MS623SS

101 LPDR WM-10 (2)

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

WM Record File 101

WM Project 10
Docket No.
PDR ✓
XLPDR ✓

FEB 11 A10:27

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February 6, 1987

MEMORANDUM: Robert E. Browning, Director
Division of Waste Management

FROM: F. Robert Cook, Senior On-Site License Representative, Basalt Waste Isolation Project (BWIP)

SUBJECT: OBSERVATIONS, COMMENTS AND RECOMMENDATIONS FOR THE PERIOD NOVEMBER 15, 1986 TO JANUARY 16, 1987

TECHNICAL ITEMS

1. Waste Package--

a. Attachment A includes a description of various waste package activities ongoing at this site. (This can be found on page 9 of its Enclosure A. Other testing listed under the heading "GEOCHEMISTRY TESTING" of Enclosure A is also pertinent to waste package design efforts.

b. In comment 1d of my memorandum of December 8, 1986, I referred to activities listed in 10 CFR 60.11(a)(8). This was an appropriate reference in former Part 60 rules. The appropriate current reference as of July, 1986, is 10 CFR 60.17 (b).

c. The waste package strategy for BWIP waste packages performance is not yet complete. Consideration of various key definitions such as "substantially complete" are influencing the strategy for assigning performance goals in a potentially non-conservative way. And it appears that the individual protection limits of 40 CFR 191.15 are not being considered in the development of the strategy for the waste package reliability and confidence design standards. Since the individual protection standards, which apply during the first thousand years following operations, appear to effectively establish a concentration limit at the accessible environment for the various radio isotopes which can escape from the waste, it appears prudent to consider these standards and flow paths with minimal dispersion in establishing waste package reliability and confidence design objectives.

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2. Repository Engineering--

a. A review of rock mechanics for BWIP repository system design was accomplished by two independent groups during the period. The first review conducted by personnel familiar with the project occurred in mid November. A report of this review is contained in Attachment E. It represents an excellent summary of issues identified by the participants except for omission of a significant comment to eliminate casing of the exploratory shaft in the Cohassett flow.

This was a comment made by N. Cook and was highlighted in a follow-up letter on the Attachment E report. The crux of his comment during the meeting was that the bore hole itself would provide the first opportunity to observe the performance of the rock mass at an increased scale and would provide valuable validation of rock mechanics analyses forming the basis for breakout precautions and and construction support systems. He implied that if it was necessary to case the Cohassett to obtain stability, it would be impractical to construct an underground facility in the Cohassett. He noted that the geometry associated with the breakout would further concentrate the in-situ stress and reduce stability margins, if any exist.

Comments regarding the seismic network around the shaft at depth are pertinent to evaluating the stability of the system during the boring operation and prior dewatering operations. (Planning for large scale pump testing at the RRL-2 location includes considering pumping the interbeds on either side of the Cohassett. A separate hole for pumping the lower interbed is being studied.) Such seismic data would help validate design procedures needed to determine the disturbed zone for use in the pre-emplacement ground water travel time and shaft sealing design measures.

A detailed set of minutes of the November meeting was prepared by RHO consultants, also participating in the meeting, and will be forwarded to Staff upon its availability.

b. The second review group was made up of National Academy of Science (NAS) personnel. They did their review about January 8, 1987. They have not issued their report as yet, however, their summary session with DOE highlighted the need for developing an analytical basis for the rock mechanics testing keyed to repository design including design evaluation of the natural part of the repository system contributing to isolation.

Other issues/questions raised during the meeting are briefly noted below. J. Buckley of the NRC staff was in attendance at the first day of the review session and has additional understanding of the these items and the extent of the concern voiced by the NAS group.

1. Difficulty of validating rock mechanics at the scale of the repository.

2. Determination of the needed accuracy for data accumulated during testing.
3. The relationship of rock mechanics to the probabilistic analysis required by 40 CFR 191.
4. Dynamic failure criterion.
5. Applicability of in-situ stress test procedures of the ASTM.
6. Effects of moisture on the effective mechanical properties of the rock mass.
7. The use of sonic testing to determine rock mechanical properties.
8. Use of in-situ stress in the underground test facility to supply loadings for testing that would evaluate rock failure criteria.
9. Concern regarding the "political" implications of designing a test as suggested in 8. above which produced rock failures at depth.
10. The omission of spectrum gamma testing from the suite of geophysical testing since there is no uranium and thorium deposits believed in the geology and hence no need for the test.
11. Actions NAS can take to help meet rock mechanics objectives and develop a technical defensible design.
12. Level of concern regarding rock mechanics in DOE management view.
13. Internal communication among engineering types for the underground facility, rock mechanics and geotechnical types within RHO.
14. Alternative planning if the Cohassett was found to be unacceptable.
15. Impracticality of applying QA measures to rock mechanics testing and other related design activities.
16. Concern regarding the space available and safety for personnel during breakout from the 6 foot exploratory shaft.
17. Protection of technical managers in RHO from administrative jobs and QA tasks which dilute their attention to technical jobs. (The discussion in this area seemed to indicate a misunderstanding of the purpose of QA on NAS members part. DOE (Olson) explained the need and use of QA quite well in my estimation. He distinguished between undirected research and an engineering development activity or the benefit of the NAS members.)
18. The contractual relationship between DOE, RHO and the AE--KE/PB.
19. Coordination of the various disciplines to achieve validation of design procedures, especially geophysical testing, hydrologic parameter determination and rock mechanics analyses for disturbed zone determination.

c. Attachment H contains a summary of recent accomplishments and plans for repository and exploratory shaft design. Also included is a a more detailed presentation of plans for ground control strategy for the underground facility. I note that an integration of planning for assessing the extent of the disturbed

zone and the synergistic effects of dewatering and seismicity is not included in this planning.

3. Geology--

a. Attachment I is an assessment of the palynology of chips from RSH-1, Rattlesnake Hills Well. It supplements information in BNWL 776.

b. A single deep seismic event occurred south of Gable Mountain in mid December. Its magnitude was less than 2.

c. Comments concerning the presence of methane at the site in item 5b below are pertinent to geologic concerns.

4. Performance Assessment--

a. Comments in item 2 above concerning the incorporation of rock mechanics analyses into the performance analyses, particularly as regards determination of the disturbed zone, are pertinent to performance assessment.

b. RHO plans to incorporate the assessment of waste package performance into the performance assessment group.

c. BWIP now plans to prepare a performance assessment study plan as a reference document to the SCP.

5. Geochemistry--

a. Attachment A contains a summary of the geochemical activities ongoing at this site.

b. Rockwell (RHO) has been working on a report of the methane in the ground water for nearly two years. The report was completed in essentially in its present form in March, 1986, however it was not issued because of slow managerial review cycles within RHO. It is intended to be used as a basis for repository design. However, it does not contain information regarding the origin of the methane observed in the ground water, specifically information concerning C-12--C-13 ratios, which are theorized to indicate the mechanism by which the methane was generated. <u>The assumption is that there is no free methane in the basalt</u>--that all the methane is dissolved and its origin is from sediments below the basalts. This would suggest a thermogenic origin.

I consider the methane observed in the ground water may well have its origin, in part, from localized coal deposits from within the basalts and specifically the upper Grande Ronde itself. Such coal deposits were observed in RSH-1, Rattlesnake Mountain well, and to a lesser extent in DC-1 along with local variations in methane and total gas measurements, per the drillers mud log.

Information concerning DC-1 is contained in excerpts from the drillers log, Attachment B.

Since localized deposits of coal do exist, it is possible that free methane also is present in the basalts. Hence for safety reasons it appears warranted to consider the possibility of this condition in repository design. Staff should review the methane report upon its issuance in this light and comment to DOE accordingly.

In addition it would appear that a systematic evaluation of drillers logs as to the existence of methane measurements and chip sample evaluations for coal deposits, if not already accomplished, would provide further information pertinent to site geochemical characterization and repository design. (The DC-1 log was the first log I reviewed in this respect.)

c. Attachment K is a list of records which pertain to the I-129 levels in the ground water at and around Hanford. Rockwell and PNL personnel have been assembling the information with the objective of specifying a course of action to determine the hydrologic conditions it implies, as well as resolving other issues the information raises. I expect the records identified will be made available following any necessary declassification. The group accomplishing the review interviewed me for information I might have relative to the I-129 in the ground water. I assisted them in their understanding as did they in mine.

d. Experiments on selenium sorption with Rocky Coulee and Cohassett flow top materials in an anoxic environment were completed. Results apparently indicate that the materials create a reducing environment favorable to selenium sorption.

6. Site/Environmental--

a. Attachment F contains a summary of BWIP plans and accomplishments in environmental work.

b. Attachment G is a review of transportation issues accomplished by the Council of Energy Resource Tribes (CERT) for the Nez Perce and Umatilla Tribes. The recommendations in section 7.2 of the CERT report are pertinent for Staff consideration in planning and future interactions with the Tribes.

7. Hydrology--

a. During the period a substantial review of hydrologic data was accomplished by NRC Staff and contractors. DOE is still assembling the large amount of information made available to the reviewers, and it plans to forward it as soon as the package is complete. I consider this review was of substantial value to the Staff and with some changes to provide more time for preparing a

report prior to leaving the site and better access to technical personnel and information would be ideal.

b. DOE continues to prepare a stategy for the site hydrology test program. DOE headquarters with Weston assistance has assumed a first line management role in the preparation of this strategy. Rockwell and DOE/RL personnel are functioning as assistants to DOE headquarters in this respect. Design controls and assignment of qualified technical personnel with adequate background as doers in this critical design activity is not apparent.

8. Quality Assurance--

a. DOE conducted an audit of PNL during January. Attachment C is a report of the CERT on-site representative for the Nez Perce and Umatilla Tribes. He along with a State representative and myself observed various audit activities. DOE has not issued a report as yet. The most important finding was related to management control of the project activities including the unambiguous specification of requirements and orders.

In addition although not identified by the audit team to my knowledge, I believe there are problems with the definition of records pertinent to PNL's activities and the disposition of such records to verify and assure their quality.

It also appears to me that there is still a substantial segment of the PNL personnel, including management, which do not appreciate the importance of quality assurance for BWIP activities and appeared somewhat reluctant to accept the audit teams findings. This conclusion is based on the reaction of PNL personnel to the wrap-up interview and interviews with personnel by the audit team auditing management controls. It was this team's actions that I observed. I concluded that this team did an effective audit given the time and resources they had.

Also PNL QA verification of management system requirements was not evident. The concept that the management systems are part of the QA program was not evident, however I believe PNL recognizes this problem.

b. DOE's document hierarchy indicates that management system requirements are collateral documents to the quality assurance requirements.

I consider that the management requirements stem from the requirements of Criterion I of Appendix B of 10 CFR 50. In this respect they should be considered as subsidiary requirements to the QA requirements and subject to audit and verification by QA personnel. The hierarchy being invoked by DOE appears to confuse personnel and leads them into believing that management compliance

with procedures and controls may not be subject to licensing review.

I recommend that staff review this issue and address it in meeting with DOE.

c. Problems with Q-listing continue within RHO and its contractors. The problem which I identified in my last report concerning grading activities is fully recognized by DOE/RL and the contractors. The directives provided by DOE/HDQS are not working. They are creating confusion and disbelief in the merit of quality assurance for the project. I consider this item is the biggest current problem DOE has to resolve in the area of QA in order to move ahead to restart activities under an acceptable QA program.

I consider that it will be necessary to define standard controls for grades of activities falling within the scope of each of the 18 criteria. Such grades would apply to the preparation of procedures for activities concerning Q-listed items. Until a grading of controls becomes available to the procedure writers, they cannot proceed.

MISCELLANEOUS ITEMS

a. A meeting was held with the State and Indians on January 14 and 15, 1987. P. Hildenbrand attended this meeting and is cognizant of the issued raised. A series of presentations was made by the DOE and RHO personnel. These were summarized in the view graphs they used. Staff cognizance of those view graphs is warranted to understand the current status of the BWIP SCP, planned geotechnical investigations and overall project schedule, which reveals a July 1992 time for license application. The schedule appears to allow no time between the application and the beginning of construction. The schedule does not appear to be consistent with the schedule contained in the revised Mission Plan, recently released by DOE.

b. On January 16, I attended the monthly Washington State Nuclear Waste Board meeting. Attachment A was obtained at that meeting. A significant issue discussed at the meeting was the status of the Governors negotiations with DOE (Rusche) regarding consultation and cooperation agreement and a conflict resolution process. Attachment J is pertinent to these items.

c. In my last report I discussed the prospective training regarding interactions with the OR at BWIP. Since the meeting noted in that report among DOE and RHO representatives no significant training has occurred to my knowledge. A training session was initiated by RHO (Carter) for various geotechnical personnel affected by the original directive not to provide information to the OR. However, when I wanted to attend in accordance with approval of Anttonen and Gibbs in accordance with

earlier commitments, the meeting was discontinued based on a participant's desire not to meet in the presence of the OR. The matter has been referred to DOE headquarters where it currently is on the table. DOE is reported to be considering responses to my letter to Mr. Anttonen of October 30, 1986.

d. During the week of December 14 I attended the simiannual briefing for J. G. Davis and extensively reviewed activities and plans with staff. I was on leave the week of December 21.

F. Robert Cook

F. Robert Cook,
Senior On-Site Licensing
Representative, Basalt
Waste Isolation Project
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Attachments A-C and E-L--(No attachment D)

cf:	JTBuckley	JOBunting	WLilley
JJLinehan	JMLibert	JMHoffman	SWasler
PTPrestholt	JTGreeves	PHildenbrand	
FRCook/rdg	PJustus	JKennedy	
NColeman	FXCameron	DBrooks	
HLefevre	KCChang		
DOE/JAnttonen	DOE/JEKnight	YIN/WBurke	O.DOE/WDixon
O.DOE/MBlazic	NP/RTHalf-Moon	Wash.DOE/THusseman	
YIN/RJim			