



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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210610
COMSECY-03-0014

March 12, 2003

MEMORANDUM TO:

Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

Approved with comments.

Nils J. Diaz
Nils J. Diaz 05/28/03

FROM:

William D. Travers
Executive Director for Operations

SUBJECT:

PUBLIC RELEASE OF THE YUCCA MOUNTAIN REVIEW PLAN,
NUREG-1804, FINAL REVISION 2

In COMSECY-02-001, the staff transmitted the Yucca Mountain Review Plan (YMRP), Draft Revision 2, to the Commission for approval to publicly release for comment. The staff received approval, subject to the incorporation of changes, in a Staff Requirements Memorandum (SRM) dated February 25, 2002. In response to the SRM, the staff modified the plan and a request for comments on the plan was announced in a Federal Register notice on March 29, 2002. In addition to the 5-month public comment period which ended August 12, 2002, staff conducted three public meetings in Nevada to solicit comments. Approximately 1000 comments were received, including comments from the Advisory Committee on Nuclear Waste (ACNW), that were binned into eleven categories. In response to comments from the public and the ACNW, staff has prepared the YMRP, Revision 2, NUREG-1804 (Attachment 1). This version is being submitted to the Commission for approval. Attachment 2 provides staff's responses to public comments, and Attachment 3 provides staff's specific responses to the ACNW comments. Attachment 4 provides a summary of changes made to the YMRP. Attachment 5 highlights the YMRP modifications, using redline/strikeout, to draft Revision 2 of the YMRP.

Following Commission approval the staff plans to follow the Agency's process of: 1) posting NUREG-1804, Final Revision 2, on the U.S. Nuclear Regulatory Commission (NRC) website; 2) publishing the YMRP as NUREG-1804, Final Revision 2; 3) issuing a Federal Register notice of availability and public comments and responses (Attachment 2); and 4) issuing a press release announcing the YMRP's availability on the website.

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Comments of Chairman Diaz on COMSECY-03-0014

In COMSECY-03-0014, the staff asks Commission approval to publish the Yucca Mountain Review Plan (YMRP) as NUREG-1804. I approve publication subject to the following comments.

In order to meet the statutory deadlines for completion of the NRC review of a license application for a geologic repository, it is essential that our review of safety issues focus primarily on those matters that could significantly impact risk. In commenting on the draft review plan, the Advisory Committee on Nuclear Waste (ACNW) noted that although the YMRP embodies the risk perspectives in Part 63, the manner in which the review plan is applied will determine whether a risk-informed and performance-based process is used for a licensing decision. I agree with the ACNW's views. In particular, staff has provided an example of how a risk-informed review would be conducted (in Appendix A of the draft final YMRP). However, the actual implementation of this process will determine whether a risk-informed review is performed. For those parts of the review where the use of risk measures is appropriate, staff should ensure that "consistency" and "uniformity" of the review are not the primary basis for determining the level of effort applied. Rather, the scope of the review of a particular aspect of the license application should be commensurate with its risk significance.

The YMRP addresses security matters in terms of the existing requirements and any new requirements that would result from NRC's comprehensive review of security. The review plan does not explicitly incorporate the compensatory measures (CMs) for Spent Fuel Facilities that were issued in May and October of 2002. The staff should ensure that the Department of Energy's Office of Civilian Radioactive Waste Management has a copy of the applicable Orders for their incorporation as appropriate.

Attached to this vote are necessary clarification and editorial changes to the YMRP.

Review Plan for General Information

Review Method 3 Basis for the Commission's Licensing Authority

The staff should verify that the license application contains a presentation of the appropriate provisions of the statutory authority that apply to the proposed activities at the geologic repository operations area and established U.S. Nuclear Regulatory Commission jurisdiction.

} syntax?

1.1.3 Acceptance Criteria

The following acceptance criteria are based on meeting the requirements of 10 CFR 63.21(b)(1), relating to the description of the general information.

Acceptance Criterion 1 The Location and Arrangement of the Geologic Repository Operations Area are Adequately Defined.

- (1) A general but accurate description of the geologic repository operations area is provided. This description includes:
 - (a) A discussion of the physical characteristics of the site and the natural setting;
 - (b) Scaled drawings or maps showing the location of the geologic repository operations area and its associated structures, systems, and components;
 - (c) A summary of the design features of the above- and below-ground structures, systems, and components, with a designation of whether they are permanent or temporary;
 - (d) A definition of the purpose of each geologic repository operations area structure, system, and component, and any interrelationships among them;
 - (e) Plans to restrict access to, and to regulate land uses around, the geologic repository operations area; and
 - (f) A description of radiological monitoring instrumentation and activities, including the U.S. Department of Energy plans for the mitigation of radiological impacts associated with the construction and operation of the proposed repository.

Acceptance Criterion 2 The General Nature of the Activities to be Conducted at the Geologic Repository is Adequately Described.

- (1) A summary description of the types, kinds, and amounts of spent nuclear fuel and other high-level radioactive waste to be disposed of is provided;
- (2) A summary description of the proposed operations is provided that includes receipt, handling, emplacement, retrieval, of waste and waste packages. This description includes basic plans for the movement of personnel, material, and equipment during construction and normal operations;

Review Plan for Safety Analysis Report

could lead to radiological release. Verify that appropriate methods are used for the analyses, data used are appropriate for the methods, and results are properly interpreted.

Review Method 6 Site Igneous Activity Information

Consult with the reviewer of Section 2.2.1.2 ("Scenario Analysis and Event Probability") of the Yucca Mountain Review Plan to verify the license application adequately considers igneous activity at the site, including volcanic eruption, subsurface magmatic activity/flow, and volcanic ash flow/ash fall.

Review Method 7 Site Geomorphology Information

Evaluate the analysis of site geomorphology [using guidance such as NUREG/CR-3276 (Schumm and Chorley, 1983) and "Standard Format and Content for Documentation of Remedial Action Selection at Title I Uranium Mill Tailings Sites" (U.S. Nuclear Regulatory Commission, 1989), as appropriate]. Assess the extent of erosion of the land surface and the likelihood that mass wasting, such as landslides or rock avalanches, or rapid fluvial degradation in channels or interfluves, might affect site structures or operations.

Review Method 8 Site Geochemical Information

Evaluate the description of the geochemical information at Yucca Mountain that is relevant to the preclosure safety analysis and geologic repository operations area design, to confirm that it is adequate, including items such as:

- (1) Geochemical composition of any subsurface water held within the rock matrix or perched water zones, or episodically flowing through fractures to determine corrosivity;
- (2) Geochemical composition of rock strata within and above the repository horizon to identify minerals that might leach and increase the corrosivity of water flowing through the strata; and
- (3) Any geochemical alterations to the rock fractures and rock matrix through heating or other processes that might significantly alter geomechanical rock mass properties.

Review Method 9 ^{d/} Land Use, Structures and Facilities, and Residual Radioactivity ✓

Evaluate the description of previous uses of land within the land withdrawal area; the description, locations, and uses of man-made structures and facilities; and the identification of any residual sources of radiation within the land withdrawal area as they relate to the preclosure safety analysis. The evaluation should include such items as:

- (1) Conflicts with uses of the land for a repository;
- (2) Impacts on existing structures and facilities or potential contamination from these facilities; and

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- (b) Neutron capture provided by borated water in casks and waste transfer pools, and by borated materials incorporated into casks;
 - (c) Gamma and neutron shielding provided by the structural and nonstructural materials in the walls and ends of storage/transfer casks;
 - (d) Temporarily positioned shielding used during operations for preparing casks, and/or during transfer of casks, and shielding provided by any pool facility interior and exterior walls; and
 - # > (e) Selection of appropriate shielding materials, and that the design analysis of the shielding performance for normal and Categories 1 and 2 event sequences. Coordinate with the reviewer of the repository design for Section 2.1.1.7 ("Design of Structures, Systems, and Components Important to Safety and Safety Controls") of the Yucca Mountain Review Plan. ✓
- (4) Means to monitor and control dispersal of radioactive contamination;
- (5) Means to control access to high radiation areas, very high radiation areas, or airborne radioactivity areas, to ensure compliance with the requirements of Subparts G and H of 10 CFR Part 20, such as:
- (a) Analyses that identify airborne radioactivity areas. These analyses should provide a technical basis for any inability to practically apply process or other engineering controls, to restrict the concentrations of radioactive material in air to values below those that define an airborne radioactivity area;
 - (b) A plan for monitoring and limiting intakes of radiation (e.g., controlling access, limiting individual exposure times, using individual respiratory protection equipment); and
 - (c) Consistency with guidance such as Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Power Plants" (U.S. Nuclear Regulatory Commission, 1993).
- (6) Means to prevent or control criticality, such as complying with American National Standards Institute/American Nuclear Society-8 nuclear criticality safety standard documents listed in Regulatory Guide 3.71 (U.S. Nuclear Regulatory Commission, 1998a);
- (7) A radiation alarm system designed to warn of significant increases in radiation levels, concentrations of radionuclides in air, and increased radioactivity in effluents. This system should be designed to provide prompt notification to personnel both in the work area where an increase in radiation is detected and in control centers. Features of control centers should include:
- (a) Appropriate installation of radiation alarms in areas where waste is being stored, transferred, or processed/repackaged;

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The U.S. Department of Energy should indicate how the program would be developed and integrated with the preclosure quality assurance program. The U.S. Department of Energy quality assurance program is reviewed using Section 2.5.1 of the Yucca Mountain Review Plan.

Facility Radiation Surveys: The U.S. Department of Energy should describe the general type of information that will be required to facilitate decommissioning, with respect to radiation surveys to support closure and decommissioning activities.

Financial Assurance: The U.S. Department of Energy is not required to provide a financial assurance plan in support of closure or decommissioning.

2.1.3.3 Acceptance Criteria

63.21 (c)(16)(vi) does not exist, replace with 63.21 (c)(22)(vi)

The following acceptance criteria are based on meeting the requirements of 10 CFR 63.21(c)(8) and (c)(16)(vi), relating to plans for permanent closure and decontamination, or decontamination and dismantlement of surface facilities.

Acceptance Criterion 1 The License Application Describes and Provides Bases for Features of the Geologic Repository Operations Area Design That Will Facilitate Permanent Closure and Decontamination, or Decontamination and Dismantlement of Surface Facilities.

- (1) The license application describes the functions of design features as they relate to permanent closure and decontamination, or decontamination and dismantlement;
- (2) The repository design is compatible with the objectives of permanent closure and decontamination, or decontamination and dismantlement. Design provisions are included, where feasible and economical, and those design choices that support closure and decontamination, or decontamination and dismantlement are selected over competing alternatives. An acceptable rationale for not adopting the more favorable alternatives is provided; and
- (3) Designs will facilitate closure and decontamination, or decontamination and dismantlement.

Acceptance Criterion 2 The License Application Includes Adequate Preliminary Plans for Permanent Closure and Decontamination, or Decontamination and Dismantlement of Surface Facilities.

- (1) The license application demonstrates that the U.S. Department of Energy is cognizant of the information, analyses, and programs that will be required at permanent closure, decommissioning, and dismantlement;
- (2) The license application demonstrates that the U.S. Department of Energy will ensure that the necessary information to support closure and decommissioning—related to operating history, facility description and radiological status, dose evaluations,

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infiltration. The reviewer should verify that the technical bases support the treatment of uncertainty and variability of these parameters in the performance assessment. If conservative values are used as a method for addressing uncertainty and variability, the reviewer should verify that the conservative values result in conservative estimates of risk and do not cause unintended results (i.e., conservative representation of one aspect of the repository behavior that leads to an overall reduction in risk; inappropriate dilution of the risk estimate by assuming an approach is conservative when a parameter range is increased beyond the supporting data).

Confirm if uncertainty in data, because of both temporal and spatial variations in conditions affecting climate and net infiltration, is incorporated into the parameter ranges. For example, evaluate the climatic and hydrostratigraphic parameters used in the abstracted model to verify that they are consistent with site characterization data, and sufficiently detailed to capture heterogeneities that may influence the distribution and rate of liquid-water flux that has moved beyond the zone of evapotranspiration.

Verify that the U.S. Department of Energy appropriately establishes possible statistical correlations between parameters. Verify that an adequate technical basis or bounding argument is provided for neglected correlations.

} include
this
provision
in all
abstractions

Confirm that performance assessments incorporate the hydrologic effects of future climate change that could alter the rates and patterns of present-day net infiltration into the unsaturated zone.

Review Method 4 Model Uncertainty

Evaluate the U.S. Department of Energy alternative conceptual models used in developing the abstraction for climate and net infiltration. Examine the model parameters, considering available site characterization data, laboratory experiments, field measurements, natural analog research, and process-level modeling studies. Where appropriate, use an alternative total system performance assessment model to evaluate selected parts of the U.S. Department of Energy abstraction of climate and net infiltration.

Verify that the bounds of uncertainty created by the process-level models are adequately reflected in this abstraction. Where appropriate, use an alternative total system performance assessment model to verify that the U.S. Department of Energy total system performance assessment approach reflects or bounds the uncertainties in the process-level models.

Evaluate the treatment of conceptual model uncertainty in light of the available site characterization data, laboratory experiments, field measurements, natural analog information and process-level modeling studies. If adoption of a conservative model is used as an approach for addressing conceptual model uncertainty, the reviewer should verify that the selected conceptual model: (i) is conservative relative to alternative conceptual models that are consistent with the available data and current scientific understanding; and (ii) results in conservative estimates of risk and not cause unintended results (i.e., conservative representation of one aspect of the repository behavior that leads to an overall reduction in the risk estimate).

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- (3) Specific degradation, deterioration, and alteration processes have been included in the analyses, taking into consideration their effects on annual dose, and appropriate technical bases have been provided for inclusion or exclusion, in compliance with 10 CFR 63.114(f); and
- (4) Adequate technical bases have been provided for models used in the performance assessment, as required by 10 CFR 63.114(g).

2.2.1.3.6.5 References

Altman, W.D., J.P. Donnelly, and J.E. Kennedy. NUREG-1297, "Generic Technical Position on Peer-Review for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988a.

———. NUREG-1298, "Generic Technical Position on Qualification of Existing Data for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988b.

Kotra, J.P., et al. NUREG-1563, "Branch Technical Position on the Use of Expert Elicitation in the High-Level Radioactive Waste Program." Washington, DC: U.S. Nuclear Regulatory Commission. 1996.

2.2.1.3.7 Radionuclide Transport in the Unsaturated Zone

To review this model abstraction, *consider the degree to which* evaluate the adequacy of the U.S. Department of Energy license application, *relative to the degree to which the U.S. Department of Energy relies on radionuclide transport through the unsaturated zone, to demonstrate its license application.* *Compliance* Review this model abstraction, considering the risk information evaluated in the "Multiple Barriers" Section (2.2.1.1). For example, if the U.S. Department of Energy relies on the unsaturated zone to provide significant delay in the transport of radionuclides and/or dilution of concentration to the reasonably maximally exposed individual, then perform a detailed review of this abstraction. If, on the other hand, the U.S. Department of Energy demonstrates this abstraction to have a minor impact on the delay, or a minor impact on the dose to the reasonably maximally exposed individual, then conduct a simplified review, focusing on the bounding assumptions. The review methods and acceptance criteria provided here are for a detailed review. Some of the review methods and acceptance criteria may not be necessary, in a simplified review, for those abstractions that have a minor impact on performance. The demonstration of compliance with the performance objectives is evaluated using Section 2.2.1.4 of the Yucca Mountain Review Plan. *Make similar changes to other abstractions*

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radionuclides in ground water, and has found, with reasonable expectation, that the requirements of 10 CFR 63.115 are satisfied.

The required characteristics of the reference biosphere have been satisfied. In particular the U.S. Nuclear Regulatory Commission staff found reasonable expectation that:

- (1) The features, events, and processes used to describe the reference biosphere, the biosphere pathways, the evolution of climate, and the evolution of the geologic setting are consistent with present knowledge of the region, conditions, and past processes in the Yucca Mountain region, as required by 10 CFR 63.305(a)–(d);

U.S. Nuclear Regulatory Commission staff has reviewed the Safety Analysis Report and other information submitted in support of the license application, relevant to the concentration of radionuclides in ground water, and has found, with reasonable expectation, that the requirements of 10 CFR 63.312 are satisfied. The required characteristics of the reasonably maximally exposed individual have been satisfied. In particular, the U.S. Nuclear Regulatory Commission staff found that:

- (1) The reasonably maximally exposed individual is a hypothetical person living in the accessible environment above the highest radionuclide concentration in the plume of contamination, with a diet and living style representative of people who now live in the town of Amargosa Valley, Nevada. The reasonably maximally exposed individual has metabolic and physical characteristics, and well water usage patterns that meet the requirements of 10 CFR 63.312(a)–(e).

U.S. Nuclear Regulatory Commission staff has reviewed the Safety Analysis Report and other information submitted in support of the license application, relevant to the concentration of radionuclides in ground water, and has found, with reasonable expectation, that the requirements of 10 CFR 63.332 are satisfied. The specific requirements for the representative volume have been met. In particular, the U.S. Nuclear Regulatory Commission staff found that:

- (1) The U.S. Department of Energy uses average hydrologic characteristics to determine the position and dimension of the ground-water aquifers, and projects radionuclide concentrations such that the highest concentration levels in the contaminant plume are included. The annual water demand also contains no more than 3.715×10^9 liters (3,000 acre-feet) and meets any other requirements specified in 10 CFR 63.332(a)(1)–(3).

2.2.1.3.12.5 References

Altman, W.D., J.P. Donnelly, and J.E. Kennedy. NUREG–1297, "Generic Technical Position on Peer Review for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988a.

———. NUREG–1298, "Generic Technical Position on Qualification of Existing Data for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988b.

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10 CFR 63.312 are satisfied. The required characteristics of the reasonably maximally exposed individual have been satisfied. In particular, the U.S. Nuclear Regulatory Commission staff found that:

- (1) The reasonably maximally exposed individual is a hypothetical person living in the accessible environment above the highest radionuclide concentration in the plume of contamination, with a diet ~~and living style~~ representative of people who now live in the town of Amargosa Valley, Nevada. The reasonably maximally exposed individual has metabolic and physical characteristics, and well water usage patterns that meet the requirements of 10 CFR 63.312(a) and (b).

2.2.1.3.13.5 References

Altman, W.D., J.P. Donnelly, and J.E. Kennedy. NUREG-1297, "Generic Technical Position on Peer Review for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988a.

———. NUREG-1298, "Generic Technical Position on Qualification of Existing Data for High-Level Nuclear Waste Repositories." Washington, DC: U.S. Nuclear Regulatory Commission. 1988b.

Cannon Center for Survey Research, University of Nevada. "Identifying and Characterizing the Critical Group Results of a Pilot Study of Amargosa Valley." Las Vegas, Nevada: Cannon Center for Survey Research. 1997.

Kotra, J.P., et al. NUREG-1563, "Branch Technical Position on the Use of Expert Elicitation in the High-Level Radioactive Waste Program." Washington, DC: U.S. Nuclear Regulatory Commission. 1996.

2.2.1.3.14 Biosphere Characteristics

To review this model abstraction, evaluate the adequacy of the U.S. Department of Energy license application, relative to the degree to which biosphere characteristics affect the U.S. Department of Energy license application. Review this model abstraction considering the risk information evaluated in the "Multiple Barriers" Section (2.2.1.1). For example, if the U.S. Department of Energy indicates that biosphere characteristics have a strong effect on performance, then conduct a detailed review of this abstraction. If, on the other hand, the U.S. Department of Energy demonstrates this abstraction to have a minor impact on the dose to the reasonably maximally exposed individual, then perform a simplified review focusing on the bounding assumptions. The review methods and acceptance criteria provided here are for a detailed review. Some of the review methods and acceptance criteria may not be necessary, in a simplified review, for those abstractions that have a minor impact on performance. The demonstration of compliance with the postclosure individual protection standard is evaluated, using Section 2.2.1.4.1 of the Yucca Mountain Review Plan.

Review Responsibilities—High-Level Waste Branch and Environmental and Performance Assessment Branch

Appendix A

Regulatory Commission, 2000) which embodies the principle that the licensee is responsible for the safe operation of a nuclear facility.

The following three principles are important in implementing the U.S. Nuclear Regulatory Commission regulatory mission:

- (1) The U.S. Nuclear Regulatory Commission does not select sites or designs, or participate with licensees or applicants in selecting proposed sites or designs.;
- (2) The U.S. Nuclear Regulatory Commission role is not to monitor all licensee activities, but to oversee and audit them. The U.S. Nuclear Regulatory Commission should evaluate whether a license application meets the applicable regulations based on a review of what is in the application and supporting materials. Reviews using staff audit calculations should be performed in limited situations, such as where there are unique proposals involving new methods or assumptions. Otherwise, the U.S. Nuclear Regulatory Commission staff should review the application to verify that assumptions are justified, methods used are acceptable and applicable over the range presented, models are properly applied, and results are acceptable. Staff may do quick, bounding calculations and performance assessments, and confirmatory analyses using process-level models; however, in-depth, detailed analyses may be limited to a few applications. Figure A1-1 shows the relationship of the level of detail to licensing reviews and inspections during the preclosure period; and
- (3) The three outcomes available to the U.S. Nuclear Regulatory Commission at the conclusion of a licensing review are: (i) grant the license; (ii) grant the license subject to conditions; or (iii) deny the license. Other than rejecting an applicant or licensee proposal, the U.S. Nuclear Regulatory Commission has no power to compel a licensee to come forward with, or prepare, a different proposal.

The U.S. Nuclear Regulatory Commission regulatory role in any licensing action is to apply the applicable regulations and guidance, and to review applications for proposed actions to determine if compliance with regulations has been achieved. The burden of proof is on the applicant or licensee to show that the proposed action is safe, to demonstrate that regulations are met, and to ensure continued compliance with the regulations. License conditions should be discussed with the licensee and imposed, as necessary to meet the reasonable assurance and reasonable expectation determinations for issuance of a construction authorization, a license, or any amendment thereto. Failure of the applicant to satisfy regulatory requirements can provide a basis to deny the requested licensing action.

In conducting its reviews, the U.S. Nuclear Regulatory Commission evaluates whether an applicant or licensee has demonstrated that its proposed approach is adequate to meet the codified requirements. The applicant or licensee is not required to present a complete understanding and answers for all issues that could be raised concerning a proposal, including those not related to health and safety. U.S. Nuclear Regulatory Commission staff should examine whether applicant or licensee proposals are acceptable. If a proposal meets the

During the technical review, some requests for additional information may be related to an apparent failure to meet regulatory requirements. In this case, the request for additional information should identify the specific section of the regulations, or other supporting documents, (e.g., regulatory guides, standard review plans, U.S. Nuclear Regulatory Commission technical reports, American Society of Mechanical Engineers/American Society for Testing and Materials codes, or techniques accepted by the scientific community) that relate to the issue. This type of supporting information may provide both a technical and a regulatory perspective for the request.

Requests for additional information should be numbered sequentially, with the numbering for an individual request for additional information remaining constant through the course of the licensing review. The cover letter transmitting the requests for additional information will include a schedule for the applicant to provide responses and the dates of remaining milestones. The letter will also reiterate the statement from the acceptance review that failure to respond within the specified time frame may be grounds for denial of the application, in accordance with 10 CFR 2.108(a).

The content of the safety evaluation report will be based on the guidance provided in the Yucca Mountain Review Plan. Any limits and restrictions imposed as a condition of approval of the construction authorization or license will be specified in the safety evaluation report and the license. The technical reviewer should notify the licensing project manager as soon as practical when potential license conditions or license specifications are identified. The format for the safety evaluation report will follow the structure of the Yucca Mountain Review Plan. The safety evaluation report will describe the information the staff reviewed, provide the technical basis for the staff conclusion regarding compliance, and state an evaluation finding. Information from the U.S. Nuclear Regulatory Commission precicensing issue resolution process that has not been submitted or referenced in support of the license application may not be relied on to reach a determination of whether regulatory requirements are met. The findings made as a result of the staff's detailed review will be stated in the safety evaluation report at the conclusion of each section.

A1.2 General Review Procedure

A licensing review is not intended to be a detailed evaluation of all aspects of facility operations. Specific information about implementation of the program outlined in an application is obtained through the U.S. Nuclear Regulatory Commission review of procedures and operations done as part of the inspection function. A definition of the differences between licensing reviews and inspections is shown in Figure A1-1. If a construction authorization or license is issued, certain changes to the authorized activities may require the issuance of an amendment as provided by 10 CFR 63.44, 63.45, and 63.46. An application an amendment should describe the proposed changes in detail, and should discuss any related health and safety, as well as environmental issues. The health and safety aspects of amendment requests should be reviewed using the applicable sections of this Yucca Mountain Review Plan. *Synlay?*

In conducting any review, the staff will rely on the approach described in Section A1.1 to ensure the efficient and effective use of resources. This approach will involve drafting a safety evaluation report that identifies where the U.S. Department of Energy has not provided

confirmatory items¹ will need to be resolved before licensing. Some may require information from construction activities before they can be closed. The staff will track these items through its inspection process or address them in licensing.

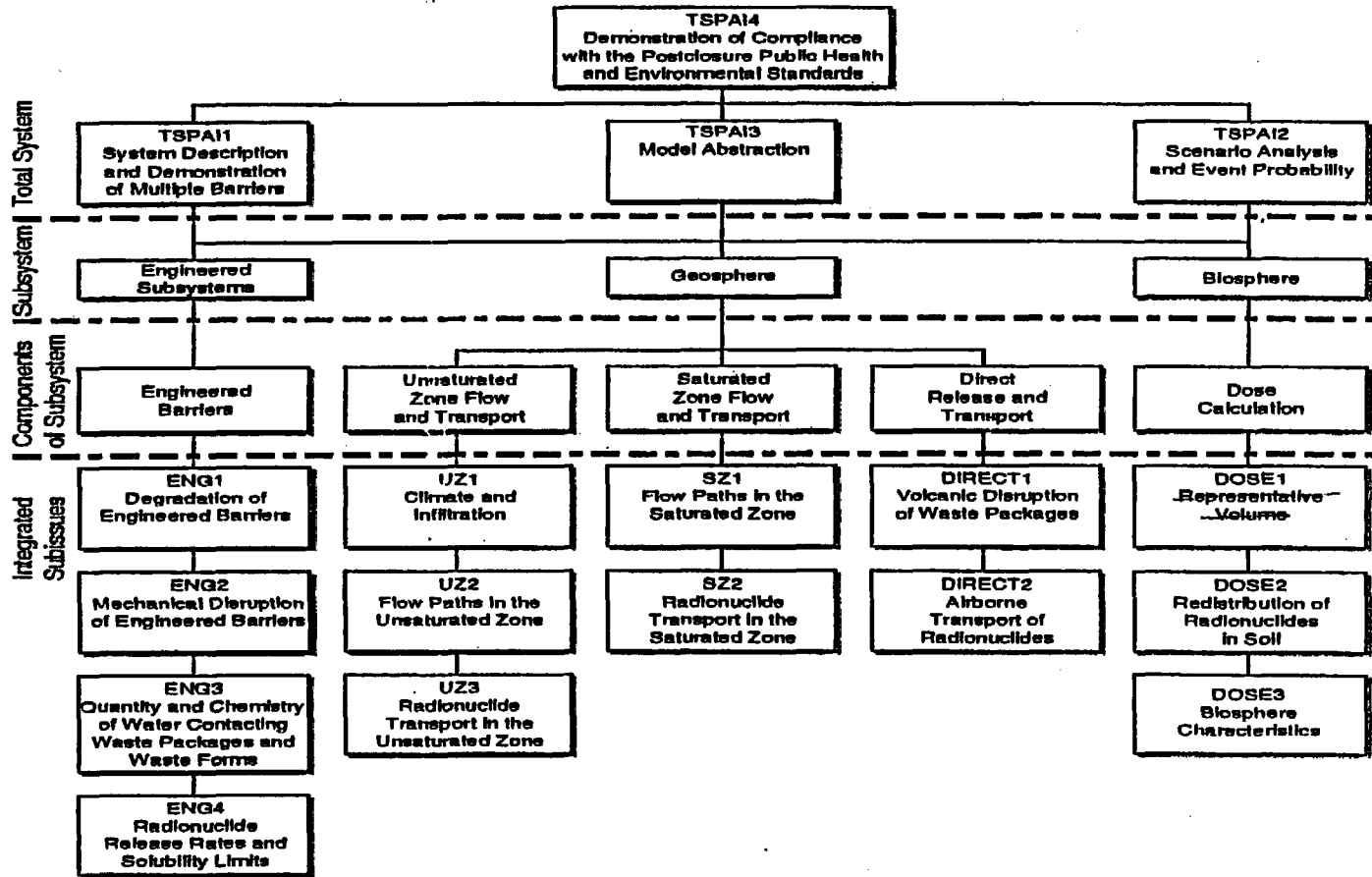
The staff review may identify license conditions which will be incorporated into any license issued. These conditions are needed to ensure that the applicable requirements are met, for example, during facility operation. A license condition may be in the form of a condition in the body of the license, or a license specification that outlines the operational limits of the facility (derived from analyses and evaluations in the license application), which is appended to any license issued. It is important to note that any license commitment made by the U.S. Department of Energy in its application that is relied on to make regulatory findings should be included as a license condition. U.S. Department of Energy license conditions identified by the U.S. Nuclear Regulatory Commission staff could be a matter addressed in the hearing on the license application.

A1.2.3 Licensing Review Process

The licensing process for a high-level waste repository at Yucca Mountain is depicted in Figure A1-2. Prelicensing activities, consistent with the Nuclear Waste Policy Act and 10 CFR 2.101(a) and 63.16, have been underway for a number of years. Figure A1-2 portrays the licensing process from the time at which the U.S. Department of Energy submits an application to the U.S. Nuclear Regulatory Commission.

Upon receipt of an application, the U.S. Nuclear Regulatory Commission staff would treat the application as tendered and begin an acceptance review to determine whether the application is sufficiently complete for docketing and to begin detailed technical review. The staff could reach three conclusions as a result of docketing this acceptance review. First, the license application could be determined to be substantially incomplete, in which case it would be rejected and returned to the U.S. Department of Energy with an identification of the deficiencies. Second, the staff could find that the license application is sufficiently complete that the detailed technical review could begin, but that additional information is needed in limited areas. In this case, the staff would docket the application, proceed with the detailed technical review in other areas and prepare requests for additional information regarding the deficient areas. The U.S. Department of Energy would need to provide the needed information within a specified period, to enable the staff to complete the acceptance review. Then, the staff could determine that the license application is complete in all respects. In this case, the application would be docketed, and the detailed technical review of the entire application would begin. ✓

¹Confirmatory items are used during a licensing process to identify items for which a licensee needs to provide additional confirmatory information but which do not prevent the licensing action from proceeding. Closed pending issues, which were defined during the formal high-level waste prelicensing issue resolution process established between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy, were those issues for which the U.S. Nuclear Regulatory Commission staff had confidence that the U.S. Department of Energy proposed approach, together with any U.S. Department of Energy agreements to provide additional information (through specified testing, analysis, etc.) acceptably addressed the staff questions such that no information beyond that provided, or agreed to, would likely be required at the time of initial license application. Closed pending items do not presuppose whether the U.S. Nuclear Regulatory Commission considers the U.S. Department of Energy license application to meet the acceptance criteria provided in this review plan. The closed pending terminology will not apply during licensing.



*Concentration
of Radionuclides
in ground water*

Figure A1-5. Components of Performance Assessment Review

importance of the information. Specifically, for a risk-informed, performance-based regulatory program, NRC staff focuses on those areas that have been shown to have the greatest importance to public health and safety. Areas requiring detailed, NRC staff independent analyses are determined by NRC staff needs to confirm analyses in order to make a reasonable assurance or reasonable expectation determination. Specifically, whether waste can be received and possessed and reviewed to the level necessary to ensure that the facility can be operated safely. } Sydney ?

The Yucca Mountain Review Plan facilitates a risk-informed, performance-based review and allows for flexibility in the level of detail required for this review. The Commission addressed the use of a risk-informed, performance-based review for a potential Yucca Mountain repository licensing proceeding in its "Statement of Considerations" for 10 CFR Part 63 (66 FR 55732, 55736-55737, November 2, 2001) as follows.

In developing these criteria, the Commission sought to establish a coherent body of risk-informed, performance-based criteria for Yucca Mountain that is compatible with the Commission's overall philosophy of risk-informed, performance-based regulation ["Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities—Final Policy Statement" (60 FR 42622; August 16, 1995)]. Stated succinctly, risk-informed, performance-based regulation is an approach in which risk insights, engineering analysis and judgment (e.g., defense in depth), and performance history are used to: (1) focus attention on the most important activities, (2) establish objective criteria for evaluating performance, (3) develop measurable or calculable parameters for monitoring system and licensee performance, (4) provide flexibility to determine how to meet the established performance criteria in a way that will encourage and reward improved outcomes, and (5) focus on the results as the primary basis for regulatory decision-making.

Relevant defense-in-depth, safety margin, and performance history information from other facilities can be applied to a high-level waste repository. Many aspects of design and performance for nuclear facilities are analogous to those that would be used for a high-level waste repository. For example, there is extensive regulatory guidance on design and implementation of radiation health physics programs at nuclear facilities. Because this information would be used in review of a license application for a proposed repository at Yucca Mountain, the Yucca Mountain Review Plan references such regulatory guidance.

To clarify the risk-informed, performance-based review, the "Introduction" section of the draft Yucca Mountain Review Plan (now Appendix A) and the "Acceptance Review" section (now Appendix B) have been modified, as appropriate, to clarify the scope of NRC staff's licensing review.

Issue 2: Does the Yucca Mountain Review Plan assume that all licensing issues will be resolved and a license for a high-level waste repository at Yucca Mountain will be approved?

Comment. A commenter was concerned that the statement in the draft Yucca Mountain Review Plan "Introduction" that NRC staff will resolve issues using its technical understanding implied that all issues will be resolved in favor of licensing.

Response. The language in the draft Yucca Mountain Review Plan "Introduction" was not intended to suggest that NRC staff had prejudged the acceptability of a license application for Yucca Mountain. A conclusion as to whether all licensing issues are resolved

One commenter stated that the technical bases and assumptions for identifying initiating events need to include acts of terrorism, sabotage, and acts of war. The same commenter stated that for calculating Category 2 event sequences, sabotage in the repository, acts of war directed at the repository, sabotage in the operations area, acts of war in the operations area, accidental criticality, intentional criticality, dirty bombs, and permanent contamination of the operations area need to be considered.

Response. NRC staff has taken actions regarding security at NRC-licensed facilities in the wake of the September 11, 2001, attacks. Numerous security advisories have been issued to site security managers keeping them updated on the threat environment. NRC staff monitors the threat environment and shares information and analysis with other law enforcement and intelligence agencies. Interim Compensatory Measures have been issued to NRC licensees outlining mandatory enhancements to physical protection in areas such as access control, physical barriers, detection, assessment, and response. The Interim Compensatory Measures are designed to enhance and strengthen physical protection until the Commission-ordered comprehensive review of physical protection is complete. ✓

The purpose of the Yucca Mountain Review Plan is to ensure the quality and uniformity of NRC staff licensing reviews under 10 CFR Part 63. The NRC comprehensive review of safeguards and security is a separate activity. The NRC safeguards and security review encompasses all types of licensed facilities and includes information and personnel security programs. Additionally, the review schedule may need to be modified based on the changing threat environment. NRC staff review of the physical protection aspects of a license application for a high-level waste repository at Yucca Mountain would be consistent with results from the comprehensive review.

Protection against terrorism and sabotage were discussed by the Commission in the "Statement of Considerations" for 10 CFR Part 63 (66 FR 55771, November 2, 2001):

As regards the potential risk of radiological sabotage to the repository during the preclosure phase of operations, the Commission's regulations for Yucca Mountain at § 63.21(b)(3) require that licensees have in place adequate physical security plans and attendant procedures to protect against radiological sabotage, consistent with § 73.51—NRC's requirements for the physical protection of stored spent nuclear fuel and high-level radioactive waste. In light of the terrorist attacks of September 11, 2001, the Commission has directed the staff to conduct a comprehensive reevaluation of NRC physical security requirements. If this effort indicates that NRC's regulations or requirements warrant revision, such changes would occur through a public rulemaking or other appropriate methods.

The physical security plan required by 10 CFR 63.21(b) and 10 CFR 73.51 would not be made publicly available, but would be reviewed to determine whether the regulatory requirements are met.

The technical bases and assumptions for identifying initiating events and evaluating Category 2 event sequences do not need to include acts of war. As the Commission stated in issuing 10 CFR Part 63 (66 FR 55776, November 2, 2001), "[c]onsideration of the effects of wars and military actions is beyond the scope of NRC's responsibility. NRC has not taken into account the effects of war in developing Part 63."



REQUEST REPLY BY: 3/26/03

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

COMSECY-03-0014

March 12, 2003

MEMORANDUM TO:

Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

Approve with comments.

Greta Joy Dicus
Greta Joy Dicus 3/17/03

FROM:

William D. Travers *William Travers*
Executive Director for Operations

SUBJECT:

PUBLIC RELEASE OF THE YUCCA MOUNTAIN REVIEW PLAN,
NUREG-1804, FINAL REVISION 2

In COMSECY-02-001, the staff transmitted the Yucca Mountain Review Plan (YMRP), Draft Revision 2, to the Commission for approval to publicly release for comment. The staff received approval, subject to the incorporation of changes, in a Staff Requirements Memorandum (SRM) dated February 25, 2002. In response to the SRM, the staff modified the plan and a request for comments on the plan was announced in a Federal Register notice on March 29, 2002. In addition to the 5-month public comment period which ended August 12, 2002, staff conducted three public meetings in Nevada to solicit comments. Approximately 1000 comments were received, including comments from the Advisory Committee on Nuclear Waste (ACNW), that were binned into eleven categories. In response to comments from the public and the ACNW, staff has prepared the YMRP, Revision 2, NUREG-1804 (Attachment 1). This version is being submitted to the Commission for approval. Attachment 2 provides staff's responses to public comments, and Attachment 3 provides staff's specific responses to the ACNW comments. Attachment 4 provides a summary of changes made to the YMRP. Attachment 5 highlights the YMRP modifications, using redline/strikeout, to draft Revision 2 of the YMRP.

Following Commission approval the staff plans to follow the Agency's process of:
1) posting NUREG-1804, Final Revision 2, on the U.S. Nuclear Regulatory Commission (NRC) website; 2) publishing the YMRP as NUREG-1804, Final Revision 2; 3) issuing a Federal Register notice of availability and public comments and responses (Attachment 2); and 4) issuing a press release announcing the YMRP's availability on the website.

CONTACT: Jeff Ciocco, NMSS/DWM
(301) 415-6391

gjd
6-13-07

Comments of Commissioner Dicus on COMSECY 03-0014

I wish to commend the staff on their dedicated efforts to bring the Yucca Mountain Review Plan (YMRP), Final Revision 2 to completion. This marks an important step in the agency's readiness to receive DOE's license application for the High-Level Waste (HLW) Repository. I want to express my personal appreciation for the diligence, timeliness, and dedication to stakeholder involvement that the staff has put forward in providing this work to the Commission.

I approve the staff's recommendations to: 1) post NUREG-1804, Final Version 2 on the NRC public web site; 2) publish the YMRP as NUREG-1804, Final Version 2; 3) issue a Federal Register notice of the document availability and the public comments and responses; and 4) issue a press release announcing the YMRP's availability on the web site.

Additionally, I join the Chairman and Commissioner Merrifield with respect to the emphasis of having staff conduct a risk-informed review of the DOE HLW license application, as well as in keeping DOE informed of related security efforts that are not included in 10 CFR Part 63 and the Yucca Mountain Review Plan. I remain mindful of the many efforts that the NRC has taken to establish a framework conducive to risk-informed regulation, however, I remain skeptical, yet optimistic, of our willingness and ability to effectively implement such an approach. The appropriate balance of conducting the HLW review centers around the performance capability of systems, structures, and components that are important to protecting public health and safety, and the staff's ability to focus its review commensurate with the identified risk-significance. With respect to the impacts of physical security protective measures on repository operations, I believe that the appropriate security information, including related Orders, should be provided to DOE as soon as possible. Providing this information early in the process will allow for DOE to factor physical security measures into design and construction, rather than at the functional testing or operational phase. Although I recognize the value of the results that will be generated as a result of the vulnerability assessment work being conducted for spent fuel storage and transportation packages, I do not see this as a reason not to provide DOE with readily available information, even if their baseline Physical Security Plan is not to be submitted until after the license application.



REQUEST REPLY BY: 3/26/03
COMSECY-03-0014

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 12, 2003

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: William D. Travers *William Travers*
Executive Director for Operations

SUBJECT: PUBLIC RELEASE OF THE YUCCA MOUNTAIN REVIEW PLAN,
NUREG-1804, FINAL REVISION 2

Approved with comments
Edie Jeffrey
6/17/03

In COMSECY-02-001, the staff transmitted the Yucca Mountain Review Plan (YMRP), Draft Revision 2, to the Commission for approval to publicly release for comment. The staff received approval, subject to the incorporation of changes, in a Staff Requirements Memorandum (SRM) dated February 25, 2002. In response to the SRM, the staff modified the plan and a request for comments on the plan was announced in a Federal Register notice on March 29, 2002. In addition to the 5-month public comment period which ended August 12, 2002, staff conducted three public meetings in Nevada to solicit comments. Approximately 1000 comments were received, including comments from the Advisory Committee on Nuclear Waste (ACNW), that were binned into eleven categories. In response to comments from the public and the ACNW, staff has prepared the YMRP, Revision 2, NUREG-1804 (Attachment 1). This version is being submitted to the Commission for approval. Attachment 2 provides staff's responses to public comments, and Attachment 3 provides staff's specific responses to the ACNW comments. Attachment 4 provides a summary of changes made to the YMRP. Attachment 5 highlights the YMRP modifications, using redline/strikeout, to draft Revision 2 of the YMRP.

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CONTACT: Jeff Ciocco, NMSS/DWM
(301) 415-6391

Commissioner McGaffigan's Comments on COMSECY-03-0014

I support the comments made by the Chairman and Commissioner Merrifield and approve the publication of the Yucca Mountain Review Plan as NUREG-1804, Final Revision 2. I also approve the staff's plans to post NUREG-1804 on the NRC website and to issue a Federal Register notice. I would also like to take the opportunity recognize the tremendous staff effort which has gone into developing this document and would like to complement the staff on completing a complex task and producing a high quality document.

EM



REQUEST REPLY BY:

3/26/03

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

COMSECY-03-0014

March 12, 2003

MEMORANDUM TO:

Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

Approved subject to the
attached comments.

FROM:

William D. Travers
Executive Director for Operations

William Travers
5/10/03

SUBJECT:

PUBLIC RELEASE OF THE YUCCA MOUNTAIN REVIEW PLAN,
NUREG-1804, FINAL REVISION 2

In COMSECY-02-001, the staff transmitted the Yucca Mountain Review Plan (YMRP), Draft Revision 2, to the Commission for approval to publicly release for comment. The staff received approval, subject to the incorporation of changes, in a Staff Requirements Memorandum (SRM) dated February 25, 2002. In response to the SRM, the staff modified the plan and a request for comments on the plan was announced in a Federal Register notice on March 29, 2002. In addition to the 5-month public comment period which ended August 12, 2002, staff conducted three public meetings in Nevada to solicit comments. Approximately 1000 comments were received, including comments from the Advisory Committee on Nuclear Waste (ACNW), that were binned into eleven categories. In response to comments from the public and the ACNW, staff has prepared the YMRP, Revision 2, NUREG-1804 (Attachment 1). This version is being submitted to the Commission for approval. Attachment 2 provides staff's responses to public comments, and Attachment 3 provides staff's specific responses to the ACNW comments. Attachment 4 provides a summary of changes made to the YMRP. Attachment 5 highlights the YMRP modifications, using redline/strikeout, to draft Revision 2 of the YMRP.

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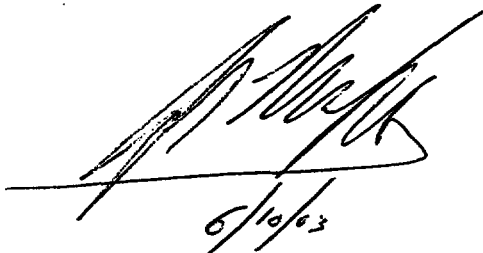
Comments from Commissioner Merrifield on COMSECY-03-0014:

I approve publication of the Yucca Mountain Review Plan as presented in COMSECY-03-0014 as modified in the following paragraphs. But first, I compliment the staff for a job well done in completing a complex task. In particular, I compliment the staff for significantly reducing the number of acronyms used in the document, which makes the document much more readable and understandable from a public perspective.

I support the Chairman's vote on this COMSECY-03-0014 and will emphasize two points in his vote. First, in order for this review to be a risk informed effort, the staff will need to be diligent in ensuring that the scope of the review of a particular aspect of the license application is commensurate with its risk significance. Second, it is important to keep the Department of Energy informed of security efforts that are not contained in the Yucca Mountain Review Plan. The staff should ensure that the Department of Energy's Office of Civilian Radioactive Waste Management has a copy of all applicable security Orders for their incorporation as appropriate. The additional security requirements should be in place before spent fuel is received on site.

In addition to the Chairman's vote, the following revisions should be implemented:

1. In the abstract to the Yucca Mountain Review Plan (page iii), there is a sentence which reads "The President has notified Congress that he considers Yucca Mountain qualified as a site for construction of a geologic repository." This sentence does not accurately represent the President's certification and should be appropriately modified.
2. In the response to public comments (attachment 2 of the COMSECY), the response to question 4 requires revision. Starting at the top of page 4 there are two sentences which read "Areas requiring detailed, NRC staff independent analysis are determined by NRC staff needs to confirm analysis in order to make a reasonable assurance or reasonable expectation determination. Specifically, whether waste can be received and possessed and reviewed to the level necessary to ensure that the facility can be operated safely." These two sentences are confusing and can be interpreted in several ways. The sentences should be appropriately revised to more clearly reflect the staff intent.



6/10/03