

Selected NRC Products  
High-Level Waste Program

September 1989

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## INTRODUCTION

The purpose of this list is to identify selected NRC High-Level Waste Program products and provide a summary of current and planned documents issued by the NRC staff. The list is not intended to be directive in nature but rather to offer a collection of products generated by the HLW program in order to provide timely guidance/advice for prelicensing and eventual licensing phases. It is necessary to use a variety of documents to provide such guidance because of: a) variability in the nature of the technical issues in HLW; b) the site specific nature of many of the issues; c) the evolving nature of issues with time as the exploratory site investigations are carried out; and d) variability in what is an appropriate level of detail that must be addressed in guidance.

Due to the uncertainties in investigative results and changes of priorities and schedules, guidance flexibility is needed. The variety of existing documents and procedural forms allows the staff to take a flexible approach in assuring efficient, timely and complete guidance in the prelicensing and licensing phases. This summary permits interested parties who have limited time and who cannot, practically speaking, follow the great amount of detail that is the subject of the prelicensing guidance process to be informed of how the process is working. This summary offers a listing of generic as well as site-specific products which have been or are being planned. The document will be reviewed and reissued on a periodic basis.

The summary is divided into three major components: Regulations, Licensing Guidance Process; and NRC Review Plans. Copies of the referenced documents can be obtained from the USNRC Public Document Room.

### I. REGULATIONS

While there are a number of NRC and other Federal agencies rules and regulations which pertain to the prelicensing and licensing actions, this list includes only those products produced by the HLW Program.

10 CFR Part 60--Disposal of High-Level Radioactive Wastes in Geologic Repositories.

<u>TITLE</u>	<u>ISSUE DATE</u>
o Licensing Procedures for HLW in Geologic Repositories	February 1981
- Site Characterization and State/Tribal Participation (Final)	July 1986
- Negotiated Rulemaking on Submission and Management of Records and Documents (Final)	April 1989
- NEPA/EIS Adoption (Final)	July 1989

<u>TITLE</u>	<u>ISSUE DATE</u>
o Technical Criteria for HLW in Geologic Repositories	June 1983
- Unsaturated Zone	July 1985
- EPA Standard (Proposed)	June 1986
- Definition of Anticipated and Unanticipated Processes and Events (Proposed)	December 1989 (Proposed date)

On February 27, 1987 the Commission published an advance notice of proposed rulemaking (ANPR) on revising the definition of high-level radioactive waste (HLW) in 10 CFR Part 60. This action was in response to the Nuclear Waste Policy Act of 1982, which contains a definition of HLW which differs from that in 10 CFR Part 60. The advance notice contained an approach to revising the definition of HLW based in part on concentrations of radionuclides rather than on source of the waste alone. After reviewing public comments on the advance notice, the staff recommended that a revision of the existing definition is not warranted. Instead, it was determined that 10 CFR Part 61 should be amended to require geologic repository disposal of all above Class C low-level waste (LLW) unless the Commission has approved an alternative means of disposal. A proposed rule to this effect was issued on May 18, 1988 (53FR17709), and a final rule was published on May 25, 1989 (54FR22578).

## II. LICENSING GUIDANCE PROCESS

This section is divided into ten areas: Site Characterization Analysis (SCA) and Semi-annual update reviews; Regulatory Guides; Technical Positions; Documented Technical Meetings; Site Visits and Observation Audits of DOE QA Programs; Safety Evaluations; Environmental Assessment Reviews; Contractor Reports (Research and Special Studies); State/Tribal Interactions; and Program Planning and Management Reviews.

### A. SITE CHARACTERIZATION ANALYSIS AND SEMI-ANNUAL REPORTS

On December 22, 1987, the President signed into law a bill amending the Nuclear Waste Policy Act (the Nuclear Waste Policy Amendments Act of 1987, Pub. L. No. 100-203). The primary effect of the legislation is to focus DOE's site characterization efforts on the Yucca Mountain in Nevada to determine its suitability as a site for a geologic repository. Accordingly, DOE only issued a CDSCP for the Yucca Mountain site on January 8, 1988. A plenary session on the CDSCP was held in Reno, Nevada on January 28-29, 1988. The NRC staff completed its review of the CDSCP and transmitted its draft point papers to DOE on March 7, 1988. Subsequently, DOE conducted consultations with the NRC and State of Nevada to discuss comments on the CDSCP. One such workshop was held in March to discuss NRC's draft comments, and the NRC continued efforts to resolve these comments in a workshop with DOE in April on alternative conceptual models. The NRC transmitted the final point papers to DOE on May 11, 1988. After consideration of the comments received and workshop

discussions, DOE issued the statutory SCP required by the Nuclear Waste Policy Act (NWP) and 10 CFR Part 60 on December 28, 1988. NRC completed its review of the SCP and transmitted its Site Characterization Analysis (SCA) to DOE on July 31, 1989. The SCA was issued as NUREG-1347 in August 1989. Follow up will be provided by DOE issuing semi-annual progress reports which will be commented on by the NRC as required under the NWP (Section 113).

#### B. REGULATORY GUIDES

Regulatory Guides are drafted by the staff to establish a standard approach to licensing. They are not directives, but reflect acceptable procedures or actions which would be considered acceptable by the staff.

The current plans are to issue standard format and content documents as Regulatory Guides.

<u>TITLE</u>	<u>DESCRIPTION</u>	<u>ISSUE DATE</u>
1. Regulatory Guide 4.17	Standard Format and Content of Site Characterization Plans for High-Level Waste Geologic Repositories	March 1987
2. Regulatory Guide _____	Draft Format and Content for a License Application	December 1989*

\*Projected Issue Date

#### C. TECHNICAL POSITIONS

Prior to the passage of the Nuclear Waste Policy Amendments Act of 1987, the Technical Positions (TPs) had been divided into two types: Generic Technical Positions, dealing with issues which relate to licensing activities for repositories independent of the technology or site selected; and Site Technical Positions (STPs), which give site specific guidance/advice. Now with the focus on one site, all TPs will be related to the Yucca Mountain site.

STPs provided a format for establishing the staff's positions on site specific issues. Issue-oriented Site Technical Positions (ISTPs) were generated in each technical review area (geology/geophysics, geochemistry, waste package, repository design/rock mechanics, and hydrogeology) for each site. ISTPs constituted what the staff considered to be a systematic and comprehensive identification of issues which need to be resolved for licensing. The ISTPs were coordinated with DOE/NRC workshops in individual program areas.

The concept of TPs was developed to provide maximum flexibility in completing a series of technical positions that have sufficient formality to record staff positions and to notify the prospective licensee (DOE). TPs will be initiated by the need for documentation of a staff concern or in response to a major question raised by the licensee, and will be issued as appropriate throughout the pre-licensing period. They establish acceptable methods of

analysis, minimum information needs, or acceptable methods of data gathering and form the basis for tracking issues over time.

<u>TITLE</u>	<u>ISSUE DATE</u>
o Documentation of Computer Codes, NUREG-0856 48FR31761, 7/11/83	June 1983
o Modeling Strategy Document for HLW Performance Assessment	July 1984
o Licensing Assessment Methodology for HLW Geologic Repositories (Draft)	July 1984
o ISTP for Nevada Nuclear Waste Storage Investigations (NNWSI) (Draft)	September 1984
o Determination of Radionuclide Solubility in Groundwater for Assessment of High-Level Radionuclide Waste Isolation (Final)	November 1984
o Waste Package Reliability Analysis (Final)	December 1985
o In-Situ Testing During Site Characterization (Final)	December 1985
o Design Information Needs in Site Characterization Plans (Final)	December 1985
o Borehole and Shaft Seals (Final)	February 1986
o Interpretation and Identification of the Disturbed Zone (Draft)	July 1986
o Groundwater Travel Time (Draft)	July 1986
o Determination of Radionuclide Sorption for HLW Repositories (Final)	January 1987
o Qualification of Existing Data for HLW Repositories (Final) (NUREG-1298 dated February 1988)	June 1987
o Peer Review for HLW Repositories (Final) (NUREG-1297 dated February 1988)	June 1987
o Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events (Draft) (PLEASE NOTE THAT THIS IS NOW BEING DEVELOPED AS A PROPOSED RULEMAKING)	February 1988
o Items and Activities in the High-Level Waste Geologic Repository Program Subject to Quality Assurance Requirements (Final) (NUREG-1318)	April 1988

<u>TITLE</u>	<u>ISSUE DATE</u>
o Tectonic Models under 10 CFR Part 60 (Draft)	June 1989
o Postclosure Seals, Barriers, and Drainage System in an Unsaturated Medium (Final) (NUREG-1373)	August 1989
o Methods of Evaluating the Seismic Hazard at a Geologic Repository (Draft)	August 1989
o Natural Resources Assessment Methods (Draft)	TBD
o Waste Retrievability (Draft)	TBD
o Acceptable Scope for EBS/Waste Package Testing Programs (Draft)	TBD
o Extrapolation of EBS/Waste Package Short-Term Test Data (Draft)	TBD

#### D. DOCUMENTED TECHNICAL MEETINGS

The purpose of the technical meetings is to assure that an information flow is maintained between the NRC and DOE which facilitates the accomplishment by each agency of its responsibilities relative to site investigation and site characterization. Technical meetings are held to review data, review and consult on interpretation of data, identify potential licensing issues, agree on the adequacy of methods and approaches for acquisition of information and data as well as available data. Schedules of activities pertaining to these technical meetings will be made publicly available to all interested parties. A written report agreed to by both NRC and DOE will be prepared for each meeting including agreements reached. The meetings are open to participation by State/Tribal representatives and allow public attendance as observers.

Prior to the passage of the Nuclear Waste Policy Amendments Act of 1987, meetings were listed as either site-specific or generic in nature. Now that all meetings are related to the Yucca Mountain Project, and will be listed as such, BWIP and Salt Workshops and Technical Meetings previously held have been deleted from this document. The Generic Workshops and Technical Meetings are still being included due to their historical nature and since they pertained to the Yucca Mountain Project as well as the others previously considered for the repository.

#### YUCCA MOUNTAIN PROJECT WORKSHOPS AND TECHNICAL MEETINGS

<u>MEETING</u>	<u>DATE</u>
NRC/DOE Bimonthly QA Meeting	September 7, 1989
Meeting on Tectonics	August 30-31, 1989
Meeting on Substantially Complete Containment	August 29, 1989

YUCCA MOUNTAIN PROJECT WORKSHOPS AND TECHNICAL MEETINGS (Continued)

<u>MEETING</u>	<u>DATE</u>
Meeting to Discuss Interactions	July 26, 1989
NRC/DOE Bimonthly QA Meeting	July 11, 1989
Meeting on Design Control Process and DOE's QA Programs	July 6-7, 1989
Meeting on SCP/DAA Preliminary Concerns	May 9-10, 1989
Meeting on Quality Assurance	May 9, 1989
NRC/DOE/NV/CNWRA Meeting on ongoing work	April 25, 1989
Meeting on Quality Assurance	March 22, 1989
Meeting on Quality Assurance	February 23, 1989
Meeting on Air Force Overflights	February 8, 1989
Meeting on QA Issues	January 25, 1989
Meeting on Study Plans	December 15, 1988
Meeting on ESF Design Control	December 8, 1988
Meeting on ESF Design Control	November 23, 1988
Meeting on DOE's QA Program Description	November 18, 1988
Meeting on ESF Design Control	November 3, 1988
Meeting on ESF Open Items	October 19-21, 1988
Meeting on DOE/OCRWM QA Requirements Document	September 28, 1988
Exploratory Shaft Facility Technical Meeting	July 18-19, 1988
Meeting on OCRWM QA Program	July 7-8, 1988
Alternative Conceptual Models	April 11-14, 1988
Workshop on NRC's Draft Point Papers on the CDSCP	March 21-24, 1988
DOE's QA Program Workshop	March 18, 1988
Seismotectonics Technical Meeting	September 22-23, 1987

YUCCA MOUNTAIN PROJECT WORKSHOPS AND TECHNICAL MEETINGS (Continued)

<u>MEETING</u>	<u>DATE</u>
Exploratory Shaft Meeting	April 14-15, 1987
Management Meeting	June 12, 1986
Management Meeting	February 19-20, 1986
Exploratory Shaft Design/Construction	August 27-28, 1985
Waste Package	July 23-25, 1985
Management Meeting	March 11, 1985
Sample Acquisition for Topopah Spring Member and Calico Hills Tuff	February 4, 1985
QA Visit	December 13-14, 1984
Geology Data Review	September 17-28, 1984
Hydrology Data Review	July 25-28, 1984
Design/Rock Mechanics Data Review	July 17-20, 1984
Geochemistry	July 10-13, 1984
Waste Package	October 18-19, 1983
Geology	October 4-6, 1983
Hydrology	September 20-21, 1983
Hydrology Data Review	January 27-28, 1983
Conceptual Design	January 24-25, 1983
Hydrology	January 18-19, 1983
Geochemistry	January 12-13, 1983
Site Technical and Program Review	May 17-19, 1982
Peer Review of NNWSI	August 24-28, 1981
Site Technical and Program Review	February 16-24, 1981
Site Technical and Program Review	September 24-25, 1979
Geochemistry and Hydrogeology	March 2, 1979

YUCCA MOUNTAIN PROJECT WORKSHOPS AND TECHNICAL MEETINGS (Continued)

<u>MEETING</u>	<u>DATE</u>
Site Technical and Program Review	February 23-24, 1978
Seismic/Geologic Design Criteria for Waste Repository	January 25, 1978

GENERIC WORKSHOPS AND TECHNICAL MEETINGS

Issues Hierarchy and Issue Resolution Strategy	October 8-9, 1987
Generic Design Basis Accident Dose Limit	August 26, 1987
Q-List GTP	August 25, 1987
NRC Staff Comments on OGR QA Plan	August 19, 1987
QA Technical Meeting on Peer Review and Qualification of Existing Data GTPs	May 14, 1987
Issues Hierarchy and Issue Resolution Strategy	March 3-4, 1987
DWPF Vitrification Process, Waste Form and Supporting Data Base Technical Meeting	December 9-10, 1986
Waste Acceptance Process Meeting	July 31, 1986
Level of Detail in the SCP	May 7-8, 1986
Pilot Project Demo/Status of NWSA Program	April 29, 1986
EA Site Ranking Methodology Briefing	April 23, 1986
Licensing Support System Coordinating Group	April 22, 1986
Rod Consolidation	December 17, 1985
Generic QA Meeting	December 4-5, 1985
Generic Seismo-Tectonics Meeting	December 3-4, 1985
Site Characterization Plans--Chapter 8	October 29-30, 1985
Subsystem Performance Allocation	September 26-27, 1985
DOE Position Paper on Retrievability and Retrieval	July 31, 1985

GENERIC WORKSHOPS AND TECHNICAL MEETINGS (Continued)

<u>MEETING</u>	<u>DATE</u>
Exploratory Shaft Facility Design/Construction, Licensing Issues, and the Exploratory Shaft Test Plans	July 18, 1985
Q-list Methodology	July 1, 1985
Appendix 7 to Site Specific Agreement--On-Site Representatives Activities	June 14, 1985
Management Meeting with DOE	May 30, 1985
Design Information Needs for SCPs	April 18, 1985
Performance Allocation Meeting	April 17, 1985
Review of Report "Recommended Safety, Reliability, QA and Management Techniques with Possible Application by DOE to the HLW Repository Program"	April 11, 1985
Discussion of NRC Comments on DOE's Draft EAs	April 8-9, 1985
DOE Annotated Outline for Site Characterization Plans	February 13, 1985
Development of Licensing Issues and Information Management Systems	February 8, 1985
QA Site Visits Summary Briefing	January 28, 1985
Briefing on NRC Licensing Process	January 28, 1985
NRC's Comments on DOE Draft Mission Plan	December 17, 1984
Preparation for QA Visits to Project Sites	November 30, 1984
Transportation Model Workshop	November 27-28, 1984
NRC Licensing Process Briefing to DOE Field Offices	November 5-8, 1984
QA Review Plan and Upcoming QA Site Visits	October 24, 1984
QA Site Visits Planning Meetings	October 18, 1984 September 17, 1984
In-Situ Testing Planning Meeting	August 9, 1984
DOE Siting Guidelines	April 18, 1984

GENERIC WORKSHOPS AND TECHNICAL MEETINGS (Continued)

<u>MEETING</u>	<u>DATE</u>
Discussion of the OCRWM Mission Plan	April 11, 1984
NRC Review Plan of QA for Site Characterization	May 12, 1983

E. SITE VISITS, OBSERVATION AUDITS OF DOE QA PROGRAMS, AND NRC STAFF AUDITS

The purpose of site visits is for the staff to gain an understanding of ongoing programs. In particular, the staff (1) performs reviews of selected documents; (2) holds discussions with DOE and its contractors; and (3) observes instrument, data collection, and processing activities. Following site visits, the NRC staff issues a short report summarizing the results. (There were site visits prior to 1988, but they were mainly for familiarization with the site and maintaining cognizance of the ongoing programs, versus the site visits by the staff listed below for the purposes stated above.)

The purpose of observation audits is to assess whether DOE is meeting the NRC's quality assurance (QA) program requirements. From the observations, the staff is able to assess the adequacy of DOE's audit program, gain confidence in DOE's technical oversight, and obtain information on the adequacy of the audited organization's implementation of their QA program. After each observation, a report is issued discussing the results.

The purpose of NRC staff audits is to independently assess the adequacy of the audited organization's implementation of their QA program. During the audit, staff (1) holds discussions with audited organization's staff, (2) compares QA records with QA program requirements, and (3) observes activities in progress with regard to QA program requirements. Following the audit, staff issues a report summarizing the audit and results.

Site Visits

<u>SITE VISIT</u>	<u>DATE</u>
USGS Seismic Monitoring Program	Feb 29-March 3, 1988
NRC/DOE/State of Nevada Volcanism Field Visit	May 1-5, 1989
Hydrology Site Visit, Mercury, NV	July 24-28, 1989
Air Core Drilling Demonstration, Milford, Utah	August 19, 1989

Observation Audits of DOE QA Programs

<u>OBSERVATION AUDIT</u>	<u>DATE</u>
Westinghouse	Aug 31-September 4, 1987
Westinghouse	November 9-21, 1987
Fenix & Scisson (F&S)	Feb 22-March 4, 1988

Observation Audits of DOE QA Programs (Continued)

PNL/Materials Characterization Center (MCC)	February 22-25, 1988
Holmes & Narver (H&N)	March 28-April 1, 1988
USGS, Menlo Park, CA	April 26-28, 1988
USGS, Denver, CO	June 8-17, 1988
Sandia National Laboratories, Albuquerque, NM	July 25-29, 1988
Reynolds Electrical & Engineering Co, Las Vegas, NV	Aug 22-26, 1988
Los Alamos National Laboratory	October 3-7, 1988
Lawrence Livermore National Laboratory	October 24-27, 1988
Holmes & Narver (Supplemental)	November 1-4, 1988
Fenix & Scisson (Supplemental)	November 7-10, 1988
Fenix & Scisson	April 10-14, 1989
Holmes & Narver	April 24-26, 1989
Lawrence Livermore National Laboratory	June 5-9, 1989
USGS, Denver, CO	August 14-23, 1989
Sandia National Laboratories, Albuquerque, NM	September 11-15, 1989

NRC Staff AuditsNRC STAFF AUDITDATE

Los Alamos QA Program (HLW Repository)

June 8-12, 1987

F. SAFETY EVALUATIONS

Safety Evaluations are formal staff evaluations of documents submitted by the DOE. They contain the staff's analysis of DOE's approaches for addressing various aspects of the Commission's regulations and whether these approaches will protect the public health and safety.

NNWSI QA Plan (88-9)

October 14, 1988

OCRWM QA Program Description

May 2, 1989

OCRWM QA Requirements Document

May 8, 1989

### G. ENVIRONMENTAL ASSESSMENT (EA) REVIEWS

The staff has reviewed and commented on all DOE's draft and final EAs. These reviews were part of the continuing interface between the staffs of the DOE and NRC which will lead to early identification of potential licensing issues. The staff comments identified open items which are relevant to the potential licensing of each site based on information currently available and which will need to be resolved during site characterization.

NRC staff comments on the DOE Draft Environmental Assessments      March 20, 1985

NRC staff comments on the DOE Final Environmental Assessments      Dec. 22, 1986

### H. CONTRACTOR REPORTS

In establishing the basis for guidance, the NRC staff periodically requires assistance from contractors. Reports giving details of the results of such assistance are published as NUREG/CR documents. Some NUREG/CR reports are a reflection of results of experimental programs whereas others are technical evaluations utilizing existing expertise and data. The following lists divide these reports into eight technical review areas and also differentiate reports produced for the Office of NMSS from those produced for the Office of Research (RES).

#### 1. Performance Assessment

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
a) <u>NMSS</u>		
o SWIFT Self-Teaching Curriculum	NUREG/CR-1968	March 1982
o DNET Self-Teaching Curriculum	NUREG/CR-2391	March 1983
o PATH 1 Self-Teaching Curriculum	NUREG/CR-2394	October 1982
o NRC Report on Dosimetry and Health Effects Self-Teaching Curriculum	NUREG/CR-2422	March 1983
o Summary of Repository Siting Models (Final Report)	NUREG/CR-2782	July 1982
o Repository Site Data Report for Tuff: Yucca Mountain, Nevada	NUREG/CR-2937	November 1983
o Parameters and Variables Appearing in Repository Siting Models	NUREG/CR-3066	December 1982

a) NMSS (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Benchmark Problems for Repository Siting Models	NUREG/CR-3097	December 1982
o Parameters and Variables Appearing in Radiological Assessment Codes	NUREG/CR-3160	June 1983
o A Summary of Computer Codes for Radiological Assessment	NUREG/CR-3209	March 1983
o Evaluation of Engineering Aspects of Backfill Placement for HLW Deep Geologic Repositories	NUREG/CR-3218	May 1984
o Technical Assistance for Regulatory Development: Review and Evaluation of the EPA Standard 40 CFR 191 for Disposal of High-Level Waste	NUREG/CR-3235	April 1983
o Verification of the Network Flow and Transport/Distributed Velocity Method (NWFT/DVM) Computer Code	NUREG/CR-3378	June 1984
o A Summary of Repository Design Models	NUREG/CR-3450	November 1983
o Benchmark Problems for Radiological Assessment Codes	NUREG/CR-3451	August 1983
o Benchmark Problems for Repository Design Models	NUREG/CR-3636	February 1984
o A Summary of Computer Codes for Waste Package Performance Assessment	NUREG/CR-3699	April 1984
o SWIFT II Self-Teaching Curriculum	NUREG/CR-3925	August 1986
o Techniques for Determining Probabilities of Events and Processes Affecting the Performance of Geologic Repositories	NUREG/CR-3964 Vol. 1 (Literature Review)	June 1989
o Repository Site Data Report for Unsaturated Tuff: Yucca Mt, Nevada	NUREG/CR-4110	November 1985
o Repository Environmental Parameters and Models Relevant to Assessing the Performance of HLW Packages	NUREG/CR-4134 Revision 1	May 1985 October 1987
o Methodologies for Assessing Long-Term Performance of HLW Packages	NUREG/CR-4477	January 1986

a) NMSS (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Assessing Compliance with the EPA HLW Standard: An Overview	NUREG/CR-4510	October 1986
o TOUGH User's Guide	NUREG/CR-4645	August 1987
o User's Manual for the NEFTRAN Computer Code	NUREG/CR-4766	September 1987

b) RES

o Risk Methodology for Geologic Disposal of Radioactive Waste:		
-- Sandia Waste Isolation Flow and Transport (SWIFT) Model	NUREG/CR-0424	October 1978
-- The Network Flow and Transport (NWFT) Model	NUREG/CR-1190	March 1982
-- Distributed Velocity Method of Solving Convective-Dispersion Equation	NUREG/CR-1376	October 1980
-- Model Description and User Manual for Pathways Model	NUREG/CR-1636 Vol. 1	May 1981
-- Sensitivity Analysis of the Environmental Transport	Vol. 2	May 1981
-- Asymptotic Properties of the Environmental Transport	Vol. 3	May 1981
-- Effects of Variable Hydrologic Patterns on the Environmental Transport Model	Vol. 4	April 1982
-- Dosimetry and Health Effects	NUREG/CR-2166	October 1981
-- The DNET Computer Code User's Manual	NUREG/CR-2343	April 1982
o User's Manual for the Sandia Waste-Isolation Flow and Transport Model (SWIFT) Release 4.81	NUREG/CR-2324	January 1982
o Risk Methodology for Geologic Disposal of Radioactive Waste: Final Report	NUREG/CR-2452	August 1987

b) RES (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Data Input Guide for SWIFT II; The Sandia Waste-Isolation Flow and Transport Model for Fractured Media Release 4.84	NUREG/CR-3162	April 1986
o Theory and Implementation for SWIFT II; The Sandia Waste-Isolation Flow and Transport Model for Fractured Media Release 4.84	NUREG/CR-3328	August 1986
o The Role of Geochemical Factors in the Assessment and Regulation of Geologic Disposal of High-Level Radioactive Waste	NUREG/CR-3490	March 1984
o Reliability of Geotechnical, Environmental, and Radiological Instrumentation in Nuclear Waste Repository Studies	NUREG/CR-3494	November 1983
o On the Development of Environmental Radiation Standards for Geologic Disposal of High-Level Radioactive Waste	NUREG/CR-3714	July 1984
o Uncertainties in Long-Term Repository Performance Due to the Effects of Future Geologic Processes	NUREG/CR-3832	August 1984
o Climatic Calibration of Pollen Data	NUREG/CR-3847	June 1984
o Stress-Corrosion Cracking of Low-Strength Carbon Steels in Candidate HLW Repository Environments	NUREG/CR-3861	February 1987
o A Three-Dimensional Computer Model to Simulate Fluid Flow and Containment Transport Thru a Rock Fracture System	NUREG/CR-4042	January 1985
o Critical Parameters for a High-Level Waste Repository	NUREG/CR-4161 Vol. 1: Basalt Vol. 2: Tuff Vol. 3: Salt	May 1985 May 1987 July 1987
o Permeameter Studies of Water Flow Through Cement and Clay Borehole Seals in Granite, Basalt and Tuff	NUREG/CR-4748	October 1986

b) RES (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o High-Level Waste Preclosure Systems Safety Analysis--Phase 2, Final Report	NUREG/CR-4846	June 1987
o System Performance of HLW Package Components	NUREG/CR-4956	September 1987
2. <u>Hydrology</u>		
a) <u>NMSS</u>		
o An Appraisal of Nuclear Waste Isolation in the Vadose Zone in Arid and Semiarid Regions (with Emphasis on the NTS)	NUREG/CR-3158	October 1983
b) <u>RES</u>		
o Unsaturated Flow and Transport Through Fractured Rock Related to HLW Repositories	NUREG/CR-3206	March 1983
o Pressure Testing of Fractured Rocks-- A Methodology Employing 3-Dimensional Cross-Hole Tests	NUREG/CR-3213	July 1983
o Prediction of Far-Field Subsurface Radionuclide Dispersion Coefficients from Hydraulic Conductivity Measurement	NUREG/CR-3612	March 1984
o Relationship Between the Gas Conductivity and Geometry of a Natural Fracture	NUREG/CR-3680	April 1984
o Radionuclide Transport as Vapor Through Unsaturated Fractured Rock	NUREG/CR-4654	July 1987
o Unsaturated Flow and Transport Through Fractured Rock Related to HLW Repositories--Final Report - Phase II	NUREG/CR-4655	May 1987
o Dating Ground Water and the Evaluation of Repositories for Radioactive Waste	NUREG/CR-4912	April 1987

3. Geochemistrya) NMSS

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Proceedings of the Conference on the Application of Geochemical Models to High-Level Nuclear Waste Repository Assessment	NUREG/CP-0062	June 1985
o Status of Geochemical Problems Relating to the Burial of High-Level Radioactive Waste, 1982	NUREG/CR-3062	March 1983
o Evaluation of Radionuclide Geochemical Information Developed by DOE High-Level Nuclear Waste Repository Site Projects	NUREG/CR-3730	March 1984
o Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE High-Level Nuclear Waste Repository Site Projects	NUREG/CR-3851 (Oct-Dec 1983) (Jan-Mar 1984) (Apr-Jun 1984) (Jul-Sep 1984)	Sep 1984 Vol 1 Oct 1984 Vol 2 Feb 1985 Vol 3 Oct 1985 Vol 4
o Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE High-Level Nuclear Waste Repository Site Projects Annual Report	NUREG/CR-4236 (Oct-Dec 1984) (Jan-Mar 1985) (Apr-Jun 1985) (Oct 84-Sep 85)	Oct 1985 Vol 1 Dec 1985 Vol 2 Apr 1986 Vol 3 Jul 1986 Vol 4
o Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE High-Level Nuclear Waste Repository Site Projects	NUREG/CR-4708 (Oct 85-Mar 86) (Apr 86-Sep 87)	Jan 1987 Vol 1 Jul 1988 Vol 2
o Progress in Development of a Methodology for Geochemical Sensitivity Analysis for Performance Assessment	NUREG/CR-5085	August 1989
o Progress in Evaluation of Radionuclide Geochemical Information Developed by DOE High-Level Nuclear Waste Repository Site Projects	NUREG/CR-5236 (Oct 87-Jan 89)	August 1989

b) RES

o NRC Nuclear Waste Management Geochemistry 1983	NUREG/CP-0052	May 1984
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b) RES (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Uncertainties in Geologic Disposal of HLW - Groundwater Transport of Radionuclides and Radiological Consequences	NUREG/CR-2506	July 1983
o Valence Effects on Adsorption: A Preliminary Assessment of the Effects of Valence State Control on Sorption	NUREG/CR-2863	February 1983
o Radionuclide Migration Around Uranium Ore Bodies--Analogue of Radioactive Waste Repositories	NUREG/CR-3941	October 1984
o Valence Effects on Solubility and Sorption	NUREG/CR-4309	March 1986
o Temperature Effects on the Solubility and Speciation of Selected Actinides	NUREG/CR-4582	June 1986
o A Study of Natural Glass Analogues as Applied to Alteration of Nuclear Waste Glass	NUREG/CR-4842	February 1987

4. Design/Rock Mechanicsa) NMSS

o Information Base for Waste Repository Design	NUREG/CR-0495 Vols. 1-7	March 1979
o Identification of Characteristics Which Influence Repository Design--Tuff	NUREG/CR-2614	April 1984
o Evaluation of Alternative Shaft Sinking Techniques for HLW Deep Geologic Repositories	NUREG/CR-2854	March 1983
o Thermal Impact of Waste Emplacement and Surface Cooling Associated with Geologic Disposal of Nuclear Waste	NUREG/CR-2910	March 1983
o Relationship of an In Situ Test Facility to a Deep Geologic Repository for HLW	NUREG/CR-2959	March 1983
o In Situ Test Programs Related to Design and Construction of HLW Deep Geologic Repositories	NUREG/CR-3065 Vols. 1 and 2	March 1983

a) NMSS (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Assessment of Retrieval Alternatives for the Geologic Disposal of Nuclear Waste	NUREG/CR-3489	May 1984
o Parameters and Variables Appearing Repository Design Models	NUREG/CR-3586	January 1984
o Stability of Disposal Rooms During Waste Retrieval	NUREG/CR-5335	March 1989
o Sensitivity of the Stability of a Waste Emplacement Drift to Variation in Assumed Rock Joint Parameters in Welded Tuff	NUREG/CR-5336	April 1989
o Analysis of Alternative Waste Isolation Concepts	NUREG/CR-5389	June 1989
o Basis for In-situ Geomechanical Testing at the Yucca Mountain Site	NUREG/CR-5400	July 1989

b) RES

o Rock Mass Sealing--Experimental Assessment of Borehole Plug Performance, Annual Report, 6/82-5/83	NUREG/CR-3473	September 1983
o Experimental Assessment of the Sealing Effectiveness of Rock Fracture Grouting	NUREG/CR-4541	March 1987
o Rock Mass Sealing--Experimental Assessment of Borehole Plug Performance, Annual Report, 6/84-5/85	NUREG/CR-4642	June 1986
o Size Influence on the Sealing Performance of Cementitious Borehole Plugs	NUREG/CR-4738	September 1986
o The Sealing Performance of Bentonite/ Crushed Basalt Borehole Plugs	NUREG/CR-4983	November 1987

5. Waste Packagea) NMSS

o Container Assessment--Corrosion Study of HLW Container Materials (Quarterly Progress Reports)	NUREG/CR-2317	1981-1982
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a) NMSS (Continued)

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Nuclear Waste Management Technical Support in the Development of Nuclear Waste Form Criteria for the Nuclear Regulatory Commission	NUREG/CR-2333 Vols. 1-3	February 1982
o Review of DOE Waste Package Program -- National Waste Package Program	NUREG/CR-2482 (Parts 1 and 2) (Apr 82-Sep 82) (Oct 82-Mar 83) (Apr 83-Sep 83) (Oct 83-Mar 84) (Apr 84-Sep 84) (Oct 84-Mar 85) (Apr 85-Sep 85)	Feb 1982 Vol 1 Apr 1983 Vol 2 Mar 1983 Vol 3 Sep 1983 Vol 4 Aug 1984 Vol 5 Mar 1985 Vol 6 Mar 1985 Vol 7 Dec 1985 Vol 8 Dec 1985 Vol 9
o Packing Material Testing Required to Demonstrate Compliance with 1000-Year Radionuclide Containment	NUREG/CR-2755	January 1983
o Review of Waste Package Verification Tests, Semi-Annual Report	NUREG/CR-3091 (Apr 82-Sep 82) (Oct 82-Mar 83) (Apr 83-Sep 83) (Oct 83-Mar 84) (Apr 84-Sep 84) (Oct 84-Mar 85) (Apr 85-Sep 85)	Apr 1983 Vol 1 Aug 1983 Vol 2 Feb 1984 Vol 3 Jul 1985 Vol 4 Jul 1985 Vol 5 Oct 1985 Vol 6 Jan 1986 Vol 7
o Waste Package Performance After Repository Closure -- Post-Emplacement Monitoring	NUREG/CR-3219 Vol. 1 Vol. 2	July 1983 May 1983
o Waste Package Reliability	NUREG/CR-4509	February 1986
o Stress Corrosion Cracking Tests on HLW Container Materials in Simulated Tuff Repository Environments	NUREG/CR-4619	June 1986
o Evaluation and Compilation of DOE Waste Package Test Data	NUREG/CR-4735 (Dec 85-Jul 86) (Aug 86-Jan 87) (Feb 87-Jul 87) (Aug 87-Jan 88)	Mar 1987 Vol 1 Oct 1987 Vol 2 May 1988 Vol 3 Aug 1988 Vol 4

b) RES

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Long-Term Performance of Materials Used for HLW Packaging  (Annual Report)	NUREG/CR-3427 (Apr 83-Jun 83) (Jul 83-Sep 83) (Oct 83-Dec 83) (Apr 83-Apr 84)	Aug 1983 Vol 1 Dec 1983 Vol 2 Mar 1984 Vol 3 Jun 1984 Vol 4
o Long-Term Performance of Materials Used for HLW Packaging  (Annual Report)	NUREG/CR-3900 (Apr 84-Jun 84) (Jul 84-Sep 84) (Oct 84-Dec 84) (Apr 84-Apr 85)	Sep 1984 Vol 1 Jan 1985 Vol 2 May 1985 Vol 3 Jul 1985 Vol 4
o Long-Term Performance of Materials Used for HLW Packaging  (Annual Report)	NUREG/CR-4379 (Apr 85-Jun 85) (Jul 85-Sep 85) (Oct 85-Dec 85) (Apr 85-Mar 86)	Sep 1985 Vol 1 Jan 1986 Vol 2 Mar 1986 Vol 3 Jun 1986 Vol 4
o Fracture in Glass/HLW Canister	NUREG/CR-4198	May 1985
o Investigation of the Stability of Clay/Basalt Packing Materials	NUREG/CR-4585	March 1986
o Long-Term Performance of High-Level Glass Waste Forms	NUREG/CR-4795	November 1987
o Long-Term Performance of Spent Fuel Waste Forms	NUREG/CR-4954	September 1987
o Long-Term Performance of Container Materials for High-Level Waste	NUREG/CR-4955	November 1987

6. Geology/Geophysicsa) NMSS

o Information Needs for Characterization of High-Level Waste Repository Sites in Six Geologic Media	NUREG/CR-2663 Vols. 1 and 2	July 1985
o Effects of Earthquakes on Underground Facilities: Literature Review and Discussion	NUREG/CR-4609	June 1986
o Survey of Geophysical Techniques for Site Characterization in Basalt, Salt and Tuff	NUREG/CR-4957	July 1987

b) RES

<u>TITLE</u>	<u>NUMBER</u>	<u>DATE</u>
o Indirect Rock Mass Investigations for Optimizing Borehole Drilling Programs	NUREG/CR-3143	
--Executive Summary	Vol. 1	October 1983
--Summary of Wave Propagation Geophysical Techniques	Vol. 2	November 1983
--Ray Optic Geotomography	Vol. 3	October 1983
--Wave Diffusion Geotomography	Vol. 4	October 1983
o Geomorphic Controls on the Management of Nuclear Waste	NUREG/CR-3276	October 1983
o Crosshole Geophysical Methods Used to Investigate the Near Vicinity of High Level Waste Repositories	NUREG/CR-3758	August 1984

7. Quality Assurancea) NMSS

o Recommended Safety, Reliability, QA and Management Aerospace Techniques with Possible Application by DOE to the HLW Repository Program	NUREG/CR-4271	July 1985
o QA Plan for Computer Software Supporting the U.S. NRC's HLW Management Program	NUREG/CR-4369	January 1986

8. Regulatory and Othersa) NMSS

o Analysis of Regulatory Uncertainties Related to the Site Characterization Plan and the Exploratory Shaft Facility	CNWRA 89-002	April 1989
o Analysis and Evaluation of Regulatory Uncertainties in 10CFR60 Subparts B & E	CNWRA 89-003	May 1989

I. STATE/TRIBAL INTERACTIONS

NWPA Section 117(a) states that NRC must provide the states and Indian tribes timely and complete information regarding its determinations or plans made regarding siting, development, or design for licensing, construction, operation, regulation, or decommissioning. In a continuing effort to keep the states and tribes involved, NRC staff has made numerous presentations to the states and tribes on current NRC activities in the NWPA process.

Due to the Nuclear Waste Policy Amendments Act of 1987, which focuses DOE's site characterization efforts on the Yucca Mountain site in Nevada, the NRC is now limiting the routine distribution of significant NRC high-level waste documents to parties associated with the Yucca Mountain site. They also receive a weekly notice of NRC/DOE upcoming meetings, both tentative and firmly established. These upcoming meetings are also announced on a toll-free telephone recording for use by the general public. Notices of availability of significant HLW documents are sent to several hundred parties who have expressed an interest in keeping abreast of the HLW program.

The State of Nevada and local representatives are recognized as participants in all NRC/DOE meetings related to the Yucca Mountain site.

#### J. PROGRAM PLANNING AND MANAGEMENT REVIEWS

<u>TITLE</u>	<u>ISSUE DATE</u>
NRC comments on the DOE draft report to the President, An Evaluation of Commercial Repository Capacity for Disposal of Defense High-Level Waste	Oct. 5, 1984
SECY-84-449, Recommendations of the DOE Panel on Alternative Means of Financing and Managing Radioactive Wastes (AMFM)	Nov. 26, 1984
Staff comments to the Chairman on DOE AMFM	Mar. 8, 1985
NRC comments on the Draft DOE Project Decision Schedule	Oct. 24, 1985
NRC comments on level of detail in Section 8.3 of the DOE Site Characterization Plan	Dec. 12, 1985
Report on Section 10 of draft Project Decision Schedule transmitted from NMSS to DOE	Dec. 16, 1985
NRC comments on DOE Monitored Retrievable Storage (MRS) Facility	Feb. 5, 1986
SECY-86-66, Status of Activities Under the Nuclear Waste Policy Act of 1982, to Commission	Feb. 26, 1986
Joint NRC/DOE Notice of Technical Assistance issued	Apr. 3, 1986
10 CFR Part 72 revisions concerning licensing of the MRS published in the <u>Federal Register</u>	May 23, 1986
SECY-86-92, Proposed Revisions to 10 CFR Part 60 to Conform to EPA Standards	June 19, 1986
SECY-87-137, First Quarterly Progress Report on the Pre-licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	June 8, 1987

<u>TITLE</u>	<u>ISSUE DATE</u>
SECY-87-267, Second Quarterly Progress Report on the Pre-licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	Oct. 26, 1987
SECY-88-39, Third Quarterly Progress Report on the Pre-licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	Feb. 9, 1988
SECY-88-39A, Quarterly Progress Report on the Pre-Licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	May 10, 1988
SECY-88-39B, Quarterly Progress Report on the Pre-Licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	Aug. 9, 1988
SECY-88-285, Regulatory Strategy and Schedules for the High-Level Waste Repository Program	Oct. 5, 1988
SECY-88-39C, Quarterly Progress Report on the Pre-Licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	Nov. 16, 1988
SECY-89-037, Quarterly Progress Report on the Pre-Licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	Feb. 3, 1989
SECY-89-037A, Quarterly Progress Report on the Pre-Licensing Phase of DOE's Civilian High-Level Radioactive Waste Management Program	May 12, 1989

### III. NRC REVIEW PLANS

Review Plans document the procedure which will be used by the staff in reviewing major documents submitted by the DOE. They identify the questions that will be asked and the independent analysis that will be performed by the staff. The primary purpose of review plans is to standardize and organize the staff's review of licensing documents. They provide, indirectly, guidance to the licensee in terms of the kinds of data and information that is expected in documents such as the SCP. They also provide useful information to interested parties about how NRC is doing its job. Review plans for SCPs and Quality Assurance programs have been written. Other review plans, such as the Review Plan for an Application for a Construction Authorization, will be prepared as needed.

<u>TITLE</u>	<u>ISSUE DATE</u>
Standard Review Plan for Site Characterization Plans (Draft) (Superseded by the December 1987 Plans)	August 1983

<u>TITLE</u>	<u>ISSUE DATE</u>
Review Plan for High-Level Waste Repository Quality Assurance Program Descriptions (Revision 2)	March 1989
Standard Review Plan for Draft Environmental Assessments	January 1985
Standard Review Plan for Final Environmental Assessments	March 1986
Administrative Plan and Procedures for NRC Staff Review of DOE's Consultation Draft Site Characterization Plans	December 1987
Draft Technical Review Plan for NRC Staff Review of DOE's Site Characterization Plans	December 1987
Draft Review Plan for NRC Staff Review of DOE Study Plans and Procedures	December 1987
Administrative Plan and Procedures for NRC Staff Review of DOE's Site Characterization Plan	December 1988
Revised Technical Review Plan for NRC Staff Review of DOE's Site Characterization Plans	December 1988
Supplement to the Site Characterization Plan Review Plan	February 1989

AVAILABILITY OF INFORMATION

- HLW documentation, including NUREG/CR reports, received by HLWM and generated by HLWM and its contractors is routinely sent to NRC's Public Document Room (PDR), 2120 L Street, NW, Lower Level, Washington, DC, 20555. Telephone 202/634-3273. Contact the PDR for information and copies of NRC's HLW correspondence.
- Copies of NUREGs and NUREG/CRs can be obtained by contacting the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available from the National Technical Information Service, Springfield, VA 22161.

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