See Packet I for 109.2 ent.

406.1/ETT/84/04/06/0

APR 26 1984

Mr. J. William Bennett
U.S. Department of Energy
NE-22
Washington, D.C. 20545

Dear Mr. Bennett:

Attached for your information are listings of the current HLW Technical Assistance Contracts, proposed FY85 HLW Technical Assistance Contracts, and the current Research HLW Contracts. This is provided in the context of the "Procedural Agreement Between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy Identifying Guiding Principles for Interface During Site Investigation and Site Characterization" to mutually exchange information on reports in progress and planned field and laboratory testing.

If there are questions concerning individual contracts, please contact the individual project manager identified for each contract. Questions concerning licensing issues in the technical areas covered by these contracts should be directed to the individuals identified in the Project-Specific Procedural Agreements.

Sincerely,

"ORIGINAL SIGNED BY"

Hubert J. Miller, Chief
Repository Projects Branch
Division of Waste Management

Enclosure:
Listings of Contracts

Distribution:
WM s/f: 406.1
PDR
NMSS r/f
WMRP r/f
C/F
REBrowning
MJBell
FRCook
PTPrestholt
TVerma

w/enclosure
WMRP Staff
WMGT Staff
WMEG Staff
WMPC Staff
ETana r/f

F. Arsenault
P. Comella
R. Conti

WM Record File
109.2

WM Project 1
Docket No.
PDR ✓
LPDR

Distribution:

(Return to WM, 623-SS) C2

*See Previous Concurrences.

8406110154 840426
PDR WASTE
WM-1 PDR

OFC	:WMRP*	:WMRP*	:WMRP*	:WMRP	:WMRP	:WMEG	:WMGT
NAME	:ETTana:ett	:RRBoyle	:JJLinehan	:SMCoplan	:HJMiller	:JTGreeves	:MRKnapp
DATE	:84/04/11	:84/04/11	:84/04/	:84/04/	:84/04/25	:84/04/24	:84/04/24

For Raj

406.1/ETT/84/04/06/0

Mr. J. William Bennett
U.S. Department of Energy
NE-22
Washington, D.C. 20545

Dear Mr. Bennett:

Attached for your information are listings of the current HLW Technical Assistance Contracts, proposed FY85 HLW Technical Assistance Contracts, and the current Research HLW Contracts. This is provided in the context of the "Procedural Agreement Between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy Identifying Guiding Principles for Interface During Site Investigation and Site Characterization" to mutually exchange information on reports in progress and planned field and laboratory testing.

If there are questions concerning individual contracts, please contact the individual project manager within the Division of Waste Management identified for each contract.

Sincerely,

Hubert J. Miller, Chief
Repository Projects Branch
Division of Waste Management

Enclosure:
Listings of Contracts

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WM s/f: 406.1
PDR
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WMRP r/f
C/F
REBrowning
MJBell
WMRP Staff
WMGT Staff
WMEG Staff
WMPC Staff
FXCook
PTPrestholt
TVerma ETana r/f

OFC	:WMRP	:WMRP	:WMRP	:WMRP	:WMRP	:WMEG	:WMGT
NAME	:ETTana:ett	:RRBoyle	:JJLinehan	:SMCoplan	:HJMiller	:JTGreeves	:MRKnapp
DATE	:84/04/11	:84/04/ 11	:84/04/ 11	:84/04/	:84/04/	:84/04/	:84/04/

Encl. to ltr to W. Bennett from H. Miller - 4/26/89

NRC HLW TECHNICAL ASSISTANCE PROJECTS SUMMARIES

PROJECT TITLE: TECHNICAL ASSISTANCE IN SEISMO-TECTONIC IMPACTS ON REPOSITORIES
FIN NO.: A0294
CONTRACTOR: LLL
PROJECT MGR: WESTBROOK, WMGT

The contractor will assist the NRC staff in assessing the uncertainties and limitations of data methods used in seismo-tectonic evaluations completed by DOE in site characterization. These evaluations will be used in the design of the repository and as input to performance assessment models. The contractor will identify and evaluate any critical issues in seismo-tectonics related to design and construction, long-term repository stability and radionuclide migration. Also, the contractor will provide input to the technical basis for NRC technical positions on seismo-tectonic stability.

PROJECT TITLE: REPOSITORY SITE DEFINITION AND TECHNOLOGY TRANSFER
FIN NO.: A1158
CONTRACTOR: SANDIA
PROJECT MGR: ORNSTEIN, WMGT

The contractor will meet part of the NRC need to predict radionuclide transport via groundwater movement near a repository by defining potential sites. The contractor will support NRC staff in exercising and documenting the models and codes which will be used to help perform reviews of DOE submittals. The models and codes to be exercised and documented have been developed by this contractor for the NRC Office of Research. This work includes the formulation of test problems for the models and coces, the preparation of supporting documentation, and the technical support necessary for training the NRC staff to operate the codes.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR PERFORMANCE ASSESSMENT
FIN NO.: A1165
CONTRACTOR: SANDIA
PROJECT MGR: WISE, WMRP

Task 1 supports NRC site characterization reviews by providing assistance to help integrate the technical content of the NRC program. Task 2 supports the NRC review of the performance assessment aspects of the national and international waste management programs, including the DOE program. The contractor will provide technical reviews of DOE models, computer programs, and performance assessment techniques, and comment to the NRC about their applicability, technical quality, sufficiency, and relationship to the NRC program. Under Task 3 the contractor will provide technical support for the production of regulations by reviewing non-NRC regulatory documents, such as the EPA standard, and evaluating their pertinence to NRC regulatory products and the NRC performance assessment program. Under Task 4, additional short

term technical assistance related to the first three tasks will be provided as required.

PROJECT TITLE: MAINTENANCE OF COMPUTER PROGRAMS
FIN NO.: A1166
CONTRACTOR: SANDIA
PROJECT MGR: Codell, WMGT

This contract provides for the maintenance of computer programs under development by NRC, including revised documentation, of SWIFT, NWFT/DVM, DNET, Pathways to Man, Dose and Health Effects, LHS, Stepwise Regression, and other computer codes. It also provides for a review of the extent to which the codes have been validated. Task 1 provides for maintenance and quality assurance (QA) of the codes. The contractor will investigate suspected code errors and possible improvements. Task 2 provides for a review of the validation program for the codes.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR REVIEW OF COUPLED THERMAL-HYDROLOGIC-MECHANICAL ASSESSMENT AND SITE CHARACTERIZATION ACTIVITIES AT THE PROPOSED SITES FOR GEOLOGIC REPOSITORIES
FIN NO.: A1755
CONTRACTOR: SANDIA
PROJECT MGR: NATARAJA, WMEG

SNL shall provide technical assistance to the NRC by performing two tasks related to the review and evaluation of the site-characterization aspects of a geologic repository, particularly as they relate to coupled thermal-hydrologic-mechanical assessments. General preconceptual and conceptual designs submitted with the Site Characterization Plan for the proposed sites (other than tuff) shall be reviewed by SNL. These reviews shall concentrate on phenomena, processes, and computational aspects important to repository design.

PROJECT TITLE: GEOCHEMICAL SENSITIVITY ANALYSIS
FIN NO.: A1756
CONTRACTOR: SANDIA
PROJECT MGR: KELLY, WMGT

SNL shall provide technical assistance to the NRC by performing four tasks related to uncertainties in radionuclide discharge and retardation data used by DOE in performance assessment models of repository candidate sites. SNL shall undertake a sensitivity study to assess the uncertainty ofs these data, with emphasis on geochemical radionuclide sorption data. SNL shall also provide short term technical assistance to the NRC in NRC reviews of DOE site

environmental assessments, site characterization plans (SCP's), and SCP updates.

PROJECT TITLE: OVERVIEW/SCHEDULE DOCUMENT
FIN NO.: A3163
CONTRACTOR: BNL
PROJECT MGR: CHANG, WMEG

The contractor will continue its development of an Overview/Schedule Document. This document will show the information needed by NRC to: (a) assess the waste package portion of a DOE license application for a high level waste repository, and (b) advise DOE regarding the waste package under the West Valley Demonstration Act. The document shall also show the source (e.g., DOE Waste Package Program, NRC-sponsored research or NRC-sponsored technical assistance) of the information and the schedule for obtaining it.

PROJECT TITLE: REVIEW OF DOE WASTE PACKAGE PROGRAM
FIN NO.: A3164
CONTRACTOR: BNL
PROJECT MGR: WICK, WMEG

In Task 1, the contractor will continue its review and assessment of the DOE Waste Package Program. The assessment shall result in the determination and documentation of all information needed by NRC to evaluate future DOE designs of waste packages (slated for disposal in a licensed repository) relative to requirements for waste packages in 10 CFR 60. In Task 2, the contractor will perform short term technical assistance pertaining to Task 1 per written request. This generally consists of providing on short notice information which would not be provided in the normal course of work.

PROJECT TITLE: REVIEW OF WASTE PACKAGE VERIFICATION TESTS
FIN NO.: A3167
CONTRACTOR: BNL
PROJECT MGR: WICK, WMEG

In Task 1, the contractor will continue to evaluate the types of tests which must be performed to demonstrate that DOE's waste package can satisfy the performance objectives and the design requirements of proposed 10 CFR 60. As part of the evaluation, the contractor shall define waste package test conditions. In Task 2, the contractor will perform short term technical assistance pertaining to Task 1 per written request. This generally consists of providing on short notice information which would not be provided in the normal course of work.

PROJECT TITLE: PREPARATION OF ENGINEERED ANALYSES FOR HIGH-LEVEL WASTE PACKAGES IN GEOLOGIC REPOSITORIES
FIN NO.: A4165
CONTRACTOR: AFSC
PROJECT MGR: CHANG, WMEG

A review and evaluation will be performed of methods which can be used to analyze waste form, containers and packing as components of a multi-barrier high-level waste repository. The review will include an assessment of the relevance of the methods and data for use in engineering assessments relative to performance objectives in 10 CFR 60. The product of this effort will be a description of the selected methodologies in sufficient details to allow actual analysis of the basalt repository system waste packages and a description of how the waste package performance assessment methodology interfaces with the methodology being used by the staff for high-level waste repository system analysis.

PROJECT TITLE: TECHNICAL ASSISTANCE IN GEOCHEMISTRY
FIN NO.: B0287
CONTRACTOR: ORNL
PROJECT MGR: BROOKS, WMGT

The objective of this contract is to provide technical assistance to the NRC in reviewing the geochemical plans or conclusions of the DOE site screening, site characterization, and technical development (research) programs and in identifying the geochemical information needed to characterize the environment of waste packages and to quantify media-specific radionuclide migration. The contractor will assist the NRC in establishing what information at each geologic repository candidate area will be required in order to assess how much credit can be taken for geochemical processes in performance assessments conducted in licensing.

PROJECT TITLE: EFFECT OF REPOSITORY ENVIRONMENT ON PERFORMANCE OF WASTE PACKAGE/ENGINEERED SYSTEM COMPONENTS
FIN NO.: B0288
CONTRACTOR: ORNL
PROJECT MGR: CHANG, WMEG

The contractor will identify ranges of values for parameters pertinent to characterizing the emplacement environment for high-level waste package design. Processes which are influenced by these parameters will be listed and discussed. Values of these parameters will be bounded to the extent adequate for determining how well the waste package can be expected to meet DOE's performance goals for operational health and safety and for environmental impacts. A final report for this project will include a specification for methodology/models which will allow the prediction of repository parameters and assessment of the reliability of the parametric bounds specified.

PROJECT TITLE: DETERMINATION OF METABOLIC DATA APPROPRAITE FOR HLW DOSIMETRY (ICRP-30)
FIN NO.: B0289
CONTRACTOR: ORNL
PROJECT MGR: FEHRINGER, WMRP

Task 1 consists principally of a literature review to summarize available information regarding the chemical species of radioelements entering the biosphere following release from a repository, and to estimate the effects of the groundwater-biosphere interface (e.g., transition to oxidizing surface waters) and transport through the biosphere on the chemical species. Task 2 will summarize information available in the literature regarding the influence of chemical species on the dosimetry parameters used to describe metabolic processes such as uptake from the gastro-intestinal tract. Based on this summary and on the results of Task 1, the contractor will recommend changes in the ICRP-30 assumptions needed for environmental dosimetry analyses, and will identify areas where additional research is needed.

PROJECT TITLE: LABORATORY EVALUATION OF DOE RADIONUCLIDE SOLUBILITY DATA AND SELECTED RETARDATION PARAMETERS, EXPERIMENTAL STRATEGIES, LABORATORY TECHNIQUES AND PROCEDURES
FIN NO.: B0290
CONTRACTOR: ORNL
PROJECT MGR: STARMER, WMGT

Under Task 1, solubility and solution species for important radionuclides inventory (with emphasis on the actinide series) using site-specific groundwater/backfill/rock will be independently assessed. Under Task 2, radionuclide retardation/migration emphasizing ion exchange and direct sorption mechanisms under site-specific groundwater/backfill/rock conditions will be independently assessed.

PROJECT TITLE: GEOTECHNICAL SCIENCES PROGRAM
FIN NO.: B3109
CONTRACTOR: LBL
PROJECT MGR: TBD

The contractor shall: (1) recommend programs for in-situ testing in various candidate rock types, including specific tests to resolve siting issues for a HLW repository; (2) recommend programs and experiments to resolve geochemistry issues; (3) review and evaluate the capability of engineered barriers to retard movement of groundwater and provide a geochemical barrier to radionuclide transport; (4) assess alternative geologic environments with respect to advantages and disadvantages in near-field/far-field and long term/short term characteristics; (5) evaluate the utility of surface cooling, waste density and loading sequence on parameters to control thermal effects on repository

stability and nuclide isolation; and (6) provide technical assistance in review of documents and recommendations for criteria in the above areas.

PROJECT TITLE: SYMPOSIUMS ON THE "SCIENTIFIC BASIS FOR NUCLEAR WASTE MANAGEMENT"
FIN NO.: B4118
CONTRACTOR: SRL
PROJECT MGR: WICK, WMEG

The contractor will select papers for the symposium, perform final editing and typing of the Proceedings, and have them printed.

PROJECT TITLE: U.S. NATIONAL COMMITTEE ON ROCK MECHANICS
FIN NO.: B6932
CONTRACTOR: BUMINES
PROJECT MGR: TBD

The NRC participates as one of fourteen federal agencies that supports the USNC/RM. The Committee is the focal point for government, industry and the scientific community for advancing the science and engineering of rock mechanics.

PROJECT TITLE: TECHNICAL SUPPORT FOR DESIGN REVIEW
FIN NO.: B6934
CONTRACTOR: BUMINES
PROJECT MGR: TIKTINSKY, WMEG

The Bureau of Mines will review portions of DOE site characterization reports and activities in the areas of ventilation systems, hoisting systems, excavation techniques, and rock mechanics. They will also review NRC documents on these subjects (technical criteria and directives).

PROJECT TITLE: TECHNICAL SUPPORT ON SITING ACTIVITIES
FIN NO.: B6935
CONTRACTOR: USCOE
PROJECT MGR: WESTBROOK, WMGT

The COE will review DOE site screening plans and activities, site characterization reports and site characterization activities, and prepare reports on these reviews to NRC. The COE staff will: (1) examine regional geologic and hydrologic environments of sites; (2) review site exploration activities; (3) examine rock cores; (4) review data collection activities at sites; and (5) examine large site exposure of the sub-surface medium.

PROJECT TITLE: BENCHMARKING OF COMPUTER CODES AND LICENSING ASSISTANCE
FIN NO.: B6985
CONTRACTOR: TEKNEKRON
PROJECT MGR: BROOKS, WMRP

The contractor will provide independent evaluation of models and codes beginning with those involved in the NRC assessment of a Site Characterization Report (SCR). The code evaluation will include the quality of the physical models which drive the code, and the limitations of both these physical models and the mathematical techniques by which the code uses the models to predict long-term repository performance. The contractor will establish a method for performing the code evaluations, including development of benchmark problems with known solutions, learn to operate appropriate coces, and then conduct the evaluations.

PROJECT TITLE: ASSESSMENT OF WASTE RETRIEVAL ALTERNATIVES
FIN NO.: B7327
CONTRACTOR: ENG INT
PROJECT MGR: TIKTINSKY, WMEG

The contractor will identify and evaluate alternatives being considered by the DOE for retrievability or recoverability of HLW from geologic repositories as defined in existing conceptual designs. The purpose of this evaluation is to identify more specifically than has been done previously, those concerns and potential problems which must be addressed by the DOE in its repository design to assure that the retrievability requirements of 10 CFR Part 60 will be met.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR DESIGN REVIEWS
FIN NO.: B7328
CONTRACTOR: ENG INT
PROJECT MGR: TIKTINSKY, WMEG

This contract provides NRC with technical assistance in the area of repository design. Technical work includes review of DOE conceptual designs, technical documents, and participating in technical meetings, workshops, and site visits.

PROJECT TITLE: TECHNICAL ASSISTANCE IN HYDROGEOLOGY
FIN NO.: B7330
CONTRACTOR: BOA
PROJECT MGR: JOHNSON, WMGT

This contract will provide reviews of the hydrogeologic aspects of the DOE site screening, site characterization, and technical development (research) programs. Technical work includes reviewing specific site characterization reports (SCR) and technical documents as well as participating in technical meetings and site visits. This contract will also provide reviews and

technical input to the hydrogeologic sections of NRC review plans, and advice on technical positions.

PROJECT TITLE: TECHNICAL ASSISTANCE IN GEOPHYSICAL METHODS FOR SITE CHARACTERIZATION
FIN NO.: D1003
CONTRACTOR: UNDES
PROJECT MGR: RICE, WMGT

The contractor will survey currently available geophysical surveying methods and data analysis techniques. The contractor will review the appropriate sections of the SCR and advise the staff of the completeness and applicability of the geophysical techniques and interpretations proposed for site characterization. The contractor shall provide direct technical assistance in the form of attendance at conferences, meetings, and site visits.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR IN SITU TESTING
FIN NO.: D1004
CONTRACTOR: ENG INT
PROJECT MGR: BUCKLEY, WMEG

This contract provides review of in situ testing and related engineering aspects of the DOE site characterization, and technical development (research) programs as they relate to in situ test facilities. Technical work includes reviewing specific portions of Site Characterization Reports (SCR), technical documents, and participating in technical meetings, workshops and site visits. This contract will also provide reviews and technical input to the engineering geology, geomechanical and in situ testing sections of NRC review plans, technical documents, site visits and workshops.

NRC FY85 HLW TECHNICAL ASSISTANCE PROJECTS SUMMARIES

PROJECT TITLE: TECHNICAL ASSISTANCE IN SEISMO-TECTONIC IMPACTS ON REPOSITORIES
FIN NO.: A0294
CONTRACTOR: LLL
PROJECT MGR: WESTBROOK, WMGT

The contractor will assist the NRC staff in assessing the uncertainties and limitations of data methods used in seismo-tectonic evaluations completed by DOE in site characterization. These evaluations will be used in the design of the repository and as input to performance assessment models. The contractor will identify and evaluate any critical issues in seismo-tectonics related to design and construction, long-term repository stability and radionuclide migration. Also, the contractor will provide input to the technical basis for NRC technical positions on seismo-tectonic stability.

PROJECT TITLE: REPOSITORY SITE DEFINITION AND TECHNOLOGY TRANSFER
FIN NO.: A1158
CONTRACTOR: SANDIA
PROJECT MGR: ORNSTEIN, WMGT

The contractor will meet part of the NRC need to predict radionuclide transport via groundwater movement near a repository by defining potential sites. The contractor will support NRC staff in exercising and documenting the models and codes which will be used to help perform reviews of DOE submittals. The models and codes to be exercised and documented have been developed by this contractor for the NRC Office of Research. This work includes the formulation of test problems for the models and coces, the preparation of supporting documentation, and the technical support necessary for training the NRC staff to operate the codes.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR PERFORMANCE ASSESSMENT
FIN NO.: A1165
CONTRACTOR: SANDIA
PROJECT MGR: WISE, WMRP

Task 1 supports NRC site characterization reviews by providing assistance to help integrate the technical content of the NRC program. Task 2 supports the NRC review of the performance assessment aspects of the national and international waste management programs, including the DOE program. The contractor will provide technical reviews of DOE models, computer programs, and performance assessment techniques, and comment to the NRC about their applicability, technical quality, sufficiency, and relationship to the NRC program. Under Task 3 the contractor will provide technical support for the production of regulations by reviewing non-NRC regulatory documents, such as the EPA standard, and evaluating their pertinence to NRC regulatory products and the NRC performance assessment program. Under Task 4, additional short

term technical assistance related to the first three tasks will be provided as required.

PROJECT TITLE: MAINTENANCE OF COMPUTER PROGRAMS
FIN NO.: A1166
CONTRACTOR: SANDIA
PROJECT MGR: Codell, WMGT

This contract provides for the maintenance of computer programs under development by NRC, including revised documentation, of SWIFT, NWFT/DVM, DNET, Pathways to Man, Dose and Health Effects, LHS, Stepwise Regression, and other computer codes. It also provides for a review of the extent to which the codes have been validated. Task 1 provides for maintenance and quality assurance (QA) of the codes. The contractor will investigate suspected code errors and possible improvements. Task 2 provides for a review of the validation program for the codes.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR REVIEW OF COUPLED THERMAL-HYDROLOGIC-MECHANICAL ASSESSMENT AND SITE CHARACTERIZATION ACTIVITIES AT THE PROPOSED SITES FOR GEOLOGIC REPOSITORIES
FIN NO.: A1755
CONTRACTOR: SANDIA
PROJECT MGR: NATARAJA, WMEG

SNL shall provide technical assistance to the NRC by performing two tasks related to the review and evaluation of the site-characterization aspects of a geologic repository, particularly as they relate to coupled thermal-hydrologic-mechanical assessments. General preconceptual and conceptual designs submitted with the Site Characterization Plan for the proposed sites (other than tuff) shall be reviewed by SNL. These reviews shall concentrate on phenomena, processes, and computational aspects important to repository design.

PROJECT TITLE: GEOCHEMICAL SENSITIVITY ANALYSIS
FIN NO.: A1756
CONTRACTOR: SANDIA
PROJECT MGR: KELLY, WMGT

SNL shall provide technical assistance to the NRC by performing four tasks related to uncertainties in radionuclide discharge and retardation data used by DOE in performance assessment models of repository candidate sites. SNL shall undertake a sensitivity study to assess the uncertainty ofs these data, with emphasis on geochemical radionuclide sorption data. SNL shall also provide short term technical assistance to the NRC in NRC reviews of DOE site

environmental assessments, site characterization plans (SCP's), and SCP updates.

PROJECT TITLE: REVIEW OF DOE WASTE PACKAGE PROGRAM
FIN NO.: A3164
CONTRACTOR: BNL
PROJECT MGR: WICK, WMEG

In Task 1, the contractor will continue its review and assessment of the DOE Waste Package Program. The assessment shall result in the determination and documentation of all information needed by NRC to evaluate future DOE designs of waste packages (slated for disposal in a licensed repository) relative to requirements for waste packages in 10 CFR 60. In Task 2, the contractor will perform short term technical assistance pertaining to Task 1 per written request. This generally consists of providing on short notice information which would not be provided in the normal course of work.

PROJECT TITLE: REVIEW OF WASTE PACKAGE VERIFICATION TESTS
FIN NO.: A3167
CONTRACTOR: BNL
PROJECT MGR: WICK, WMEG

In Task 1, the contractor will continue to evaluate the types of tests which must be performed to demonstrate that DOE's waste package can satisfy the performance objectives and the design requirements of proposed 10 CFR 60. As part of the evaluation, the contractor shall define waste package test conditions. In Task 2, the contractor will perform short term technical assistance pertaining to Task 1 per written request. This generally consists of providing on short notice information which would not be provided in the normal course of work.

PROJECT TITLE: PREPARATION OF ENGINEERED ANALYSES FOR HIGH-LEVEL WASTE PACKAGES IN GEOLOGIC REPOSITORIES
FIN NO.: A4165
CONTRACTOR: AFSC
PROJECT MGR: CHANG, WMEG

A review and evaluation will be performed of methods which can be used to analyze waste form, containers and packing as components of a multi-barrier high-level waste repository. The review will include an assessment of the relevance of the methods and data for use in engineering assessments relative to performance objectives in 10 CFR 60. The product of this effort will be a description of the selected methodologies in sufficient details to allow actual analysis of the basalt repository system waste packages and a description of how the waste package performance assessment methodology interfaces with the

methodology being used by the staff for high-level waste repository system analysis.

PROJECT TITLE: TECHNICAL ASSISTANCE IN GEOCHEMISTRY
FIN NO.: B0287
CONTRACTOR: ORNL
PROJECT MGR: BROOKS, WMGT

The objective of this contract is to provide technical assistance to the NRC in reviewing the geochemical plans or conclusions of the DOE site screening, site characterization, and technical development (research) programs and in identifying the geochemical information needed to characterize the environment of waste packages and to quantify media-specific radionuclide migration. The contractor will assist the NRC in establishing what information at each geologic repository candidate area will be required in order to assess how much credit can be taken for geochemical processes in performance assessments conducted in licensing.

PROJECT TITLE: EFFECT OF REPOSITORY ENVIRONMENT ON PERFORMANCE OF WASTE PACKAGE/ENGINEERED SYSTEM COMPONENTS
FIN NO.: B0288
CONTRACTOR: ORNL
PROJECT MGR: CHANG, WMEG

The contractor will identify ranges of values for parameters pertinent to characterizing the emplacement environment for high-level waste package design. Processes which are influenced by these parameters will be listed and discussed. Values of these parameters will be bounded to the extent adequate for determining how well the waste package can be expected to meet DOE's performance goals for operational health and safety and for environmental impacts. A final report for this project will include a specification for methodology/models which will allow the prediction of repository parameters and assessment of the reliability of the parametric bounds specified.

PROJECT TITLE: LABORATORY EVALUATION OF DOE RADIONUCLIDE SOLUBILITY DATA AND SELECTED RETARDATION PARAMETERS, EXPERIMENTAL STRATEGIES, LABORATORY TECHNIQUES AND PROCEDURES
FIN NO.: B0290
CONTRACTOR: ORNL
PROJECT MGR: STARMER, WMGT

Under Task 1, solubility and solution species for important radionuclides inventory (with emphasis on the actinide series) using site-specific groundwater/backfill/rock will be independently assessed. Under Task 2, radionuclide retardation/migration emphasizing ion exchange and direct sorption

mechanisms under site-specific groundwater/backfill/rock conditions will be independently assessed.

PROJECT TITLE: PUBLICATION OF PROCEEDINGS FOR 1984, 1985, AND 1986 SYMPOSIUMS ON THE "SCIENTIFIC BASIS FOR NUCLEAR WASTE MANAGEMENT"
FIN NO.: B2497
CONTRACTOR: PNL
PROJECT MGR: WICK, WMEG

The contractor will select papers for the symposium, perform final editing and typing of the Proceedings, and have them printed.

PROJECT TITLE: U.S. NATIONAL COMMITTEE ON ROCK MECHANICS
FIN NO.: B6932
CONTRACTOR: BUMINES
PROJECT MGR: TBD

The NRC participates as one of fourteen federal agencies that supports the USNC/RM. The Committee is the focal point for government, industry and the scientific community for advancing the science and engineering of rock mechanics.

PROJECT TITLE: TECHNICAL SUPPORT FOR DESIGN REVIEW
FIN NO.: B6934
CONTRACTOR: BUMINES
PROJECT MGR: TIKTINSKY, WMEG

The Bureau of Mines will review portions of DOE site characterization reports and activities in the areas of ventilation systems, hoisting systems, excavation techniques, and rock mechanics. They will also review NRC documents on these subjects (technical criteria and directives).

PROJECT TITLE: TECHNICAL SUPPORT ON SITING ACTIVITIES
FIN NO.: B6935
CONTRACTOR: USCOE
PROJECT MGR: WESTBROOK, WMGT

The COE will review DOE site screening plans and activities, site characterization reports and site characterization activities, and prepare reports on these reviews to NRC. The COE staff will: (1) examine regional geologic and hydrologic environments of sites; (2) review site exploration activities; (3) examine rock cores; (4) review data collection activities at sites; and (5) examine large site exposure of the sub-surface medium.

PROJECT TITLE: BENCHMARKING OF COMPUTER CODES AND LICENSING ASSISTANCE
FIN NO.: B6985
CONTRACTOR: TEKNEKRON
PROJECT MGR: BROOKS, WMRP

The contractor will provide independent evaluation of models and codes beginning with those involved in the NRC assessment of a Site Characterization Report (SCR). The code evaluation will include the quality of the physical models which drive the code, and the limitations of both these physical models and the mathematical techniques by which the code uses the models to predict long-term repository performance. The contractor will establish a method for performing the code evaluations, including development of benchmark problems with known solutions, learn to operate appropriate coces, and then conduct the evaluations.

PROJECT TITLE: TECHNICAL ASSISTANCE IN HYDROGEOLOGY
FIN NO.: B7330
CONTRACTOR: BOA
PROJECT MGR: JOHNSON, WMGT

This contract will provide reviews of the hydrogeologic aspects of the DOE site screening, site characterization, and technical development (research) programs. Technical work includes reviewing specific site characterization reports (SCR) and technical documents as well as participating in technical meetings and site visits. This contract will also provide reviews and technical input to the hydrogeologic sections of NRC review plans, and advice on technical positions.

PROJECT TITLE: TECHNICAL ASSISTANCE IN GEOPHYSICAL METHODS FOR SITE CHARACTERIZATION
FIN NO.: D1003
CONTRACTOR: UNDES
PROJECT MGR: RICE, WMGT

The contractor will survey currently available geophysical surveying methods and data analysis techniques. The contractor will review the appropriate sections of the SCR and advise the staff of the completeness and applicability of the geophysical techniques and interpretations proposed for site characterization. The contractor shall provide direct technical assistance in the form of attendance at conferences, meetings, and site visits.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR IN SITU TESTING
FIN NO.: D1004
CONTRACTOR: RFP/BOA
PROJECT MGR: BUCKLEY, WMEG

This contract will provide reviews of the in situ testing and related engineering aspects of the DOE site characterization, and technical development (research) programs as they relate to in situ test facilities. Technical work includes reviewing specific portions of Site Characterization Reports (SCR), technical documents, and participating in technical meetings, workshops and site visits. This contract will also provide reviews and technical input to the engineering geology, geomechanical and in situ testing sections of NRC review plans, technical documents, site visits and workshops.

PROJECT TITLE: U.S. NATIONAL COMMITTEE ON TUNNELING TECHNOLOGY (USNC/TT)
FIN NO.: D1010
CONTRACTOR: BUMINES
PROJECT MGR: TBD

The NRC participates as one of twelve federal agencies that support the USNC/TT. The Committee is the focal point for government, industry and the scientific community for advancing the science and engineering of underground construction.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR DESIGN REVIEWS
FIN NO.: TBD
CONTRACTOR: RFP/BOA
PROJECT MGR: TBD

The contractor will provide expertise to review site specific designs and plans for construction of structures, systems, and components important to radiological health and safety. This work will include review, evaluation, and comment on pre-conceptual and conceptual design reports that the DOE will submit prior to or in conjunction with site characterization plans. These reviews will be based on the criteria set forth in 10 CFR Part 60, staff technical positions on repository design and NRC standard review plans. Results, conclusions, and recommendations developed during design reviews shall be documented in task reports for each task assignment.

PROJECT TITLE: TECHNICAL ASSISTANCE FOR LICENSING ISSUE TRACKING
FIN NO.: TBD
CONTRACTOR: TBD
PROJECT MGR: PITTIGLIO, WMRP

Develop, document, and implement a software system for tracking HLW repository licensing issues. The system would provide computer support for the staff's efforts to (1) provide early identification of licensing issues and (2) assure that timely and appropriate steps are taken during the prelicensing and licensing stages in resolving these issues. The system would have the capabilities to input and track issues. The issues will be identified both on a site specific basis (3 to 4 sites) and, as appropriate, on a generic basis,

and in each case consist of 40 to 50 issues in each of seven technical areas. The contractor will assist in obtaining public comment and be responsible for maintenance, input, and output at least during an initial trial period.

PROJECT TITLE: TECHNICAL ASSISTANCE IN ENVIRONMENTAL AND SOCIOECONOMIC ASSESSMENTS
FIN NO.: TBD
CONTRACTOR: TBD
PROJECT MGR: PFLUM, WMRP

This contract will provide reviews of the environmental and socioeconomic aspects of each DOE site screening and site characterization program (BWIP, NNWSI, Salt, Crystalline). Technical work includes reviewing sections of SCP's, EA's and other technical documents as well as participating in technical meetings and site visits as needed. This contract will also provide reviews and technical input to the environmental and socioeconomic sections of NRC review plans and advise in generic and site technical positions that might be developed by the staff.

PROJECT TITLE: TECHNICAL ASSISTANCE IN NUMERICAL MODELING ASSESSMENT OF HIGH-LEVEL WASTE REPOSITORIES
FIN NO.: TBD
CONTRACTOR: SANDIA
PROJECT MGR: TBD

This contract will provide expert opinion input to NRC reviews of the DOE site screening, site characterization and technical development (research) programs which include complex numerical modeling assessments. Technical work includes application of assessment methodologies and computer codes developed for the NRC by Sandia to be applied to various media. Technical work also includes reviewing specific site reports, technical comments as well as participating in technical meetings, site visits or workshops. This contract will also provide reviews and technical input to numerical modeling assessment sections of NRC review plans, issue development, and advice on technical positions.

PROJECT TITLE: EVALUATION OF EARTH SURFACE CHANGES IMPACTS ON RADIOACTIVE WASTE DISPOSAL SITES
FIN NO.: TBD
CONTRACTOR: TBD
PROJECT MGR: TBD

The contractor will review site screening plans, decommissioning plans, and other operational activities for high level facilities. Written reports on these reviews will be prepared for the NRC. The contractor will examine data and information that relates to earth surface changes that could affect a site such as long term river changes, embankment retreat, wind erosion,

sedimentation, weathering effects and climate changes. The contractor will develop probabilistic assessment scenarios for the items listed above on an as needed basis.

PROJECT TITLE: TECHNICAL ASSISTANCE IN NATURAL RESOURCE ASSESSMENT
FIN NO.: TBD
CONTRACTOR: RFP
PROJECT MGR: TBD

This contract shall provide reviews of the natural resources aspects of each DOE site screening and site characterization program. Technical work includes reviewing specific SCP's, EA's, and supporting technical documents as well as participating in technical meeting and site visits. This contract will also provide reviews and technical input to the natural resources sections of NRC review plans and advice on generic and site technical positions.

NRC RES HLW PROJECTS SUMMARIES

PROJECT TITLE: GEOTECHNICAL, ENVIRONMENTAL, & RADIATION FIELD MEASUREMENT SYSTEM EVALUATION
FIN NO.: A0367
CONTRACTOR: LLNL
PROJECT MGR: ZURFLEUH

The effectiveness and reliability of currently available instrumentation is assessed for use in characterizing and monitoring potential repository sites.

PROJECT TITLE: FRACTURING AND GEOMECHANICS OF JOINTED ROCK
FIN NO.: A0371
CONTRACTOR: LLL
PROJECT MGR: TBD

Remote sensing methods (geotomography) for identifying and describing joints and fractures are assessed. (Project completed)

PROJECT TITLE: RISK METHODOLOGY OTHER THAN BEDDED SALT
FIN NO.: A1266
CONTRACTOR: SNL
PROJECT MGR: SHEPARD

The risk assessment methodology developed for bedded salt is being modified and adapted for application to risk and performance assessment for nuclear waste isolation in basalt, tuff, domed salt, and granite. The contractor is using the results produced under contract A1158 "Repository Site Definition and Technology Transfer" to determine what modifications of the bedded salt models and methods are required to represent the other media.

PROJECT TITLE: LAB ANALOG OF LEACHING & MIGRATION
FIN NO.: A2230
CONTRACTOR: ANL
PROJECT MGR: KIM/ALEXANDER

A new SOW is under preparation for this project. This project will focus on experiments on glass waste forms.

PROJECT TITLE: MODIFICATION OF BACKFILL MATERIALS
FIN NO.: A2239
CONTRACTOR: ANL
PROJECT MGR: ALEXANDER

The object of this project is to assess the effects of (1) thermochemically induced mineralogical changes in backfill, (2) hydraulic gradient, (3) piping, (4) induration and fracturing, and (5) the ability of backfill to control groundwater within the underground facility.

PROJECT TITLE: CONTAINER ASSESSMENT
FIN NO.: A3237
CONTRACTOR: BNL
PROJECT MGR: McNEIL

The contractor will assess potential failure modes of the candidate waste container materials. The emphasis in FY84 and 85 shall be on the evaluation of accelerated testing of iron and steel containers for failure by hydrogen-related mechanisms. As necessary to assess these failure modes, the contractor shall evaluate the performance of appropriate weldments in representative waste package environments. These environments whould bound the conditions anticipated for the waste package, including the presence of appropriate backfills in both salt and crystalline rock repositories.

PROJECT TITLE: PITTING CORROSION
FIN NO.: A3269
CONTRACTOR: BNL
PROJECT MGR: McNEIL

The research program will address growth rates of pits as a function of pit age. The study will include consideration of heat transfer effects on pitting to determine whether isothermal tests can be used to project pitting corrosion behavior in situations involving containers which have significant internal heat from radionuclide decay.

PROJECT TITLE: UNCERTAINTIES IN LONG-TERM COLLECTIVE DOSE & HEALTH EFFECTS FROM GEOLOTIC DISPOSAL OF HLW
FIN NO.: A9041
CONTRACTOR: ORNL
PROJECT MGR: RANDALL

This project is intended to provide the NRC staff with information giving a broad view of the quantifiable and unquantifiable uncertainties which arise in connection with the calculation of long-term collective dose and health effects due to the release of radionuclides from HLW which has been isolated in a geologic repository. The analysis of uncertainties is to be done in stages by considering individual components of a repository safety assessment.

PROJECT TITLE: VALENCE EFFECTS ON ADSORPTION

FIN NO.: B0462
CONTRACTOR: ORNL
PROJECT MGR: BIRCHARD

The contractor will evaluate the effect of poor valence state control on laboratory measurements of adsorption. The contractor will identify and test methods for improving the valence state control of adsorption measurements particularly under reducing conditions and compare these techniques to standard techniques used for sorption measurements on multivalent nuclides.

PROJECT TITLE: GEOCHEMICAL ASSESSMENT OF NUCLEAR WASTE ISOLATION
FIN NO.: B3040
CONTRACTOR: LBL
PROJECT MGR: ALEXANDER/BIRCHARD

The contractor will identify geochemical variables, processes, and mechanisms that affect the performance of the canister, overpack-backfill, borehole seals, near-field and far-field systems and evaluate how they can be measured or defined. Emphasis will be placed on identifying the mechanisms and conditions which control the transport of radionuclides from sites of origin in response to natural processes.

PROJECT TITLE: COUPLED INTERACTIONS GEOTHERMAL AND HYDROTHERMAL SYSTEMS
FIN NO.: B3046
CONTRACTOR: LBL
PROJECT MGR: ALEXANDER

Study of geothermal systems to provide insights as to what coupled processes are important to repository performance and compliance demonstration and how such processes should be addressed.

PROJECT TITLE: ELEMENTS OF HYDROFIELD VALIDATION
FIN NO.: B5685
CONTRACTOR: UNDES
PROJECT MGR: RANDALL

This is a planned project. An SOW is under development.

PROJECT TITLE: GROUND WATER TRANSPORT
FIN NO.: B5753
CONTRACTOR: U OF AZ
PROJECT MGR: RANDALL

Identify and formulate the controlling properties of ground water flow in fractured media. Includes assessment of various formulations of fracture flow models and associated field measurements.

PROJECT TITLE: SEALING ROCK MASS
FIN NO.: B6627
CONTRACTOR: U OF AZ
PROJECT MGR: DOYLE

Identifies significant material and fabrication parameters for sealing shafts, tunnels and boreholes, including assessment of seal and plug performance under a variety of conditions.

PROJECT TITLE: DATING GROUND WATER
FIN NO.: B6628
CONTRACTOR: U OF AZ
PROJECT MGR: BIRCHARD

Investigation of current and new techniques for dating groundwater similar to those expected at repository sites. Application of dating techniques to identification and definition of hydrostratigraphic units is considered.

PROJECT TITLE: RADIONUCLIDE MIGRATION AROUND URANIUM ORE BODIES: ANALOGUE OF RADIOACTIVE WASTE REPOSITORIES
FIN NO.: B6661
CONTRACTOR: AAEC
PROJECT MGR: BIRCHARD

Rates of radionuclide migration in geologic systems using the naturally occurring radionuclides U-238, U-234, Th-230, and Ra-226 will be determined. These data will be used to validate migration rates and distances that are calculated from laboratory determined parameters and used in conceptual models of radioactive waste behavior. The AAEC will provide observed and laboratory geochemical data and a description of the geologic and hydrologic environment and ore body source term needed to verify existing codes. These data will be used by NRC and its other contractors in the verification of transport models.

PROJECT TITLE: ASSESS PREDICTIVE METHODS FOR NATURAL EVENTS
FIN NO.: B6686
CONTRACTOR: UNDES
PROJECT MGR: DOYLE

This is a planned project. An SOW is under development.

PROJECT TITLE: LONG-TERM PERFORMANCE OF WP MATERIAL
FIN NO.: B6764
CONTRACTOR: BCL
PROJECT MGR: KIM

Assessment of properties and parameters that determine the interaction between waste packages and the repository environment. Includes waste canister corrosion and waste form aging experiments.

PROJECT TITLE: MONITORING CHANGES IN ROCK & GROUND WATER
FIN NO.: B7062
CONTRACTOR: UNDES
PROJECT MGR: TBD

This is a planned project. An SOW is under development. The object is to determine whether changes in underground facility environment can be forecast by monitoring geophysical and hydrologic properties.

PROJECT TITLE: TESTING PROCEDURES FOR ROCK MECHANICS
FIN NO.: B7115
CONTRACTOR: ASTM
PROJECT MGR: SCHMITT

The objective of this work is to develop a set of standards on the testing procedures used in determining the mechanical, thermal and hydraulic properties of rocks. These standards will be used by the NRC to develop guidance for testing procedures for the design and construction of geologic repositories for high-level nuclear waste.

PROJECT TITLE: CLIMATES OF THE HOLOCENE: METHODOLOGIES FOR PALEOCLIMATIC RECONSTRUCTION
FIN NO.: B7121
CONTRACTOR: NSF
PROJECT MGR: KORNASIEWCZ

The NSF will provide a major paleoclimatic data base from which time series and synoptic paleoclimatic conditions can be reconstructed. Detailed paleoclimatic maps for the mid-Holocene period of 6000-7000 years ago and preliminary paleoclimatic maps for the periods 3000, 6000, 9000, and 12,000 years ago will be provided.

PROJECT TITLE: RESEARCH ON THE EFFECT OF MANUFACTURING PROCESSES ON MATERIAL PROPERTIES AFFECTING FAILURE MECHANISMS IN HIGH-LEVEL WASTE CONTAINERS

FIN NO.: B7278
CONTRACTOR: UNDES/RFP
PROJECT MGR: McNEIL

The contractor, with assistance where appropriate from NRC, shall learn from DOE and DOE contractors the container types most likely to be used by DOE. The contractor will be responsible for selecting, in consultation with NRC, up to six different container types consistent with DOE's known or perceived intentions. For selected container types the contractor will determine what production processes should reasonably be expected to be used to make the containers, and what welding technology should reasonably be expected to be used for sealing them.

PROJECT TITLE: UNSATURATED FLOW AND TRANSPORT THROUGH FRACTURED ROCK RELATED TO HIGH-LEVEL WASTE REPOSITORIES - PHASE II
FIN NO.: B7291
CONTRACTOR: U OF AZ
PROJECT MGR: NICHOLSON

The research is focused on developing a capability to characterize potential repository sites in unsaturated fractured rock and for the long-term monitoring of such sites. Existing computer models developed for unconsolidated media and saturated fractured rock will be assessed for application to unsaturated fractured rock. The ultimate objective is to arrive at a nonisothermal, multiphase, multispecies model that simulates large-scale unsaturated-saturated groundwater systems.

PROJECT TITLE: SITE INVESTIGATIONS FOR TUNNEL
FIN NO.: B7591
CONTRACTOR: NAS
PROJECT MGR: ZURFLEUH

Participation in funding a generic study on characterization of sites for geologic engineering.

PROJECT TITLE: HIGH-LEVEL WASTE PRECLOSURE SAFETY SYSTEMS ANALYSIS
FIN NO.: B8203
CONTRACTOR: SANDIA
PROJECT MGR: EISENBERG

The contractor shall develop and apply a systematic methodology that will identify and quantitatively prioritize those structures, systems, components, and operations which are most important to safety during the preclosure phase of repository development; emphasis shall be placed on the subsurface elements of the system and its operations.

PROJECT TITLE: THERMAL EFFECTS ON REPOSITORY ROCKS
FIN NO.: B8944
CONTRACTOR: U OF DELAWARE
PROJECT MGR: RANDALL

This project focuses on providing NRC with an understanding of the rates of heat transfer from the waste to the host rock. The spatial and temporal changes of temperature in the repository due to the presence of the waste are directly dependent on these heat transfer rates.