESSES							1	1	1
TOTAL REQUIRED	18	24	28	29	34	37	46	46	46

TABLE 5c. CENTER CORE STAFF PROFILE--WASHINGTON AREA OFFICE

EXPERTISE/EXPERIENCE	FISCAL YEAR								TOTAL REQUIRED
	FY 88	FY 89	FY 90				FY 91	FY 92	
			1Q	2Q	3Q	4Q			
ADMINISTRATION	1	1	1	1	1	1	1	1	1
CODE ANALYST									
DATA BASE MANAGEMENT AND DATA PROCESSING									
ELECTROCHEMISTRY									
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING									
ENVIRONMENTAL SCIENCES		1	1	1	1	1	1	1	1
GEOCHEMISTRY									
GEOHYDROLOGY/HYDROGEOLOGY									
GEOLOGY									
GEOMORPHOLOGY/QUATERNARY GEOLOGY									
HEALTH PHYSICS									
INFORMATION MANAGEMENT SYSTEMS									
MATERIAL SCIENCES									
MECHANICAL, INCLUDING DESIGN & FABRICATION									
METEOR/CLIMATOLOGY									
MINING ENGINEERING									
NUMERICAL MODELING									
PERFORMANCE ASSESSMENT									
QUALITY ASSURANCE									
RADIOCHEMISTRY									
REGULATORY ANALYSIS	1	1	1	1	1	1	1	1	1
RELIABILITY									
RISK ASSESSMENT/ANALYSIS	1	1	1	1	1	1	1	1	1
ROCK MECHANICS									
STRUCTURAL GEOLOGY/TECTONICS				1	1	1	1	1	1
SYSTEMS ENGINEERING									
TRANSPORTATION ANALYSIS									
VOLCANOLOGY/IGNEOUS PROCESSES									
TOTAL REQUIRED	3	4	4	5	5	5	5	5	5

TABLE 6. CENTER CORE STAFF PROFILE--AREAS OF CONCENTRATION

EXPERTISE/EXPERIENCE	FISCAL YEAR								TOTAL REQUIRED
	FY 88	FY 89	FY 90				FY 91	FY 92	
			1Q	2Q	3Q	4Q			
GEOCHEMISTRY	2	2	3	3	4	4	6	6	6
HYDROLOGY/CLIMATOLOGY		2	2	2	3	3	5	5	5
ROCK MECHANICS/MINING	1	3	2	2	3	4	5	5	5
MATERIAL SCIENCES	3	3	5	5	5	5	5	5	5
STRUCTURAL/TECTONICS	1	1	2	4	4	4	6	6	6
PERFORMANCE ASSESSMENT	1	2	2	2	4	5	7	7	7
MECHANICAL & FACILITIES ENGINEERING	1	2	2	2	2	2	2	2	2
SYSTEMS ENGINEERING	5	5	5	5	5	6	6	6	6
ADMINISTRATION & SUPPORT SERVICES	7	9	9	9	9	9	9	9	9
TOTAL REQUIRED	21	28	32	34	39	42	51	51	51

TABLE 11. CENTER CORE STAFF HIRING PLAN

EXPERTISE/EXPERIENCE	FISCAL YEAR						ADDITIONAL REQUIRED
	FY 90				FY 91	FY 92	
	1Q	2Q	3Q	4Q			
CODE ANALYST			1	1	1	1	1
ENGINEERING GEOLOGY/GEOLOGICAL ENGINEERING				1	1	1	1
GEOCHEMISTRY			1	1	2	2	2
GEOHYDROLOGY/HYDROGEOLOGY			1	1	2	2	2
GEOMORPHOLOGY/QUATERNARY GEOLOGY					1	1	1
METEOR/CLIMATOLOGY					1	1	1
NUMERICAL MODELING					1	1	1
PERFORMANCE ASSESSMENT			1	2	3	3	3
RADIOCHEMISTRY					1	1	1
ROCK MECHANICS					1	1	1
SYSTEMS ENGINEERING				1	1	1	1
VOLCANOLOGY/IGNEOUS PROCESSES					1	1	1
TOTAL ADDITIONAL	0	0	4	7	16	16	16

APPENDIX A

LIST OF EXPERIENCE/EXPERTISE CODES

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

LISTING OF EXPERTISE CODES

CODE =====	DESCRIPTION =====
AD	Administration
AH	Adjudicatory Hearings
AM	Applied Mathematics
AP	Alloy/Met. Process Development
BG	Borehole Geophysics
CD	Code Analyst
CE	Civil/Structural Engineering
CG	Crustal Geomechanics
CH	Chemistry/Chem Engineering
CN	Construction Engineering
CR	Ceramic Engineering
CS	Corrosion Science
DB	Data Base Management and Data Processing
EC	Economics/Socioeconomics
EE	Electrical Engineering
EG	Engineering Geology/Geological Engineering
EH	Environmental Health (EPA, etc.)
EL	Electrochemistry
EN	Environmental Sciences
ES	Earth Sciences
FF	Fuel Fabrication & Reprocessing
GC	Geochemistry
GE	Geology
GG	Geography

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

LISTING OF EXPERTISE CODES

CODE =====	DESCRIPTION =====
GH	Geohydrology/Hydrogeology
GM	Geomorphology/Quaternary Geology
GP	Geophysics
GS	Geostatistics
GT	Geotechnical/Civil Engineering
HA	Hazard Assessment/Analysis
HF	Human Factors Engineering
HP	Health Physics
HY	Hydrology
IM	Information Management Systems
IN	Institutional Issues (States & Indian Tribes)
IS	Industrial Safety Engineering
LI	Licensing Support
MC	Meteorology/Climatology
ME	Mechanical, Including Design & Fabrication
MG	Mining Geology
MI	Mining Engineering
ML	Material Life Prediction
MS	Material Sciences
ND	NDE Technology
NE	Nuclear Engineering
NM	Numerical Modeling
NR	Natural Resources
OR	Operations Research

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

LISTING OF EXPERTISE CODES

CODE =====	DESCRIPTION =====
PA	Performance Assessment
QA	Quality Assurance
RA	Risk Assessment/Analysis
RC	Radiochemistry
RE	Reliability
RG	Regulatory Analysis
RM	Rock Mechanics
SA	Systems Analysis
SC	Security Specialist
SE	Systems Engineering
SG	Structural Geology/Tectonics
SH	Surface Water Hydrology
SM	Soil Mechanics
SO	Socioeconomics
SR	Stress Analysis
ST	Statistics
SU	Surveying/Pavement Technology
SY	Seismology
TD	Thermodynamics
TR	Transportation Analysis
VE	Ventilation Engineering
VO	Volcanology/Igneous Processes
WL	Waste Leaching
WT	Welding Technology

APPENDIX B

**BACK-UP PERSONNEL
FOR KEY CENTER STAFF**

TENTATIVE LISTING OF BACK-UP STAFF FOR KEY CENTER PERSONNEL
 CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

<u>POSITION/TITLE</u>	<u>CURRENT DESIGNEE</u>	<u>BACK-UP STAFF</u>
President	John E. Latz	Wesley C. Patrick
Technical Director	Wesley C. Patrick	TBD
Director Quality Assurance	Bruce E. Mabrito	Robert D. Brient
Director Administration	Henry F. Garcia	J.S. Ferrandi
Director Information Mgt.	Rawley D. Johnson	Robert L. Marshall
Director Washington Office	Robert E. Adler	Ruth F. Weiner
Director Systems Engineering	Allen R. Whiting	Wesley C. Patrick
Manager Engineering Barriers System	Prasad K. Nair	Hersh K. Manaktala
Manager Geologic Setting	John L. Russell	Michael P. Miklas
Manager Performance Assessment	Budhi Sagar	Ruth F. Weiner
Manager Quality Assurance	Bruce E. Mabrito	Robert D. Brient
Manager RDCO	Asadul H. Chowdhury	Sui Min Hsiung
Manager Research	Wesley C. Patrick	Prasad K. Nair
Manager SPA&E/T	John P. Hageman	Roger L. Bessey
Manager TRS	John P. Hageman	Ruth F. Weiner
Manager WSE&I	D. Ted Romine	Allen R. Whiting

ROGER L. BESSEY

Manager

Mechanical and Fluids Engineering Division

B.S. In Physics, Yale University, 1961

M.S. in Physics, Purdue University, 1963

M.B.A. in Business, The University of Texas San Antonio, 1976

Mr. Bessey, in recent years, has led a group of approximately 12 engineers, technicians and clerical personnel engaged in dynamics research, analysis, and testing. This work has included major contracts, primarily in the area of equipment qualification, and many contracts to assist commercial firms in increasing reliability of their products or hardening their equipment designs to adverse environments. Specific jobs have included investigation of the behavior of computer, oil field logging, and other electronic equipment under vibration loading; testing of military hardware to MIL standards; protective helmet testing to Department of Transportation and other standards; analytical qualification of equipment and systems for application in nuclear power plants; and environmental testing. Mr. Bessey has also managed DOD programs including reverse engineering and test procedure development as well as other aspects of the DOD competition engineering programs.

Mr. Bessey has been involved in, and project manager of, numerous projects in the areas of seismic analysis, vibrations testing, structural dynamics, acoustics, terminal ballistics, engineering dynamics, optics, and materials sciences. These projects have included analysis of structural response to seismic and vibrational environments for nuclear power plant applications and for the military, response of structures to random acoustic excitation, impulsive loading of many types of test structures with explosives, analysis of exploding propellant tank fragmentation, measurements of the spectral emissions characteristics of welding arcs, physical and spectral optic characteristics of eye protective devices, measurement of blast fields about recoilless rifles, small arms and explosive charges, and an experimental investigation of strain rate effects on materials. Mr. Bessey is the author or coauthor of twenty-five published papers, handbooks, and reports, including a handbook on vulnerability studies for the Army.

Professional Chronology:

Graduate Teaching Assistant, Purdue University, 1961-63; Research Physicist, Technology, Inc., 1963-66; Research Physicist, Southwest Research Institute 1966-77; Senior Research Physicist, Southwest Research Institute, 1977-81; Group Leader, Southwest Research Institute, 1981-85; Manager, Southwest Research Institute, 1985-1986; Manager, Department of Fluid Machinery and Structural Dynamics, 1986-present.

Memberships:

Mr. Bessey is past treasurer and current national director of the Institute of Environmental Sciences Texas Hill Country Chapter, a past treasurer and current member of the San Antonio Chapter of Sigma Xi Research Society of America, and a member of the American Nuclear Society.

J. S. (JACK) FERNANDI
Controller

B.B.A. in Accounting, St Mary's University, 1968
Certified Internal Auditor, 1976
Certified Public Accountant, 1982
Certified Cost Analyst, 1983

Mr. Fernandi has been involved with general and cost accounting and auditing activities for private industry and governmental agencies since 1968. He has experience with internal and external audits, implementation of accounting systems, federal tax returns for profit and non-profit concerns, pricing research and service activities and preparation of proposals for projected and final indirect cost recoveries. His current responsibilities include management of the Accounting and Credit Departments, liaison with Government Auditors on accounting/financial matters, and preparation of tax returns and indirect provisional, forward pricing and final cost proposals.

He has an extensive background in Federal Government procurement practices and has worked extensively with procurement actions and negotiations. He has experience with manual and automated accounting systems.

Mr. Fernandi serves as a Lieutenant Colonel in the Army Reserve where he works with training matters for an R & D filler headquarters. He has been active in the local chapter of the Institute of Internal Auditors (Director 1978-1981), the local chapter of the Reserve Officers' Association (Treasurer 1986-87) and other professional organizations.

PROFESSIONAL CHRONOLOG: Finance Officer, U.S. Army, 1969-72; Staff Accountant, University of Texas Health Sciences Center, 1972; Defense Contract Audit Agency, 1972- (auditor, 1972-1975, team leader, 1975-1977, procurement liaison auditor, 1977-1978); Southwest Research Institute, 1978- (manager, 1978-1984, assistant controller, 1984-1989, controller 1989-).

Rev. Nov. 1989

APPENDIX C

**POTENTIAL CONSULTANTS
AND SUBCONTRACTORS**

NOTES:

1. "Identified" means that the Center has determined that the party may possess the appropriate expertise and experience.
2. "Contacted" means that the Center has solicited the interest of the party.
3. "Positive Response" means that the party has expressed interest in consulting or subcontracting with the Center.
4. If a party is under contract and has been authorized to work on one or more activities within the Center scope of work, that party is listed in Table 9 or 10 of the Staffing Plan and is not included here.

LISTING OF POTENTIAL CONSULTANTS

SPECIALTY AREA *****	CANDIDATE -----	STATUS -----
** CIVIL ENGINEERING		
SOIL MECHANICS	LEIGHTON & ASSOCS.	CONTACTED
SEISMIC ENGINEERING	T. KRAUTHAMMER	POSITIVE RESPONSE
STRUCTURAL ENGINEERING	M. SATEESHA	POSITIVE RESPONSE
SURFACE HYDROLOGY	M. GOODRICH	POSITIVE RESPONSE
	D. UPDEGRAAF	POSITIVE RESPONSE
SOIL MECHANICS	T. KRAUTHAMMER	POSITIVE RESPONSE
STRUCTURAL ENGINEERING	T. KRAUTHAMMER	POSITIVE RESPONSE
SOIL/STRUC. INTER.	T. KRAUTHAMMER	POSITIVE RESPONSE
** ENVIRONMENTAL HEALTH PHYSICIST		
	IMPELL	POSITIVE RESPONSE
** HUMAN FACTORS ENGINEERING		
	IMPELL	POSITIVE RESPONSE
	STEVENS AND ROE	POSITIVE RESPONSE
** MECHANICAL ENGINEERING		
THERMODYNAMICS	C. REARDON	CONTACTED
STRUCTURAL ANALYSIS	K. WAHI	POSITIVE RESPONSE
THERMAL MODELING	D. UPDEGRAAF	POSITIVE RESPONSE
THERMAL MODELING	K. WAHI	POSITIVE RESPONSE

LISTING OF POTENTIAL CONSULTANTS

SPECIALTY AREA

CANDIDATE

STATUS

THERMAL MODELING	R. ALEXANDER	POSITIVE RESPONSE
THERMAL MODELING	D. UPDEGRAAF	POSITIVE RESPONSE
FLUID MECHANICS	R. ALEXANDER	CONTACTED
STRUCTURAL ANALYSIS	T. KRAUTHAMMER	POSITIVE RESPONSE

** MINING ENGINEERING

THERMAL MODELING	K. WAHJ	POSITIVE RESPONSE
MATERIALS HANDLING		
VENTILATION	R. ALEXANDER	CONTACTED
MINING SYSTEMS	B. CHYTROWSKI	CONTACTED
ROCK MECHANICS	B. CHYTROWSKI	CONTACTED
	M. SATEESHA	POSITIVE RESPONSE
	K. WAHJ	POSITIVE RESPONSE

** NUCLEAR ENGINEERING

THERMODYNAMICS	C. REARDON	CONTACTED
THERMAL MODELING	IMPELL	POSITIVE RESPONSE
FLUID MECHANICS	IMPELL	POSITIVE RESPONSE
STRUCTURAL ANALYSIS	T. KRAUTHAMMER	POSITIVE RESPONSE
SPENT-FUEL MANAGEMENT	R. WIESENER	POSITIVE RESPONSE

LISTING OF POTENTIAL CONSULTANTS

SPECIALTY AREA *****	CANDIDATE -----	STATUS -----
** NUCLEAR SCIENCES ✓		
SHIELDING SPECIALIST	IMPELL	POSITIVE RESPONSE
CRITICALITY SPECIALIST	IMPELL	POSITIVE RESPONSE
** PROBABILISTIC RISK ASSESSMENT ✓		
	IMPELL	POSITIVE RESPONSE
	SANFORD COHEN ASSOC.	POSITIVE RESPONSE
** RADIATION HEALTH PHYSICIST		
	SANFORD COHEN ASSOC.	POSITIVE RESPONSE
	IMPELL	POSITIVE RESPONSE
** SECURITY/PHYSICAL PROTECTION SPECIALIST ✓		
	DR. MARK BLAUER	CONTACTED

COMPUTER AND INFORMATION SCIENCES

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** COMPUTER APPLICATIONS		
COMPUTER SYSTEMS ANALYST	C. PLESSUMS	CONTACTED
SYSTEMS MANAGER	C. PLESSUMS	CONTACTED
PROGRAMMER	C. PLESSUMS	CONTACTED
** DATABASE MANAGEMENT		
DATABASE ADMINISTRATOR/ANALYST	C. ACREE	POSITIVE RESPONSE
** SCI/ENGR. APPLICATIONS		
CODE MAINTENANCE		
** SCI/ENGR. APPLICATONS		
CODE VALIDATION		
** SPECIALTY SYSTEMS		
IMAGE SYSTEMS ANALYST/PROGRAMMER	C. PLESUMS	CONTACTED
MICROFICHE PROCESSING ANALYST	C. PLESUMS	CONTACTED
DOCUMENT CONTROL	C. ACREE	CONTACTED

GENERAL AND SOCIAL SCIENCES

LISTING OF POTENTIAL CONSULTANTS

SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** ECONOMICS/SOCIOECONOMICS	G. HUMPHRESS	POSITIVE RESPONSE
** ENVIRONMENTAL HEALTH AND SAFETY	ECOLOGY & ENVIRONMENT, INC.	CONTACTED
	IMPELL	POSITIVE RESPONSE
** INSTITUTIONAL RELATIONS	IMPELL	POSITIVE RESPONSE
	F. EDWARDS	POSITIVE RESPONSE
** LITERARY SCIENCES	OPEN	OPEN
** LICENSING AND ADMINISTRATIVE LAW	CONNOLLY AND O'CONNEL	POSITIVE RESPONSE
** PUBLIC ADMINISTRATION		
** REGULATORY ANALYST	IMPELL	POSITIVE RESPONSE
** SOCIOLOGIST/PSYCHOLOGIST SPECIALIST IN PUBLIC PERCEPTION OF RISK	G. HUMPHRESS	POSITIVE RESPONSE
	W. WISOR	POSITIVE RESPONSE

GENERAL AND SOCIAL SCIENCES

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA	CANDIDATE	STATUS
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** STATISTICAL ANALYSIS OF DATA (PARTICULARLY "SPARSE" AND "FUZZY" DATA)	L. TILTON	CONTACTED
** STATISTICAL DESIGN OF EXPERIMENTS		
** SYSTEMS ANALYSIS/SYSTEM ENGINEERING	IMPELL	POSITIVE RESPONSE

GEOLOGICAL SCIENCES

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA

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CANDIDATE

STATUS

** CRUSTAL GEOMECHANICS

** GEOCHEMISTRY

GEOCHEMISTRY OF ZEOLITES AND CLAY MINERALS N. GUVEN POSITIVE RESPONSE

MINERAL REACTION KINETICS GEOCHEMISTRY D. BROOKINS POSITIVE RESPONSE

ISOTOPE GEOCHEMISTRY D. BROOKINS POSITIVE RESPONSE

GEOCHEMICAL MODELING

GEOCHEMICAL TRANSPORT MODELING N. GUVEN POSITIVE RESPONSE

ELECTRON MICROPROBE EXPERIENCE N. GUVEN POSITIVE RESPONSE

NATURAL ANALOGUES D. BROOKINS POSITIVE RESPONSE

** GEOMORPHOLOGY

GEOMORPHOLOGY LEIGHTON & ASSOCS. CONTACTED

** GEOPHYSICS

HEAT FLOW GEOPHYSICS

SEISMIC GEOPHYSICS T. CAMPBELL POSITIVE RESPONSE

BOREHOLE METHODS LEIGHTON & ASSOCS. CONTACTED

AIRBORNE METHODS LEIGHTON & ASSOC. CONTACTED

LISTING OF POTENTIAL CONSULTANTS

=====

SPECIALTY AREA =====	CANDIDATE -----	STATUS -----	
	SURFACE BASED METHODS	LEIGHTON & ASSOCs.	CONTACTED
** GEOSTATISTICS	M. GOODRICH	CONTACTED	
** HYDROLOGY	SURFACE WATER	R. HORNER	CONTACTED
	SURFACE WATER	M. GOODRICH	POSITIVE RESPONSE
	UNSATURATED FLOW	M. GOODRICH	POSITIVE RESPONSE
	UNSATURATED FLOW	D. UPDEGRAAF	POSITIVE RESPONSE
	UNSATURATED FLOW	S. NEUMAN	IDENTIFIED
	UNSATURATED FLOW	J. YEH	POSITIVE RESPONSE
** METEOROLOGY/CLIMATOLOGY			
** NATURAL RESOURCE	HYDRO-CARBONS		
** NATURAL RESOURCE ASSESSMENT	INDUSTRIAL MINERALS		
	METALLICS		
** PALEOCLIMATOLOGY			

GEOLOGICAL SCIENCES

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** PERFORMANCE OF NATURAL SYSTEMS	D. BROOKINS	POSITIVE RESPONSE
** PETROGRAPHY IGNEOUS PETROGRAPHER WITH ASH-FLOW AND ASH-FALL TUFFS EXPERIENCE		
** PROBABILISTIC RISK ANALYSIS OF DISRUPTIVE PROCESSES AND EVENTS		
** STRATIGRAPHY YUCCA MOUNTAIN/GREAT BASIN EXPERIENCE	L. GERMAIN	POSITIVE RESPONSE
YUCCA MOUNTAIN/GREAT BASIN EXPERIENCE	B. KILLIAN	POSITIVE RESPONSE
YUCCA MOUNTAIN/GREAT BASIN EXPERIENCE	G. RAWSON	POSITIVE RESPONSE
** STRUCTURAL GEOLOGY BASIN AND RANGE/GREAT BASIN		
** TECTONICS BASIN AND RANGE/GREAT BASIN		

GEOLOGICAL SCIENCES

LISTING OF POTENTIAL CONSULTANTS

SPECIALTY AREA

CANDIDATE

STATUS

** VOLCANOLOGY

MATERIAL SCIENCES AND METALLURGY

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** ELECTROCHEMISTRY/CORROSION	R. COTTIS	IDENTIFIED
	D. DUQUETTE	IDENTIFIED
** HYDROGEN EFFECTS	R. WEI	IDENTIFIED
** METAL FABRICATION/WELDING	IMPELL	POSITIVE RESPONSE
	C. LUNDIN	IDENTIFIED
** MICROBIOLOGICAL EFFECTS	W. IVERSON	IDENTIFIED
** PHYSICAL METALLURGY		
GENERAL	D. DUQUETTE	IDENTIFIED
FATIGUE	R. WEI	IDENTIFIED
** PROBABILISTIC RISK AND PERFORMANCE ASSESSMENT	IMPELL	POSITIVE RESPONSE
** RADIATION DAMAGE TO MATERIALS	IMPELL	POSITIVE RESPONSE
** RADIONUCLIDE BEHAVIOR		
THERMODYNAMICS		

MATERIAL SCIENCES AND METALLURGY

LISTING OF POTENTIAL CONSULTANTS
=====

SPECIALTY AREA
=====

CANDIDATE

STATUS

SORPTION/LEACHING

TRANSPORT

** WASTE FORM LEACHING

SPENT FUEL

P. SOO

IDENTIFIED

GLASS

P. SOO

IDENTIFIED

MATERIALS TRANSPORTATION

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** NEPA COMPLIANCE EXPERTISE (EIS, SAR, ETC)	J. MC GOUGH	CONTACTED
** RISK ASSESSEMENT METHODOLOGIES	ECOLOGY & ENVIRONMENT, INC.	CONTACTED
** RISK ASSESSMENT METHODOLOGIES	J. MC GOUGH	CONTACTED
	C REARDON	CONTACTED
** TRANSPORTATION CASK INTEGRITY	IMPELL	POSITIVE RESPONSE
** TRANSPORTATION OF NUCLEAR OR HAZARDOUS MATERIALS	C. REARDON	CONTACTED
	ECOLOGY & ENVIRONMENT, INC.	CONTACTED
	J. MC GOUGH	CONTACTED
	IMPELL	POSITIVE RESPONSE

QUALITY ASSURANCE

LISTING OF POTENTIAL CONSULTANTS

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SPECIALTY AREA =====	CANDIDATE -----	STATUS -----
** APPLICATIONS IN THE GEOSCIENCES	TBD	
** MANUFACTURING/PROCESSING	IMPELL	POSITIVE RESPONSE
** QA IN LICENSING ARENA	IMPELL	POSITIVE RESPONSE
** SITING CRITICAL AND/OR NUCLEAR FACILITIES	IMPELL	POSITIVE RESPONSE

APPENDIX D

**STATEMENTS OF REQUIREMENTS
FOR "OPEN"
FULL-TIME CENTER STAFF POSITIONS**

SOUTHWEST RESEARCH INSTITUTE

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GEOCHEMIST EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has an immediate employment opportunity for a geochemist who will conduct work supporting the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in establishing a geochemistry program in an area of national impact.

Qualifications desired are a Ph.D., a specialization in geochemistry and demonstrated ability to apply geochemistry and related technical fields to problems relevant to isolation of waste in a mined repository in fractured, porous rocks. Experience desired includes interpretation and critical evaluation of laboratory and field data for water-rock interactions and development and/or evaluation of conceptual models of complex geochemical/hydrological systems. The position requires the ability to interface with hydrologists and engineers in the siting and performance of underground facilities in fractured rock. An ability to integrate field observations and measurements with laboratory experimentation and modeling must be demonstrated. A combination of experience with natural analog studies of waste isolation systems and stable and/or unstable isotope geochemistry is also desired. Excellent written and verbal communication skills are required. Duties of the position will include performance of technical activities related to geochemical aspects of mined geologic repositories of high-level nuclear waste including site characterization and performance assessment. The successful applicant will be personally involved with research projects, project design and cost determination, and extensive project documentation. Duties of the position will also include supervision of technical and support staff. All applicants must pass a previous conflict of interest evaluation and be qualified for a security clearance.

The Center for Nuclear Waste Regulatory Analyses is a Federally-funded Research and Development Center supported by the Nuclear Regulatory Commission. The Center is a division of Southwest Research Institute, an independent, not-for-profit R&D organization which occupies 765 acres of countryside in San Antonio. More than 2,300 employees work at the Institute in more than one million square feet of laboratories, workshops, and offices. The Institute is well-equipped to support geochemical investigations which include computer modeling, geophysics, and analytical facilities for materials characterization.

Applications accompanied by resumes and other supporting materials, including the names of three references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, Texas 78228-0510. Nominations for the position are solicited. Additional information on this employment opportunity is available from Dr. John L. Russell at (512) 522-5183.

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GEOHYDROLOGISTS-2 EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has immediate employment opportunities for two geohydrologists who will conduct work supporting the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicants will have important roles in establishing a geohydrology program in an area of national impact.

Qualifications desired are a Ph.D. or Masters Degree with specialization in geohydrology and experience in modeling complex geohydrologic systems, including porous and fractured media in both saturated and unsaturated states. Experience desired includes data collection, data analyses, and conceptual and mathematical modeling related to ground water movement and solute transport in field investigations and laboratory experiments. Excellent written and verbal communication skills are required. Duties of the position will include performance of technical activities related to geohydrological aspects of geologic repositories for high-level nuclear waste including site characterization and performance assessment. The successful applicants will be personally involved with research projects, project design and cost determination, and extensive project documentation. Duties of the positions will also include supervision of technical and support staff. All applicants must pass a previous conflict of interest evaluation and be qualified for a security clearance.

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Applications accompanied by resumes and other supporting materials, including the names of 3 references should be submitted to A. W. Desmarais, Personnel Office, Southwest Research Institute, 6220 Culebra Road, San Antonio, TX 78228-0510. Nominations for the positions are also solicited.

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GEOMORPHOLOGIST EMPLOYMENT OPPORTUNITY

The Center for Nuclear Waste Regulatory Analyses at Southwest Research Institute announces a position beginning Jan., 1990 for a geomorphologist who will conduct work supporting the program of the Nuclear Regulatory Commission involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in establishing a program in an area of national impact.

Qualifications are a Ph.D. or Masters degree with a minimum of 5 years responsible professional experience, a specialization in geomorphology, geology of the Quaternary, or associated disciplines and demonstrated ability to apply geomorphology and associated disciplines to problems associated with siting, design, and construction of engineered structures in arid areas. The selected person should be capable of scientifically evaluating geomorphological models of landscape development in arid regions. Academic background and work experiences in the following areas is desirable: 1) Stratigraphy and sedimentation of Quaternary deposits, 2) Soil science, 3) Seismo-tectonics, 4) Evaluation of scenarios of landscape development through the origination and use of models and computerized solutions, and 5) Unsaturated zone hydrology. The person will be asked to comment on a spectrum of geologic, climatic, tectonic, and geomorphic models useful for determining the interrelationships among the affected variables. The successful applicant will have the capability of translating results from the regional scale studies to the site specific scale. Experience in conducting geomorphologic studies in arid environments, including field research is desirable. The selected will have a demonstrated superior written and verbal communication facility. Applicant must pass a previous conflict of interest evaluation and be qualified for a security clearance.

Duties of the position include performance of technical activities related to the geomorphologic aspects of disposal of high-level nuclear waste in a mined geologic repository in an arid environment including site characterization, design, construction, and performance assessment. The successful applicant will be personally involved with design, cost determination, and extensive documentation of projects. Also, duties of the position will include supervision of technical and support staff.

The Center for Nuclear Waste Regulatory Analyses is a Federally-funded Research and Development Center supported by the Nuclear Regulatory Commission. The Center is a division of Southwest Research Institute, a not-for-profit R&D organization which occupies 765 acres of countryside in San Antonio. More than 2,300 employees work at the Institute in more than one million square feet of laboratories, workshops, and offices. The Institute is well-equipped to support computer oriented investigations.

Applications accompanied by resumes and other supporting materials, including the names of three references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, Texas 78228-0510. Nominations for the position are solicited. Southwest Research Institute is an Equal Opportunity/Affirmative Action employer.



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PERFORMANCE ASSESSMENT EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has an immediate employment opportunity in performance assessment conducting work supporting the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in establishing a performance assessment program in an area of national impact.

Qualifications desired are a Ph.D. or Masters Degree in a field of science or engineering pertinent to assessing the performance of natural and engineered barrier systems for isolation of waste in a mined repository in fractured, porous rocks. The position requires at least 5 years experience and demonstrated ability to apply the geosciences and related technical fields to performance assessment. Preference will be given to an individual with demonstrated ability in evaluation of conceptual and numerical models of complex geologic, hydrologic, and geochemical systems. Experience desired includes computer modeling using complex codes exercised on mainframe computer systems. The position requires the ability to interface with engineers, scientists, and regulatory analysts and to provide technical input which will be used in decisions by a regulatory agency. An ability to develop numerical models from conceptual models using information resulting from laboratory experimentation and field testing must be demonstrated. Excellent written and verbal communication skills are required. Duties of the position will include technical activities related to performance assessment aspects of mined geologic repositories for high-level nuclear waste. The successful applicant will be personally involved with research projects, project design and cost determination, and extensive project documentation. Duties of the position will also include supervision of technical and support staff.

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Applications accompanied by resumes and other supporting materials, including the names of 3 references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, TX 78284. Nominations for the position are also solicited.

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RESEARCH ASSISTANT EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has an immediate employment opportunity for a research assistant who will conduct work relevant to the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in supporting the geochemistry research program of the Center for Nuclear Waste Regulatory Analyses.

Qualifications desired are a B. S. degree in chemistry or geology with a minor in chemistry. Experience desired includes analyses of solid and aqueous samples using wet chemical and analytical laboratory techniques, such as atomic absorption spectroscopy, plasma emission spectroscopy, and/or ion chromatography. Training and experience in handling and analyzing radioisotopes desired, but not required. Duties of the position will include assistance in conducting and documenting geochemistry experiments, preparation and review of technical operating procedures, data collection and analyses, report preparation, maintenance of laboratory facilities, and participation in development of experimental designs and techniques. All applicants must pass a previous conflict of interest evaluation.

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Applications accompanied by resumes and other supporting materials, including the names of three references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, Texas 78228-0510. Nominations for the position are solicited.

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REPOSITORY DESIGN, CONSTRUCTION, AND OPERATIONS (RDCO) EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has an immediate employment opportunities in repository design, construction, and operations conducting work supporting the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicants will have an important role in the program in an area of repository design to ensure the public health and safety.

The ideal candidates will have a Ph.D. or Masters Degree in Rock Mechanics, Civil, or Mining Engineering or the equivalent in experience. Working experience in design, construction and/or operation of an underground mine is preferable. Special consideration will be given to candidates who have research and/or design experience related to disposal of high level hazardous waste. Excellent written and verbal communication skills are required. Duties of the position will include providing technical input to develop understanding of the safety issues and concerns associated with design, construction, and operations of a repository, assessing DOE's design parameters for given site conditions to meet regulatory requirements, assessing analytic techniques, developing methodologies to verify performance objectives for a repository, and participation in NRC sponsored research. All applicants must pass a previous conflict of interest evaluation and be qualified for a security clearance.

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Applications accompanied by resumes and other supporting materials, including the names and addresses of three references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, Texas 78228-0510. Nominations for the position are solicited.

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VOLCANOLOGIST EMPLOYMENT OPPORTUNITY

The Center for Nuclear Waste Regulatory Analyses at Southwest Research Institute announces a position beginning January, 1990 for a volcanologist and/or Quaternary igneous activity specialist who will conduct work supporting the program of the Nuclear Regulatory Commission, involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in establishing a program in an area of national impact.

Qualifications are a Ph.D. or Masters degree with a minimum of 5 years responsible professional experience, a specialization in volcanology, and demonstrated ability to apply volcanology and associated disciplines to solving applied problems. The selected person should be capable of evaluating volcanologic models. The individual should understand the current state of the science of such models and be capable of utilizing the models to determine the temporal and spatial distribution of volcanism in the southern Great Basin. The successful applicant will have an interest in tectonics such that the expected volcanic scenarios can be evaluated for impact on and relationship to folding, faulting, and subsidence. Desirable additional interests and skills include the following: 1) Familiarity with geologic sciences including geochemistry, structural geology, tectonics, seismology, and geomorphology, and 2) Ability to evaluate various scenarios of volcano development through the origination and use of predictive models. The person will comment on a spectrum of volcanic, tectonic, and geomorphic models useful for determining the interrelationships among the affected variables. The successful applicant will have the capability of translating model results from the regional to the site specific scale. Experience in conducting volcanic studies including field research is desirable. The selectee will have a demonstrated superior written and verbal communication facility. Applicant must pass a previous conflict of interest evaluation and be qualified for a security clearance.

Duties of the position will include performance of technical activities related to the volcanic aspects of disposal of high-level nuclear waste in a mined geologic repository in an arid environment including site characterization, design, construction, and performance assessment. The successful applicant will be personally involved with research projects, project design, and cost determination, and extensive project documentation. Also, duties of the position will include supervision of technical and support staff.

The Center for Nuclear Waste Regulatory Analyses is a Federally-funded Research and Development Center supported by the Nuclear Regulatory Commission. The Center is a division of Southwest Research Institute, a not-for-profit R&D organization which occupies 765 acres of countryside in San Antonio. More than 2,300 employees work at the Institute in more than one million square feet of laboratories, workshops, and offices. The Institute is well-equipped to support computer oriented investigations.

Applications accompanied by resumes and other supporting materials, including the names of three references should be submitted to A. W. Desmarais, Personnel Office, 6220 Culebra Road, San Antonio, Texas 78228-0510. Nominations for the position are solicited. Southwest Research Institute is an Equal Opportunity/Affirmative Action employer.



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WASTE SYSTEMS ENGINEERING & INTEGRATION SYSTEM ENGINEER EMPLOYMENT OPPORTUNITY

The Southwest Research Institute's Center for Nuclear Waste Regulatory Analyses has an immediate employment opportunity in Waste Systems Engineering & Integration Systems conducting work supporting the Nuclear Regulatory Commission's program involving licensing a geologic repository for high-level nuclear waste. The successful applicant will have an important role in establishing a performance assessment program in an area of national impact.

Qualifications desired are a B.S. or advanced degree in Engineering, a minimum of three years experience in systems engineering, including program analysis and planning, and nuclear and/or regulatory experience is desirable, but less important than the grasp of systems engineering principles and practices. Excellent written and verbal communication skills are required.

Duties of the position will include analyzing the Nuclear Regulatory Commission (NRC) regulatory process and regulatory requirements relative to the high-level nuclear waste management system. Analyze and define alternative methods for compliance determination. Assist in the identification of uncertainties in regulations and technical approaches and in defining methods for their clarification/elimination. Assist the NRC in reviewing and providing guidance for DOE system engineering and integration. Work with Center managers to integrate research, engineering, and geoscience activities. Interact with computer specialists to refine database design and operation. Assist in the preparation of procedures for regulatory analyses. Assist in the preparation of operating plans including the definition of program requirements, schedules and costs, and the preparation of management networks.

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Applications accompanied by resumes and other supporting materials, including the names of 3 references should be submitted to Mr. Tony Magaro, Personnel Office, 6220 Culebra Road, San Antonio, TX 78228-0510. Nominations for the position are also solicited.

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