

JUN 11 1990

HOYLE/TOPICAL GUIDELINES

- 1 -

MEMORANDUM FOR: John C. Hoyle, Chairman
Licensing Support System Advisory
Review Panel

FROM: Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards

SUBJECT: TOPICAL GUIDELINES FOR THE LICENSING SUPPORT SYSTEM

The purpose of this memorandum is to transmit the proposed revision of the interim topical guidelines for the Licensing Support System (LSS) to the LSS Advisory Review Panel (LSSARP) for consideration at the October 1990 LSSARP meeting. Enclosure 1 is the "Draft Regulatory Guide Topical Guidelines for the Licensing Support System" (Draft Regulatory Guide) which was prepared by the Nuclear Regulatory Commission (NRC) staff and the Office of the General Counsel (OGC). Enclosure 2 is a copy of the interim topical guidelines. Enclosure 3 is a document which describes the disposition of the three lists which comprised the interim topical guidelines. The Commission has reviewed the Draft Regulatory Guide and has given the staff permission to forward it to the LSSARP.

Please address any questions on the enclosed material to Mark Delligatti, the project manager for the revision of the LSS topical guidelines, at extension 20430.

(Signed) Robert M. Bernero

Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards

Enclosures: As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 18 1990


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ENCLOSURE 1

DRAFT REGULATORY GUIDE
TOPICAL GUIDELINES FOR THE LICENSING SUPPORT SYSTEM

ABSTRACT

This Regulatory Guide sets forth the topical guidelines for the Licensing Support System established in the Rules of Practice in 10 CFR Part 2, Subpart J for the adjudicatory proceeding on the application for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to 10 CFR Part 60.

INTRODUCTION

Subpart J of 10 CFR Part 2 (10 CFR 2.1000 to 2.1023) sets forth procedures for an adjudicatory proceeding on the application for a license to receive and possess high-level nuclear waste at a geologic repository under 10 CFR Part 60. Pursuant to these regulations, the Licensing Support System (LSS), an electronic information management system, is being designed and implemented to provide for the entry of and access to potentially relevant licensing information.

The topical guidelines define the scope of documentary material which should be included in the LSS. Interim topical guidelines, drafted by the High-Level Waste Licensing Support System Advisory Review Panel were adopted by the U.S. Nuclear Regulatory Commission (NRC) with the statement that the topical guidelines would later be revised and set forth as a regulatory guide by NRC staff (see 54 Fed. Reg. 14925 (1989)). The interim topical guidelines were partially modeled after the Environmental Assessments prepared in connection with the U.S. Department of Energy (DOE's) site selection process.

Document is defined in 10 CFR 2.1001 as "...any written, printed, recorded, magnetic, graphic matter, or other documentary material, regardless of form or characteristic." 10 CFR 2.1001 also defines documentary material as "...any material or other information that is relevant to, or likely to lead to the discovery of information that is relevant to the licensing of the likely candidate for a geologic repository. The scope of documentary material shall be guided by the topical guidelines in the applicable NRC regulatory guide." The form which this material might take is included in Appendix A, a non-exhaustive list of types of documents which may be included in the LSS.

This regulatory guide has been prepared using the interim topical guidelines in addition to the "Draft Format and Content Guide for the License Application for the High-Level Waste Repository" (FCRG), which sets forth the information that the NRC staff suggests should be submitted in the license application. Pursuant to section 114(f)(4) of the Nuclear Waste Policy Act of 1982 as amended, (42 U.S.C. 10134(f)(4)), the Commission is required "to the extent practicable," to adopt the environmental impact statement (EIS) prepared by DOE. The Commission's regulations have been amended to be in accord with this statutory provisions. See 10 CFR 51.26(c). Therefore, the environmental issues in the topical guidelines will be limited to those documents relevant to the Commission's adoption or modification of the DOE EIS.

1. Purpose of the Regulatory Guide

The purpose of this regulatory guide is to provide a list of the topics for which LSS participants should submit documentary materials for entry into the LSS under 10 CFR § 2.1003. The topical guidelines are designed to be broad enough to encompass all potential licensing issues. This regulatory guide will also be used by the Pre-License Application Licensing Board for evaluating petitions for access to the LSS during the pre-license application period under 10 CFR 2.1008.

This regulatory guide will not be used as the detailed topical index for documentary evidence contained in the LSS. Neither will it serve to determine the scope of contentions that may be offered in the application proceeding under 10 CFR 2.1014.

2. Use of the Regulatory Guide

To the extent practicable, the regulatory guide follows a repository systems-based format that conforms to the approach to be followed in other generic NRC licensing guidance documents for the high-level waste repository program.

Because the topical guidelines have been kept broad and at a fairly high level of detail, the user should consider each topic to be inclusive rather than exclusive. For instance, 10 CFR Part 60 Subpart J requires a performance confirmation program for the various components of the repository system. However, performance confirmation is not a topic in this regulatory guide. Rather, information which is pertinent to performance confirmation for any particular component of the repository system would be considered to fall under the particular topic which designates that particular system (performance confirmation relevant to geologic processes would be considered topical information under the appropriate heading for the Natural System). The topical guidelines are presented at between one and three levels of detail. Each guideline should be considered all inclusive with regard to all documents germane to that topic for the site. For example, much of the information which shall support the licensing proceedings will be based upon the use of methodologies, computer codes and models. It is appropriate for such information to be included in the LSS. As stated above, the FCRG sets forth the information that the NRC staff suggests should be submitted in the license application. The FCRG should be considered as another source of guidance regarding the types of information that could be included in the LSS.

TOPICAL GUIDELINES
FOR INCLUSION OF DOCUMENTS
IN THE LICENSING SUPPORT SYSTEM

I. General Information

1. General Facility Description
2. Basis for Licensing Authority
3. Schedules Relevant to the NRC/DOE Repository Programs
4. Any Publicly Available Information on Certification of Safeguards
5. Any Publicly Available Information on the Physical Security Plan
6. Site Characterization
7. License Specifications (those variables, conditions, or other items which DOE determines to be probable subjects of license specifications)
8. Information Relevant to NRC Findings Regarding Compliance with Statutes Other than: The Atomic Energy Act, as amended; the Energy Reorganization Act; and the Nuclear Waste Policy Act, as amended for example, e.g., The Endangered Species Act of 1973.
9. Information Relevant to NRC Adoption or Modification of the DOE Environmental Impact Statement

II. The Natural Systems of the Geologic Setting

1. Geologic System
 - a. Regional Geology
 - b. Regional Geology
 - c. Site Geology
 - d. Future Variations in Geologic Processes
2. Hydrologic System
 - a. Surface Water Hydrology
 - b. Regional Hydrogeology
 - c. Site Hydrogeology
3. Geochemical System
 - a. Regional Geochemistry
 - b. Site Geochemistry

3. Geochemical System
 - a. Regional Geochemistry
 - b. Site Geochemistry
4. Climatological and Meteorological Systems
 - a. Present Climate and Meteorology
 - b. Paleoclimatology
 - c. Future Climatic Variation
5. Integrated Natural System Response to the Maximum Design Thermal Loading
6. Processes and Events
(anticipated and unanticipated, potentially disruptive)
7. Effectiveness of Natural Barriers Against the Release of Radioactive Material to the Environment (Information relevant to the performance objective of 10 CFR 60.113)

III. Geologic Repository Operations Area (GROA): Physical Facilities

1. Surface Facilities
 - a. Waste Handling System/Building(s)/Equipment (Including Hot Cell)
 - b. On-Site Radioactive Waste Management System
 - c. Fire and Explosion Protection System(s)
 - d. Emergency Systems
 - e. Communication Systems
 - f. Utility Systems
 - g. Instrumentation and Control Systems
 - h. On-Site Transportation System
 - i. Ventilation System(s)
 - j. Operations Support System(s)
 - k. Plans for the Decommissioning System
 - l. Other Surface Systems
2. Shafts/Ramps
 - a. Waste Shaft/Ramp
 - b. Muck Shaft/Ramp
 - c. Ventilation Intake Shaft(s)
 - d. Ventilation Exhaust Shaft(s)
 - e. Men and Materials Shafts
 - f. Plans for the Decommissioning System
 - g. Other Shaft/Ramp Systems
3. Underground Facility
 - a. Excavation and Ground Support Systems
 - b. Muck Handling System
 - c. Ventilation System
 - d. Waste Emplacement System
 - e. Waste Retrieval System

- f. Emergency System(s)
 - g. Communication System
 - h. Operations Support System
 - i. Plans for the Decommissioning System
 - j. Other Underground Systems
- 4. Interface of Structures, Systems, and Components
 - 5. Retrievability of Waste
 - 6. Effectiveness of the GROA Against the Release of Radioactive Materials to the Environment (Information relevant to the performance objective of 10 CFR 60.111)

IV. Engineered Barrier Systems

- 1. Waste Package
- 2. Waste Form
- 3. Underground Facility
- 4. Engineered Barrier System Waste Package Emplacement Environment
- 5. Engineered Barrier System Alternate Design Features
- 6. Effectiveness of Engineered Barriers Against the Release of Radioactive Material to the Environment (Information relevant to the performance objective of 10 CFR 60.113).

V. Overall System Performance Assessment

- 1. Basic Approach
- 2. System Description
 - a. Conceptual Models
 - b. Processes and Events (Potentially Disruptive)
 - c. Processes and Events (Undisturbed Performance)
- 3. Cumulative Release of Radioactive Materials
 - a. Screening of Processes and Events
 - b. Scenario Development and Screening
 - c. Consequence Analyses: Estimates of Cumulative Releases
 - d. Probability Estimates
 - e. Model and Code Validation
- 4. Undisturbed Performance
 - a. Individual Protection Requirements
 - b. Groundwater Protection Requirements
 - c. Model and Code Validation

VI. Conduct of Repository Operations

- 1. Maintenance**
- 2. Organization**
- 3. Personnel**
- 4. Records/Reports**
- 5. Training Programs**
- 6. Schedules**
- 7. Identification of Operating Controls and Limits**
- 8. Preservation of Records**
- 9. Site Markers**

VII. Land Ownership and Control

- 1. Plans for Restricting Controlled Area Access**
 - a. Identification of Controlled Area**
 - b. Identification of Existing Legal Interests**
 - c. Identification of Legal Interests To Be Obtained**
 - d. Water Rights**
- 2. Plans for Regulating Land Use Outside the Controlled Area**
 - a. Identification of Adjacent Areas of Concern**
 - b. Identification of Existing Legal Interests**
 - c. Identification of Legal Interests To Be Obtained**
- 3. Plans for Regulating Land Use at the GROA**
- 4. Other Types of Legal Interests**

VIII. Quality Assurance (QA) Records

- 1. QA Records for Site Characterization**
- 2. QA Records for Design and Construction**
- 3. QA Records including records covering Operations, Permanent Closure, Decontamination and Decommissioning**
- 4. QA Records for all relevant research activities**

IX. Emergency Planning

X. Radiation Protection

- 1. Ensuring that Radiation Exposures are As Low As Reasonably Achievable (ALARA)**
- 2. Radiation Sources**
- 3. Radiation Protection Design Features**
- 4. Estimated Onsite Dose Assessment**
- 5. Health Physics Program**
- 6. Estimated Offsite Dose Assessment**

XI. Any Alternatives Considered (e.g., design interpretations, models)

APPENDIX A
EXAMPLES OF CATEGORIES OF DOCUMENTS
TO BE INCLUDED IN THE LICENSING SUPPORT SYSTEM

1. Technical Reports and Analyses by all participants (including those developed by contractors)
2. Quality Assurance Records
3. External Correspondence
4. Internal Memoranda
5. Meeting Minutes/Transcripts
6. Draft Documents on which a nonconcurrence has been registered
7. Congressional Questions and Answers (Q's and A's)
8. Other Documents (for a. through i. include data bases and references):
 - a. Draft and Final Environmental Assessment for the Site Characterized
 - b. Site Characterization Plan
 - c. Site Characterization Study Plans
 - d. Site Characterization Progress Reports
 - e. Issue Resolution Reports
 - f. License Application
 - g. Topical Reports, Data, and Data Analyses
 - h. The DOE Environmental Impact Statement
 - i. Recommendation Report to the President of the United States (Notice of Disapproval, if submitted)
 - j. Any Publicly Available Information on Rulemakings
 - k. Public and Agency Comments on Documents
 - l. Response to Comments
 - m. NRC Technical Positions
 - n. NRC Regulatory Guides
 - o. The DOE Project Decision Schedules
 - p. DOE Program Management Documents

ENCLOSURE 2

Day	Regulation (10 CFR)	Action
648		2nd Prehearing Conference Order: rules on amended contentions, sets any further discovery schedule, and sets schedule for prefiled testimony and hearing.
658	2.1015(b)	Appeals from 2nd Prehearing Conference Order, w/ briefs.
668	2.1015(b)	Briefs in opposition to appeals.
698		AS order ruling on appeals from 2nd Prehearing Conference Order.
700	2.749 (set by LB)	Final motions for summary disposition.
720	2.749	Replies to final motions for summary disposition.
730	Supp. info.	Discovery complete.
740		LB order on final motions for summary disposition.
750	2.1015(b)	Appeals from final summary disposition order, w/ briefs.
760	2.1015(b)	Evidentiary hearing begins. Briefs in opposition to appeals from final summary disposition orders.
780		AS order on appeals from final summary disposition orders.
850		Evidentiary hearing ends.
880	2.754(a)(1)	Applicant's proposed findings.
890	2.754(a)(2)	Other parties' (except NRC staff's) proposed findings.
900	2.754(a)(2)	NRC staff's proposed findings.
905	2.754(a)(3)	Applicant's reply to proposed findings.
995	2.780	Initial decision.
1005	2.785(a), 2.782(a), 2.1015(c)	Stay motions to AS Notices of Appeal.
1015	2.785(d)	Replies to stay motions.
1035		AS ruling on stay motion.
1045	2.782(b), 2.785(a)	Appellant's briefs. Stay motions to Commission.
1055	2.785(d)	Replies to stay motions.
1065	2.782(c)	Appellee's brief.
1075	2.782(c)	NRC staff brief.
1095	2.1023, Supp. info	Completion of NWSS and Commission supervisory review; Commission ruling on any stay motions; issuance of construction authorization; NWPA 3-year period tolled.
1105	2.783	Oral argument on appeals.
1165		Appeal Board decision.
1180	2.1015(e), 2.785(b)(1)	Petitions for Commission review.
1190	2.785(b)(3)	Replies to petitions.
1250		Commission decision.

Topical Guidelines

The following topical guidelines are to be used for identifying the documentary material that should be submitted by LSS participants for entry into the LSS under section 2.1003. The topical guidelines will also be used by the Pre-License Application Licensing Board for evaluating petitions for access to the

LSS during the pre-license application phase under § 2.1008.

I. Categories of Documents

- Technical reports and analyses including those developed by contractors
- QA/QC records including qualification and training records
- External correspondence
- Internal memoranda
- Meeting minutes, including DOE/NRC meetings, Commission meetings
- Drafts (i.e., those submitted for decision beyond the first level of management or similar criterion)
- Congressional Q's & A's
- "Regulatory" documents related to HLW site selection and licensing, such as:
 - Draft and final environmental assessments
 - Site characterization plans
 - Site characterization study plans
 - Site characterization progress reports
 - Issue resolution reports
 - Rulemakings
 - Public and agency comments on documents
 - Response to public comments
 - Environmental Impact Statement, Comment Response Document, and related references
 - License Application (LA), LA data base, and related references
 - Topical reports, data, and data analysis
 - Recommendation Report to President
 - Notice of Disapproval, if submitted

II. General Topics

1. Any document pertaining to the location and potential of valuable natural resources, hydrology, geophysics, tectonics (including volcanism), geomorphology, seismic activity, atomic energy defense activities, proximity to water supplies, proximity to populations, the effect upon the rights of users of water, proximity to components of the National Park System, the National Wildlife Refuge System, the National Wildlife and Scenic River System, the National Wilderness Preservation System, or National Forest Lands, proximity to sites where high-level radioactive waste and spent nuclear fuel is generated or temporarily stored, spent fuel and nuclear waste transportation, safety factors involved in moving spent fuel or nuclear waste to a repository, the cost and impact of transporting spent fuel and nuclear waste to a repository site, the advantages of regional distribution in siting of repositories, and various

geologic media in which sites for repositories may be located.

2. Any document related to repository design, siting, construction, or operation, or the transportation of spent nuclear fuel and high-level nuclear waste, not categorized as an "excluded document", generated by or in the possession of any contractor of the Department of Energy, the Nuclear Regulatory Commission, or any other party to the HLW licensing proceeding.

3. All documents related to the physical attributes of the Basin and Range Province of the continental United States.

4. Any document listing and/or considering any site or location other than Yucca Mountain as a possible location for a high level nuclear waste repository, or any alternative technology to deep geologic disposal.

5. Any document analyzing the effect of the development of a repository at Yucca Mountain on the rights of users of water in the Armagosa ground-water basin in Nevada.

6. Any document analyzing the health and safety implications to the people and environment of the transportation of spent fuel between locations where spent fuel is generated or stored and Yucca Mountain, Nevada, or any other site nominated for repository characterization on May 28, 1988, including, but not limited to:

- a. Any analysis of possible human error in the manufacture of spent fuel casks;
- b. Any analysis of the actual population density along all of any specific projected routes of travel;
- c. Any analysis of releases from any actual radioactive material transportation incidents;
- d. Any analysis of the emergency response time in any actual radioactive materials transportation incident;
- e. Any actual accident data on any specific projected routes of travel;
- f. Any calculations or projections on the probabilities of accidents on any specific projected routes of travel;
- g. Any data on the physical properties or containment capabilities of spent fuel casks which have been used or which are projected to be used at any hypothetical or actual projected repository;
- h. Any analysis of modeling of the containment capabilities of spent fuel casks under a stress scenario;
- i. Any analysis or comparison of spent fuel casks projected to be used against the spent fuel cask certification standards of the Nuclear Regulatory Commission;

j. Any analysis of the containment capabilities of spent fuel casks containing spent fuel which has been burned up over an extended period.

7. Any document analyzing or comparing Yucca Mountain, Nevada, with any other site in the same geohydrologic setting.

8. Any document relating to potential interference or incompatibility between a Yucca Mountain, Nevada, high-level nuclear waste repository and atomic energy activities at the Nevada Test Site and Nellis Airforce base.

9. Any document related to the land status, use or ownership of Yucca Mountain, Nevada.

10. Any document considering or analyzing the attributes or detriments of any engineered barrier upon the radionuclide isolation capability of Yucca Mountain, Nevada, or any other site considered.

11. Any document evaluating the effect of extended fuel burn-up on Yucca Mountain, Nevada's adequacy as a repository site for disposal of spent fuel or upon the design of any such theoretical repository.

12. Any document analyzing or investigating the potential for discharge of radionuclides into the Death Valley National Monument.

13. Any document analyzing the recharge of the underlying saturated zone or the hydroconductivity of the unsaturated zone at Yucca Mountain.

14. Any document containing any data or analysis of volcanism in the geologic setting of which Yucca Mountain is a part.

15. Any document containing any data or analysis of tectonic events at Yucca Mountain, or pertaining to the tectonic framework of the Yucca Mountain area or any document containing any data or analysis of faults with or without surface expression in the area of Yucca Mountain.

16. Any document containing instructions or other limitations on the scope of work to be performed by Department of Energy personnel or contractor's personnel.

17. Any document pertaining to prevention or control of human intrusion at the Yucca Mountain site.

III. Specific Topics

1. The Site

A. Location, General Appearance and Terrain, and Present Use

B. Geologic Conditions

1. Stratigraphy and volcanic history of the Yucca Mountain area

a. Caldera evolution and genesis of ash flows

b. Timber Mountain Tuff

c. Paintbrush Tuff

d. Tuffaceous beds of Calico Hills

e. Crater Flat Tuff

f. Older tuffs

g. Sedimentary units

h. Basalts

2. Structure

3. Seismicity

4. Energy and mineral resources

a. Energy resources

b. Metals

c. Nonmetals

5. Paleontology

6. Mineralogy

7. Geomorphology

8. Tectonics

a. Faulting

b. Stress

c. Uplift/subsidence

d. Volcanism

C. Hydrologic Conditions

1. Surface water

2. Ground water

a. Ground water movement

b. Ground water quality

3. Present and projected water use in the area

4. Groundwater resources

5. Climatology

6. Meteorology

D. Geochemistry

1. Rock chemistry of the overlying and underlying host units

2. Water chemistry of unsaturated or saturated zones

3. Alteration

4. Retardation and transport

E. Environmental Setting

1. Land use

a. Federal use

b. Agricultural

i. Grazing land

ii. Cropland

c. Mining

d. Recreation

e. Private and commercial development

2. Terrestrial and aquatic ecosystems

a. Terrestrial vegetation

i. Larrea-Ambrosia

ii. Larrea-Ephedra or Larrea-Lycium

iii. Coleogyne

iv. Mixed transition

v. Grassland-burn site

b. Terrestrial wildlife

i. Mammals

ii. Birds

iii. Reptiles

c. Special-interest species

d. Aquatic ecosystems

3. Air quality and weather conditions: Air quality

4. Noise

5. Aesthetic resources

6. Archaeological, cultural, and historical resources

7. Radiological background

a. Monitoring program

b. Dose assessment

F. Transportation

1. Highway infrastructure and current use

2. Railroad infrastructure and current use

G. Socioeconomic Conditions

1. Economic conditions

a. Nye County

b. Clark County

c. Lincoln County

d. Methodology

2. Population density and distribution

a. Populations of the State of Nevada

b. Population of Nye County

c. Population of Clark County

d. Population of Lincoln County

3. Community services

a. Housing

b. Education

c. Water supply

d. Waste-water treatment

e. Solid waste

f. Energy utilities

g. Public safety services

h. Medical and social services

i. Library facilities

j. Parks and recreation

4. Social conditions

a. Existing social organization and structure

i. Rural social organization and social structure

ii. Social organization and structure in urban Clark County

b. Culture and lifestyle

i. Rural culture

ii. Urban culture

c. Community attributes

d. Attitudes and perceptions toward the repository

5. Fiscal and governmental structure

2. Expected Effects of the Site Characterization Activities

A. Site Characterization Activities

1. Field studies

a. Exploratory drilling

b. Geophysical surveys

c. Geologic mapping

d. Standard operating practices for reclamation of areas disturbed by field studies

e. trenching

2. Exploratory shaft facility

a. Surface facilities

b. Exploratory shaft and underground workings

c. Secondary egress shaft

d. Exploratory shaft testing program

e. Final disposition

f. Standard operating practices that would minimize potential environmental damage

3. Other studies

a. Geodetic surveys

b. Horizontal core drilling

c. Studies of past hydrologic conditions

d. Studies of tectonics, seismicity, and volcanism

e. Studies of seismicity induced by weapons testing

f. Field experiments in G-Tunnel facilities

g. Laboratory studies

h. Waste package design, testing, and analysis

B. Expected Effects of Site Characterization

1. Expected effects on the environment

a. Geology, hydrology, land use and surface soils

i. Geology

ii. Hydrology

iii. Land use

iv. Surface soils

b. Ecosystems

c. Air quality

d. Noise

e. Aesthetics

- I. Archaeological, cultural, and historical resources
2. Socioeconomic and transportation conditions
 - a. Economic conditions
 - i. Employment
 - ii. Materials
 - b. Population density and distribution
 - c. Community services
 - d. Social conditions
 - e. Fiscal and governmental structure
 - f. Transportation
3. Worker safety
4. Irreversible and irretrievable commitment of resources
- C. Alternative Site Characterization Activities
3. Regional and Local Effects of Locating a Repository at the Site
 - A. The Repository
 1. Construction
 - a. The surface facilities
 - b. Access to the subsurface
 - c. The subsurface facilities
 - d. Other construction
 - i. Access route
 - ii. Railroad
 - iii. Mined rock handling and storage facilities
 - iv. Shafts and other facilities
 - e. Utilities
 2. Operations
 - a. Emplacement phase
 - i. Waste receipt
 - ii. Waste emplacement
 - b. Caretaker phase
 3. Retrievability
 4. Decommissioning and closure
 5. Schedule and labor force
 6. Material and resource requirements
- B. Expected Effects on the Physical Environment
 1. Geologic impacts
 2. Hydrologic impacts
 3. Land use
 4. Ecosystems
 5. Air quality
 - a. Ambient air-quality regulations
 - b. Construction
 - c. Operations
 - d. Decommissioning and closure
 6. Noise
 - a. Construction
 - b. Operations
 - e. Decommissioning and closure
 7. Aesthetic resources
 8. Archaeological, cultural, and historical resources
 9. Radiological effects
 - a. Construction
 - b. Operation
 - i. Worker exposure during normal operation
 - ii. Public exposure during normal operation
 - iii. Accidental exposure during operation
- C. Expected Effects of Transportation Activities
 1. Transportation of people and materials
 - a. Highway impacts
 - i. Construction
 - ii. Operations
 - iii. Decommissioning
 - b. Railroad impacts
 2. Transportation of nuclear wastes
 - a. Shipment and routing nuclear waste shipments

- i. National shipment and routing
- ii. Regional shipment and routing
- b. Radiological impacts
 - i. National impacts
 - ii. Regional impacts
 - iii. Maximally exposed individual impacts
- c. Nonradiological impacts
 - i. National impacts
 - ii. Regional impacts
 - d. Risk summary
 - i. National risk summary
 - ii. Regional risk summary
 - e. Costs of nuclear waste transportation
 - f. Emergency response
 - D. Expected Effects on Socioeconomic Conditions
 1. Economic conditions
 - a. Labor
 - b. Materials and resources
 - c. Cost
 - d. Income
 - e. Land use
 - f. Tourism
 2. Population density and distribution
 3. Community services
 - a. Housing
 - b. Education
 - c. Water supply
 - d. Waste-water treatment
 - e. Public safety services
 - f. Medical services
 - g. Transportation
 4. Social conditions
 - a. Social structure and social organization
 - i. Standard effects on social structure and social organization
 - ii. Special effects on social structure and social organization
 - b. Culture and lifestyle
 - c. Attitudes and perceptions
 5. Fiscal conditions and government structure
 4. Suitability of the Yucca Mountain Site for Site Characterization and for Development as a Repository
 - A. Suitability of the Yucca Mountain Site for Development as a Repository: Evaluation Against the Guidelines That Do Not Require Site Characterization
 1. Technical guidelines
 - a. Postclosure site ownership and control
 - i. Data relevant to the evaluation
 - ii. Favorable condition
 - iii. Potentially adverse condition
 - iv. Evaluation and conclusion for the qualifying condition on the postclosure site ownership and control guidelines
 - b. Population density and distribution
 - i. Data relevant to the evaluation
 - ii. Favorable condition
 - iii. Potentially adverse condition
 - iv. Disqualifying condition
 - v. Evaluation and conclusion for the qualifying condition on the population density and distribution guideline
 - c. Preclosure site ownership and control
 - i. Data relevant to the evaluation
 - ii. Favorable condition
 - iii. Potentially adverse condition
 - iv. Evaluation and conclusion for the qualifying condition on the preclosure site ownership and control guideline
 - d. Meteorology
 - i. Data relevant to the evaluation
 - ii. Favorable conditions

- iii. Potentially adverse conditions
- iv. Evaluation and conclusion for the qualifying condition on the meteorology guideline
- e. Offsite installations and operations
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying conditions
 - v. Evaluation and conclusion for the qualifying condition on the offsite installations operations guideline
- f. Environmental quality
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying condition
 - v. Evaluation and conclusion for the qualifying condition on the environmental quality guidelines
- g. Socioeconomic impacts
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying condition
 - v. Evaluation and conclusion for the qualifying condition on the socioeconomic guideline
- h. Transportation
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Evaluation and conclusion for the qualifying condition on the transportation guideline
2. Preclosure System
 - a. Preclosure system: radiological safety
 - i. Data relevant to the evaluation
 - ii. Evaluation of the Yucca Mountain site
 - iii. Conclusion for the qualifying condition on the preclosure system guideline radiological safety
 - b. Preclosure system: environment, socioeconomics, and transportation
 - i. Data relevant to the evaluation
 - ii. Evaluation of the Yucca Mountain site
 - iii. Conclusion for the qualifying condition on the preclosure system guideline: environment, socioeconomics, and transportation
 3. Postclosure technical
 - a. Geohydrology
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying condition
 - v. Evaluation and conclusion for the qualifying condition on the postclosure geohydrology guideline
 - b. Geochemistry
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Evaluation and conclusion for the qualifying condition on the postclosure geochemistry guideline
 - c. Rock characteristics
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Evaluation and conclusion for the qualifying condition on the postclosure rock characteristics guideline
 - d. Climatic changes
 - i. Data relevant to the evaluation
 - ii. Favorable conditions

- iii. Potentially adverse conditions
- iv. Evaluation and conclusion for the climate changes qualifying condition
- e. Erosion
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying conditions
- f. Dissolution
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse condition
 - iv. Disqualifying condition
- v. Evaluation and Conclusion for the qualifying condition on the postclosure and dissolution guideline
- g. Tectonics
 - i. Data relevant to the evaluation
 - ii. Favorable condition
 - iii. Potentially adverse condition
 - iv. Disqualifying condition
- v. Evaluation and conclusion for the qualifying condition on the postclosure tectonics guideline
- h. Human interference: natural resources and site ownership and control
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying conditions
- v. Evaluation and conclusion for the qualifying condition on the postclosure human interference and natural resources technical guideline
- 4. Postclosure system
 - a. Evaluation of the Yucca Mountain Site
 - i. Quantitative analysis
 - ii. Qualitative analysis
 - b. Summary and conclusion for the qualifying condition on the postclosure system guideline
- 5. Preclosure technical
 - a. Surface characteristics
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Evaluation and conclusion for the qualifying condition on the postclosure surface characteristics guideline
 - b. Rock characteristics
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse conditions
 - iv. Disqualifying condition
 - v. Evaluation and conclusion for the qualifying condition on the postclosure rock characteristics guideline
- c. Hydrology
 - i. Data relevant to the evaluation
 - ii. Favorable conditions
 - iii. Potentially adverse condition
 - iv. Disqualifying condition
- v. Evaluation and conclusion for the qualifying condition on the postclosure hydrology guideline
- g. Tectonics
 - i. Data relevant to the evaluation
 - ii. Favorable condition
 - iii. Potentially adverse conditions
 - iv. Disqualifying condition
- v. Evaluation and conclusion for the qualifying condition on the postclosure tectonics guideline
- 6. Ease and cost of siting, construction, operation, and closure

- a. Data relevant to the evaluation
- b. Evaluation
- c. Conclusions for the qualifying condition on the ease and cost of siting, construction, operation, and closure guidelines
- 7. Conclusion regarding suitability of the Yucca Mountain Site for site characterization
- B. Performance Analyses
 - 1. Preclosure radiological safety assessments
 - a. Preclosure radiation protection standards
 - b. Methods for preclosure radiological assessment
 - 1. Radiological assessment of construction activities
 - i. Radiological assessment of normal operations
 - ii. Radiological assessment of accidental releases
 - 2. Preliminary analysis of postclosure performance
 - a. Subsystem description
 - i. Engineered barrier subsystem
 - ii. The natural barrier subsystem
 - b. Preliminary performance analyses of the major components of the system
 - i. The waste package lifetime
 - ii. Release rate from the engineered barrier subsystem
 - c. Preliminary system performance description and analysis
 - d. Comparisons with regulatory performance objectives
 - e. Preliminary evaluation of disruptive events: disruptive natural processes
 - f. Conclusions
 - 5. Transportation
 - A. Regulations Related to Safeguards
 - 1. Safeguards
 - 2. Conclusion
 - B. Packagings
 - 1. Packaging design, testing, and analysis
 - 2. Types of packaging
 - a. Spent fuel
 - b. Casks for defense high-level waste and West Valley high-level waste
 - c. Casks for use from an MRS to the repository
 - 3. Possible future developments
 - a. Mode-specific regulations
 - b. Overweight truck casks
 - c. Rod consolidation
 - d. Advanced handling concepts
 - e. Combination storage/shipping casks
 - C. Potential Hazards of Transportation
 - 1. Potential consequences to an individual exposed to a maximum extent
 - a. Normal transport
 - b. Accidents
 - 2. Potential consequences to a large population from very severe transportation accidents
 - a. Risk assessment
 - i. Outline of method for estimating population risks
 - ii. Computational models and methods for population risks
 - iii. Changes to the analytical models and methods for population risks
 - d. Transportation scenarios evaluated for risk analysis
 - e. Assumption about wastes
 - f. Operational considerations for use in risk analysis

- g. Values for factors needed to calculate population risks
- h. Results of population risk analyses
- j. Uncertainties
- 4. Risks associated with defective cask construction, lack of quality assurance, inadequate maintenance and human error
- D. Cost Analysis
 - 1. Outline method
 - 2. Assumptions
 - 3. Models
 - 4. Cost estimates
 - 5. Limitations of results
- E. Barge Transport to Repositories
- F. Effect of a Monitored Retrievable Storage Facility on Transportation Estimates
- G. Effect of At-Reactor Rod Consolidation on Transportation Estimates
- H. Criteria for Applying Transportation Guideline
 - 1. DOE Responsibilities for Transportation Safety
 - 1. Prenotification
 - 2. Emergency response
 - 3. Insurance coverage for transportation accidents
 - J. Modal Mix
 - 1. Train shipments
 - a. Ordinary
 - b. Dedicated train
 - 2. Truck shipments
 - a. Legal weight
 - b. Overweight

Environmental Impact: Categorical Exclusion

The NRC has determined that this final rule is the type of action described in categorical exclusion 10 CFR 51.22(c)(1). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this final rule.

Paperwork Reduction Act Statement

This rule does not contain information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.).

Regulatory Analysis

The DOE analysis of the costs and benefits of the LSS (U.S. Department of Energy, "Licensing Support System Benefit-Cost Analysis" (July, 1988) and companion DOE reports ("Preliminary Needs Analysis," "Preliminary Data Scope Analysis," and "Conceptual Design Analysis;") are available for inspection in the NRC Public Document Room, 2120 L Street NW., Washington, DC. Single copies may be obtained from Francis X. Cameron, Office of General Counsel, U.S. Nuclear Regulatory Commission, Washington DC, 20555; Telephone: (301)-492-1823.

Regulatory Flexibility Analysis

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)),

ENCLOSURE 3

DISPOSITION OF THE INTERIM TOPICAL GUIDELINES

On April 14, 1989, the final rule amending the Nuclear Regulatory Commission's (NRC's) Rules of Practice in 10 CFR Part 2 for the adjudicatory proceeding on the application for a license to receive and possess high-level radioactive waste (HLW) at a geologic repository operations area, pursuant to 10 CFR Part 60, was published in the Federal Register [54FR14925 (1989)] under the title: "Submission and Management of Records and Documents Related to the Licensing of a Geologic Repository for the Disposal of High-Level Radioactive Waste." Topical guidelines identifying the information that should be submitted by the Licensing Support System (LSS) participants for entry into the LSS were recommended by all parties to the negotiated rulemaking. All of the recommendations were published as interim topical guidelines in the supplementary information on the rule, with the understanding that the list might be modified by the NRC after the rulemaking was completed. Subsequently, the NRC directed the staff to review, clarify, and modify the topical guidelines with the results being published as a regulatory guide. This document discusses the results of the NRC staff's review, clarification, and modification of the interim topical guidelines.

Three lists were included in the interim topical guidelines. The first list, "Categories of Documents" was retained (with some additions) and is Appendix A to the proposed "Draft Regulatory Guide Topical Guidelines for the Licensing Support System" (the draft regulatory guide). The second list was comprised of 17 general topics. The staff's disposition of each of these general topics is discussed later in this document. In summary, it is the staff's position that all information relevant to the licensing proceeding, which was requested in the second list, has been included in the draft regulatory guide. The third list was comprised of specific topics. It covers a broad range of material, including some that is well outside the scope of information that would be needed in the proceedings to license the HLW repository.

The information in the third list, which is outside the scope of what would be needed in the proceedings to license the HLW repository, generally deals with transportation and environmental issues. Requests for information on transportation of waste from reactor or temporary storage sites to the repository is clearly beyond the scope of the licensing requirements in 10 CFR Part 60. The Nuclear Waste Policy Act (NWPA) clearly states, in Sections 9 and 137, that it does not affect the regulation of transportation of spent nuclear fuel or high-level radioactive waste. The list of specific topics also includes requests for information on a range of environmental concerns which the staff assumes will have been resolved during the development and adoption by the U.S. Department of Energy (DOE) of the Environmental Impact Statement

(EIS) which must accompany an application to possess HLW at the repository. Therefore environmental information required to be included in the LSS has been limited to that information needed for NRC's adoption or modification of the DOE EIS.

The remaining information from the third list fell into two areas: information directly related to the repository systems defined in 10 CFR Part 60 (i.e; the natural, geologic repository operations area, and engineered barrier systems) and other topics described in 10 CFR Part 60 for which information is required in order for DOE to submit a complete license application (e.g., quality assurance, repository operations, etc.). Since the staff had recently completed a proposed "Draft Format and Content Regulatory Guide for the License Application for the High-Level Waste Repository" (FCRG), it was decided to develop the topical guidelines such that they would parallel the approach taken in this document. Therefore, the draft regulatory guide follows, as closely as practicable, the repository systems-based approach used in the FCRG. In cases where topical information crosses system boundaries in the FCRG, it has been redefined as a specific topic in the draft regulatory guide (e.g., Radiation Protection).

It should be noted that the FCRG contains an appendix that depicts the relationship of the 10 CFR Part 60 regulatory requirements to sections of the FCRG. Thus, the staff believed that patterning the topical guidelines after the FCRG would help ensure that the topical guidelines would be complete with regard to the information required for the HLW repository license application process.

In developing the topical guidelines included in the draft regulatory guide, the staff attempted to provide a list of the topics for which LSS participants should submit documentary materials for entry into the LSS under 10 CFR 2.1003. As revised, the topical guidelines are designed to be broad enough to encompass all potential licensing issues. Most of the guidelines include several subheadings. In these cases, the higher level guideline is meant to cover any more detailed item that falls under it. The topical guidelines will not be used as the detailed topical index for locating documents within the LSS. This function will be served by the document header, whose fields are being developed by the LSS Administrator, with guidance from the LSS Advisory Review Panel. If such a document is developed, it will be developed separately by the LSS Administrator. The topical guidelines have been kept broad. Each guideline is all-inclusive, with regard to all documents germane to that topic, for the site.

As discussed above, a list of 17 general topics was included in the interim topical guidelines. Listed below are the 17 general topics and the staff's response (R) to each one.

1. Any document pertaining to the location and potential of valuable natural resources, hydrology, geophysics, tectonics (including volcanism), geomorphology, seismic activity atomic energy defense activities, proximity to water supplies, proximity to populations, the effect upon the rights of users of water, proximity to components of the National Park System, the National Wildlife Refuge Systems, and the National Wildlife and Scenic River System, the National Wilderness Preservation System or National Forest Land, proximity to sites where high-level radioactive waste and spent nuclear fuel is generated or temporarily stored, spent fuel and nuclear waste transportation, safety factors involved in moving spent fuel or nuclear waste to repository, the cost and impact of transporting spent fuel and nuclear waste to a repository site, the advantages of regional distribution in siting of repositories, and various geologic media in which sites for repositories may be located.
- R. It is NRC's position that the LSS should be limited to information relevant to licensing of the HLW repository. Information relevant to: natural resources, hydrology, geophysics, tectonics, volcanism, geomorphology, and seismic activity are covered under Topic II. Natural Systems of the Geologic Setting. The relevance of the rest of the information described in this general topic would seem to be primarily to development and consideration of DOE's EIS. As stated on page one of the draft regulatory guide:

Pursuant to section 114(f)(4) of the Nuclear Waste Policy Act of 1982 as amended, (42 U.S.C. 10134(f)(4)), the Commission is required "to the extent practicable," to adopt the environmental impact statement (EIS) prepared by the Department of Energy (DOE). The Commission's regulations have been amended to be in accord with this statutory provision. See 10 CFR § 51.26(c). Therefore, the environmental issues in the topical guidelines will be limited to those documents relevant to the Commission's adoption or modification of the DOE EIS.

2. Any document related to repository design, siting, construction, or operation, or the transportation of spent nuclear fuel and high-level nuclear waste not categorized as an "excluded document," generated by or in the possession of any contractor of the Department of Energy, the Nuclear Regulatory Commission, or any other party to the HLW licensing proceeding.
- R. This general topic, with the exception of requirements for information on transportation which are beyond the scope of the LSS, is simply a requirement for all relevant information not considered to be excluded documents. Sections 9 and 137 of the NWPA state that it (the NWPA) does not affect regulation of transportation of spent nuclear fuel or high-level radioactive waste. Since the inclusion of all relevant information is a requirement for participation in the LSS and the licensing proceedings, this seems to be an unnecessary or redundant topic.

3. All documents related to the physical attributes of the Basin and Range Province of the continental United States.
- R. The Basin and Range Province basically encompasses the entire western part of the United States. 10 CFR Part 60 defines the geologic setting at a more appropriate level for repository licensing. The draft regulatory guide is based on the information requirements of 10 CFR Part 60. The topic which speaks to the Geologic Setting is Topic II. Natural Systems of the Geologic Setting.
4. Any document listing and/or considering any site or location other than Yucca Mountain as possible location for a high level nuclear waste repository, or any alternative technology to deep geologic disposal.
- R. The LSS will be used in the licensing proceedings for the site being proposed in DOE's license application. The topical guidelines have been written to be as generic as 10 CFR Part 60 is. Any relevance other sites might have had was removed by the amendments to the NWPA. The NRC staff could not see the relevance of information about alternative technology to deep geologic disposal to the HLW licensing process as defined in 10 CFR Part 60.
5. Any document analyzing the effect of the development of a repository at Yucca Mountain on the rights of users of water in the Amargosa groundwater basin in Nevada.
- R. The topic of water rights is included in the draft regulatory guide. Topic VII is Land Ownership and Control. Under this heading is subtopic 1d, Plans for Restricting Access to the Controlled Area-Water Rights. To the extent that questions of radionuclide transport would be appropriate for discussion in the license application, they would be covered in Topic II. Natural Systems of the Geologic Setting (II.2 Hydrologic System) and X. Radiation Protection (X.6 Estimated Offsite Dose Assessment). The draft regulatory guide makes it clear that each topic is to be considered all inclusive in terms of information required for the HLW licensing process. In addition, it is assumed that environmental issues relevant to the Amargosa groundwater basin will have been considered in the development of DOE's EIS.

6. Any document analyzing the health and safety implications to the people and environment of the transportation of spent fuel between locations where spent fuel is generated or stored and Yucca Mountain, Nevada, or any other site nominated for repository characterization on May 28, 1986, including, but not limited to:
- a. Any analysis of possible human error in the manufacture of spent fuel casks;
 - b. Any analysis of the actual population density along all of any specific projected routes of travel;
 - c. Any analysis of releases from any actual radioactive material transportation incidents;
 - d. Any analysis of the emergency response time in any actual radioactive materials transportation incident;
 - e. Any actual accident data on any specific projected routes of travel;
 - f. Any calculations or projections on the probabilities of accidents on any specific projected routes of travel;
 - g. Any data on the physical properties or containment capabilities of spent fuel are projected to be used at any any hypothetical or actual projected repository;
 - h. Any analysis of modeling of the containment capabilities of spent fuel casks under a stress scenario;
 - i. Any analysis or comparison of spent fuel casks projected to be used against the spent fuel cask certification standards of the Nuclear Regulatory Commission;
 - j. Any analysis of the containment capabilities of spent fuel casks containing spent fuel which has been burned up over an extended period.
- R. Transportation is beyond the scope of the licensing process for the HLW repository, as defined by 10 CFR Part 60 and the NWPA. Therefore, this topic has not been included in the draft regulatory guide.
7. Any document analyzing or comparing Yucca Mountain, Nevada, with any other site in the same geohydrologic setting.
- R. This topic was excluded because under the NWPA, as amended, no other site is to be considered concurrently.
8. Any document relating to potential interference or incompatibility between a Yucca Mountain, Nevada, high-level nuclear waste repository

and atomic energy activities at the Nevada Test Site and Nellis Air force base.

- R. It is the view of the NRC staff that this is primarily an issue which would be addressed in DOE's EIS. However, information about activities at Nellis Air Force Base or the Nevada Test Site which could affect the safety or performance of the repository would fall under several of the topics in the draft regulatory guide (e.g., II. Natural Systems of the Geologic Setting, III. Geologic Repository Operations Area, IV. Engineered Barrier Systems, VI. Conduct of Repository Operations, etc.).
9. Any document related to the land status, use or ownership of Yucca Mountain, Nevada.
- R. This is covered under Topic VIII. Land Ownership and Control.
10. Any document considering or analyzing the attributes or detriments of any engineered barrier upon the radionuclide isolation capability of Yucca Mountain, Nevada, or any other site considered.
- R. This would be covered under Topic IV. Engineered Barrier Systems for the site proposed in the application.
11. Any document evaluating the effect of extended fuel burn-up on Yucca Mountain, Nevada's adequacy as a repository site for disposal of spent fuel or upon the design of any such theoretical repository.
- R. Topic XI. is Any Alternatives Considered (e.g., design interpretations, models)
12. Any document analyzing or investigating the potential for discharge of radionuclides into the Death Valley National Monument.
- R. This topic would be addressed in DOE's EIS.
13. Any document analyzing the recharge of the underlying saturated zone or the hydroconductivity of the unsaturated zone at Yucca Mountain.
- R. This is covered under Topic II., Natural Systems of the Geologic Setting (II.2 Hydrologic System).
14. Any document containing any data or analysis of volcanism in the geologic setting of which Yucca Mountain is a part.
- R. This is covered in Topic II., Natural Systems of the Geologic Setting, (II.1 Geologic System).

15. Any document containing any data or analysis of tectonic events at Yucca Mountain, or pertaining to the tectonic framework of the Yucca Mountain area or any document containing any data or analysis of faults within or without surface expression in the area of Yucca Mountain.
- R. This is covered in Topic II., Natural Systems of the Geologic Setting, (II.1 Geologic System).
16. Any document containing instructions or other limitations on the scope of work to be performed by Department of Energy personnel or contractor's personnel.
- R. Appendix A to the draft regulatory guide contains a list of examples of categories of documents to be included in the LSS. Among the categories which apply here are: external correspondence, internal memoranda, and DOE program management documents. Specific documents would fall under various topical headings within the guide depending on subject matter.
17. Any document pertaining to prevention or control of human intrusion at the Yucca Mountain site.
- R. Depending on the focus of the document, it would fall under Topic I. General Information (I.5 Any Publicly Available Information on the Physical Security Plan); VI. Conduct of Repository Operations (VI.9 Site Markers); or VII Land Ownership and Control (passim).