Distribution: WM86026
WM s/f
WMRP
NMSS
CF
REBrowning
MBell
JBunting
PJustus
JGreeves
JLinehan
RBoyle
SCoplan
JKennedy
RCook
PPrestholt
TVerma
KStablein
RJohnson
PHildenbrand
JGiarratana
PDR
JLibert & r/f

JL/86/06/09

JUN 10 1986

O. L. Olson, Director
Basalt Waste Isolation Division
U.S. Department of Energy
P.O. Box 550
Richland, WA 99342

Dear Mr. Olson:

As agreed at the Exploratory Shaft meeting of December 1985, the NRC staff has reviewed document BWI-CR-015 entitled,"Preliminary Performance Requirements and Criteria for the Seal System of a Nuclear Waste Repository in Basalt". The report proposes a performance requirement which is intended to serve as the basis for design criteria for borehole and shaft seals for a geologic repository in basalt. This performance requirement for the seal system is specified in terms of a minimum groundwater traveltime through the seal system to assure that a geologic repository in basalt would meet radionuclide release limits of the EPA Standard (40 CFR 191).

We realize that the document is outdated with respect to the current conceptual design of BWIP and may not accurately reflect DOE's current thinking concerning a number of issues. However, the enclosed comments address the document as written and do not attempt to acknowledge any changes in DOE's thinking or further analytic efforts which may have occurred since publication of the document.

Furthermore, we recognize that numerous uncertainties exist with respect to the parameters considered in the development of the performance requirement, and we would consider it unrealistic to expect that DOE be able to fully address all sources of uncertainty in preparing this preliminary document. However, the document does not adequately acknowledge these uncertainties or the consequent limitations of the analysis presented. For that reason (as elaborated in the comments), the performance requirement, as defined, would not appear to provide an adequate basis for design criteria.

2008

JL/86/06/09

General and specific comments are provided in the enclosure. If you or your staff have any questions or wish to discuss the review please contact Paul Hildenbrand of my staff at FTS 427-4672.

Sincerely,

"ORIGINAL SIGNED BY"

John J. Linehan, Acting Chief
Repository Projects Branch
Division of Waste Management

Enclosure: NRC staff comments on
BWI-CR-015

OFC	:WMRP:vkg	:WMRP	:WMRP	:WMGT	:WMGT	:WMRP	:
NAME	:JLiberty	:SCoplan	:PHildenbrand	:PJustus	:JGreeves	:JLinehan	:
DATE	:86/06/09	:86/06/10	:86/06/9	:86/06/9	:86/06/09	:86/06/10	:

NRC STAFF REVIEW:
"PRELIMINARY PERFORMANCE REQUIREMENTS AND CRITERIA
FOR THE SEAL SYSTEM OF A
NUCLEAR WASTE REPOSITORY IN BASALT,"
1983, by Rockwell Hanford Operations
APRIL 24, 1986

General Comments:

1. EPA Standard. It is recognized that the document was completed prior to finalization of the EPA Standard (40 CFR 191). Furthermore, it is appreciated that the performance requirement for the seal system specified in the report is intended to result in compliance of the repository with the requirements of 10 CFR 60 and 40 CFR 191. However, the presentation fails to address pertinent aspects of the EPA Standard as discussed in the following paragraphs.

First, to be consistent with the requirement of the EPA post-closure containment standard, the document should more directly address the performance of the seal system in response to disruptive events and scenarios. As the seal system, ultimately, will have to be considered along with other components in determining the Complementary Cumulative Distribution Function (CCDF) of radionuclide releases to the accessible environment, evaluations that describe seal performance only under ambient conditions will not be sufficient to demonstrate compliance, particularly where critical assumptions may be violated in the event of changes in subsurface or surface conditions. Accordingly, specific discussion should be included as to the effects upon seal performance of, for example, earth movements (or other mechanical disturbance) or increased groundwater flow through or in the vicinity of the repository.

Second, in both the initial screening of radionuclides and the determination of the required minimum groundwater traveltime, the analysis restricts radionuclide releases to only 0.1% of the limits specified in the EPA standard (40 CFR 191). The document identifies this restriction as a conservative approach. However, the 0.1% limit may or may not be conservative with respect to the EPA Standard depending upon the cumulative releases of nuclides to the accessible environment through all potential pathways in the variety of possible scenarios which must be considered in determining the CCDF. The document should recognize explicitly that the seal system is only one of the possible pathways for the release of radionuclides and discuss the 0.1% limit in that context.

Third, it is not clear from the presentation that the screening criteria used in the analysis have not eliminated from consideration nuclides which may be significant to the definition of the performance requirement for the seal system. For example, the criteria appear to eliminate long-lived nuclides of parents having half-lives less than 20 years. Moreover, by considering inventories at 100 years out of reactor, the screening process does not appear to account for nuclides ingrown after this time or after the 1,000 year minimum containment period required for the engineered barrier system by 10 CFR Part 60. The document should provide a more detailed accounting of peak inventories of all nuclides expected to exist in the system over the 10,000 year period covered by the EPA standard and should indicate for each the criterion by which it is excluded from the final list.

Fourth, the derivation of the performance requirement for the seal system relies heavily upon sorption of key radionuclides. The document indicates, in this regard, that without the retardation effects of sorption, the required groundwater traveltime through the seal system would have to be on the order of 100,000 years (instead of 1,000 years) in order to limit release of nuclides to the level set for the performance requirement (0.1% of the limits specified in the EPA standard). Because of the significance of sorption to the performance requirement, the document should provide more information regarding the methods used in the determination of sorption values. If, for example, laboratory experiments were employed, the document should include description of these experiments and provide a basis for the extension of their results to the repository situation. The basis should consider such factors as the sorption properties of materials, particle size effects, scale differences between experiments and the repository setting, and the applicability of the mathematical expression used to calculate the retardation to the repository situation.

Finally, that the 1,000 year traveltime requirement may, itself, be erroneous. The selection of this criterion was made on the basis of the calculated groundwater travel time of 441 years required to maintain the release limit specified for what the document terms the "key nuclide", ^{231}Pa. However, this designation seems inappropriate. For example, using the values for required nuclide traveltime and sorption provided in Tables 4-2 and C-2 respectively, the NRC staff calculated for the nuclide ^{246}Cm a required groundwater traveltime of more than 2000 years.

The document should be revised to address the above problems in derivation of the performance requirement for the seal system.

2. Unreliable Hydrogeologic Characteristics. Preliminary hydrogeologic conclusions reached in the document are based on the results of a simple algebraic model of groundwater flow past the waste packages to the shafts. The validity and accuracy of the model inherently depends upon the hydrogeologic characteristics assumed for the engineered components of the repository and for

basalt. Because the characteristics assumed for the basalt are presently considered by the NRC staff to be unreliable, conclusions based on the model are currently subject to question.

For example, the model assumes parameter ranges for hydraulic conductivity values whose reliability has been questioned. Comment 6-15 of NRC's comments on the draft Environmental Assessment for the Hanford Site describes problems with the reliability of DOE's preliminary tests of horizontal hydraulic conductivity. The hydraulic conductivity values assumed in the model were based on the results of these tests. These test results were questioned by the NRC staff because of irregularities in the test procedures, improper test analysis, temperature effects, effects of dissolved gas and solids, and the effects of large-and small-scale heterogeneities in basalt flows. In addition, existing test results demonstrate a large variability in horizontal hydraulic conductivity values. Because of their restricted scale, these tests may not have interrogated anomalous zones of high conductivity that may significantly affect radionuclide migration from the underground facility. [cf. Letter to Olson from Wright, "NRC review of BWIP hydraulic test data," May 29, 1984]. Further, reliable field data do not exist to characterize vertical hydraulic conductivity of basalt flows at Hanford.

As another example of the model's assumption of unreliable hydrologic characteristics, Appendix C (pg. 80) cites Long (1983) to indicate that vertical hydraulic conductivities are two to three times the horizontal conductivities of dense basalts. Long (1983, pg. I-292), in turn, references Sagar and Runchal (1982) to support the statement that the maximum anisotropy ratio of vertical to horizontal conductivity is about 3.5. Sagar and Runchal (1982), however, only provide estimates of equivalent hydraulic conductivity as the results of a demonstration of their analytical approach rather than as a characterization of the Hanford basalts. In fact, they state that the demonstration is "... intended as an illustrative example and not as a definitive statement on the hydraulic conductivity of fractured basalt at Gable Mountain." Despite this caveat, RHO appears to have adopted anisotropy ratios calculated from Sagar and Runchal (1982) as characteristics of basalt flows at Hanford.

Sagar and Runchal (1982) assumed (1) uniform distributions of orientations for three fracture sets, (2) a fracture density of 8 fractures per elemental cube 5 m on a side, (3) the mean and standard deviation of fracture apertures, (4) the mean and standard deviation of the fracture lengths. The first of these assumptions was based upon field data. The remaining three, however, were adopted arbitrarily for demonstration purposes. Accordingly, the authors do not demonstrate that the assumed fracture characteristics are representative of actual fractures in the Pomona Member at Gable Mountain. With the exception of the orientation characteristics derived from field observations, the other characteristics may bear little resemblance to the actual characteristics of the fractures at Gable Mountain.

Even the orientation data may not be representative of portions of the entablature of the Pomona Member [cf. NRC comments on draft Hanford Environmental Assessment, Major Comment 1, 1985]. Orientations of fracture sets would be expected to vary considerably within the entablature of a basalt flow and among flows. Fracture orientation may be predominantly subhorizontal near the top of the entablature in contrast with subvertical fracture orientation deeper in the zone. Near the base of the entablature, horizontal joints may predominate. Based on observations of fracture orientations, the ratio of vertical hydraulic conductivity to horizontal conductivity could be expected to vary as a function of location within the entablature. Sagar and Runchal (1982) do not report the location within the entablature where the orientation data were collected. The reported data may be a composite of fracture characteristics observed throughout the entablature. Conversely, the orientation data may have been collected in only one section that would not be representative of the entire entablature. Similarly, fracture characteristics observed at Gable Mountain may not be representative of fractures in the Pomona Member or other basalt flows elsewhere at the Hanford Site.

The document should acknowledge and characterize uncertainty due to lack of reliable estimates of parameters such as vertical hydraulic conductivity. In the absence of reliable estimates, the document should be revised so as to systematically examine the sensitivity of model results to plausible ranges in hydraulic parameter values.

REFERENCES: Long, P. E. (Ed.) (1983). Repository Horizon Identification Report, RHO-BW-ST-28 P.

Sagar, B., and A. Runchal (1982). "Permeability of Fractured Rock: Effect of Fracture Size and Data Uncertainties," Water Resources Research, v. 18, pp. 266-274.

3. Significance of the Disturbed Rock Zone. Appendix A summarizes rock disturbances caused by excavation and stress redistribution without providing sufficient information about the hydraulic properties of the disturbed rock zone. In spite of the hydrologic analysis provided in the document, this zone remains a potentially significant pathway for radionuclide migration because of its increased conductivity relative to that of the surrounding rock. The document does not adequately consider the significance of the disturbed rock

zone or identify appropriate evaluation approaches relative to shaft seal design.

Appendix A cites several references that describe general effects of excavation on rock properties, including qualitative and semi-quantitative estimates of hydraulic conductivity changes. The excavation disturbance creates a disturbed rock zone (DRZ; as opposed to the "Disturbed Zone" in 10 CFR Part 60) around shafts and tunnels. Reliable estimates of the hydraulic conductivity and effective porosity are not currently available to describe the disturbed rock zone in basalt around shafts proposed for the Hanford repository.

The document discusses the potential significance of the disturbed rock zone, but does not provide assurance that the DRZ will not become a preferential pathway for groundwater as specified in 10 CFR Part 60. Based on the simple model described in the document, RHO has concluded that the fraction of potentially contaminated groundwater flowing along the shaft through the DRZ is less than 1/260,000th the design requirement (cf. pg. 92). However, this model considers only radionuclide migration to the DRZ around the shafts through tunnels. It does not consider that potentially significant migration to the DRZ could occur through the basalt overlying the waste and through the overlying flow top. Moreover, it does not consider disruptive events or scenarios which might increase flow of groundwater and/or radionuclides to and through the DRZ to flow tops and interbeds above the host rock.

The revision of the document should expand upon the analysis of the significance of the DRZ and the potential increase in its significance as a function of disruptive events and scenarios. The revision should evaluate available information on the hydraulic characteristics of DRZ's in rocks of similar characteristics and geologic settings, and identify appropriate testing approaches to characterize the hydraulic characteristics (hydraulic conductivity, effective porosity, characteristics of flow regime) of the DRZ. In this regard, characterization of the DRZ should be recognized as a primary objective of site characterization. Testing in the Exploratory Shaft facility should be designed and conducted to provide necessary information on the hydraulic characteristics of the DRZ.

4. Non-Conservative Simplifications of the Model. Design requirements and criteria described in the document are based on the results of the model presented in Appendix C. The model attempts to demonstrate that less than 1% of groundwater flowing past waste packages flows up through the shaft. The model fails to support this design assumption because it has been simplified in such fashion as to bias the outcome of the analysis in a non-conservative way.

The model described in Appendix C is based on a decision network, in which groundwater flow directions are determined at decision points. At each decision point, the fraction of flow is systematically reduced according to the ratio between the products of hydraulic conductivity, cross-sectional area, and hydraulic gradient along each flow path. For example, groundwater flows away from the waste packages either upward through the basalt flow interior or laterally into emplacement rooms. To flow up the shaft, groundwater in the emplacement rooms must flow through the access tunnels and avoid the disturbed rock zone around the shaft. The model simplifies the groundwater flow system by assuming that groundwater, and hence radionuclides, will not enter the shaft if it deviates from this pathway.

In the real system, however, groundwater that flows upward into the host rock will reach a flow top where it may flow to a shaft or the DRZ around a shaft. Thus, the model would be expected to underestimate the fraction of flow up the shaft and its DRZ because it ignores groundwater pathways to the shaft that deviate from the network.

In addition, the model tends to deemphasize flow up the shaft DRZ. For example, in tracing the flow from node 4 in the model, attention is given to the 1% of the flow which proceeds up the shaft. Little mention is made of the 99% of flow that follows the disturbed rock zone. When NRC staff corrected several calculational errors in the flow-rate equations (see Specific Comments) and considered this 99% flow up the shaft DRZ, it found that the fraction of flow reaching the overlying flow top using the network would be closer to 10% rather than the 0.029% as calculated in the document.

As another simplification, DOE's approach assumes porous media flow along the entire pathway from waste packages up through the shafts. Because none of the codes identified in Section 6.2.3 is capable of simulating fracture flow, the document implies that future assessments of the shaft system will continue this approach. At the scale of the underground facility, however, groundwater flow along discrete features may be significant with respect to releases from the engineered barrier system. The document does not justify the assumption of porous media flow. For example, Section 4.2.2 indicates that flow along the gap at the grout/rock interface will be modeled as equivalent porous media flow. Representation of the interface as a porous medium may considerably underestimate the velocities of flow in discrete discontinuities that may exist along the interface. Similarly, the modeling does not consider annular flow along the interface between the shaft backfill and liner. Even flow in basalt, in which groundwater flows predominantly through fractures, is treated in the model as equivalent porous media flow.

The document needs to justify the assumption of equivalent porous media flow at the scales under consideration. The document should describe and evaluate assumptions invoked in developing the model and should further evaluate whether these assumptions are, indeed, conservative as claimed in the document.

5. Potential Effects of Shafts on Groundwater Flow. The document does not assess potential effects of the shafts on groundwater flow and the hydraulic gradient in the vicinity of the underground facility. Because the hydraulic conductivities of the shaft backfill, disturbed rock zone, and grout may differ significantly from those of the basalt flows, flow near the underground facility may be perturbed from ambient conditions. The buoyancy gradients caused by repository heating could conceivably amplify the perturbations caused by contrasts of hydraulic conductivities between engineered components and the host rock. These perturbations could significantly alter groundwater flow directions and rates from pre-emplacement conditions. Thus, the document should evaluate potential effects of shaft and repository construction on hydraulic gradients before and after closure.

6. Design Changes. Due to significant changes in BWIP's conceptual design since 1983, much of the information presented in this document is outdated. The following are examples:

A. Page 15, parag. 2 states that there are four candidate horizons under consideration within the RRL. The NRC was told at the ES Design and Construction workshop that BWIP was now considering only the Cohassett flow as the candidate horizon for construction of the repository.

B. Page 21 shows the waste emplacement scheme of 1983. Since that time BWIP has given preference to a short horizontal hole (20 ft.) concept rather than the 200 ft. horizontal holes shown.

C. Page 49, Figure 5.4 shows what is called a plug in the shaft. The draft EA shows a similar structure (Bulkhead) on page 6-105, but also includes a chemical grout extending beyond the edge of the damaged zone.

The revised document should be updated to appropriately reflect all changes in the BWIP conceptual design.

Specific Comments

1. The table of key nuclides (pg. 28) should be updated to conform to the final version of the EPA Standard (40 CFR 191). Note also that the screening

criteria, described on page 28, have effectively removed from consideration ^{237}Np, a long-lived daughter of a short-lived parent.

2. Page 28 - The third nuclide screening criterion removes nuclides on the basis of estimated solubilities in the basalt geochemical system that will restrict release of the nuclide within the repository horizon to less than or equal to 0.1% of the EPA release limits. No analysis is supplied, however, to support this assumption.

3. Page 32 - With regard to the groundwater travel time criterion it should be noted that, whereas, the document identifies ^{231}Pa as the limiting nuclide requiring a groundwater travel time of 441 years, the NRC staff used the sorption and nuclide traveltime values presented in Tables 4-2 and D-2 respectively to calculate a required water travel time of 2014 years for ^{246}Cm in contrast with the 200 years reported.

4. Section 4.2.2 (pg. 38) implies that groundwater supply to the waste panels in the host rock will be diffusion-limited. This implication appears to be inconsistent with available information about the nature of groundwater flow through basalts in which groundwater predominantly moves through fractures and joints. Thus, the supply of groundwater would be limited by advection through the discontinuities. The document should be revised to eliminate the implication of diffusion-limited groundwater supply or to justify the implication that groundwater supply to the underground facility will be controlled by diffusion.

5. Page 41, parag. 2 appears to use the terms seals and backfill interchangeably. Backfill and seals may not be the same depending on the intended function and design of the backfill.

6. Page 41, parag. 2 - The references for the thermal calculations presented are not given.

7 Page 41, parag. 2 - Will it be possible to cool walls of the emplacement rooms prior to sealing and backfilling as described in the document?

8. Page 43, parag. 5 states that backfill <u>may</u> be required in boreholes, shafts, tunnels etc... to supplement sealing. What are the acceptance and rejection criteria for the use of backfills and at what stage will a decision be made?

9. Page 44, parag. 1 states that seals shall have mechanical integrity comparable to that of the host rock. What is meant here by mechanical

integrity? Page 45 lists the materials. The acceptance and rejection criteria for each material are not given.

10. Section A.1 (pg. 71, parag.2) mentions that longitudinal flow around a shaft plug may increase as a result of minor "slabbing." The document does not define "slabbing", provide estimates of the range of increases in flow caused by "slabbing", or assess whether "slabbing" is expected at the Hanford Site. The document should be revised to define "slabbing" and to estimate the potential magnitude of flow increases attributable to "slabbing" at Hanford.

11. Section A.3 (pg. 72, parag. 2) asserts that the assumption of fractures normal to the direction of maximum stress change is conservative in analyses of fracture flow. This assumption is not necessarily conservative, however, because movement in the plane of a fracture may cause wedging of the fracture at irregularities on the fracture surface. Thus, the fracture aperture may actually increase as a result of shear stress, which would cause a cubic increase in the effective hydraulic conductivity of the fracture. The document should be revised to evaluate whether the assumption is conservative or to delete the statement.

12. Section A.3 (pg. 73, parag. 3) asserts that up to 80% of the potential increase in flow through the disturbed rock zone is predicted to occur within 1-m of the wall of a 3-m radius shaft excavated by blasting. The document should be revised to provide an assessment or reference that supports the assertion.

13. Section C.1 (pg. 80, parag. 1) states the assumption upon which the shaft design requirements and criteria have been developed as ". . . [less than] 1% of the radionuclides released from the engineered system could be transported up the shaft to the accessible environment [if] it can be shown that [less than] 1% of the fluid passing near the waste packages could move up the shaft. . ." The assumption appears to be an appropriate working hypothesis for preliminary designs of the shaft seal system. However, this assumption implicitly assumes that the amount of flow is directly proportional to radionuclide releases. This assumption has not been supported through performance modeling of the repository. Such modeling should consider variables that would influence radionuclide releases, including radionuclide solubilities, attenuation characteristics of the engineered system, waste package failure rates, and the configuration of the groundwater flow system at and after the time of release. The document should be revised to evaluate the validity of this assumption and include additional variables that may significantly affect its validity.

14. Page 83 - Several of the shaft cross-sectional areas listed in Table C-1 have been calculated incorrectly. Based on the excavation diameters (in m) reported in the left column, the cross-sectional areas should be 18.1 m^2 for the confinement air exhaust shaft, 35.3 m^2 for the service shaft; and 27.3 m^2 for the basalt transport shaft. These areas were calculated using the simple formula:

area = r^2, where r is the excavated radius.

With these corrections, the total cross-sectional area is calculated to be 121.5 m^2 rather than the 118.7 m^2 as reported in the document. This area is then equated to the area of an equivalent shaft with an excavated radius of 12.44 m (reported as 12.3 m). The document, however, does not demonstrate the equivalence of the single shaft and the multiple shafts, which may be questionable considering potential overlaps of the disturbed rock zones associated with individual shafts.

15. Section C.2.3 (pg. 83) describes hydraulic gradients in the vicinity of the underground facility. The description, however, does not reference or provide assessments that support the estimated "repository-scale equivalent head gradient created by buoyancy effects of the temperature field". Further, the description states that ignoring local-scale increases in the hydraulic gradient is conservative because it underestimates the fraction of groundwater flowing past the waste packages into basalt. As stated in General Comment 5, however, BWIP has not assessed the magnitude and transient nature of the gradients that may increase in the lateral direction as well as the vertical. Consequently, BWIP has not demonstrated that ignoring local-scale hydraulic gradients is necessarily conservative. For example, based on NRC staff non-isothermal modeling of groundwater flow in the vicinity of a hypothetical repository at Hanford, lateral gradients near the underground facility may increase from 0.001 to 0.04 m/m (cf. Gordon and Weber, 1983). Thus, assuming increased vertical gradients that ignore local-scale increases in conjunction with ambient lateral gradients does not constitute a demonstrably conservative approach to estimate groundwater flow in the vicinity of the waste packages.

REFERENCE: Gordon, M. and M. Weber (1983). Non-isothermal Flow Modeling of the Hanford Site. U. S. Nuclear Regulatory Commission, Division of Waste Management, Docket File 101

16. Section C.2.3 (pg. 83) incorrectly states that Area 2 of the underground facility represents 20% of the total repository. Consistent with the dimensions provided in Figure C-1, Area 2 represents approximately 27% of the total area of the waste panel area (i.e., sum of the areas of section 1 through 4).

17. Table C-2 (pg. 85) and Section C.4 (pg. 92) identify an eighth node (emplacement horizon shaft seal) that is not described as a node in the flow network. The document should be revised to delete mention of this node or to describe what the node represents and assess its significance.

18. Equation C-3 (pg. 89) miscalculates the value for Q(1b). The hydraulic gradient vector multiplier should be 0.7 rather than 0.07, which increases the proportion of flow into the emplacement rooms from 34% to 83%. As noted in Specific Comment 18, this proportion could be greater considering increases in the lateral gradient above ambient conditions.

19. Pages 89-92 - Arithmetic (or typographical) errors were noted in the flow rate expressions included in Appendix C, sections C.3.2, C.3.3, and C.3.5. Moreover, the preliminary conclusions of C.4 and the sensitivity analysis of section C.5 are affected by these errors. The document should be revised to correct these errors appropriately.

20. Section C.3.5 (pg.90) states that the average "effective thickness" of flow tops in the Grande Ronde Basalts is 8 meters. The document, however, does not define "effective thickness" or reference a supporting assessment for this average estimate. Relevant to groundwater traveltime analyses, effective thickness is defined as the product of the effective porosity of a unit and the thickness of the predominant contributing zone in that unit. In comparison with the 8-meter average stated in the document, the two field-measured values of flow effective thickness at Hanford are both less than 0.01 meters (DOE, Draft Hanford EA, 1984). Section C.3.5 appears to use the term in a different context because there is no discussion of effective porosity with respect to the model calculations. The document should be revised to define "effective thickness" consistent with other BWIP assessments and reference supporting assessments as a basis for the average value.

FROM	DATE OF DOCUMENT	DATE RECEIVED	NO
MNataraja	1/8/86	1/1[illegible]86	WM-86026

LTR | MEMO | REPORT | OTHER: NOTE

TO	ORIG.	CC	OTHER
SCoplan		XX	WMRP DUE 7/30/86

ACTION NECESSARY ☒ | CONCURRENCE ☐ | DATE ANSWERED

NO ACTION NECESSARY ☐ | COMMENT ☐ | BY 2/3

CLASSIF | POST OFFICE REG. NO. | FILE CODE: 426.1

DESCRIPTION (Must Be Unclassified)

Review of Preliminary Performance Requirements & Criteria for the Seal System ...

ENCLOSURES

REMARKS

Closed 10/10/86 by letter to Okon

REFERRED TO	DATE	RECEIVED BY	DATE
HMiller M 1/13	1/13		~~2/28~~ ~~2/14~~
JLinehan JL 1/13			3/28
SCoplan Sc 1/14		5/19	~~4/18~~
~~W. Walker~~			
P. Brooks			~~4/25~~
J. Libert		6/9	~~5/12~~

U. S. NUCLEAR REGULATORY COMMISSION — MAIL CONTROL FORM — FORM NRC 326 (1-75)

JAN 8 1986

JTB/85/01/06 N1 COPLAN

RP response back to Raj.

Note To: Seth Coplan
Repository Projects Branch, WM

From: Mysore S. Nataraja
Rock Mechanics Section
Engineering Branch, WM

SUBJECT: REVIEW OF "PRELIMINARY PERFORMANCE REQUIREMENTS AND CRITERIA FOR THE SEAL SYSTEM OF A NUCLEAR WASTE REPOSITORY IN BASALT" (SD-BWI-CR-015)

Seth, I would like to request that a technical review be done on the document stated above.

It was stated by DOE at the BWIP Repository Design workshop held on December 3-5, 1985 that they have never received NRC comments on BWI-CR-015. It is possible that a review was completed in the past but never transmitted to DOE. John Buckley has checked the DCC for the review but had no luck. If a review has been done please pass a copy on to me for transmittal to DOE. I am attaching a copy of the report for your review.

Mysore S. Nataraja
Rock Mechanics Section
Engineering Branch, WM

cc: John Greeves
Hubert Miller
Paul Hildenbrand
John Linehan
John Buckley