Center for Nuclear Waste Regulatory Analyses

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November 23, 1988

U.S. NUCLEAR REGULATORY COMMISSION
ATTN: Mr. Philip M. Altomare
Division of High-Level Waste Management
WF1
Mail Stop 4-H-3
Washington, D. C. 20555

Subject: Additional Submittals for Milestones A3 and A4

Dear Mr. Altomare:

This letter transmits items in fulfillment of the subject Center Intermediate Milestones (defined in the letter from J. Latz to M. Mace, July 26, 1988). As discussed in our meeting minutes and subsequent telephone conferences, the E-17 content has been modified, E-36 has been added, and numerous changes have been made in the output format. The subject Milestones are defined as:

A3 Finalize PASS organizational structure, field definitions, and report generation for DOE Compliance Determination Methods, NRC Compliance Determination Methods, Uncertainties, Uncertainty Questions, and Information Requirements.

A4 Finalize PASS organizational structure, field definitions, and report generation for DOE, State and Tribe "Issues"; ranking Open Items; and Uncertainty Reduction Methods.

Note that requirements regarding data field definitions and inter-relationships among the defined data fields were provided in the letter of August 12, 1988 on "Completion of Milestones D5 and A1" and are not considered further here. Furthermore, the PA database has not matured to the point where "issues" and ranking of Open Items are meaningful, so these fields remain to be filled.

The examples used to demonstrate fulfillment of the subject milestones are the Regulatory Requirement known as "E-17" & "E-36". These items are the same as will be used in the "proof-of-system" demonstration (WSE&I Milestone R7) that is scheduled for December 1, 1988. To support NRC staff review of these regulatory requirements, we have provided information beginning with the Regulatory Requirement and progressing through various of the the process blocks of the Program Architecture Relational Database. Included as Table 1 is a listing of which data fields in the Program Architecture Relational Database (reference pages 29 & 30 of TOP-001-02 Rev. 0) are currently being utilized in support of E-17 and E-36.

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Regulatory Requirement E-17 has a Regulatory Uncertainty associated with it. In accordance with the PA Process Diagram (see TOP-001), Postulated Elements of Proof (rather than actual EOPs) are identified and certain other blocks are currently bypassed (see TOP-001-02). These blocks will be addressed subsequent to resolution of the Regulatory Uncertainty.

Regulatory Requirement E-36 does not contain a Regulatory Uncertainty but has Technical Uncertainty associated with it and therefore actual "Elements of Proof" are defined in accordance with the referenced TOP's.

Schedules, resources, and other information associated with Blocks 16-22 will be provided in Intermediate Milestone A5 and will be presented in the demonstration on December 1, 1988.

Please obtain the necessary technical and legal staff reviews at your earliest convenience and contact me if you have any questions regarding this matter.

Sincerely yours,

Allen R. Whiting

Allen R. Whiting
Director - SE&I

ARW/y
Attachments

cc: M. Mace
J. Bunting, with 4 copies
J. Latz
W. Patrick

TABLE 1

11/23/88

PROGRAM ARCHITECTURE RELATIONAL DATABASE FIELD (PARDF) CURRENTLY UTILIZED BY E-17 & E-36

(E-17)	(PARDF)	(E-36)	(E-17)	(PARDF)	(E-36)	(E-17)	(PARDF)	(E-36)	(E-17)	(PARDF)	(E-36)
*	1	*		15	*	*	29	*	*	43	*
*	2	*		16	*	*	30	*	*	44	*
*	3	*		17	*	*	31	*	*	45	*
*	4	*		18	*	*	32	*	*	46	*
*	5	*		19	*	*	33	*	*	47	*
*	6	*		20		*	34	*		48	
*	7	*		21		*	35	*		49	
*	8	*		22			36			50	
*	9	*	*	23	*		37			51	
*	10	*		24	*	*	38	*	*	52	*
*	11	*		25	*	*	39	*	*	53	*
*	12	*		26	*	*	40	*			
	13	*		27	*	*	41	*			
	14	*		28	*	*	42	*			

*REFERENCE PAGES 29 & 30 OF TOP-001-02 REV. 0

RR1
STRUCTURES, SYSTEMS, AND COMPONENTS,, IMPORTANT TO SAFETY,, DESIGN,, PROTECTION AGAINST,, NATURAL PHENOMENA,, ENVIRONMENTAL CONDITIONS,, Design criteria,, Geologic Repository Operations Area,, Anticipated,, Safety functions,, Interfere

RR1/EP1
Structures, systems, and components,, Important to safety,, Design,, Protection against,, Natural phenomena,, Environmental conditions,, Design criteria,, Geologic repository operations area,, Anticipated,, Safety functions,, Interfere

RR1/EP1/DC1
Design criteria,, Site Characterization Plan,, Information needs,, Conceptual Design Report,, Scenario development

RR1/EP1/NC1
Structure, system, and component,, Important to safety,, Design,, Criteria,, Materials,, Characteristics,, Identified,, Described,, Fail safe,, Layout,, Standards,, Codes,, Aging,, Durability,, Functions,, Normal conditions,,

RR1/EP1/NC1/IR1
Anticipated,, Environmental Conditions,, Identification,, Description,, Accuracy,, Reliability,, Durations,, Variations,, Occurrence Probability

RR1/EP1/NC1/IR1/UN1
Accepted,, Method,, Identify,, Describe,, Anticipated,, Combinations,, Environmental conditions

RR1/EP1/NC1/IR1/UN1/UQ1
What method/s is/are acceptable to identify anticipated environmental conditions for a mined geologic repository?

RR1/EP1/NC1/IR1/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR2
Anticipated,, Natural Phenomena,, Accuracy,, Reliability,, Durations,, Variations,, Extremes,, Frequency

RR1/EP1/NC1/IR2/UN1
Accepted,, Method,, Identify,, Describe,, Anticipated,, Natural phenomena

RR1/EP1/NC1/IR2/UN1/UQ1
What method/s is/are acceptable to identify and describe anticipated natural phenomena which could have an impact on a mined geologic repository?

RR1/EP1/NC1/IR2/UN1/UQ1/NR1

DRAFT

NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR3
Structures, systems, and components,, Important to safety

RR1/EP1/NC1/IR4
Rationale,, Excluded,, Structures, systems, and components,, Important to safety

RR1/EP1/NC1/IR4/UN1
Excluded,, Structures, systems, and components,, Important to safety,, Method,, Determination

RR1/EP1/NC1/IR4/UN1/UQ1
What method/s is/are acceptable to identify and justify those major structures, systems, and components of a mined geologic repository are not important to safety (if they are not)?

RR1/EP1/NC1/IR4/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR5
Excluded,, Natural Phenomena,, Rationale,, Anticipated,, Remotely plausible

RR1/EP1/NC1/IR5/UN1
Excluded,, Natural phenomena,, Method

RR1/EP1/NC1/IR5/UN1/UQ1
What method/s is/are acceptable to exclude natural phenomena as "not anticipated"?

RR1/EP1/NC1/IR5/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR6
Excluded,, Environmental Conditions,, Rationale,, Anticipated,, Remotely plausible

RR1/EP1/NC1/IR6/UN1
Excluded,, Environmental conditions,, Exclusion method

RR1/EP1/NC1/IR6/UN1/UQ1
What method/s is/are acceptable to exclude environmental conditions as "not anticipated"?

RR1/EP1/NC1/IR6/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR7
Combinations,, Anticipated,, Environmental Conditions,, Natural

Phenomena

RR1/EP1/NC1/IR7/UN1
Accepted,, Method,, Identify,, Describe,, Anticipated,, Combinations,, Environmental conditions,, Natural phenomena

RR1/EP1/NC1/IR7/UN1/UQ1
What method/s is/are acceptable to identify combinations of environmental conditions and natural phenomena as "not anticipated"?

RR1/EP1/NC1/IR7/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR8
Excluded,, Combinations,, Anticipated,, Environmental Conditions,, Natural Phenomena,, Important to safety,, Structures Systems and Components

RR1/EP1/NC1/IR8/UN1
Excluded,, Combinations,, Natural phenomena,, Environmental conditions,, Exclusion method

RR1/EP1/NC1/IR8/UN1/UQ1
What method/s is/are acceptable to exclude combinations of environmental conditions and natural phenomena as "not anticipated"?

RR1/EP1/NC1/IR8/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR9
Analysis,, Structures, systems, and components,, Anticipated,, Natural phenomena,, Environmental conditions,, Important to safety

RR1/EP1/NC1/IR9/UN1
Accepted,, Analysis,, Evaluation,, Structures, systems, and components,, Important to safety

RR1/EP1/NC1/IR9/UN1/UQ1
What are the accepted types of analysis used to evaluate structures, systems, and components important to safety for a mined geologic repository?

RR1/EP1/NC1/IR9/UN1/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/EP1/NC1/IR9/UN2
Accepted,, Codes,, Standards,, Evaluate,, Design,, Structure, systems, and components,, Important to Safety

RR1/EP1/NC1/IR9/UN2/UQ1
What are the acceptable codes and standards that can/should be used as a basis of evaluation of the design of the structures, systems, and components important to safety for a mined geologic repository?

RR1/EP1/NC1/IR9/UN2/UQ1/NR1
NRC staff,, CNWRA staff,, Generic Technical Position

RR1/RI1
The full text of the issue(s) is included together with a document reference. The DOE has identified Issue 2.7 "Repository Design Criteria Design Criteria for Radiological Safety", in the CD-SCP, Chapter 6, Section 6.4.7, page 6-263. This issue inclu

RR2009
ADVERSE CONDITION-GEOCHEMICAL,, Geochemical Processes,, Radionuclide sorption,, Rock strength degradation,, EBS performance,, Compensating favorable conditions,, Remedy of Condition,, Controlled area,, Isolation of Waste,,

RR2009/UN1
Taking into account,, Degree of resolution

RR2009/UN1/UQ1
What was intended by the NRC when it said that the "degree of resolution" achieved by the investigations be "taken into account" when evaluating an adverse condition that may be present and still be undetected?

RR2009/UN1/UQ1/NR1
Comprise performance,, Degree of resolution,, Geochemical processes,, Reduce sorption of radionuclides,, Degradation of rock strength,, Performance of the engineered barrier system,, Clarification of uncertainty

RR2009/UN1/UQ1/NR1/IR1
NRC clarification,, NRC intent,, Degree of resolution

RR2009/UN2
Compromise performance,, Not to affect significantly

RR2009/UN2/UQ1
What is the intent of "not to affect significantly" the ability of the geologic repository to meet the performance objectives relating to isolation of the waste?

RR2009/UN2/UQ1/NR1
Compromise performance,, Not to affect significantly,, Geochemical processes,, Reduce sorption of radionuclides,, Degradation of rock strength,, Performance engineered barrier

system,, Clarification of uncertainty

RR2009/UN2/UQ1/NR1/IR1
NRC clarification,, NRC intent,, Degree of resolution

17

REQUIREMENT ID: RR2009
COGNIZANT EM: RUSSELL, J L
ANALYST: Miklas, M P
REVIEWER: Hageman, J P
PARC REVIEW STATUS: OK
QA REVIEW STATUS: OK

SUBMISSION DATE: 19881121
REVIEW DATE: 19881122
PARC REVIEW DATE: 19881122
QA REVIEW DATE: 19881122

REGULATORY REQUIREMENT

TOPIC: ADVERSE CONDITION-GEOCHEMICAL,, Geochemical Processes,, Radionuclide sorption,, Rock strength degradation,, EBS performance,, Compensating favorable conditions,, Remedy of Condition,, Controlled area,, Isolation of Waste,,

APPLICABLE PERIOD: Site Characterization and Operations

REGULATORY AGENCY: NRC

STATUTE OR REGULATION: 10CFR60 122 (a) (2) *
STATUTE OR REGULATION: 10CFR60 122 (b) *
STATUTE OR REGULATION: 10CFR60 122 (c)
STATUTE OR REGULATION: 10CFR60 122 (c) (8)

DRAFT

REGULATORY REQUIREMENT TEXT (PAPD Step 2, Field 9)

The following excerpts from 10 CFR 60, and any statutes/regulations referenced therein, are closely related to the same regulatory topic. Together, they make up this Regulatory Requirement.

10CFR60 122 (a) (2) *

(2) If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:

(i) The potentially adverse human activity or natural condition has been adequately investigated, including the extent to which the

condition may be present and still be undetected taking into account the degree of resolution achieved by the investigations; and

(ii) The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and

(iii)

(A) The potentially adverse human activity or natural condition is shown by analysis pursuant to paragraph (a) (2) (ii) of this section not to affect significantly the ability of the geologic repository to meet the performance objectives relating to isolation of the waste, or

(B) The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or

(C) The potentially adverse human activity or natural condition can be remedied.

10CFR60 122 (b) *

(b) Favorable conditions.

(1) The nature and rates of tectonic, hydrogeologic, geochemical, and geomorphic processes (or any of such processes) operating within the geologic setting during the Quaternary Period, when projected, would not affect or would favorably affect the ability of the geologic repository to isolate the waste.

(2) For disposal in the saturated zone, hydrogeologic conditions that provide:

(i) A host rock with low horizontal and vertical permeability;

(ii) Downward or dominantly horizontal hydraulic gradient in the host rock and immediately surrounding hydrogeologic units; and

(iii) Low vertical permeability and low hydraulic gradient between the host rock and the surrounding hydrogeologic units.

(3) Geochemical conditions that:

(i) Promote precipitation or sorption of radionuclides;

(ii) Inhibit the formation of particulates, colloids, and inorganic and organic complexes that increase the mobility of radionuclides; or

(iii) Inhibit the transport of radionuclides by particulates, colloids, and complexes.

(4) Mineral assemblages that, when subjected to anticipated thermal loading, will remain unaltered or alter to mineral assemblages having equal or increased capacity to inhibit radionuclide migration.

(5) Conditions that permit the emplacement of waste at a minimum depth of 300 meters from the ground surface. (The ground surface shall be deemed to be the elevation of the lowest point on the surface above the disturbed zone.)

(6) A low population density within the geologic setting and a controlled area that is remote from population centers.

(7) Pre-waste-emplacement groundwater travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment that substantially exceeds 1,000 years.

(8) For disposal in the unsaturated zone, hydrogeologic conditions that provide --

(i) Low moisture flux in the host rock and in the overlying and underlying hydrogeologic units;

(ii) A water table sufficiently below the underground facility such that fully saturated voids contiguous with the water table do not encounter the underground facility;

(iii) A laterally extensive low-permeability hydrogeologic unit above the host rock that would inhibit the downward movement of water or divert downward moving water to a location beyond the limits of the underground facility;

(iv) A host rock that provides for free drainage; or

(v) A climatic regime in which the average annual historic precipitation is a small percentage of the average annual potential evapotranspiration.

10CFR60 122 (c)

(c) Potentially adverse conditions. The following conditions are potentially adverse conditions if they are characteristic of the controlled area or may affect isolation within the controlled area.

10CFR60 122 (c) (8)

(8) Geochemical processes that would reduce sorption of radionuclides, result in degradation of the rock strength, or adversely affect the performance of the engineered barrier system.

RELATED STATUTES/REGULATIONS (PAPD Step 2, Field 12)

RELATED STATUTE OR REGULATION: 10CFR60 21 (c)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (i)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (i) (E)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (i) (F)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (ii)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (ii) (A)
RELATED STATUTE OR REGULATION: 10CFR60 21 (c) (1) (ii) (B)
RELATED STATUTE OR REGULATION: 10CFR60 112 *
RELATED STATUTE OR REGULATION: 10CFR60 113 (a) (1) *
RELATED STATUTE OR REGULATION: 10CFR60 122 (c) (7)
RELATED STATUTE OR REGULATION: 10CFR60 122 (c) (9)
RELATED STATUTE OR REGULATION: 10CFR960 4-2-2 (c) (2)

RELATED STATUTES/REGULATIONS TEXT

The following are related to the subject of the Regulatory Requirement. However, they are not appropriate for inclusion in the Regulatory Requirement. These excerpts are provided for information only.

10CFR60 21 (c)

(c) The Safety Analysis Report shall include:

10CFR60 21 (c) (1)

(1) A description and assessment of the site at which the proposed geologic repository operations area is to be located with appropriate attention to those features of the site that might affect geologic repository operations area design and performance. The description of the site shall identify the location of the geologic repository operations area with respect to the boundary of the accessible environment.

10CFR60 21 (c) (1) (i)

(i) The description of the site shall also include the following information regarding subsurface conditions. This description shall, in all cases, include such information with respect to the controlled area. In addition, where subsurface conditions outside the controlled area may affect isolation within the controlled area, the description shall include such information with respect to subsurface conditions outside the controlled area to the extent such information is relevant and material. The detailed information referred to in this paragraph shall include:

10CFR60 21 (c) (1) (i) (E)

(E) The geochemical properties; and

10CFR60 21 (c) (1) (i) (F)

(F) The anticipated response of the geomechanical, hydrogeologic, and geochemical systems to the maximum design thermal loading, given the pattern of fractures and other discontinuities and the heat transfer properties of the rock mass and groundwater.

10CFR60 21 (c) (1) (ii)

(ii) The assessment shall contain:

10CFR60 21 (c) (1) (ii) (A)

(A) An analysis of the geology, geophysics, hydrogeology, geochemistry, climatology, and meteorology of the site,

10CFR60 21 (c) (1) (ii) (B)

(B) Analyses to determine the degree to which each of the favorable and potentially adverse conditions, if present, has been characterized, and the extent to which it contributes to or detracts from isolation. For the purpose of determining the presence of the potentially adverse conditions, investigations shall extend from the surface to a depth sufficient to determine critical pathways for radionuclide migration from the underground facility to the accessible environment. Potentially adverse conditions shall be investigated outside of the controlled area if they affect isolation within the controlled area.

10CFR60 112 *

The geologic setting shall be selected and the engineered barrier system and the shafts, boreholes and their seals shall be designed to assure that releases of radioactive materials to the accessible environment following permanent

closure conform to such generally applicable environmental standards for radioactivity as may have been established by the Environmental Protection Agency with respect to both anticipated processes and events and unanticipated processes and events.

10CFR60 113 (a) (1) *

(1) Engineered barrier system.

(i) The engineered barrier system shall be designed so that assuming anticipated processes and events:

(A) Containment of HLW will be substantially complete during the period when radiation and thermal conditions in the engineered barrier system are dominated by fission product decay; and

(B) any release of radionuclides from the engineered barrier system shall be a gradual process which results in small fractional releases to the geologic setting over long times. For disposal in the saturated zone, both the partial and complete filling with groundwater of available void spaces in the underground facility shall be appropriately considered and analysed among the anticipated processes and events in designing the engineered barrier system.

(ii) In satisfying the preceding requirement, the engineered barrier system shall be designed, assuming anticipated processes and events, so that:

(A) Containment of HLW within the waste packages will be substantially complete for a period to be determined by the Commission taking into account the factors specified in 60.113 (b) provided, that such period shall be not less than 300 years nor more than 1,000 years after permanent closure of the geologic repository; and

(B) The release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part

in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure, or such other fraction of the inventory as may be approved or specified by the Commission; provided, that this requirement does not apply to any radionuclide which is released at a rate less than 0.1% of the calculated total release rate limit. The calculated total release rate limit shall be taken to be one part in 100,000 per year of the inventory of radioactive waste, originally emplaced in the underground facility, that remains after 1,000 years of radioactive decay.

10CFR60 122 (c) (7)

(7) Groundwater conditions in the host rock, including chemical composition, high ionic strength or ranges of Eh-pH, that could increase the solubility or chemical reactivity of the engineered barrier system.

10CFR60 122 (c) (9)

(9) Groundwater conditions in the host rock that are ot reducing.

10CFR960 4-2-2 (c) (2)

(2) Geochemical processes or conditions that could reduce the sorption of radionuclides or degrade the rock strength.

NOTES
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1. REGULATORY REQUIREMENT NOTES

1.1 RATIONALE FOR CONTENT OF REGULATORY REQUIREMENT:

10CFR60.122 (a) (2) requires that each of the

potentially adverse conditions given in (c)(1) through (c)(24) be evaluated. The use of the term "any" in (a) (2) requires individual consideration of each potentially adverse condition. The wording in (a) (2)* requires evaluations and interpretations of each potentially adverse condition by using the singular tense for the terms "condition" and "activity."

10CFR60 122 (a) (2) is as follows: "If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated: ..."

The consideration of the compromise of the ability of the geologic repository to meet the waste isolation performance objectives is predicated on evaluating each adverse condition to determine 1) for some, if it is present or absent and 2) if present, the effect of the adverse condition on the ability of the geologic repository to meet the performance objectives relative to waste isolation given the extent and probable impact of the given adverse condition. Thus, the repository site will be evaluated based on the adverse conditions and their severity/significance relative to the favorable conditions and their compensating conditions. If favorable conditions do not compensate, it is possible that the adverse effect can be remedied by engineering design, in which case the ability of the geologic repository to meet the performance objectives would remain inviolate.

Neither the favorable conditions nor the adverse conditions are considered to be regulatory requirements in and of themselves. Rather, the conditions are meant to be evaluated as a package with enhancements and shortcomings, as the conditions warrant, with the dominant consideration being the performance objectives relating to waste isolation.

The twenty-four adverse conditions are dealt with on an individual basis in the Program Architecture Process in order to clarify the efforts needed to demonstrate the proper evaluation of each of the adverse conditions. However, as stated in Staff Analysis of Public Comments On Proposed Rule 10CFR60, "Disposal of High Level Radioactive Wastes in Geologic Repositories,"(NUREG 0804,December 1983), "It should be understood that the incorporation of favorable and unfavorable conditions provides an analytical framework for applying the performance objectives. It is not the intention that the conditions be regarded as independent

requirements,...." Thus, each adverse condition is to be researched independently, but is to be considered as part of the total package along with the favorable conditions to determine the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. As stated in the Staff Analysis, "The presence of only one significant condition [an adverse condition] not compensated for by a favorable condition or capable of remedy by design would render the site unsuitable since the performance objectives would not be met."

Though the regulation is not specific, it is suggested that the adverse conditions be considered as part of the total package, in combination with each other, as well as individually. It is possible that an adverse condition when acting alone may not produce a significant effect, but that when acting in concert with other adverse conditions might cause the performance objectives relating to waste isolation to be breached. Those related adverse conditions, thus, need to be examined closely relative to each other to see that significant adverse conditions do not symbiotically result in unsuitability.

60.122 (a)(2)(iii)(B), provides the option of demonstrating that the effect of each potentially adverse human activity or natural condition considered on its individual merits is compensated by the presence of a combination of the favorable characteristics. The use of the term "characteristics" in 122 (a)(2)(iii)(B) instead of the term "conditions" which is found in the heading of 122 (b) raised some concern among some of the reviewers as to the intent of the rulemakers. Two differing viewpoints were presented.

In one view, the document authors intended to refer to only the favorable conditions listed in 122 (b) as those that could ameliorate the presence of a given adverse condition. As such, the license applicant would be required to consider each of the present listed favorable conditions when accomplishing the evaluation required under 122 (a)(2)(iii)(B). This evaluation would occur after an understanding of the adverse condition and its effects on the performance objectives had been formulated (though it must be recognized that the inherent effect of some of the favorable conditions would be a part of the analysis of the expected effects of selected adverse conditions). A logic train would be developed such that the "favorable conditions" of 122 (b) were considered in the resolution of both 122 (a)(1) and 122 (a)(2)(iii)(B).

In the other view, the document authors intended the

term "characteristics" to be different than the term "conditions" in order to allow leeway in the application of compensating favorable attributes. If the licensee was not required to use only the listed favorable conditions, a wider range of possible favorable conditions might be developed and subsequently applied, and/or some of the listed favorable conditions might not be made a part of the subsequent consideration. A logic train would be developed that applied the "favorable conditions," as listed, in 122 (b) to the resolution of the requirements contained in 122 (a)(1) only.

After careful deliberation upon the two possibilities, it was decided that the probable intent of the authors of the regulation was to have the same set of favorable conditions considered in both 122 (a)(1) and 122 (a)(2)(iii)(B). Therefore, 10CFR60 122 (b)(*) is included in Regulatory Requirement 2009.

Contained within NUREG 0804 are numerous references to the favorable conditions and their consideration with the adverse conditions. Throughout NUREG 0804 it is made forcefully clear that knowledge which might affect performance either favorably or adversely, whether or not that particular point is listed in the published list of adverse or favorable conditions in 122 (a)(1) or (a)(2), must be dealt with in the site characterization planning, and subsequent activity. If the license applicant discovers additional "favorable" conditions then it is to the licensee's advantage to discuss those beneficial conditions. Conversely, if new "adverse" conditions are discovered then the applicant must report them and discuss the effect of the favorable conditions and the engineered barrier system on same.

Regulatory uncertainties are present because 10CFR60 122 (a)(2) uses undefined terms including "taking into account the degree of resolution" and "not to affect significantly."

Michael P. Miklas, Jr.
October 15, 1988

No omissions for the regulatory requirement were found.
J.Russell, 11/21/88

1.2 REGULATORY TEXT CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

10CFR60.21(c)(1)(i)(E & F), and (c)(1)(i)(A & B) were considered for inclusion as part of RR2009. They are related to RR2009, but were excluded as a part of the Regulatory Requirement because these texts are part of the License Application

requirement covered in RR74 (10CFR60.21) and were deemed to be separate Regulatory Requirements (see 2.1 below).

1.3 COMMENTS/OBSERVATIONS:

Other analysts included J.L.Russell. J.L.Russell 11/18/88

2. RELATED STATUTES AND REGULATIONS NOTES

2.1 RATIONALE FOR CONTENT OF RELATED STATUTES AND REGULATIONS:

10CFR60.21(c), (c)(1), (c)(1)(i), (c)(1)(i)(E & F), (c)(1)(ii), (c)(1)(ii)(A & B), are all related to potentially adverse geochemical conditions, but are Regulatory Requirements of the license applications 10CFR60.21 (RR74).

John L. Russell 11/18/88

10CFR60.112 * is the overall system performance objective for the geologic setting which must be met after permanent closure but which is a measure of performance required in evaluating siting criteria.

10CFR60.113(a)(1) * is related because it included performance objectives for the EBS which area affected by geochemical processes.

10CFR60.122(c)(7) and 10CFR60.122 (c)(9) are related because geochemical processes and ground water chemical conditions affect each other.

Michael P. Miklas, Jr.
October 14, 1988

2.2 REGULATORY TEXT CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

None

2.3 IDENTIFICATION NUMBER(S) OF ELEMENTS OF PROOF (FOR OTHER REGULATORY REQUIREMENTS) IN WHICH EACH RELATED STATUTE/REGULATION IS CONTAINED. [POSTULATED ELEMENTS OF PROOF ARE DENOTED BY (P)]:

10CFR60.21(c), (c)(1), (c)(1)(i), (c)(1)(i)(E), (c)(1)(ii), (c)(1)(ii)(A), (c)(1)(ii)(B), = RR74/(P)EP1
10CFR60.112* = RR1001/(P)EP(1)
10CFR60.113(a)(1)* = RR1002/(P)EP1 and RR1003/(P)EP1
10CFR60.122(c)(7) = RR2008/(P)EP1
10CFR60.122(c)(9) = RR2010/(P)EP1

J.L.Russell 11/18/88

2.4 COMMENTS/OBSERVATIONS:

UNCERTAINTY ID:	RR2009/UN1		
ANALYST:	MIKLAS, M P	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY

TOPIC:	Taking into account,, Degree of resolution
SOURCE:	NRC
TYPE:	REGULATORY
SITE DEPENCENCY:	GENERIC
ACTION AGENCY:	NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

The intended meaning of the phrase "take into account the degree of resolution" needs to be clarified in order to allow the DOE to adequately investigate the potentially adverse human activity or natural conditions. An adequate investigation is one that provides reasonable assurance that the potentially adverse human activities or natural conditions have been thoroughly and correctly studied.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

In 60.122 (a)(2)(i) "take into account" could imply that some evaluatory weight be placed upon the possibility of undetected adverse conditions and the

probability of their occurrence and possible effect on the performance expectations. It could also mean that a safety margin (large allowance for uncertainty) or high statistical confidence be applied to the evaluation of the adverse condition during the consideration process.

The "degree of resolution" could mean that some scale of numerical assessment of resolution be accomplished such that the relative importance of differing types of evaluations can be assessed and the relative correctness of each determined so that potentially adverse conditions might be rated. Or, it could mean, the evaluations recognize the uncertainties in any geologic investigations. A third interpretation, might be that the means of measurement of the adverse factor be used to assess the relative importance of the values attained and their implications to the overall assessment.

The following paragraphs are a compilation of the discussion of other aspects of the regulation which were considered during the process of identifying uncertainty. The items found below were considered not to produce regulatory or institutional uncertainty.

10CFR60 122 (a) (2) states the following: "If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:"

The wording of this portion of the siting criteria is not ambiguous. The following parts of the regulation define the way in which a given potentially adverse condition must be considered in order to satisfy the requirement that the performance of the repository not be compromised.

10CFR60 122 (a) (2) (ii) is as follows: "The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated, using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and"

There is no uncertainty in this requirement. The analyses are to use techniques which are judged to have a sensitivity appropriate to the evaluation task, and the evaluations are to be conservative in order to not underestimate a given effect.

If both conditions have been met then the adverse condition is deemed to have been adequately considered.

10CFR60 122 (a) (2) (iii) (C) is as follows: "The potentially adverse human activity or natural condition can be remedied."

This portion of the regulation is straightforward. It implies that "if it can be fixed", or its adverse effects corrected in some other way, then, the potentially adverse condition will be treated as a benign operator.

10CFR60 122 (a) (2) (iii) (B) is as follows: "The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or..."

The term "compensated by the presence of a combination of the favorable characteristics" is understandable. The acceptable "combination" which can be considered compensatory is defined on the basis of the performance objectives. If unfavorable and adverse conditions are present, they may be negated or their adversity reduced by favorable conditions which cause the overall performance evaluation of the repository to remain within the numerical bounds established by the performance objectives.

M.P.Miklas, Jr., 10/28/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

The rationale for clarification is to allow DOE to adequately respond to this regulatory requirement.

J.L.Russell 11/18/88

1.3 COMMENTS/OBSERVATIONS:

Other Analyst included John L. Russell.

J.L.Russell 11/18/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR2009/UN1/UQ1

ANALYST:	MIKLAS,	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What was intended by the NRC when it said that the "degree of resolution" achieved by the investigations be "taken into account" when evaluating an adverse condition that may be present and still be undetected?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

No multiple uncertainty question given. J.L.Russell 11/21/88

   1.2 COMMENTS/OBSERVATIONS:

N/A

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR2009/UN1/UQ1/NR1

ANALYST:	Miklas, M P	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: Comprise performance,, Degree of resolution,, Geochemical processes,, Reduce sorption of radionuclides,, Degradation of rock strength,, Performance of the engineered barrier system,, Clarification of uncertainty

CODE: CLA OR OGC OR RUL-R

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):

The CNWRA shall be assigned as the agent to coordinate the development of a recommended clarification of the uncertainty with the NRC. It is possible that the OGC might be required to assist in the clarification of the regulatory text.

b. Summary of Approach:

CNWRA staff will clarify the term "taking into account the degree of resolution" by first requesting a discussion of acknowledged intent from the cognizant NRC technical staff. Clarification of the intent of the term by the NRC Staff is an information requirement necessary for resolution of the uncertainty. If the explanation of the NRC technical staff is sufficient to clarify the term, then the DOE, the State of Nevada, and other affected parties may be made aware of the intent. Upon elimination of the Regulatory Uncertainty the development of the EOP and NC of the regulatory requirement will proceed.

Alternative 1:

If the NRC technical staff is unable to clarify the term, then the Office of General Counsel will be asked to provide a clarification of terminology based on available documentation. If the OGC is able to provide the clarification by analysis of regulatory documentation, then the OGC may issue a legal opinion providing clarification. If the legal clarification eliminates the uncertainty the development of the actual EOP, NC, Technical IR, Technical UN, as needed, of this regulatory requirement will proceed. If the OGC requires additional regulatory and/or technical input or must proceed along the path of regulatory reformulation,a second alternative is proposed.

Alternative 2:
The NRC would proceed along the path of regulatory reformulation, including formal rulemaking, then the development of the EOP and NC of the regulatory requirement will be held in abeyance until such time as the Regulatory Uncertainty is resolved and the interested parties advised of the resolution. The CNWRA will provide the OGC with technical input to assist in uncertainty clarification if requested to do so.

c. Required Tasks:

Initial tasks are outlined in paragraph 1. of b. above.

d. Interactions:

TBD

e. Schedule:

TBD

f. Uncertainty Reduction Method Reference(s):

TBD

g. CPM Code:

TBD

h. Postulated Elements of Proof:

Component regulatory text for Regulatory

Requirement RR2009 was considered to be adequate as written in 10CFR60 and therefore the postulated elements of proof given below are based upon the existing regulation. Postulated Elements of Proof are presented below because Regulatory Uncertainty RR2009/UN1 has not yet been resolved by the methods noted above in Sections a and b. The Postulated Elements of Proof are anticipated to become Elements of Proof without substantive change in wording upon resolution of the Regulatory Uncertainty by clarifying the intent of the phrase creating the uncertainty by the methods given above in sections a and b.

DOE SHALL DEMONSTRATE THAT:

If geochemical processes that would reduce sorption of radionuclides, result in degradation of the rock strength, or adversely affect the performance of the engineered barrier system, are present, and if the processes are characteristic of the controlled area, or may affect isolation within the controlled area, the processes will not compromise the ability of the geologic repository to meet the performance objectives relating to the isolation of the waste. [10CFR60.122 (a)(2)*, 10CFR60.122 (c), 10CFR60.122 (c)(8), and 10CFR60.122 (b)*]

1 Geochemical processes that would reduce the sorption of radionuclides does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated: [10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]
AND

1.1 Geochemical processes that would reduce sorption of radionuclides, have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]
AND

1.2 The effect of geochemical processes that would reduce sorption of radionuclides on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would reduce radionuclide sorption and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]
AND

1.3.1 Geochemical processes that would reduce sorption of radionuclides is shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly

[compromise] the ability of the geologic repository to meet the performance objectives related to the isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

1.3.2 The effect of the geochemical processes that would reduce sorption of radionuclides is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste [10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

1.3.3 Geochemical processes that would reduce sorption of radionuclides can be remedied [10CFR60.122 (a)(2)(iii)(C)]

AND

2 Geochemical processes that would result in degradation of rock strength does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:
[10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]

AND

2.1 Geochemical processes that would result in degradation of rock strength, have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]

AND

2.2 The effect of geochemical processes that would result in degradation of rock strength on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would result in degradation of rock strength and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]

AND

2.3.1 Geochemical processes that would result in degradation of rock strength is shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly [compromise] the ability of the geologic repository to meet the performance objectives related to the isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

2.3.2 The effect of the geochemical processes that would result in degradation of rock strength is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste

[10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

2.3.3 Geochemical processes that would result in degradation of rock strength can be remedied [10CFR60.122 (a)(2)(iii)(C)]

AND

3 Geochemical processes that would adversely affect the performance of the engineered barrier system does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated: [10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]

AND

3.1 Geochemical processes that would adversely affect the performance of the engineered barrier system have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]

AND

3.2 The effect of geochemical processes that would adversely affect the performance of the engineered barrier system on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would adversely affect the performance of the engineered barrier system and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]

AND

3.3.1 Geochemical processes that would adversely affect the performance of the engineered barrier system are shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly [compromise] the ability of the geologic repository to meet the performance objectives related to isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

3.3.2 The effect of the geochemical processes that would adversely affect the performance of the engineered barrier system is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste [10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

3.3.3 Geochemical processes that would adversely affect the performance of the engineered barrier system can be remedied [10CFR60.122 (a)(2)(iii)(C)]

NOTES

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

The proposed method to reduce the Regulatory Uncertainty is to clarify the intent of the cited phrase in the Regulatory Requirement. This approach would be expedient, compared to obtaining a formal OGC opinion or formal rulemaking, while ensuring the intent of the Regulatory Requirement is understood.

Further discussion on the background of the Uncertainty is presented in the Regulatory Requirement - RR2009 and in the Uncertainty - RR2009/UN1.

Dr. John L. Russell collaborated in the reduction method development and served as reviewer.

Michael P. Miklas, Jr.
November 8, 1988

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

N/A

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

N/A

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR2009/UN1/UQ1/NR1/IR1

ANALYST:	Russell, J L	SUBMISSION DATE:	19881123
REVIEWER:	Hageman, J P	REVIEW DATE:	19881123
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881123
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881123

INFORMATION REQUIREMENT

TOPIC: NRC clarification,, NRC intent,, Degree of resolution

REQUESTORS: CNWRA,, Program Architecture Development

ACTION AGENCY: NRC

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

CODE RANKING SYSTEM TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

The information required to reduce this regulatory uncertainty is the NRC technical staff's intent of the phrase "take into account the degree of resolution" as applicable to 10CFR60.122(a)(2)*, 60.122(c), and 60.122(c)(8). Technical information requirements for associated technical uncertainties will be developed at a later date.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

Fulfilling this information requirement could resolve this uncertainty or will be necessary to determine the uncertainty reduction method or methods which are most appropriate and their coincident cost or costs.

J.L.Russell, 11/23/88

1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

N/A

1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

N/A

1.4 COMMENTS/OBSERVATIONS:

N/A

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR2009/UN2		
ANALYST:	MIKLAS, M P	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY

TOPIC:	Compromise performance,, Not to affect significantly
SOURCE:	NRC
TYPE:	R
SITE DEPENCENCY:	G
ACTION AGENCY:	NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

The meaning of the phrase "not to affect significantly" in 60.122(a)(2)(iii)(A) needs to be clarified, in order for the DOE to determine what level of effect is to be considered not important to the ability of a geologic repository to meet the performance objectives. For additional information look at NUREG-0804, page 56.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

The term "not to affect significantly", see 60.122(a)(2)(iii)(A), needs to be clarified because it could be interpreted in several ways. Relative to the performance

objectives, the term could be applied such that the effect of a given adverse condition was termed significant only when it caused the performance objectives to be breached. Or an adverse condition could be termed significant when some to-be-decided level of effect was attained which was less than that required to breach the performance objectives but did represent a seeming threat to the objectives. Similarly, an adverse condition effect could be considered a significant threat based on a probable change in ambient conditions to some to-be-identified alarm level of the adverse condition itself and/or its components.

60.112 defines postclosure performance objectives for the system. These objectives inherently limit the aggregate effects of whatever combination of favorable and adverse conditions exists. That is, given a set of favorable conditions that permit the system to satisfy 60.112, the net effect of all adverse conditions may not cause the system to exceed 60.112 release rates.

In contrast, 60.122(a)(2)(iii)(A) requires examination of the effect of individual adverse conditions on system performance and requires that each condition is "not to affect significantly the ability of the geologic repository to meet the performance objectives relating to the isolation of the waste" (ie. 60.112). Clearly, if the effects of one or more of the individual conditions each cause system performance to even approach 60.112 limits, the aggregate effects are likely to breach those limits. (This apparent inconsistency needs to be clarified to provide the basis for a uniform approach to the analysis of the effects of adverse conditions on system performance.)

The following paragraphs are a compilation of the discussion of other aspects of the regulation which were considered during the process of identifying uncertainty. The items found below were considered not to produce regulatory uncertainty.

10CFR60 122 (a) (2) states the following: "If any of the potentially adverse conditions specified in paragraph (c) of this section is present, it may compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:"

The wording of this portion of the siting criteria is not ambiguous. The following parts of the regulation define the way in which a given potentially adverse condition must be

considered in order to satisfy the requirement that the performance of the repository not be compromised.

10CFR60 122 (a) (2) (ii) is as follows: "The effect of the potentially adverse human activity or natural condition on the site has been adequately evaluated, using analyses which are sensitive to the potentially adverse human activity or natural condition and assumptions which are not likely to underestimate its effect; and"

There is no uncertainty in this requirement. The analyses are to use techniques which are judged to have a sensitivity appropriate to the evaluation task, and the evaluations are to be conservative in order to not underestimate a given effect.

If both conditions have been met then the adverse condition is deemed to have been adequately considered.

10CFR60 122 (a) (2) (iii) (C) is as follows: "The potentially adverse human activity or natural condition can be remedied."

This portion of the regulation is straightforward. It implies that "if it can be fixed", or its implications corrected in some other way, then, the potentially adverse condition will be treated as a benign operator.

10CFR60 122 (a) (2) (iii) (B) is as follows: "The effect of the potentially adverse human activity or natural condition is compensated by the presence of a combination of the favorable characteristics so that the performance objectives relating to isolation of the waste are met, or..."

The term "compensated by the presence of a combination of the favorable characteristics" is understandable. The acceptable "combination" which can be considered compensatory is defined on the basis of the performance objectives. If unfavorable and adverse conditions are present, they may be negated or their adversity reduced by favorable conditions which cause the overall performance evaluation of the repository to remain within the numerical bounds established by the performance objectives. For additional information see NUREG 0804, pages 21 and 22.

Michael P. Miklas, Jr.
10/28/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

The rationale for clarification is to enable DOE to determine the level of effect that is to be considered not important to the ability of the geologic repository to meet the performance objectives. J.L.Russell 11/21/88

1.3 COMMENTS/OBSERVATIONS:

Other analysts included John L. Russell (CNWRA).
J.Russell 11/21/88

2. BIBLIOGRAPHY

U.S.Nuclear Regulatory Agency, 1983. "Staff Analysis of Public Comments on Proposed Rule 10CFR Part 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories," NUREG-0804, p56.

UNCERTAINTY QUESTION ID: RR2009/UN2/UQ1

ANALYST:	MIKLAS,	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What is the intent of "not to affect significantly" the ability of the geologic repository to meet the performance objectives relating to isolation of the waste?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   No multiple uncertainty question given.
   J.L.Russell, 11/21/88

   1.2 COMMENTS/OBSERVATIONS:

   N/A

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR2009/UN2/UQ1/NR1

ANALYST:	Miklas, M P	SUBMISSION DATE:	19881121
REVIEWER:	Hageman, J P	REVIEW DATE:	19881122
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881122
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: Compromise performance,, Not to affect significantly,, Geochemical processes,, Reduce sorption of radionuclides,, Degradation of rock strength,, Performance engineered barrier system,, Clarification of uncertainty

CODE: CLA, OR OGC, OR RUL-

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):

The CNWRA shall be assigned as the agent to coordinate the development of a recommended clarification of the uncertainty with the NRC. It is possible that the OGC might be required to assist in the clarification of the regulatory text.

b. Summary of Approach:

CNWRA staff will clarify the term "not to affect significantly the ability of the repository to meet the performance requirements relating to isolation of waste" by first requesting a discussion of acknowledged intent from the cognizant NRC technical staff. Clarification of the intent of the term by the NRC staff is an information requirement necessary for resolution of the uncertainty. If the explanation of the NRC technical staff is sufficient to clarify the term, then the DOE, the State of Nevada, and other affected parties may be made aware of the intent. Upon elimination of the Regulatory Uncertainty the development of the EOP and NC of the regulatory requirement will proceed.

Alternative 1:

If the NRC technical staff is unable to clarify the term, then the Office of General Counsel will be asked to provide a clarification of terminology based on available documentation. If the OGC is able to provide the clarification by analysis of regulatory documentation , then the OGC may issue a legal opinion providing clarification. If the legal clarification eliminates the uncertainty the development of the actual EOP, NC, Technical IR, or Technical UN, as needed, of this regulatory requirement will proceed. If the OGC requires additional regulatory and/or technical input or must proceed along the path of regulatory reformulation, a second alternative is proposed.

Alternative 2:
The NRC would proceed along the path of regulatory reformulation, including formal rulemaking, then the development of the EOP and NC of the regulatory requirement will be held in abeyance until such time as the Regulatory Uncertainty is resolved and the interested parties advised of the resolution. The CNWRA will provide the OGC with technical input to assist in uncertainty clarification if requested to do so.

c. Required Tasks:

Initial tasks are outlined in paragraph 1 of b. above.

d. Interactions:

TBD

e. Schedule Constraints:

TBD

f. CPM Code:

TBD

g. Uncertainty Reduction Method Reference(s):

TBD

h. Postulated Elements of Proof:

Component regulatory text for Regulatory Requirement RR2009 was considered to be adequate

as written in 10CFR60 and therefore the postulated elements of proof given below are based upon the existing regulation. Postulated Elements of Proof are presented below because Regulatory Uncertainty RR2009/UN2 has not yet been resolved by the methods noted above in Sections a and b. The Postulated Elements of Proof are anticipated to become Elements of Proof without substantive change in wording upon resolution of the Regulatory Uncertainty by clarifying the intent of the phrase creating the uncertainty by the methods given above in sections a and b.

DOE SHALL DEMONSTRATE THAT:

If geochemical processes that would reduce sorption of radionuclides, result in degradation of the rock strength, or adversely affect the performance of the engineered barrier system, are present, and if the processes are characteristic of the controlled area, or may affect isolation within the controlled area, the processes will not compromise the ability of the geologic repository to meet the performance objectives relating to the isolation of the waste. [10CFR60.122 (a)(2)*, 10CFR60.122 (c), 10CFR60.122 (c)(8), and 10CFR60.122 (b)*]

1 Geochemical processes that would reduce the sorption of radionuclides does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated: [10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]
AND
1.1 Geochemical processes that would reduce sorption of radionuclides, have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]
AND
1.2 The effect of geochemical processes that would reduce sorption of radionuclides on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would reduce radionuclide sorption and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]
AND
1.3.1 Geochemical processes that would reduce sorption of radionuclides is shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly [compromise] the ability of the geologic repository to

meet the performance objectives related to the isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

1.3.2 The effect of the geochemical processes that would reduce sorption of radionuclides is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste [10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

1.3.3 Geochemical processes that would reduce sorption of radionuclides can be remedied [10CFR60.122 (a)(2)(iii)(C)]

AND

2 Geochemical processes that would result in degradation of rock strength does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated:
[10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]

AND

2.1 Geochemical processes that would result in degradation of rock strength, have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]

AND

2.2 The effect of geochemical processes that would result in degradation of rock strength on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would result in degradation of rock strength and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]

AND

2.3.1 Geochemical processes that would result in degradation of rock strength is shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly [compromise] the ability of the geologic repository to meet the performance objectives related to the isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

2.3.2 The effect of the geochemical processes that would result in degradation of rock strength is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste [10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

2.3.3 Geochemical processes that would result in degradation of rock strength can be remedied [10CFR60.122 (a)(2)(iii)(C)]

AND

3 Geochemical processes that would adversely affect the performance of the engineered barrier system does not compromise the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. In order to show that a potentially adverse condition does not so compromise the performance of the geologic repository the following must be demonstrated: [10CFR60.122 (c)(8), and 10CFR60.122 (a)(2)]

AND

3.1 Geochemical processes that would adversely affect the performance of the engineered barrier system have been adequately investigated, including the extent to which the condition may be present and still be undetected, taking into account the degree of resolution achieved by the investigations [10CFR60.122 (a)(2)(i)]

AND

3.2 The effect of geochemical processes that would adversely affect the performance of the engineered barrier system on the site has been adequately evaluated using analyses which are sensitive to geochemical processes that would adversely affect the performance of the engineered barrier system and assumptions are not likely to underestimate its effects [10CFR60.122 (a)(2)(ii)]

AND

3.3.1 Geochemical processes that would adversely affect the performance of the engineered barrier system are shown by analysis pursuant to paragraph 10CFR60.122 (a)(2)(ii) not to affect significantly [compromise] the ability of the geologic repository to meet the performance objectives related to isolation of the waste [10CFR60.122 (a)(2)(iii)(A)]

OR

3.3.2 The effect of the geochemical processes that would adversely affect the performance of the engineered barrier system is compensated by the presence of a combination of the favorable characteristics [conditions] which meet the performance objective related to isolation of the waste [10CFR60.122 (a)(2)(iii)(B) and 10CFR60.122 (b)*]

OR

3.3.3 Geochemical processes that would adversely affect the performance of the engineered barrier system can be remedied [10CFR60.122 (a)(2)(iii)(C)]

NOTES
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1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

The proposed method to reduce the Regulatory Uncertainty is to clarify the intent of the cited phrase in the Regulatory Requirement. This approach would be expedient, compared to obtaining formal OGC opinion or formal rulemaking, while ensuring the intent of the Regulatory Requirement is understood.

Further discussion on the background of the Uncertainty is presented in the Regulatory Requirement - RR2009 and in the Uncertainty - RR2009/UN1.

Dr. John L. Russell collaborated in the reduction method development and served as reviewer.

Michael P.Miklas Jr.
Nov 8, 1988

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

N/A

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

N/A

1.4 COMMENTS/OBSERVATIONS:

N/A

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR2009/UN2/UQ1/NR1/IR1

ANALYST:	Russell, J L	SUBMISSION DATE:	19881123
REVIEWER:	Hageman, J P	REVIEW DATE:	19881123
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881123
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881123

INFORMATION REQUIREMENT

TOPIC: NRC clarification,, NRC intent,, Degree of resolution

REQUESTORS: CNWRA,, Program Architecture Development

ACTION AGENCY: NRC

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

CODE RANKING SYSTEM TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

The information required to reduce this regulatory uncertainty is the NRC technical staff's intent of the phrase "not to affect significantly" as applicable to 10CFR60.122(a)(2)*, 60.122(c), and 60.122(c)(8). Technical information requirements for associated technical uncertainties will be developed at a later date.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

Fulfilling this information requirement could resolve this uncertainty or will be necessary to determine the uncertainty reduction method or methods which are most appropriate and their coincident cost or costs.

J.L.Russell, 11/23/88

1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

N/A

1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

N/A

1.4 COMMENTS/OBSERVATIONS:

N/A

2. BIBLIOGRAPHY

E 6

REQUIREMENT ID:	RR1		
COGNIZANT EM:	Hageman, J P		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

REGULATORY REQUIREMENT

TOPIC: STRUCTURES, SYSTEMS, AND COMPONENTS,, IMPORTANT TO SAFETY,, DESIGN,, PROTECTION AGAINST,, NATURAL PHENOMENA,, ENVIRONMENTAL CONDITIONS,, Design criteria,, Geologic Repository Operations Area,, Anticipated,, Safety functions,, Interfere

APPLICABLE PERIOD: Operations

REGULATORY AGENCY: NRC

STATUTE OR REGULATION: 10CFR60 E 131 (b) (1)

REGULATORY REQUIREMENT TEXT (PAPD Step 2, Field 9)

The following excerpts from 10 CFR 60, and any statutes/regulations referenced therein, are closely related to the same regulatory topic. Together, they make up this Regulatory Requirement.

10CFR60 E 131 (b) (1)

> (1) Protection against natural phenomena and environmental conditions. The structures, systems, and components important to safety shall be designed so that natural phenomena and environmental conditions anticipated at the geologic repository operations area will not interfere with necessary safety functions.

RELATED STATUTES/REGULATIONS (PAPD Step 2, Field 12)

RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c)
RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (1)
RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (1) (ii)
RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (1) (ii) (A)

DRAFT

RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (1) (ii) (E)
RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (2) *
RELATED STATUTE OR REGULATION: 10CFR60 B 21 (c) (3) *
RELATED STATUTE OR REGULATION: 10CFR60 B 31
RELATED STATUTE OR REGULATION: 10CFR60 B 31 (a)
RELATED STATUTE OR REGULATION: 10CFR60 B 31 (a) (1) *
RELATED STATUTE OR REGULATION: 10CFR60 B 31 (a) (2)
RELATED STATUTE OR REGULATION: 10CFR60 E 131 (b) (2)
RELATED STATUTE OR REGULATION: 10CFR60 E 131 (b) (3) *
RELATED STATUTE OR REGULATION: 10CFR60 E 131 (b) (4) *
RELATED STATUTE OR REGULATION: 10CFR60 E 131 (b) (5) *
RELATED STATUTE OR REGULATION: 10CFR60 E 131 (b) (6)

RELATED STATUTES/REGULATIONS TEXT

The following are related to the subject of the Regulatory Requirement. However, they are not appropriate for inclusion in the Regulatory Requirement. These excerpts are provided for information only.

10CFR60 B 21 (c)

(c) The Safety Analysis Report shall include:

10CFR60 B 21 (c) (1)

(1) A description and assessment of the site at which the proposed geologic repository operations area is to be located with appropriate attention to those features of the site that might affect geologic repository operations area design and performance. The description of the site shall identify the location of the geologic repository operations area with respect to the boundary of the accessible environment.

10CFR60 B 21 (c) (1) (ii)

(ii) The assessment shall contain:

10CFR60 B 21 (c) (1) (ii) (A)

(A) An analysis of the geology, geophysics, hydrogeology, geochemistry, climatology, and meteorology of the site,

10CFR60 B 21 (c) (1) (ii) (E)

(E) An analysis of the performance of the major design structures, systems, and components, both surface and subsurface, to identify those that are important to safety. For the purposes of this analysis, it shall be assumed that operations at the geologic repository operations area will be carried out at the maximum capacity and rate of receipt of radioactive waste stated in the application.

10CFR60 B 21 (c) (2) *

(2) A description and discussion of the design, both surface and subsurface, of the geologic repository operations area including:

(i) the principal design criteria and their relationship to any general performance objectives promulgated by the Commission,

(ii) the design bases and the relation of the design bases to the principal design criteria,

(iii) information relative to materials of construction (including geologic media, general arrangement, and approximate dimensions), and

(iv) codes and standards that DOE proposes to apply to the design and construction of the geologic repository operations area.

10CFR60 B 21 (c) (3) *

(3) A description and analysis of the design and performance requirements for structures, systems, and components of the geologic repository which are important to safety. This analysis shall consider --

(i) The margins of safety under normal conditions and under conditions that may result from anticipated operational occurrences, including those of natural origin; and

(ii) the adequacy of structures, systems, and components provided for the prevention of accidents and mitigation of the consequences of accidents, including those caused by natural phenomena.

10CFR60 B 31

Upon review and consideration of an application and environmental report submitted under this part, the Commission may authorize construction if it determines:

10CFR60 B 31 (a)

(a) Safety. That there is reasonable assurance that the types and amounts of radioactive materials described in the application can be received, possessed, and disposed of in a geologic repository operations area of the design proposed without unreasonable risk to the health and safety of the public. In arriving at this determination, the Commission shall consider whether:

10CFR60 B 31 (a) (1) *

(1) DOE has described the proposed geologic repository including but not limited to:

(i) The geologic, geophysical, geochemical and hydrologic characteristics of the site;

(ii) the kinds and quantities of radioactive waste to be received, possessed, stored, and disposed of in the geologic repository operations area;

(iii) the principal architectural and engineering criteria for the design of the geologic repository operations area;

(iv) construction procedures which may affect the

capability of the geologic repository to serve its intended function; and

(v) features or components incorporated in the design for the protection of the health and safety of the public.

10CFR60 B 31 (a) (2)

(2) The site and design comply with the performance objectives and criteria contained in Subpart E of this part.

10CFR60 E 131 (b) (2)

(2) Protection against dynamic effects of equipment failure and similar events. The structures, systems, and components important to safety shall be designed to withstand dynamic effects such as missile impacts, that could result from equipment failure, and similar events and conditions that could lead to loss of their safety functions.

10CFR60 E 131 (b) (3) *

(3) Protection against fires and explosions.

(i) The structures, systems, and components important to safety shall be designed to perform their safety fuctions during and after credible fires or explosions in the geologic repository operations area.

(ii) To the extent practicable, the geologic repository operations area shall be designed to incorporate the use of noncombustible and heat resistant materials.

(iii) The geologic repository operations area shall be designed to include explosion and fire detection alarm systems and appropriate suppression systems with sufficient capacity and capability to reduce the adverse effects of fires and explosions on structures, systems, and components important to safety.

(iv) The geologic repository operations area shall be designed to include means to protect systems, structures, and components important to safety against the adverse effects of either the operation or failure of the fire suppression systems.

10CFR60 E 131 (b) (4) *

(4) Emergency capability.

(i) The structures, systems, and components important to safety shall be designed to maintain control of radioactive waste and radioactive effluents, and permit prompt termination of operations and evacuation of personnel during an emergency.

(ii) The geologic repository operations area shall be designed to include onsite facilities and services that ensure a safe and timely response to emergency conditions and that facilitate the use of available offsite services (such as fire, police, medical and ambulance service) that may aid in recovery from emergencies.

10CFR60 E 131 (b) (5) *

(5) Utility services.

(i) Each utility service system that is important to safety shall be designed so that essential safety functions can be performed under both normal and accident conditions.

(ii) The utility services important to safety shall include redundant systems to the extent necessary to maintain, with adequate capacity, the ability to perform their safety functions.

(iii) Provisions shall be made so that, if there is a loss of the primary electric power source or circuit, reliable and timely emergency power can be provided to instruments, utility service systems, and operating systems, including alarm

systems, important to safety.

10CFR60 E 131 (b) (6)

(6) Inspection, testing, and maintenance. The structures, systems, and components important to safety shall be designed to permit periodic inspection, testing, and maintenance, as necessary, to ensure their continued functioning and readiness.

NOTES

1. REGULATORY REQUIREMENT NOTES

1.1 RATIONALE FOR CONTENT OF REGULATORY REQUIREMENT:

10CFR60.131(b)(1) is a stand alone Regulatory Requirement (RR1) because it was considered unique in its requirement to design structures, systems and components important to safety for natural phenomena and environmental conditions. J.P.Hageman 11/11/88

1.2 REGULATORY TEXT CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

1.3 COMMENTS/OBSERVATIONS:

2. RELATED STATUTES AND REGULATIONS NOTES

2.1 RATIONALE FOR CONTENT OF RELATED STATUTES AND REGULATIONS:

All the related requirements deal with "Structures, systems, and components important to safety" and their design (for protection against natural phenomena and other conditions). J.P.Hageman 9/7/88

Other parts of 10CFR60.131(b) were considered as being related to the design of structures systems and components important for safety. Since design is an interactive process and the other parts of 10CFR60.131(b) could impact the design for protection against natural phenomena and environmental conditions. Other parts of 60.131(b) are not generic in nature nor are they specifically tied to designing for natural phenomena and environmental conditions. J.P.Hageman 11/11/88

2.2 REGULATORY TEXT CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

10CFR60.122(c)(3) is not related because it deals only with waste isolation, per 10CFR60.122(a)(2).

2.3 IDENTIFICATION NUMBER(S) OF ELEMENTS OF PROOF (FOR OTHER REGULATORY REQUIREMENTS) IN WHICH EACH RELATED STATUTE/REGULATION IS CONTAINED. [POSTULA
MENTS
OF PROOF ARE DENOTED BY (P)]:

All of 10CFR60.21* is RR74/(P)EP1. All of 10CFR60.31* is in RR61/(P)EP1. There are no RR/EP numbers assigned to 10CFR72 yet. J.P.Hageman 11/11/88

2.4 COMMENTS/OBSERVATIONS:

The specific design requirements in 10CFR72 of structures, systems, and components important to safety (to continue to operate under various conditions) are much more specific than those in 10CFR60. J.P.Hageman 9/7/88

The need to add clarity to 10CFR60 or to ensure consistency with 10CFR72 should be looked at but since 10CFR60 is the higher order regulation for a repository it does have priority over 10CFR72 and it should not reference or defer to 10CFR72. Also, the definitions for "important to safety" between 10CFR60 and 10CFR72 [given in 72.68(b)] are different even though similar functions and operations could be conducted at a repository, and MRS, and an ISFSI. J.P.Hageman 9/7/88

A comparison of the two texts in 10CFR72 and 10CFR60 should be done. These differences should be considered since the same or similar activities will/could be conducted at a geologic repository, MRS, or ISFSI. If the differences are not reconciled it may be argued that the repository was not designed to the same standards as a similar facility with similar operational functions and thus designed improperly. J.P.Hageman 11/8/88

10CFR72 contains the specific design requirements for structures and systems "important to safety" for the independent storage of spent fuel and high level waste facilities. However, the definitions, limitations and requirements of 10CFR60 will govern the design of repository disposal facilities. The PARC is of the opinion that there is regulatory uncertainty in this requirement. J.Hageman 11/18/88

Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

ELEMENT OF PROOF ID: RR1/EP1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:		PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

ELEMENT OF PROOF

TOPIC: Structures, systems, and components,, Important to safety,, Design,, Protection against,, Natural phenomena,, Environmental conditions,, Design criteria,, Geologic repository operations area,, Anticipated,, Safety functions,, Interfere

WHEN ACTION REQUIRED: License application

COGNIZANT ELEMENT: RD Repository Design, Construction and Operation

ELEMENT OF PROOF TEXT (PAPD Steps 3, 5 and 9; Field 15)

The following defines what must be proven to support a conclusion that the subject Regulatory Requirement has been met. All Elements of Proof are embodied in the Regulatory Requirement or are required to prove the validity of the evidence offered (i.e., the demonstration/determination method and data).

DOE SHALL DEMONSTRATE THAT:

structures, systems, and components important to safety have been designed so that natural phenomena and environmental conditions anticipated at the geologic repository operations area will not interfere with necessary safety functions.

ESSENTIAL EXPERTISE (Field 18)

MC Meteorology/Climatology
MG Mining Geology
ST Statistics/Geostatistics
SY Seismology

SUPPORT EXPERTISE (Field 19)

ES Earth Sciences
HY Hydrology
GC Geochemistry
GH Geohydrology
GP Geophysics
RE Reliability

NOTES

1. ELEMENTS OF PROOF NOTES:

1.1 RATIONALE FOR PROBABILITY AND/OR CONFIDENCE STATEMENTS FOR PROOFS THAT INVOLVE DISTRIBUTED PARAMETERS:

There were no distributed parameters [other regulatory text, other than 10CFR60.131(b)(1)] because no other regulatory text in 10CFR60 specifically addresses or supports 131(b)(1) or is referenced by 131(b)(1). Therefore there is no complex EOP Hierarchy associated with RR1/EP1. J. P. Hageman 11/14/88

1.2 RATIONALE FOR ELEMENTS OF PROOF RELATED TO VALIDITY/APPLICABILITY OF DEMONSTRATION AND/OR DETERMINATION METHOD(S):

The EOP is very general in nature (little specificity), therefore the Demonstration Method and the Determination Method could have a great deal of latitude and yet still be argued as applicable to the EOP. J. P. Hageman 11/14/88

1.3 RATIONALE FOR ELEMENTS OF PROOF RELATED TO ACCEPTABILITY OF DATA USED FOR DEMONSTRATION AND/OR DETERMINATION:

N/A

1.4 COMMENTS/OBSERVATIONS:

There was no regulatory uncertainty directly and only associated with RR1 (E-36) given in 10CFR60.131(b)(1). J. P. Hageman 11/14/88

For information only; the definition of "important to safety" in

10CFR60 involves an accident radiation dose limit of 0.5 rem while in 10CFR72 the limit for a design basis accident is 5.0 rem [10CFR72.68(b)]. Also, 10CFR72 refers to safe spent fuel storage, prevention of damage during spent fuel handling and storage, and the provision of reasonable assurance that the spent fuel can be received, handled, stored, and retrieved without undue risk to the health and safety of the public. Also, the related regulations in 10CFR72 are more specific relative to the structures, systems, and components important to safety. The lack of specificity in 10CFR60 coupled with the specific terminology in 10CFR72 may lead to questions of regulatory inconsistencies. J. P. Hageman 11/14/88

The above, are not addressed in regards to this regulatory requirement only [131(b)(1)], but will be addressed on a specific basis for all other Regulatory Requirements in 10CFR60.131(b). J. P. Hageman 11/14/88

2. BIBLIOGRAPHY

DOW COMPLIANCE DEMONSTRATION METHOD ID: RR1/EP1/DC1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881121
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881121
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

DOE COMPLIANCE DEMONSTRATION METHOD

TOPIC: Design criteria,, Site Characterization Plan,, Information needs,, Conceptual Design Report,, Scenario development

DOE COMPLIANCE DEMONSTRATION METHOD TEXT (PAPD Step 22; Field 25)

The following is a summary of the DOE plan for presentation and support of its claim that each of the subject Elements of Proof has been met. This includes test results and/or analyses to be presented to the NRC.

DOE COMPLIANCE DEMONSTRATION METHOD

The DOE Compliance Demonstration Method is presented in section 8.3.2.3 of the Consultation Draft of the Site Characterization Plan (CD-SCP), specifically in Figure 8.3.2.3-2a, (page 8.3.2.3-13), Function 2 part L (page 8.3.2.3-15), Table 8.3.2.3-2 part K (page 8.3.2.3-24), Table 8.3.2.3.2-3 part K1 (pages 8.3.2.3-33 & 34), and Information Need 2.7.2 (page 8.3.2.3-39).

There are five information needs identified for Issue 2.7. They are:

Information needs	Subject
2.7.1	Determination that the design criteria in 10CFR60.131 through 60.133 and any appropriate additional design objectives pertaining to radiological protection have been met.
2.7.2	Determination that the design criteria in 10CFR60.131 through 60.133 and any appropriate additional design objectives pertaining to the design and protection of structures, systems, and components important to safety have been met.
2.7.3	Determination that the design criteria in 10CFR60.131 through 60.133 and any appropriate additional design objectives pertaining to

criticality control have been met.

2.7.4 Determination that the design criteria in 10CFR60.131 through 60.133 and any appropriate additional design objectives pertaining to compliance with mining regulations have been met. (This issue does not require site data and so is not discussed in the SCP).

2.7.5 Determination that the design criteria in 10CFR60.131 through 60.133 and any appropriate additional design objectives pertaining to waste treatment have been met. (This issue does not require site data and so is not discussed in the SCP).

Also in the CD-SCP (page 8.3.2.3-38) it states:

"To answer the information needs, both design and site information is needed; however, only three of the information needs require site data: Information Needs 2.7.1, 2.7.2, and 2.7.3. Information Need 2.7.1 requires site data to evaluate the design against design criteria and performance goals dealing with concentrations of radon and daughter products, use of host rock properties in providing shielding, and releases of radioactive materials to the environment. Information Need 2.7.2 requires site data to evaluate the design of structures, systems, and components important to safety with respect to protection from site-related accidents. Finally, to evaluate criticality control, Information Need 2.7.3 requires the same site data as Information Need 2.7.2."

For Information Needs 2.7.1 the CD-SCP states:

"The site parameters required by this information need (2.7.1) are those needed to (1) determine concentrations of naturally occurring radon and short-lived daughters in the repository airstreams, (2) make use of the shielding properties of the host rock, and (3) quantify the transport of radioactive materials to the workers and to the public. The site data required by this information need along with the SCP section providing the information are listed in the following table.

Data requirement	SCP section
REPOSITORY ROCK AND GROUND-WATER DATA	

Radon emanation rate from the tuff	8.3.1.15.1
Elemental composition of the host rock	8.3.1.3.2
Bulk density of the host rock	8.3.1.15.1
Water content and saturation of the host rock	8.3.1.2.3

METEOROLOGICAL DATA

Wind speeds in the region	8.3.1.12.2
Prevalent wind directions	8.3.1.12.2
Atmospheric stability of the area	8.3.1.12.2
Atmospheric mixing layer depth of the area	8.3.1.12.2
Average ambient temperature of the area	8.3.1.12.2
Atmospheric moisture of the area	8.3.1.12.2
Area precipitation, including type, amount, intensity, etc.	8.3.1.12.2
Dust and particle size distributions underground and on the site	(a)
Size and distance of major topographic features from release points	8.3.1.14.1

AGRICULTURAL AND CULTURAL DATA

Bioaccumulation of radionuclides in the terrestrial flora	(a)
Bioaccumulation of radionuclides in the terrestrial fauna	(a)
Types and amounts of crops raised	(a)
Types and amounts of crops consumed	(a)
Types and amounts of animals raised	(a)
Types and amounts of animals consumed	(a)
Animal consumption of forage	(a)
Forage storage time	(a)
Grazing yield and period	(a)
Radius or the crop and animal area	(a)
Volumetric flow of surface water to water bodies	(a)
Recreational uses of area water bodies	(a)

For information needs 2.7.2 and 2.7.3 the CD-SCP states:

"The only site data that these two information needs (2.7.2 and 2.7.3) require are data that characterize site-related accidents. This information is needed to assess the performance of structures, systems, and components important to safety. Most of this information is related to meteorology or seismic concerns...The site parameters required by this information need are those required to determine the characteristics and frequencies of site-related accidents. Below is a list of site data required by this information need along with the SCP section providing the information."

Data requirement	SCP section
Frequency and characteristics of Tornadoes	8.3.1.12.4
Cloud-to-ground lightning strikes	8.3.1.12.4
Sandstorms	8.3.1.12.4
Snow fall	8.3.1.12.4
Ice storms	8.3.12.4
Repository surface flooding	8.3.1.16.1, 8.3.1.16.3
Repository flooding from ground-water inflow	8.3.1.16.1, 8.3.1.16.3
Surface and subsurface seismic events	8.3.1.17.3
Fault movement within the repository	8.3.1.17.2
Drift roof fall, collapse, or failure	8.3.2.4.1
Surface landslides	8.3.1.14.1
Volcanic ash fall	8.3.1.17.1
Nearby forest or brush fires	8.3.1.13.1
Aircraft and helicopter crashes in the area of the surface facilities	8.3.1.13.1
Other potential accidents	Preclosure risk assessment methodology (PRAM) program 813.1.13.2

Items important to safety and the method for scenario development and the method used to identify the items important to safety are given in Appendix L of DOE's Site Characterization Plan - Conceptual Design Report (SCP-CDR).

DOE COMPLIANCE DEMONSTRATION METHOD STATUS (PAPD Step 22; Field 26)

TBD

NOTES

1. DOE COMPLIANCE DEMONSTRATION METHOD NOTES:

1.1 DOE RATIONALE FOR THE STRATEGY (OVERALL APPROACH) SELECTED FOR COMPLIANCE DEMONSTRATION:

TBD

1.2 OTHER STRATEGIES CONSIDERED BY DOE THEN EXCLUDED, AND REASON FOR EXCLUSION:

TBD

1.3 DOE RATIONALE FOR SELECTION OF INDIVIDUAL TEST, INVESTIGATION AND/OR ANALYSIS METHOD(S):

TBD

1.4 OTHER INDIVIDUAL METHODS CONSIDERED BY DOE THEN EXCLUDED, AND REASON FOR EXCLUSION:

TBD

1.5 DOE RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

TBD

1.6 COMMENTS/OBSERVATIONS:

It was noted in Table 8.3.2.3.2 that the emphasis was to protect structures, systems, and components, but how is a structure protected from rain or any other environmental condition? Also, there appears to be no support for the completeness of the items presented in the Tables presented for Information Needs 2.7.1, 2.7.2 and 2.7.3, nor does the CD-SCP discuss the logic/process used to develop these two lists of site information.

2. BIBLIOGRAPHY

U.S.Department of Energy, Consultation Draft - Site Characterization Plan (CDSCP) Washington D.C.: Office of Civilian Radioactive Waste Management, January 1988.

U.S. Department of Energy, Issues Hierarchy For a Mined Geologic Disposal System, Washington D.C.: Office of Civilian Radioactive Waste Management, September 1986.

H.R.MacDougal, L.W.Scully, J.R.Tillerson, Site Characterization Plan Conceptual Design Report (SCP-CDR), SAND84-2641, Albuquerque, NM., Sandia National Laboratories.

NRC COMPLIANCE DETERMINATION METHOD ID: RR1/EP1/NC1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC COMPLIANCE DETERMINATION METHOD

TOPIC: Structure, system, and component,, Important to safety,, Design,, Criteria,, Materials,, Characteristics,, Identified,, Described,, Fail safe,, Layout,, Standards,, Codes,, Aging,, Durability,, Functions,, Normal conditions,,

NRC COMPLIANCE DETERMINATION METHOD TEXT (PAPD Steps 7 and 9; Field 28)

NRC WILL DETERMINE WHETHER:

1. each structure, system, and component or portion thereof, important to safety, including its margins of safety, has been identified and described.

AND
1.1 the specific needed functions of each structure, system, or component important to safety have been identified and described (considering the maximum amounts and rates of waste handling).

AND
1.1.1 each of the values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the specific needed functions of each structure, system, or component important to safety under normal conditions have been identified and described.

AND
1.1.1.1 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the applicable normal functions of each structure, system, or component important to safety under normal conditions have been identified and described.

AND
1.1.1.2 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc. the applicable emergency functions of each structure, system, or component important to safety under normal conditions have been identified and described.

AND
1.1.1.3 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the safety functions of each structure, system, or component under normal conditions have been identified and described.

AND
1.1.2 each of the values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the specific needed functions of each structure, system, or component important to safety under accident conditions have been identified and described.

AND
1.1.2.1 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the applicable normal functions of each structure, system, or component important to safety under accident conditions have been identified and described.

AND
1.1.2.2 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the applicable emergency functions of each structure, system, or component important to safety under accident conditions have been identified and described.

AND
1.1.2.3 each of these values, limits, or ranges (i.e., response time, duration of response, load limits, margin of safety, tolerances, etc.) of the safety functions of each structure, system, or component under accident conditions have been identified and described.

AND
1.2 the proposed design criteria have been identified and described for each structure, system, and component important to safety.

AND
1.2.1 the proposed materials, as well as their characteristics, of each structure, system, or component important to safety have been identified and described.

AND
1.2.2 the proposed functional requirements (e.g.: rates, capacities, durabilities, etc.) of each structure, system, or component important to safety have been identified and described.

AND
1.2.3 the proposed fail safe features of each structure, system, or component important to safety have been identified and described.

AND
1.2.4 the proposed layout of each structure, system, or component important to safety has been identified and described.

AND
1.2.5 the applicable standards and codes, including QA, for each structure, system, or component important to safety have been identified and described.

AND
1.2.6 the requirements for aging and durability for each structure, system, or component important to safety have been identified and described.

AND
1.3 the procedures for operations of each structure, system, or component important to safety have been identified and described.

AND
1.3.1 operating procedures under normal conditions of each structure, system, or component important to safety have been identified and described.

AND
1.3.1.1 normal operating procedures under normal

conditions of each structure, system, or component important to safety have been identified and described.

AND
1.3.1.2 emergency operating procedures under normal conditions of each structure, system, or component important to safety have been identified and described.

AND
1.3.2 operating procedures under accident conditions of each structure, system, or component important to safety have been identified and described.

AND
1.3.2.1 normal operating procedures under accident conditions of each structure, system, or component important to safety have been identified and described.

AND
1.3.2.2 emergency operating procedures under accident conditions of each structure, system, or component important to safety have been identified and described.

AND
1.4 construction, erection, or fabrication techniques/codes/standards, including QA, applicable to each structure, system, or component important to safety have been identified and described.

AND
1.5 Verification of designs and the design process has been performed.

AND
1.6 Verification of procedures for operations has been performed.

AND
1.7 Verification that application of applicable codes and standards, including QA codes and standards have been used.

AND
2. Major structures, systems, or components of the geologic repository operations area have been analyzed and those not important to safety have been identified and justification given

to support this decision.

AND
3. Anticipated natural phenomena at the site have been identified and characterized. (Examples: Floods, Tornados, Earthquakes, Lightning, or Missiles from Natural Phenomena.)

AND
3.1 Identification of the anticipated natural phenomena was prepared considering site characteristics, such as; Geology, Geophysics, Geochemistry, Hydrology (surface and subsurface), Climatology, and Meteorology.

AND
3.2 Each identified anticipated natural phenomena was characterized as to: anticipated variations in values, both temporal and magnitude; worst case (maximum/minimum) values; knowledge of, and period of time to collect the site history; accuracy of measurements; frequency of reoccurrence; duration of phenomena and margins for variations considering inaccuracies in the above information.

AND
4. Natural phenomena that are not considered as anticipated but that may be remotely plausible have been identified and justification given as to why these natural phenomena are not anticipated at the site.

AND
5. Anticipated normal and extreme environmental conditions at the site have been identified and characterized. (Examples: Temperature, Winds, Humidity, Precipitation, Rock Characteristics, Hydrology, etc.)

AND
5.1 Identification of the anticipated environmental conditions was prepared considering site characteristics, such as; Geology, Geophysics, Geochemistry, Hydrology (surface and subsurface), Climatology and Meteorology.

AND
5.2 Each identified anticipated environmental condition was characterized as to: anticipated variations in values, both temporal and magnitude; worst case (maximum/minimum) values; knowledge of, and period of time to collect the site history; accuracy of measurements; frequency of reoccurrence; duration of conditions; and margins for variations considering inaccuracies in the above information.

AND
6. Environmental conditions that are not considered as anticipated but that may be remotely plausible have been identified and justification given as to why these environmental conditions are not anticipated at the site.

AND (Either 7 OR 8)
7. Design analysis and design review of each structure, system, and component (including operating procedures) important to safety has been performed for each of the anticipated natural phenomena and environmental conditions, and appropriate combinations thereof as they are anticipated to interact with each other. These analyses and reviews show that the necessary safety functions will not be interfered with.

OR
8. Protection of particular systems and components (by structures) from anticipated natural phenomena, anticipated environmental conditions, or appropriate combinations of these is feasible and will ensure the necessary safety functions will not be interfered with.

NOTES
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1. NRC COMPLIANCE DETERMINATION METHOD NOTES:

1.1 RATIONALE FOR THE STRATEGY (OVERALL APPROACH) SELECTED FOR COMPLIANCE DETERMINATION:

This NRC Compliance Determination Method is proposed for items that should be provided by DOE so that an orderly and complete review can be performed by NRC. J. P. Hageman 10/9/88

The rationale for the overall approach is based on a process to specifically identify what information is needed (eg. identifying and describing (listing) structures, systems and components important to safety, listing of anticipated environmental conditions, listing of anticipated natural phenomena, listing of anticipated combinations, listing of potentially plausible but not anticipated environmental conditions etc.) and how this information will be analyzed to clearly demonstrate regulatory compliance. This approach included ideas gained from review of 10CFR72, NRC's NUREG 0800, and other parts of 10CFR60. J. P. Hageman 11/14/88

1.2 OTHER STRATEGIES CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Another strategy that was considered and then rejected was to reference applicable parts of 10CFR72, other parts of 10CFR60, and NRC's NUREG 0800 in the NRC's Compliance Determination Method. This approach would only address part of needs for NRC Review and for streamlining the licensing process. There were no provisions in 10CFR72 or in NUREG 0800 to address the environmental conditions of an underground mine (eg rock mechanics, underground seismic effects, hydrology etc.) Also, this approach was rejected because it did not present a unified and logical progression/process to ask for the needed information which is tied to the design process. A unified and logical process would be proactive in providing guidance to DOE to help them establish and proceed with their design and documentation development for license application, which would facilitate (streamline) license review (the licensing process). J. P. Hageman 11/14/88

1.3 RATIONALE FOR SELECTION OF INDIVIDUAL TEST, INVESTIGATIVE AND/OR ANALYSIS METHOD(S):

To be determined. J. P. Hageman 11/14/88

1.4 OTHER INDIVIDUAL METHODS CONSIDERED THEN EXCLUDED,

AND REASON FOR EXCLUSION:

To be determined. J. P. Hageman 11/14/88

1.5 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

To be determined. J. P. Hageman 11/14/88

1.6 COMMENTS/OBSERVATIONS:

Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J. P. Hageman 11/8/88

2. BIBLIOGRAPHY

1. Nuclear Regulatory Commission, Revised January 1, 1987. Code of Federal Regulations Title 10, Part 72. Washington DC.

2. Nuclear Regulatory Commission, June 1987. Standard Review Plan for the Review of Safety Analysis Reports For Nuclear Power Plants, LWR Edition (NUREG-0800) Washington, DC.

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Anticipated,, Environmental Conditions,, Identification,, Description,, Accuracy,, Reliability,, Durations,, Variations,, Occurrence Probability

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

A listing and description of normal and extreme environmental conditions anticipated at the site is needed. Anticipated durations and variations of these environmental conditions should be described. These should be based upon the site history and available data, and should indicate the reliability and accuracy of this data (e.g., temperature, humidity, dust, wind, solar flux, rain, rock characteristics, hydrology). (See proposed NRC Compliance Determination Method, part 5.)

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

UNCERTAINTY ID:	RR1/EP1/NC1/IR1/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Accepted,, Method,, Identify,, Describe,, Anticipated,, Combinations,, Environmental conditions

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be defined an acceptable method/s to identify and describe anticipated environmental conditions for structures, systems, and components.

b. Establishing acceptable methods of identifying anticipated environmental conditions will be important to ensure the safe design and operation of the mined geologic repository.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method to identify and describe anticipated natural conditions at a repository, for NRC to review the DOE's License Application. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position would provide proactive guidance to DOE on an acceptable method/s to identify and describe anticipated environmental conditions. J. P. Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/9/88

Analyst included T. D. Romine and W. C. Patrick. J. P. Hageman 11/11/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR1/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to identify anticipated environmental conditions for a mined geologic repository?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR1/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES
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1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR2

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881111
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Anticipated,, Natural Phenomena,, Accuracy,, Reliability,, Durations,, Variations,, Extremes,, Frequency

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

A listing and description (anticipated extremes, variations, durations, frequency, etc.) of anticipated natural phenomena (e.g. - earthquakes, tornadoes, floods, etc.) at the site is needed. These should be based upon the site history and available data, and include the reliability and accuracy of this data. See NRC Compliance Determination Method, part 3.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on the proposed NRC Compliance Determination Method, part 3. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR2/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Accepted,, Method,, Identify,, Describe,, Anticipated,, Natural phenomena

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be an acceptable method/s to identify and describe anticipated natural phenomena affecting structures, systems, and components.

b. Defining acceptable methods of identifying anticipated natural phenomena will be important to ensure the safe design and operation of the mined geologic repository.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method to identify and

describe anticipated natural phenomena at a repository, for NRC to review the DOE's license application. J.P.Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position would provide proactive guidance to DOE on an acceptable method to identify and describe anticipated natural phenomena. J.P.Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, parts 5 and 6. J.P.Hageman 11/9/88

Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/9/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR2/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to identify and describe anticipated natural phenomena which could have an impact on a mined geologic repository?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR2/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES

1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR3

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881111
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Structures, systems, and components,, Important to safety

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

A listing and description is needed of every structure, system, and component, or parts there of, that are considered to be important to safety. The description shall be detailed so as to allow an evaluation of the functions and functional requirements of the items. Or it may reference an appropriate document for that evaluation. See NRC Compliance Determination Method, part 1.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on the proposed NRC Compliance Determination Method, part 1. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR4

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881111
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Rationale,, Excluded,, Structures, systems, and components,, Important to safety

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

Rationale is needed to justify excluding major structures, systems, and components of the geologic repository operations area, as not being important to safety. See proposed NRC Compliance Determination Method, part 2.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on the proposed NRC Compliance Determination Method, part 2. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR4/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Excluded,, Structures, systems, and components,, Important to safety,, Method,, Determination

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be defined an acceptable method/s to identify and justify those major structures, systems, and components of a mined geologic repository, as not being important to safety (if they are not).

b. Defining acceptable method/s could help to streamline the licensing process by anticipating and answering concerns of "Why wasn't system X considered to be important to safety?".

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method to justify excluding major structures systems and components of a repository as not being important to safety, for NRC to streamline its licensing process. J. P. Hageman 11/14/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position for an acceptable method/s, would provide proactive guidance to DOE and may avoid license approval challenges by outside parties. J. P. Hageman 11/14/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/11/88

Analyst included T. D. Romine and W. C. Patrick. C. P. Hageman 11/14/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR4/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to identify and justify those major structures, systems, and components of a mined geologic repository are not important to safety (if they are not)?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR4/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES

1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR5

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Excluded,, Natural Phenomena,, Rationale,, Anticipated,, Remotely plausible

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

Rationale is needed to justify excluding remotely plausible natural phenomena as not being anticipated. This rationale should be based upon the site history and available data, as well as the reliability and accuracy of this data. See the proposed NRC Compliance Determination Method, part 4. Also, refer to the definition of Anticipated and Unanticipated Events in 10CFR 60.2 for general criteria for "anticipated" and "not anticipated".

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   See proposed NRC Compliance Determination Method, Part 4. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR5/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Excluded,, Natural phenomena,, Method

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)
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a. There needs to be defined an acceptable method/s to exclude remotely
plausible but not anticipated natural phenomena from inclusion and subsequent analysis.

b. Defining an acceptable method/s of exclusion could help to streamline the licensing process by anticipating and answering concerns of "Why wasn't natural phenomena X considered?".

NOTES
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1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be identified an acceptable method/s to exclude

remotely plausible but not anticipated natural phenomena from analyses of design for structures, systems, and components important to safety. J.P.Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a GTP for an acceptable method/s would provide proactive guidance to DOE and may avoid license approval challenges by parties. J.P.Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 3 and 4. J.P.Hageman 11/9/88

Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/11/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR5/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to exclude natural phenomena as "not anticipated"?

NOTES

1. UNCERTAINTY QUESTION NOTES:

1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

1.2 COMMENTS/OBSERVATIONS:

Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR5/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required, since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES

1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR6

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Excluded,, Environmental Conditions,, Rationale,, Anticipated,, Remotely plausible

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

Rationale is needed to justify excluding remotely plausible environmental conditions as not being anticipated. This rationale should be based upon the site history and available data, as well as the reliability and accuracy of this data.

See the proposed NRC Compliance Determination Method, part 6. Also, refer to the definition of "Anticipated Process and Events", and "Unanticipated Process and Events" in 10CFR60.2, for general criteria for "anticipated" and "not anticipated".

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on proposed NRC Compliance Determination Method, Part 6. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR6/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY

TOPIC: Excluded,, Environmental conditions,, Exclusion method

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be defined an acceptable method/s to exclude potentially plausible but not anticipated environmental conditions from inclusion and subsequent analysis.

b. Defining an acceptable method/s of exclusion could help to streamline the licensing process by anticipating and answering concerns of "Why wasn't environmental condition X considered?".

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method to justify excluding some environmental conditions as not anticipated for NRC to streamline its licensing process. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position for an acceptable method/s would provide proactive guidance to DOE and may avoid license approval challenges by outside parties. J. P. Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/09/88

Analysts included T. D. Romine and W. C. Patrick. J. P. Hageman 11/11/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR6/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to exclude environmental conditions as "not anticipated"?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR6/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES
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1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR7

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Combinations,, Anticipated,, Environmental Conditions,, Natural Phenomena

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

A listing of plausible combinations of environmental conditions and natural phenomena anticipated at the site is needed. Also, the rationale for determination of this listing is needed to support this listing.

See proposed NRC Compliance Determination Method, parts 7 and 8.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

The effects of combinations of natural phenomena and environmental conditions should help determine the design of structures, systems, and components important to safety. For example: if a component was subjected to a combination of severe desert conditions (over several years) and then s
d
to an anticipated natural phenomena, the component may be more apt to fail than if a combination of the environmental conditions and phenomena are not considered in its design. J.P.Hageman 11/8/88

This Information Requirement is based on the proposed NRC Compliance Determination Method, parts 7 & 8. J.P.Hageman 11/8/88

1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

N/A J.P.Hageman 11/11/88

1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

N/A J.P.Hageman 11/11/88

1.4 COMMENTS/OBSERVATIONS:

Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR7/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Accepted,, Method,, Identify,, Describe,, Anticipated,, Combinations,, Environmental conditions,, Natural phenomena

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be an acceptable method/s to identify and describe anticipated combinations of environmental conditions and natural phenomena which could effect the structures, systems, and components.

b. Defining an acceptable method/s of identifying anticipated combinations of environmental conditions and natural phenomena will be important to ensure the safe design and operation of the mined geologic repository.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method to identify anticipated combination of environmental conditions and natural phenomena at a repository, for NRC to review the DOE's licence application. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position would provide proactive guidance to DOE on an acceptable method/s to identify anticipated combinations of environmental conditions and natural phenomena. J. P. Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/9/88

Analyst included T. D. Romine and W. C. Patrick.
J.P.Hageman 11/11/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR7/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881122

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to identify combinations of environmental conditions and natural phenomena as "not anticipated"?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR7/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES
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1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR8

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Excluded,, Combinations,, Anticipated,, Environmental Conditions,, Natural Phenomena,, Important to safety,, Structures Systems and Components

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

Those combinations that will not impact the design or operations of Systems, Structures, and Components Important to Safety should be identified and the rationale given to justify excluding certain combinations of environmental conditions and natural phenomena as not appropriate. See NRC Compliance Determination Method; parts 7 & 8.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on the proposed NRC Compliance Determination Method, parts 7 & 8. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR8/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY

TOPIC: Excluded,, Combinations,, Natural phenomena,, Environmental conditions,, Exclusion method

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There needs to be an acceptable method/s to exclude potentially plausible but not anticipated combinations of environmental conditions and natural phenomena from inclusion and subsequent analysis.

b. Defining an acceptable method/s of exclusion could help to streamline the licensing process by anticipating and answering concerns of "Why wasn't combination X of the environmental conditions and natural phenomena considered?".

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be an acceptable method/s of excluding potentially plausible but not anticipated combinations of environmental conditions and natural phenomena, for NRC to review the DOE's license application. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position would provide proactive guidance to DOE and may avoid license approval challenges by outside parties. J. P. Hageman 11/8/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/9/88

Analyst included T. D. Romine and W. C. Patrick. J. P. Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR8/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881114
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What method/s is/are acceptable to exclude combinations of environmental conditions and natural phenomena as "not anticipated"?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR8/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES

1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

INFORMATION REQUIREMENT: RR1/EP1/NC1/IR9

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881111
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

INFORMATION REQUIREMENT

TOPIC: Analysis,, Structures, systems, and components,, Anticipated,, Natural phenomena,, Environmental conditions,, Important to safety

REQUESTORS: NRC

ACTION AGENCY: DOE

PRIORITY RANKING CODE (PAPD Steps 17; Field 45)

The following is the relative priority or importance ranking of the program for satisfaction of the indicated NRC Information Requirement.

TBD

INFORMATION REQUIREMENT TEXT (PAPD Steps 8, 9 and 15; Field 42)

A method/s is/are needed which will facilitate the analysis of every structure, system, and component, or parts there of, for each anticipated natural phenomena and environmental condition as well as combinations thereof. The same type/s of analysis that will be performed to demonstrate that structures, systems, and components important to safety can perform their design functions for each anticipated natural phenomena and environmental conditions or combinations of the natural phenomena and environmental conditions.

See proposed NRC Compliance Determination Method, part 7.

INFORMATION REQUIREMENT PRIORITY/RANKING RATIONALE (PAPD Step17; Field 46

TBD

INFORMATION REQUIREMENT NOTES

1. INFORMATION REQUIREMENT NOTES:

   1.1 RATIONALE FOR THE INFORMATION REQUIREMENT (SPECIFIC APPLICATION(S), PERFORMANCE SENSITIVITY, ETC.):

   This Information Requirement is based on the proposed NRC Compliance Determination Method, part 7. J.P.Hageman 11/8/88

   1.2 RATIONALE FOR THE INDICATED ACCURACY/PRECISION OR STATISTICAL CONFIDENCE:

   N/A J.P.Hageman 11/11/88

   1.3 RATIONALE FOR UNUSUAL REVIEW OR QA REQUIREMENTS:

   N/A J.P.Hageman 11/11/88

   1.4 COMMENTS/OBSERVATIONS:

   Analysts also included D.T.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR9/UN1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY

TOPIC: Accepted,, Analysis,, Evaluation,, Structures, systems, and components,, Important to safety

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: DOE

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. An accepted method or type of analysis used to evaluate structures, systems, and components, important to safety for a mined geologic repository needs to be defined.

b. Defining an acceptable type of analysis for structures, systems, and components or portion there of, important to safety, is an important step toward ensuring the safe design and operation of the mined geologic repository.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined an acceptable method/s or type/s of analysis that can be used to evaluate structures, systems, and components important to safety for a repository, for NRC to review the DOE license application. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position on an acceptable method/s or type/s of analysis would provide proactive guidance to DOE and to streamline the licensing process. J. P. Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/8/88

Analyst included T. D. Romine and W. C. Patrick (CNWRA). J. P. Hageman 11/8/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR9/UN1/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What are the accepted types of analysis used to evaluate structures, systems, and components important to safety for a mined geologic repository?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR9/UN1/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES

1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

UNCERTAINTY ID:	RR1/EP1/NC1/IR9/UN2		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY
****

TOPIC: Accepted,, Codes,, Standards,, Evaluate,, Design,, Structure, systems, and components,, Important to Safety

SOURCE: NRC

TYPE: T

SITE DEPENCENCY: G

ACTION AGENCY: NRC

UNCERTAINTY TEXT (PAPD Steps 11 and 12; Field 30)

a. There is a need to identify accepted standards to evaluate the design of structures, systems, and components, important to safety for a mined geologic repository.

b. Identifying acceptable codes and standards for design evaluation of structures, systems, and components important to safety, is a key step to ensuring the safe design and operation of the mined geologic repository.

NOTES

1. UNCERTAINTY NOTES:

1.1 RATIONALE FOR THE PRESENCE OF AN UNCERTAINTY:

There needs to be defined acceptable codes and standards that are appropriate and applicable to the design of a geologic repository. J. P. Hageman 11/11/88

1.2 RATIONALE FOR "WHAT IS NEEDED TO CORRECT THE UNCERTAINTY":

Providing a Generic Technical Position would provide proactive guidance to DOE on an acceptable method/s to identify and describe anticipated environmental conditions. J. P. Hageman 11/11/88

1.3 COMMENTS/OBSERVATIONS:

This uncertainty is related to the proposed NRC Compliance Determination Method, part 6. J. P. Hageman 11/9/88

Analyst included T. D. Romine and W. C. Patrick. J. P. Hageman 11/09/88

2. BIBLIOGRAPHY

UNCERTAINTY QUESTION ID: RR1/EP1/NC1/IR9/UN2/UQ1

ANALYST:	Hageman,	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

UNCERTAINTY QUESTION

UNCERTAINTY QUESTION TEXT (PAPD Step 10; Field 35)

What are the acceptable codes and standards that can/should be used as a basis of evaluation of the design of the structures, systems, and components important to safety for a mined geologic repository?

NOTES

1. UNCERTAINTY QUESTION NOTES:

   1.1 RATIONALE FOR STRUCTURE/CONTENT OF MULTIPLE UNCERTAINTY QUESTIONS FOR A SINGLE UNCERTAINTY:

   There was no multiple uncertainty question structure developed, in order to keep the issues separate from one another even though there was similarity among the technical uncertainties related to RR1. J.P.Hageman 11/14/88

   1.2 COMMENTS/OBSERVATIONS:

   Analysts included T.D.Romine and W.C.Patrick (CNWRA). J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

NRC UNCERTAINTY REDUCTION METHOD: RR1/EP1/NC1/IR9/UN2/UQ1/NR1

ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	Nair, P K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

NRC UNCERTAINTY REDUCTION METHOD

TOPIC: NRC staff,, CNWRA staff,, Generic Technical Position

CODE: GTP

NRC UNCERTAINTY REDUCTION METHOD TEXT (PAPD Step 15; Field 39)

a. Responsible Organization(s):
The organization to reduce the uncertainty will be the NRC HLW Group and the CNWRA.

b. Summary of Approach:
A summary of the approach to be used to reduce this technical uncertainty is for the NRC and the CNWRA staff to prepare a Generic Technical Position (GTP).

c. Required Tasks:
The tasks presently considered necessary for reduction of this Technical Uncertainty to an acceptable level are to be determined. (TBD)

d. Interactions:
The interactions between the above tasks and/or between these tasks and other activities (inputs from, outputs to, coordination with) are to be determined. (TBD)

e. Schedule Constraints:
The schedule for completion of the above tasks together with periodic milestones for reviews, deliverables and interactions, as appropriate, are to be determined. (TBD)

f. CPM Code:
The reference code to the top-level CPM network of the NRC Uncertainty Reduction Method are to be

determined. (TBD)

g. Uncertainty Reduction Method Reference(s):
Reference(s) to more complete presentation of this NRC Uncertainty Reduction Method are to be determined. (TBD)

h. Postulated Elements of Proof:
Postulated Elements of proof are not required , since there was no Regulatory or Institutional Uncertainty for this Regulatory Requirement (RR1).

NOTES
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1. NRC UNCERTAINTY REDUCTION METHOD NOTES:

1.1 RATIONALE FOR CONTENT OF ABBREVIATED UNCERTAINTY REDUCTION METHOD PLAN (FIELD 39, a. through h.):

Proactive guidance to DOE for an acceptable approach for development of the Information Requirements will be essential in ensuring the licensing process is effectively conducted.

1.2 OTHER REDUCTION METHODS CONSIDERED THEN EXCLUDED, AND REASON FOR EXCLUSION:

Other uncertainty reduction method considerations are to be determined (TBD).

1.3 RATIONALE FOR SELECTION AND CONTENT OF CONTINGENCY, BACKUP OR OTHER ALTERNATIVE METHODS:

Nonapplicable

1.4 COMMENTS/OBSERVATIONS:

2. BIBLIOGRAPHY

RELATED ISSUE ID:	RR1/RI1		
ANALYST:	Hageman, J P	SUBMISSION DATE:	19881118
REVIEWER:	NAIR, p K	REVIEW DATE:	19881118
PARC REVIEW STATUS:	OK	PARC REVIEW DATE:	19881118
QA REVIEW STATUS:	OK	QA REVIEW DATE:	19881121

RELATED ISSUE

SOURCE CODE: DOE

RELATED ISSUE TEXT (Part of PAPD Steps 11 and 12; Field 13)

The following is a DOE, State or tribe "issue" related to the subject Regulatory Requirement.

The full text of the issue(s) is included together with a document reference.

The DOE has identified Issue 2.7 "Repository Design Criteria Design Criteria for Radiological Safety", in the CD-SCP, Chapter 6, Section 6.4.7, page 6-263. This issue includes the regulatory requirement covered in 10CFR60.131(b)(1).

The question asked by Issue 2.7 is, "Have the characteristics and configuration of the repository been adequately established to (a) show compliance with the preclosure design criteria of 10CFR60.131 through 10CFR60.133, and (b) provide information of the performance issues?"

Also, in the DOE's Issues Hierarchy for a Mined Geologic Disposal System (OGR/B-10,) Design Issue 2.7 is given, which is the same as in the CD-SCP.

Analysts also included D.T.Romine and W.C.Patrick (CNWRA).

NOTES

1. RELATED ISSUES NOTES:

1.1 CORRELATION OF DOE ISSUE(S) WITH THE REGULATORY REQUIREMENT:

DOE's issue 2.7 subsumes RR1, since 2.7 addresses 10CFR60.131 through 10CFR60.133. J.P.Hageman 11/14/88

1.2 COMMENTS/OBSERVATIONS:

It seems difficult to analyze all design criteria without using some systematic approach to examine the parts and then the whole of the design. J.P.Hageman 11/14/88

2. BIBLIOGRAPHY

U.S.Department of Energy, Consultation Draft - Site Characterization Plan (CDSCP) Washington D.C.: Office