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BUREAU OF MINES
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LPDR
WM-10 (2)
WM-11 (2)
WM-16 (2)

Memorandum

To: Charlotte Abrams, Project Officer, Geotechnical Branch, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, D.C.

From: Program Manager, Division of Minerals Availability

Subject: Comments on Annotated Outline, Site Characterization Plans

Attached are our review comments on the annotated outline as requested by your office.

Also as you requested, we identified Bureau capabilities beyond this program. However, we passed on the outline to Mining Research for their review and additional comments might be forthcoming.

Please contact me if there are any questions.

Ransom F. Read

cc: Earle Amey

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Abrams

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Comments on Annotated Outline
Site Characterization Plans

- 1) List sections which will require geologic review and comment, in addition to those sections which will require reading for information.

Sections that require BOM review and comments are listed below. However, it should be noted that geologic, geoengineering, and resource data may be contained elsewhere in the SCPs making it necessary to read the entire document. The BOM will review and comment on specific sections as lead reviewer as well as other sections where data and analyses within BOM scope of expertise are presented.

SCP Chapters that require geologic review and comment

Chapter 1. Geology
Chapter 2. Geoengineering
Chapter 6. Conceptual Design of a Repository
Chapter 8. Site Characterization Program

- 2) List sections upon which you feel your organization is best qualified to be lead reviewer.

The sections for which the BOM should act as lead reviewer are listed below.

1.3.2.5 Geothermal Regime (energy resource extraction)
1.6 Drilling and mining
1.7 Mineral and Hydrocarbon resources
Chapter 2 - Geoengineering
6.2.5 Shaft and Ramp Design
6.2.6 Subsurface Design
6.2.7 Backfill of Underground Openings
6.2.8 Shaft and Borehole Seals
6.3.2 Design of Underground Openings
6.3.3 Backfill
6.3.4 Strength of Rock Mass
6.3.5 Sealing of Shafts, Boreholes, and Underground Openings
6.3.6 Construction
8.3.1.2 Geology
8.3.1.6 Resource Potential
8.3.2.2 Verification of Measurement of Host Rock Environment
8.3.2.2 Coupled Interaction Tests
8.3.3 Seal System Program

- 3) List sections where you feel your organization can provide expertise.

In the event the NRC requires special assistance on areas not listed under item no. 2, the BOM can provide expertise on a number of resource assessment topics such as geochemistry, geophysics, hydrothermal alteration, structural geology.

- 4) For all sections identified in 1, 2, and 3, list specific person(s) assigned responsibility for review.

At this time, the principal BOM reviewers are expected to be Russell G. Raney, Nicholas Wetzel, and Donald Bleiwas. However, depending on the site and the section under review and on the timing of receipt of the work assignments, alternative or additional personnel may be assigned.

- 5) For all sections which will require review and comment provide in bullet form specific topics these sections should contain.

For sections dealing primarily with natural resources, the following information (which is not addressed in the SCP annotated outline) should be included in the SCP.

Section 1.6 Drilling and Mining

- o Description of all surface excavations should be included. Present descriptions in the SCP annotated outline suggest that only underground excavations will be described.

Section 1.7 Mineral and Hydrocarbon Resources

- o Geothermal resources (presently contained in section 1.3.2.5 "Geothermal Regime").
- o Description of individual deposit types (e.g. vein deposits, bedded deposits, structural traps, hydrologic traps, etc.).
- o A separate discussion for undiscovered deposits/probabilistic resource analysis.
- o An introduction to perceived resource potential.
- o Historical production and exploration data.

Section 8.3.1.6 Resource Potential

- o Geothermal resources (presently contained in section 1.3.2.5 "Geothermal Regime").
- o Non-economic resources of the candidate area (resources that may become economically viable in the future).
- o A separate discussion of undiscovered resources in the candidate area.
- o Discussion of perceived resources of the candidate area.

- 6) For sections which will require review and comment list potential major problems.

One problem that will hinder the Bureau's review is the SCP organization wherein data relevant to the evaluation of mineral resource potential is widely dispersed.

An attendant, and potentially more serious problem is that geological data developed or collected for other purposes, i.e., engineering design, which could aid in resource potential assessments may either not be available or insufficiently analyzed. For example, in section 3.9.1.3, when water chemistry is tested, analysis for metals potentially related to mineralization should be performed. Also, Chapter 4 should provide that the collected geochemical data be also applied to the discussion in the potential or actual resource discussion.