



UNITED STATES
 NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 15, 1995

Mr. Jeff Williams, Director
 Engineering Division
 Office of Waste Acceptance,
 Storage and Transportation
 Office of Civilian Radioactive
 Waste Management
 U.S. Department of Energy
 Washington, DC 20585

Dear Mr. Williams:

By letter to Chairman Selin dated August 23, 1994, from D. Dreyfus, Director, Office of Civilian Radioactive Waste Management, U.S. Department of Energy (DOE) identified its planned submittals with regard to development of multi-purpose canister (MPC)-based systems. As indicated below, the DOE plans to submit three topical reports for the U.S. Nuclear Regulatory Commission staff review, of which two are related to 10 CFR Part 60 considerations (i.e., repository disposal issues):

- (1) Topical Report - Burnup Credit (PWR Fuel - Storage/Transport)
- (2) Topical Report - Burnup Credit (PWR/BWR Fuel - Disposal)
- (3) Topical Report Addressing 10 CFR Part 60 Considerations for the MPC Design

Historically, the purpose of the NRC Topical Report Program has been to provide a mechanism for staff review of safety related subjects, independent of formal license reviews (i.e., before submittal of a license application). Topical reports found to be acceptable by the staff would then be expected to be referenced in the license application.

With regard to DOE's planned submittals, the staff agrees that a topical report is appropriate to address the burnup credit issue for storage and transportation (i.e., Topical Report 1). However, based on discussions between our staffs, there is some question about whether a topical report is the appropriate vehicle for the staff's review of the repository issues (i.e., planned Topical Reports 2 and 3). The primary benefit of an approved topical report is that it serves as an acceptable reference for the repository license application. Yet, DOE staff are indicating that little of the information in planned Topical Reports 2 and 3 is expected to be referenced in the license application. If DOE anticipates that the information planned for Topical Reports 2 and 3 will be largely updated, revised, or unsuitable for reference in the license application, then DOE should consider submitting an alternative type of report for staff review of the MPC Part 60 considerations,

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as opposed to topical reports. In this regard, at the NRC/DOE management meeting of December 6, 1994, we discussed the variety of methods presently utilized by DOE for resolution of issues including: letter responses to the staff's Site Characterization Analysis, progress reports, the License Application Annotated Outline, letter reports, technical reports, and topical reports. In light of the discussions at that meeting, DOE should determine in the first instance which of the above methods would be most appropriate for staff's review of the disposal-related information for the MPC.

With respect to this review, staff has prepared an annotated outline of the scope and content of subject matter that should be addressed in the MPC report. As you know, Part 60 does not have specific performance requirements applicable to the inner container, but contains requirements applicable to the total waste package and the engineered barrier system of which the MPC is a part. Therefore, the outline is written in terms of the design of the waste package, the engineered barrier system, and the repository environment in which they must function. While we realize that these designs are still under development and the site is still being characterized, DOE must recognize that the more detailed the information that is provided, the more thorough a review can be done by NRC and the better will we be able to determine whether we have any grounds for objection to the MPC design. As we have stated in management meetings with DOE, it is important that DOE develop a reference repository design by the end of this fiscal year, in order not to delay our review of the MPC design. The outline is enclosed for your consideration and I suggest that we meet in the near term to discuss the outline and any questions you may have in relation to preparation of the MPC report for Part 60 considerations.

If you have any questions about this letter or the enclosed outline, please contact me or Rick Weller of my staff. I can be reached at (301) 415-7286, and Mr. Weller can be reached at (301) 415-7287.

Sincerely, */s/*
Michael J. Bell, Chief
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

cc: See list attached

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DATE	2/07/95	<i>2/15/95</i>	2/13/95

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information planned for Topical Reports 2 and 3 will be largely updated, revised, or unsuitable for reference in the license application, then DOE should consider submitting an alternative type of report for staff review of the MPC Part 60 considerations, as opposed to topical reports. In this regard, at the NRC/DOE management meeting of December 6, 1994, we discussed the variety of methods presently utilized by DOE for resolution of issues including: letter responses to the staff's Site Characterization Analysis, progress reports, the License Application Annotated Outline, letter reports, technical reports, and topical reports. In light of the discussions at that meeting, DOE should determine which of the above methods would be most appropriate for staff's review of the disposal-related information for the MPC.

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NAME	RWeller ^{RAW} /jj		MBell						
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J. Williams

CC List for letter dated February 15, 1995

cc: R. Loux, State of Nevada
J. Meder, Nevada Legislative Counsel Bureau
R. Nelson, YMPO
C. Einberg, DOE/Wash, DC
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
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W. Barnard, NWTRB
R. Holden, NCAI
E. Lowery, NIEC
S. Brocoum, YMPO
R. Arnold, Pahrump, NV
R. Milner, DOE Wash., DC

SCOPE AND CONTENT OF MPC REPORT *
FOR PART 60 CONSIDERATIONS

1. INTRODUCTION

1.1 BACKGROUND

Briefly describe the evolution and salient features of the MPC development program, including the impetus for the program and planned major milestones (e.g., initial MPC fabrication and deployment by January 31, 1998).

1.2 PURPOSE

State the purpose of this report and identify the desired repository-related findings from NRC staff review of the MPC program.

1.3 SCOPE

Summarize the general contents of the various sections of this report and identify any general constraints or limitations to the information presented that would bear on the staff's evaluation of the repository-related aspects of the MPC (e.g., lack of site characterization data, conceptual nature of repository design).

2. SYSTEM DESCRIPTION

2.1 REPOSITORY

Provide a general description of the repository that is sufficient to support any preliminary assessments of compliance with Part 60 requirements. Such information should include a general description of the geologic repository operations area, the thermal loading concept, emplacement configuration for high-level waste, expected inventories of high-level waste and relevant dimensional information (e.g., drift diameter and distance between drifts and individual waste packages).

* Information to be supplied. Format is open to discussion.

2.2 ENGINEERED BARRIER SYSTEM

2.2.1 Underground Facility

Describe the engineered features of the underground facility that are intended to act as barriers to the release of radioactive materials to the geologic setting or otherwise protect the integrity of the waste packages. Such description should include the planned use of any backfill and any protective membranes.

2.2.2 Waste Packages

Provide a general description of spent fuel waste package design and any alternative designs under consideration. With a focus on the outer container that overpacks the MPC, describe the component materials and their primary function (e.g., corrosion resistance, shielding) and provide relevant dimensional information.

2.3 MULTI-PURPOSE CANISTER

Describe the general features of the MPC with respect to its structural characteristics, thermal characteristics, shielding capability, criticality control design, spent fuel capacity and selection of materials. Discuss any plans to use filler material, flux traps or geometry as additional means to address criticality control issues and provide relevant dimensional information for the MPC and its components.

3. DESIGN BASES

3.1 REPOSITORY

Discuss the general design bases for the repository in relation to both functional and regulatory requirements. Identify the design capacity (i.e., metric tonnage of high-level waste), anticipated and unanticipated processes and events, thermal loading strategy, temperature limitations (e.g., host rock), and natural phenomena that may affect the design of the waste package, including the MPC, as a component of the repository.

3.2 ENGINEERED BARRIER SYSTEM

Discuss the general design bases and the functional and regulatory requirements for the EBS as a whole, as well as for the waste packages and underground facility as components of the EBS. Include in this discussion a brief overview of the DOE compliance demonstration strategy for the EBS and waste packages with respect to 10 CFR 60.113 and specify the allocation of performance to individual components (e.g., MPC shell). Identify any design basis anticipated and unanticipated processes and events and natural phenomena that may be different from, or in addition to, that specified for the repository. Specify any temperature limits on the waste package surface and structural requirements for waste package loads.

3.3 MULTI-PURPOSE CANISTER

Discuss the general design bases for the MPC, including the bases for the criticality control, shielding, and structural features of the MPC system. Identify the functional and any regulatory requirements for the MPC. Identify both PWR and BWR design basis fuel assemblies and any temperature limits on MPC components.

4. REPOSITORY ENVIRONMENT

Describe the geohydrologic, geochemical, climatological, tectonic, and meteorological characteristics of the repository environment that may affect waste package, EBS, and overall repository performance. Provide best estimates of the ranges of important environmental parameters and include all impacts to the environment resulting from the emplacement of high-level waste.

5. COMPLIANCE WITH PART 60 REQUIREMENTS

5.1 PRELIMINARY ASSESSMENT OF EBS SUBSYSTEM PERFORMANCE

5.1.1 Waste Package Containment

Conduct a preliminary assessment of waste package compliance with the containment performance objective of 10 CFR 60.113(a)(1)(ii)(A).

Include consideration of any potential adverse impacts on the waste package resulting from handling and long-term storage prior to emplacement and repository closure.

5.1.2 EBS Release Rate

Conduct a preliminary assessment of EBS compliance with the release rate performance objective of 10 CFR 60.113(a)(1)(ii)(B).

5.2 WASTE PACKAGE DESIGN

Assess the merits of the design of the waste and its package components with respect to the design criteria of 10 CFR 60.135.

5.3 PRELIMINARY ASSESSMENT OF TOTAL REPOSITORY SYSTEM PERFORMANCE

Conduct a preliminary assessment of overall repository system compliance with the performance objective of 10 CFR 60.112.

5.4 CRITICALITY CONTROL

Assess the merits of the waste package design with respect to criticality control, including the requirements of 10 CFR 60.131(b)(7), focusing solely on post-closure, long-term criticality control issues (e.g., degradation of waste package overpack, MPC shell and basket structure). Identify and justify any nonconservatisms (e.g., burnup credit) assumed in your analysis.

6. POSTULATED DESIGN BASIS EVENTS

Assess the merits of the design of the waste package and its components to prevent or mitigate the consequences of postulated credible, but unlikely design basis events (e.g., drop accidents) that have the

- potential for significant radiological impacts on public health and safety. Identify the events analyzed and compare the results with an assumed acceptance criterion of 5 REM TEDE to an individual at or beyond the boundary of a preclosure controlled area.
7. **ENGINEERING/OPERATING EXPERIENCE**
With a focus on MPC components and materials, discuss any engineering or operating experience that relates to their selection or use in the design of the MPC (e.g., use of borated stainless steel in reactor spent fuel storage racks). Special emphasis should be placed on the experience of those features of the MPC for criticality control.
 8. **RESEARCH AND DEVELOPMENT**
Describe any ongoing or planned research and development activities for the MPC and its components. Special emphasis should be placed on activities related to criticality control (e.g., long-term dissolution studies of basket structure).
 9. **QUALITY ASSURANCE PROGRAM**
Describe the quality assurance program that will be applied to the MPC, including its design, fabrication, handling and storage. With consideration of the importance of the MPC to both safety and waste isolation, compare your program with the requirements of 10 CFR 60 Subpart G - Quality Assurance.
 10. **APPLICABLE CODES AND STANDARDS**
Identify any applicable codes and standards that will be applied to the development of the MPC.
 11. **SUMMARY AND CONCLUSIONS**
Summarize the results and conclusions of the various assessments of the MPC, waste package, EBS, and overall repository with respect to compliance with Part 60 requirements, and state your global finding regarding the acceptability of the MPC design.

12. REFERENCES

List all of the references that are cited in this report. Any references that have not been previously provided or are not readily available should be transmitted with the report.

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