

# **RECOMMENDATIONS FOR UPDATING THE STATUS OF REGULATORY AND INSTITUTIONAL UNCERTAINTIES**

*Prepared for*

**Nuclear Regulatory Commission  
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## **ACKNOWLEDGMENTS**

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# **1 INTRODUCTION**

As part of the systematic regulatory analysis of Code of Federal Regulations, Title 10, Part 60 (10 CFR Part 60), the regulation was examined to identify uncertainties in the meaning of requirements; their adequacy, completeness, or necessity (regulatory uncertainties). In addition, the regulations were examined to identify uncertainties regarding the responsibilities of the implementing agencies (institutional uncertainties). These regulatory and institutional uncertainties were initially identified by the Center for Nuclear Waste Regulatory Analyses (CNWRA) and Nuclear Regulatory Commission (NRC) in the 1990-1991 period (Center for Nuclear Waste Regulatory Analyses, 1990; Nuclear Regulatory Commission, 1990a; Nuclear Regulatory Commission, 1991) have been prepared for entry in the Open Item Tracking System (OITS). The purpose of this report is to present these uncertainties in the proper format for entry into OITS, to reflect their current resolution status, and to provide rationales for considering many of them to be resolved. These resolved uncertainties could be incorporated into OITS as archival records, but need not be further updated because of their resolved status.

## **2 DISCUSSION**

The systematic regulatory analysis of 10 CFR Part 60 performed by the CNWRA identified 77 potential uncertainties (Center for Nuclear Waste Regulatory Analyses, 1990). The NRC SECY-90-207 (Nuclear Regulatory Commission, 1990a) incorporated 43 of the CNWRA potential uncertainties, and added seven uncertainties identified by NRC. Four more uncertainties were identified in SECY-91-225 (Nuclear Regulatory Commission, 1991), for a total of 54 (50 regulatory, and 4 institutional uncertainties).

Uncertainty reduction methods were identified by NRC (Ballard et al., 1991) for the 50 uncertainties listed in SECY-90-207. Five reduction methods were available and were assigned to the uncertainties as follows: guidance (25), further analysis (18), minor rulemaking (3), major rulemaking (7), and commission paper (1). The NRC analyses suggest that many of the uncertainties (most classified as needing guidance) actually need no further action. In addition, a number of other uncertainties may have been adequately addressed by issuance of the draft Format and Content Regulatory Guide (FCRG) (Nuclear Regulatory Commission, 1990b) and the License Application Review Plan (LARP) (Nuclear Regulatory Commission, 1994). This report identifies those uncertainties and recommends that they be considered resolved based on the rationales provided in the uncertainty reduction method report (Nuclear Regulatory Commission, 1991) or based on the guidance provided by the FCRG or LARP.

## **3 RECOMMENDATIONS**

Recommendations for the current status of the regulatory and institutional uncertainties are being made based on the extent that the FCRG, LARP, and other reports have contributed to resolution. The summary of the recommended status is as follows: (i) resolved - 30, and (ii) open - 24.

The basis for recommending that these uncertainties be considered resolved is provided in the latest entry in the "History" portion of the Open Item Standard Report. Appendix A of this report lists the 54 regulatory and institutional uncertainties, their uncertainty reduction methods and the recommended status. Appendix B presents each of the uncertainties in the Open Item Standard Report format.

Those uncertainties remaining open, particularly those with uncertainty reduction methods requiring major or minor rulemaking and further analysis, should be re-evaluated to determine if those resolution methods



are still appropriate. Budget and manpower constraints may suggest that alternative, less costly resolution strategies should be considered.

## 4 REFERENCES

- Ballard, R.L., J.O. Bunting, and J.J. Holonich. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Office of Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. *Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60*. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990a. *First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program*. J.M. Taylor, ed. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990b. *Format and Content for the License Application for the High-Level Waste Repository*. Washington, DC: Nuclear Regulatory Commission, Office of Nuclear Regulatory Research.
- Nuclear Regulatory Commission. 1991. *Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program*. J.M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1994. *License Application Review Plan for a Geologic Repository for Spent Nuclear and High-Level Radioactive Waste*. Washington, DC: Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards.

**APPENDIX A**

**REGULATORY AND INSTITUTIONAL UNCERTAINTIES  
RECOMMENDED STATUS**

## REGULATORY AND INSTITUTIONAL UNCERTAINTIES RECOMMENDED STATUS

Open Item Tracking System Identification No.	Topic	Uncertainty Reduction Method	Recommended Status
<b>Institutional Uncertainties</b>			
OINSUNC090003I001	Secondary effects/nonradiological accidents	Guidance	Resolved
OINSUNC090003I002	Will NRC regulate nonradiological safety?	Guidance	Resolved
OINSUNC090207I003	NRC's role regarding EPA's implementation of the Resource Conservation and Recovery Act for the High-Level Waste Repository Program	None identified	Resolved
OINSUNC091225I004	Commission's implementation of the flexibility provision for the subsystem performance objectives	TBD	Open
<b>Regulatory Uncertainties</b>			
OREGUNC090003I001	Information having "significant implications"	Guidance	Resolved
OREGUNC090003I002	Environmental report versus environmental impact statement	Minor Rulemaking	Open
OREGUNC090003I003	Detailed content of application not in 10 CFR 60.21	Guidance	Resolved
OREGUNC090003I004	Criteria used to accept the license application	Guidance (FCRG, LARP)	Resolved
OREGUNC090003I005	Responsibility for the Public Document Room	Minor Rule	Open
OREGUNC090003I006	Consideration for performance confirmation during construction authorization	Minor Rule	Open
OREGUNC090003I007	Unpublished Subpart I in 10 CFR Part 60	Major Rulemaking	Open
OREGUNC090003I008	Clarify "substantially increasing retrieval difficulty"	Guidance	Resolved

Open Item Tracking System Identification No.	Topic	Uncertainty Reduction Method	Recommended Status
<b>Regulatory Uncertainties (cont'd)</b>			
OREGUNC090003I009	Compliance demonstration/determination regarding human intruders and record archiving	Guidance	Resolved
OREGUNC090003I010	"Construction problems" needs clarification	Guidance	Resolved
OREGUNC090003I011	"Anomalous condition" needs clarification	Guidance	Resolved
OREGUNC090003I012	Substantial safety hazard	Guidance	Resolved
OREGUNC090003I013	Significant deviation	Guidance	Resolved
OREGUNC090003I014	Reference clarification	Guidance	Open
OREGUNC090003I015	Design radiation dose criteria	Major Rulemaking	Open
OREGUNC090003I016	Facilitate versus not prevent waste retrieval	Guidance	Resolved
OREGUNC090003I017	Anticipated and unanticipated processes and events	Major Rulemaking	Open
OREGUNC090003I018	Amendments to 10 CFR 60.112 to conform to EPA standard	Major Rulemaking	Open
OREGUNC090003I019	Substantially complete containment	Further Analysis	Open
OREGUNC090003I020	Solid waste form	Guidance	Resolved
OREGUNC090003I021	Anticipated processes and events	Major Rulemaking	Open
OREGUNC090003I022	Unanticipated processes and events	Major Rulemaking	Open
OREGUNC090003I023	Milestone for land ownership and control	Guidance	Resolved
OREGUNC090003I024	Clarification of "geologic setting"	Further Analysis	Open
OREGUNC090003I025	Taking into account the degree of resolution	Further Analysis	Resolved

Open Item Tracking System Identification No.	Topic	Uncertainty Reduction Method	Recommended Status
<b>Regulatory Uncertainties (cont'd)</b>			
OREGUNC090003I026	"Not to affect significantly"	Further Analysis	Resolved
OREGUNC090003I027	Need for criteria for "adequately evaluated"	Further Analysis	Resolved
OREGUNC090003I028	Meaning of "not likely to underestimate effect"	Further Analysis	Resolved
OREGUNC090003I029	Need for criteria for "adequately investigated"	Further Analysis	Resolved
OREGUNC090003I030	Definition of geologic setting	Further Analysis	Open
OREGUNC090003I031	Treatment of combinations of potentially adverse conditions	Guidance	Open
OREGUNC090003I032	Meaning of regional groundwater flow system	Further Analysis	Resolved
OREGUNC090003I033	Meaning of regional groundwater flow system (identical to OREGUNC090003I032)	Further Analysis	Resolved
OREGUNC090003I034	Sorption of radionuclides	Further Analysis	Open
OREGUNC090003I035	Clarification of extreme erosion	Guidance	Resolved
OREGUNC090003I036	"Air-filled" pore spaces	Guidance	Resolved
OREGUNC090003I037	Design all utility testing for essential function	Guidance	Resolved
OREGUNC090003I038	Design to permit nonperiodic inspection	Guidance	Resolved
OREGUNC090003I039	Insufficient guidance in design criteria	Guidance	Resolved
OREGUNC090003I040	Subpart I	Major Rulemaking	Open
OREGUNC090003I041	Applicability of siting criteria to performance objectives	Guidance (STP)	Resolved

Open Item Tracking System Identification No.	Topic	Uncertainty Reduction Method	Recommended Status
<b>Regulatory Uncertainties (cont'd)</b>			
OREGUNC090003I042	Applicability of thermal load requirement to performance objectives	Guidance (STP)	Resolved
OREGUNC090003I043	Waste package containment time frame	Guidance (STP)	Resolved
OREGUNC090003I044	Engineered Barrier System release rate limit	Further Analysis	Open
OREGUNC090003I045	Reference to applicable mine safety standards	Further Analysis	Open
OREGUNC090003I046	Topical guidelines for Licensing Support System	Guidance (FCRG)	Open
OREGUNC090003I047	Criteria for containment of Greater-than-Class-C	Further Analysis	Open
OREGUNC090003I048	Relationship between subsystem performance objectives and overall system performance objective (EPA standard)	TBD	Open
OREGUNC090003I049	Criticality control	TBD	Open
OREGUNC090003I050	Use of the phrase "Quaternary Period"	TBD	Open

**APPENDIX B**

**DRAFT REGULATORY AND INSTITUTIONAL UNCERTAINTY  
OPEN ITEM RECORDS**

# **DRAFT REGULATORY AND INSTITUTIONAL UNCERTAINTY OPEN ITEM RECORDS**

## **OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OINSUNC090003I001

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Secondary effects/non-radiological accidents

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Institutional

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

It is uncertain how NRC is going to determine compliance with mining regulations as they relate to nonradiological accidents whose secondary effects are radiological accidents.

The uncertainty needs to be addressed to ensure adequate oversight of all potential sources of radiological accidents, as well as worker health and safety in the geologic repository operations area.

### **RATIONALE/BASIS:**

In 10 CFR 60.131(b)(9), the NRC has chosen to apply to the geologic repository the safety and health standards of the MSHA underground mine regulation, 30 CFR Chapter I, Part 57. Because the repository does not fit the legal definition of a "mine," those requirements must be enforced by the NRC and/or another agency other than MSHA. This does not present any unusual problems for the NRC with respect to those standards that have to do with the design and operation of underground facilities and equipment important to radiological safety. However, a substantial number of the standards have to do with designs, construction, and operations (including maintenance) that are not



directly related to radiological health and safety. This gives rise to questions as to the oversight and regulation of adherence to those non-radiological standards (1) during the evaluation of the license application, (2) during the evaluations of the various applications for amendment, and (3) during the repository construction and operational phases. Those questions include, but are not limited to, the following:

To what degree is OSHA responsible for the regulation of the non-radiological design, construction, and operational safety of a non-mine underground facility?

To the extent that OSHA may be responsible, will they recognize and regulate the MSHA standards or only their own standards?

Will the NRC evaluate, oversee, and regulate non-radiological design, construction, and operational safety to any MSHA standards not regulated by OSHA? If not, what regulatory oversight will be provided and by what agency?

Which agency (NRC, OSHA or other) will be responsible for the evaluation, oversight, and regulation of non-radiological designs and operations whose failure or whose accident scenarios could produce as a secondary effect, a condition that threatens radiological health and safety?

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The cited regulation requires that the design of the geologic repository operations area is to include provisions for worker protection, so that structures, systems, and components important to safety can perform their intended functions. That is as far as the NRC has jurisdiction. It is not the Commission's role to provide oversight of worker safety generally. Thus, while the mining regulations are a guide to the required design, it is not NRC's role to "determine compliance" with those regulations themselves. The staff recognizes that identification of the particular design features that must be included involves technical uncertainties that will need to be addressed.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As indicated in Ballard, et al, 1991, the NRC has no responsibility or authority to determine compliance with mining regulations. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(9)

**LARP (REVIEW PLAN) NUMBER:** 4.2; 4.3; 4.4

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OINSUNC090003I002

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Will NRC regulate non-radiological safety?

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Institutional

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The NRC intent needs to be clarified as to whether, and to what extent, the term "safely," as used in this paragraph, applies to:

- 1) radiological safety,
- 2) nonradiological "mining" safety (i.e., primarily personnel safety in overall construction and nonradiological operations),
- 3) nonradiological incidents that have the potential to cause radiological accidents, or
- 4) a combination of the above.

NRC needs to address the application of the term "safely" as applied to underground openings, deleterious rock movement, and worker safety in the underground facility, in order to provide guidance to the DOE that will help ensure adequacy of design and operation in the underground facility at the geologic repository operations area.

### RATIONALE/BASIS:

DOE implementation and NRC assessment of compliance with this Regulatory Requirement is dependent upon the intended scope of the word "safely" as it appears in 10 CFR 60.133(e)(1). The

term needs to be clarified to ensure that guidance to DOE is clear and that the process of compliance determination is well defined.

Provisions for non-radiological safety in the underground facility will both reduce the likelihood of accidents and generally contribute to radiological safety in the event of an accident. In the event of a failure of an opening because of rock movement in the underground facility [10 CFR 60.133(e)(2)], waste containment may fail, in which case a non-radiological incident in the underground facility could lead to a release of radioactive materials.

10 CFR 60.133(e)(1) addresses the safety-related design of all underground openings, including the waste package emplacement openings. However, the intended scope of the term "safely" needs to be clarified relative to the areas identified in the uncertainty text above.

Safety in design and construction of underground openings includes worker safety, which is covered in 30 CFR Part 57 and invoked by 10 CFR 60.131(b)(9). NRC is primarily concerned with radiological safety and DOE has the responsibility for non-radiological safety. Safety is addressed in part by the Memorandum of Understanding (MOU) between the NRC and OSHA which denotes general areas of responsibility of each agency and the MOU between DOE and the U.S. Department of Labor which outlines the working arrangement between MSHA and DOE for compliance with 30 CFR Part 57. Neither MOU addresses the safety issue of oversight of the potential radiological secondary effects of non-radiological incidents.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

As stated in 10 CFR 60.130, the specific design criteria are " ... minimum criteria for the design of the geologic repository operations area." Further, "These design criteria are not intended to be exhaustive, however." Omissions in 10 CFR 60.131 through 60.134 do not relieve DOE from any obligations to provide safety features in a specific facility needed to achieve the performance objectives."

Since the performance objectives are all radiological standards, the design criteria must be interpreted with that scope in mind. However, because some traumatic accidents may have radiological implications, even though they are not radiological per se, they are of concern.

Accordingly, when the regulations call for the design to ensure that operations can be carried out "safely," it means that there should be protection against any injuries that would give rise to significant radiological consequences.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." NRC regulations intend "safely" to mean there should be protection against any injuries that would give rise to significant consequences. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.133(e)

**LARP (REVIEW PLAN) NUMBER:** 4.4; 4.5.2; 5.3

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

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Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OINSUNC090207I003

**LAST UPDATE:** 25 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** NRC's role regarding EPA's implementation of the Resource Conservation and Recovery Act (RCRA) for the High-Level-Waste Repository Program

**RESPONSIBLE BRANCH/SECTION:** HLUR/ HLW Project and QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY

**SOURCE DOCUMENT:** SECY 90-207

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Institutional

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

EPA's RCRA regulations concern chemically hazardous wastes. Because RCRA created an overlapping regulatory authority with the Atomic Energy Act (AEA), EPA can regulate any high-level waste already regulated by NRC under 10 CFR Part 60 that is found to contain RCRA-defined chemically hazardous substances. As a consequence, it is not clear how the affected agencies (both EPA and NRC) would administratively implement their respective programs in the context of AEA and RCRA.

**RATIONALE/BASIS:**

See Text

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

A Commission Paper was used to document the staff's position on this issue.

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

NRC's role does not include independently evaluating DOE's demonstration of compliance with RCRA, since this responsibility falls within the jurisdiction of the EPA.

**HISTORY:**

07 Jun 1990 - SECY 90-207 issued with this uncertainty identified.

29 Jul 1991 - SECY 91-225 issued with this uncertainty identified (UN50). This document also related that the uncertainty had been reduced by the Commission paper.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." SECY 91-225 adequately resolved this uncertainty, therefore, no further action is necessary.

**CROSS REFERENCE**

**CITATION:** None

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. *First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program*. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. *Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program*. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OINSUNC091225I004

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Commission's implementation of the flexibility provision for the subsystem performance objectives

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 29 Jul 1991

**SOURCE TYPE:** Not available

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Institutional

**SPECIFIC TECHNICAL TYPE:** N/A

**OPEN ITEM TEXT:**

Flexibility in implementing the subsystem performance objectives of 10 CFR 60.113(a) is provided by 10 CFR 60.113(b), which states "On a case-by-case basis, the Commission may approve or specify some other radionuclide release rate, designed containment period or pre-waste emplacement groundwater travel time, provided that the overall system performance objective, as it relates to anticipated processes and events, is satisfied." There is a concern that this provision may inadvisedly require the Commission, which is ultimately concerned with achievement of an overall safety goal, to become unduly involved in the subsystem balancing function that is appropriately the role of the system designer (e.g., the DOE). It is also unclear how and when the Commission would implement this provision.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None



**UNCERTAINTY RESOLUTION METHOD TYPE:**

None

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

None

**HISTORY:**

July 29, 1991 - This item was identified as UN52 in SECY 91-225 (Nuclear Regulatory Commission, 1991).

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(b)

**LARP (REVIEW PLAN) NUMBER:** 3.3; 5.4

**REFERENCES:**

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I001

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Information having "significant implications"

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

The term "significant implications" needs clarification in relation to the fields of public health and safety, and common defense and security. Clarification or definition will avoid unnecessary action by the DOE in minor matters and will ensure proper action for those matters of importance that satisfy the regulatory intent of the Commission.

### **RATIONALE/BASIS:**

The regulation fails to provide guidance for safety and security related information that must be reported to the NRC by the DOE. Without reporting specifications, conditions that could have a deleterious effect on public health and safety or common defense and security might not be reported to the Commission.

High-order criteria that are consistent with the intent of the Commission are necessary to define what constitutes " ... information ... having ... significant implication for public health and safety or common defense and security." One example of such a criterion might be information in regard to conditions that compromise, or may compromise, the ability of the repository to meet the performance objectives in the areas of public health and safety or common defense and security.

In the absence of decision criteria, reliance on individual judgement to determine significance makes different interpretations possible in response to a given situation. Generic, high-order criteria to codify significance would serve to identify those situations worthy of reporting and provide for a measure of consistency in implementation of the regulation.

In addition, it is also desirable to prevent significant problems before they occur. As explained in the Supplementary Information, regulatory violations carry penalties commensurate with the magnitude of the offense. At present, the reporting of significant information appears to rest entirely on the judgement of the licensee. It is prudent to consider the possibility of a standard for significant information. This would promote vigilance by the licensee, provide an additional measure of assurance for detecting situations that produce significant risks, and promote reporting that is consistent with the needs of the Commission.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Paragraph (b) of 10 CFR 60.10 reads: "Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant or licensee violates this paragraph only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security ... ."

Section 60.10(b) was added to the Commission's regulations as part of a rulemaking that addressed the need for the NRC to receive complete, accurate, and timely communications from all of its licensees and license applicants. Thus, in addition to its application to geologic repositories, its counterparts can be found in those portions of NRC's regulations that apply to other material and facility licensees, as well.

As a matter of fact, the issue raised by the Center for Nuclear Waste Regulatory Analyses is one that was specifically addressed by the Commission when it adopted the regulations in question. Commenters on the proposed rule, which would require applicants and licensees to notify the Commission of information they have identified as having a significant implication for public health and safety, or common defense and security, indicated that further clarification of what is "significant" would be desirable. The Commission's response to 52 FR 49363, December 31, 1987, was as follows:

"The Commission believes that the requirements of proposed paragraph (b) are sufficiently clear that licensees will be able to determine when reporting is required. The standard for reporting is not so broad that licensees will have difficulty recognizing it. For example the rule does not require licensees to predict what the NRC will likely deem to be "material" information, an arguably vague standard; rather the standard is one of a licensee's own recognition of information with significant

health or safety or common defense or security implications. This is a standard that the Commission should reasonably expect licensees to understand and apply. Moreover the notice of proposed rulemaking gives guidance, in the form of examples, as to what could indicate recognition by licensees of the significance of the information. As noted in VEPCO, no specific set of regulations can be expected to cover all possible circumstances; within this constraint the Commission believes the requirements of paragraph (b) are clearly set forth."

The examples set out in the notice of proposed rulemaking, as here referred to by the Commission, observed that " ... an applicant's or licensee's recognition of information as significant could be established by the fact that specific meetings were held to discuss the matter, analyses performed or other internal actions taken to evaluate the matter." 52 FR 7432, March 11, 1987.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The standard for reporting is intended to refer to the licensee's own recognition of information with significant implications for health or safety or common defense or security. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.10(b)

**LARP (REVIEW PLAN) NUMBER:** None

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I002

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Environmental report versus environmental impact statement

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

10 CFR 60.23 uses the terms "environmental report" and "site characterization report," which is inconsistent with Nuclear Waste Policy Act (NWPA) and with other July 3, 1989, changes to 10 CFR Part 60. It should be made clear that these terms are intended to be "environmental impact statement" and "site characterization plan," respectively.

**RATIONALE/BASIS:**

Consultation with the NRC indicates that this potential uncertainty is an oversight that will be corrected at the first opportunity so that 10 CFR 60.23 agrees with other sections of 10 CFR Part 60, as they were amended on July 3, 1989 and the NWPA, as amended. This is intended to be accomplished simply by changing "environmental report" to read "environmental impact statement" and "site characterization report" to read "site characterization plan."

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Minor Rule Change

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

10 CFR Part 60 was amended in 1989 so as to use the term Environmental Impact Statement (EIS) in lieu of the environmental report hitherto called for by the regulations. Inadvertently, one reference to an "environmental report" was not amended. The proposed resolution corrects this situation by allowing incorporation by reference for all DOE submissions (which would include the EIS).

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.23

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I003

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [recommendations] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Detailed content of application not in 10 CFR 60.21

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

Although 10 CFR 60.21 describes general requirements for what should be included in the general information and Safety Analysis Report in the license application, more detailed guidance is required so that DOE can prepare a complete application.

### **RATIONALE/BASIS:**

The content requirements of the license application need to be better specified so that DOE can determine what information needs to be developed or collected to support the License Application and can submit a complete and high-quality license application. For other regulated facilities NRC has found the need to address similar situations by issuing a license application format and content guide; such as NUREG-1199, Standard Format and Content of a License Application for Low-Level Radioactive Waste Disposal Facility or Regulatory Guide 3.48, Standard Format and Content for the Safety Analysis Report for an ISFSI or MRS. This uncertainty will be addressed in the Format and Content Regulatory Guide for the Geologic Repository (Nuclear Regulatory Commission, 1990a). This uncertainty is originally presented in SECY-88-285.

### **RECOMMENDATIONS:**

None



**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Preparation of a License Application Format and Content Guide for a high-level radioactive waste repository is planned (see SECY 90-207) and a draft for public review and comment was published November 1990.

No further regulatory action, other than the completion of this regulatory guide, will be necessary to resolve this uncertainty.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." A draft "Format and Content Guide for the Licensing Application for the High-Level Waste Repository," (Nuclear Regulatory Commission, 1990a), which provides detailed generic license application guidance, was published November 1, 1990. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.21

**LARP (REVIEW PLAN) NUMBER:** All

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990a. Format and Content for the License Application for the High-Level Waste Repository. DG-3003. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC0900030I004

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Criteria used to accept the license application

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

It is uncertain whether 10 CFR Part 60 and other regulations adequately describe the means used to qualify a license application for docketing. Adequate criteria are needed by both DOE and NRC to determine the acceptability of the application for docketing.

**RATIONALE/BASIS:**

This uncertainty was originally presented in SECY-88-285. Acceptance criteria for docketing are apparently not addressed in 10 CFR Part 60, or 10 CFR Part 2. The presence of well-defined criteria serves to improve the effectiveness of prelicensing consultation and the licensing review process. 10 CFR 60.24(a) states:

The application shall be as complete as possible in the light of information that is reasonably available at the time of docketing.

10 CFR 2.101(f)(3) states:

"If the Director of Nuclear Material Safety and Safeguards determines that the tendered document is complete and acceptable for docketing, a docket number will be assigned and the applicant will be notified of the determination. If it is determined that all or any part of the tendered document is incomplete and therefore not acceptable for processing, the applicant will be informed of this determination and the respects in which the document is deficient."

The questions underlying this potential uncertainty are (1) what criteria will be used to determine if the application is "complete" and (2) whether "completeness" (presumably with respect to the Format and Content Regulatory Guide and/or the License Application Review Plan) is sufficient as the sole criterion used to accept the application for docketing.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Further analysis is required to determine the need for high-level waste (HLW) repository license application acceptance criteria other than that to be provided in the HLW Repository License Application Format and Content Guide (Nuclear Regulatory Commission, 1990a).

In SECY 89-339 (Nuclear Regulatory Commission, 1989), it was noted that "Developing criteria for acceptance of the License Application will provide a documented basis on which to accept or reject the License Application." "Acceptance criteria might also improve the effectiveness of prelicensing consultation and the Site Characterization Plan (SCP) Progress Report review process by encouraging DOE to resolve NRC staff concerns before the License Application is submitted." In SECY 90-207 (Nuclear Regulatory Commission, 1990b), "First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program," developing license application docketing criteria and content is identified as an activity for reducing regulatory uncertainty.

The Draft Regulatory Guide DG-3003, "Format and Content for the License Application for the High-Level Waste Repository," (Nuclear Regulatory Commission, 1990a) includes Section 1.6.2, "Status of DOE Resolution of NRC Objections to License Application Submittal." This section provides guidance to the DOE on specific information to be provided for the NRC to reach a decision on docketing the License Application (LA). For example, "Therefore, as part of the acceptance review of the LA and before a decision on docketing the LA, the NRC staff will evaluate the effect of any unresolved objection to LA submittal, both individually and in combination with others, on the NRC staff's ability to conduct a meaningful review and make a decision regarding construction authorization within the three-year statutory time period."

NRC staff will review public comments on this proposed regulatory guidance in determining the need for further action on this uncertainty.

This uncertainty will require further analysis, following public comments, to determine any revisions to the Draft Regulatory Guide, as well as preparation of acceptance criteria for the License Application Review Plan.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

November 12, 1993 - CNWRA TOP-001-13, Development of Compliance Determination Methods, is issued which provides review procedures and acceptance criteria for Acceptance Reviews for docketing.

September, 1994 - NUREG-1323, License Application Review Plan for a Geologic Repository for Spent Nuclear Fuel and High-Level Radioactive Waste (Nuclear Regulatory Commission, 1994) which formally published the Acceptance Review procedures and acceptance criteria is issued.

TBD - [recommendations] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The procedure for developing Compliance Determination Methods (Brient, 1993) and the LARP (Nuclear Regulatory Commission, 1994) provide specific criteria for acceptance reviews for docketing the license application. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.24(a)

**LARP (REVIEW PLAN) NUMBER:** 2.3, 2.4

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Brient, R.D. 1993. Development of Compliance Determination Methods. CNWRA TOP-001-13. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1988. Regulatory Strategy and Schedules for the High-Level Waste Repository Program. SECY 88-285. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1989. Regulatory Strategy for the High-Level Waste Repository Program Description of Uncertainties Being Addressed by the U. S. Nuclear Regulatory Commission Staff. SECY 89-339. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. Format and Content for the License Application for the High-Level Waste Repository. DG-3003. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1994. License Application Review Plan for a Geologic Repository for Spent Nuclear Fuel and High-Level Radioactive Waste. NUREG-1323. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I005

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Responsibility for the Public Document Room

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

As presently written, 10 CFR 60.22(d), when taken in the context of the balance of 60.22, can be interpreted to require DOE to be responsible for the contents of an NRC public document room. The intent of the regulation needs to be clarified.

**RATIONALE/BASIS:**

Subpart B of 10 CFR Part 60 is divided into sections which, in general, contain either generally applicable requirements or requirements applicable to a single agency. Where a section contains a mix of responsibilities (e.g., 60.18) the agency responsible for the requirement(s) of each paragraph is clearly identified. The outstanding exception is paragraph 60.22(d) which includes no explicit assignment of responsibility. However, because the balance of 60.22 and the subject (and title) of 60.22 are clearly DOE responsibilities, 60.22(d) would normally be read in that context.

The above facts, the definition of "public document room" in 10 CFR Parts 2 and 60, and the fact that DOE also has public document rooms, combine to produce the perceived uncertainty.

10 CFR 60.22(d) requires that "At the time of filing of an application and any amendments thereto, a copy shall be made available IN (emphasis added) an appropriate location near the proposed geologic repository operations area (which shall be a public document room, if one has been established) for inspection by the public ... ." As used in 10 CFR Parts 2 and 60, the term public document room means an NRC public document room. DOE cannot be required to be responsible for the contents in a public document room which is under NRC control.

An alternative interpretation is that these documents should be made available in a "DOE public document" room. If this was the intent of the regulation, then the public location must clearly be defined as a "DOE public document room". In either case the intent of the regulation needs to be clarified.

The term "in" can reasonably be expected to mean that the DOE, by providing a copy to the NRC with a transmittal requesting that it be made available in the public document room in accordance with 10 CFR 60.22(d), has fulfilled their requirement to put it in the public document room.

Again, the actual intent of the NRC needs to be clarified.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Minor Rule Change

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The Minor Rule Change would include the following:

1. Revise 10 CFR 60.22(d) to read: "At the time of filing of an application and any amendments thereto, DOE shall make one copy available in an appropriate location near the proposed geologic repository operations area for inspection by the public. DOE shall make the environmental impact statement and any supplements thereto available in the same manner. If the Commission has established a public document room at such a location, DOE shall comply with this paragraph by depositing the specified documents with the Commission at that public document room."
2. Insert a new 10 CFR 60.22(e) to read: "DOE shall produce an updated copy of the application, and the environmental impact statement and supplements at any public hearing held by the Commission on the application, for use by any party to the proceeding."
3. Redesignate 10 CFR 60.22(e) as new 60.22(f) and revise the phrase "paragraphs (c) and (d)" to read "paragraphs (c) and (e)."

The amended language would make it clear that if a NRC public document room is established, DOE's responsibility extends only to depositing the required documents (which would thereafter be the responsibility of NRC, as documents custodian).



The language would also make it clear, however, that there is a second, independent requirement -- for DOE to produce updated documents at public hearings. Separating this from the Public Document Room-deposit provision will express the requirements more clearly.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.22(d)

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I006

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Consideration for performance confirmation during construction authorization

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The intent of NRC needs to be clarified relative to the review and/or approval of the performance confirmation program (Subpart F of 10 CFR 60) to be performed during the construction phase. Performance confirmation should be considered as a part of the construction authorization process to maintain consistency within 10 CFR 60.31(a) (which references consideration of the programs and/or plans of Subparts E, G, H, and I) and to provide consistency with Subpart F (in particular, 10 CFR 60.140). Approval of the planned Performance Confirmation Program should be an aspect of NRC's considerations to authorize construction.

**RATIONALE/BASIS:**

10 CFR 60.31 relates various Subparts of 10 CFR Part 60 to review and consideration of construction authorization, which in turn regulates the authorized activities of DOE. One of these DOE activities is the performance confirmation program (described in Subpart F of 10 CFR 60), which is required to begin during site characterization and continue until closure. NUREG-0804 states that the reference to Subpart F was deleted here, and moved to 10 CFR 60.74. However, section 60.74 is directed specifically toward regulation of DOE actions rather than the review and authorization of these actions by NRC.

10 CFR 60.137 solely applies to requirements that DOE, the licensee, must comply with. 10 CFR 60.31 is what NRC, the license grantor, must accomplish. This is clarified by quoting 10 CFR 60.31, "Upon review and consideration of an application and environmental impact statement submitted under this part, the Commission may authorize construction if it determines:" (emphasis added).

10 CFR Part 60 does not presently require DOE to prepare a plan for Performance Confirmation. Since Performance Confirmation will be an integral part of the construction phase, it would seem appropriate for DOE to submit such a plan in the construction authorization (license) application for review by the NRC under the same constraints provided in 10 CFR 60.31(a) for other applicable Subparts of 10 CFR Part 60. The NRC intent in this regard needs to be made clear to all parties.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Minor Rule Change

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The suggested minor rule change is to:

1. Redesignate 10 CFR 60.21(c)(14) as 10 CFR 60.21(c)(14)(i).
2. Add a new 10 CFR 60.21(c)(14)(ii), to read, "A description of the performance confirmation program."

The regulations require the DOE to perform, or permit the Commission to perform, a performance confirmation program in accordance with Subpart F (10 CFR 60.74). To the extent the Commission finds it necessary, the construction authorization will include conditions further defining the performance confirmation requirements (10 CFR 60.32).

However, the contents of the application section (10 CFR 60.21) contain no explicit provision for DOE to describe the performance confirmation program that it proposes to undertake. Such information is important to the Commission both substantively (helping to provide reasonable assurance of protection of health and safety) and procedurally (helping in the formulation of appropriate license conditions).

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.31

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I007

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:** None

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Unpublished Subpart I in 10 CFR Part 60

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

10 CFR 60.31( a)(5) requires the Commission to determine that DOE's emergency plan complies with the criteria of Subpart I, a reserved (unpublished) Subpart in 10 CFR Part 60. Subpart I needs to be published in order to provide emergency plan criteria.

**RATIONALE/BASIS:**

The absence of criteria for emergency planning, which will be included in Subpart I, is an uncertainty that needs to be addressed so that a complete application can be prepared by the DOE. The Commission may issue a construction authorization if it determines that DOE's application includes an emergency plan which is compliant with Subpart I of 10 CFR Part 60. The Regulations of the Federal Emergency Management Agency may be useful in the preparation of Subpart I.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The Commission plans to initiate rulemaking to establish emergency planning criteria under Subpart I in 10 CFR Part 60.

The reserved Subpart I, "Emergency Planning Criteria," is intended to resolve this uncertainty when completed. Because 10 CFR 60.31(a)(5) requires DOE's emergency plan to be in compliance with 10 CFR Part 60, Subpart I, at the time a Construction Authorization is issued, DOE must know the NRC's "Emergency Planning Criteria," to prepare the License Application. A policy and technical basis for the intended rulemaking will be developed and rulemaking undertaken as set forth in SECY 90-207 (Nuclear Regulatory Commission, 1990).

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.31(a)(5)

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I008

**LAST UPDATE:** 12 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Clarify "substantially increasing retrieval difficulty"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

There appears to be an inconsistency between the phrase "substantially increase the difficulty of retrieving such emplaced waste ..." in 10 CFR 60.46(a)(1) and the intent of 10 CFR 60.111(b), as expressed in NUREG-0804. This apparent inconsistency may place an unnecessary regulatory burden on both NRC and DOE in that it would require license amendments under 60.46(a)(1) for changes which "substantially increase the difficulty of retrieving" while the basic requirement of 60.111(b) is only that retrieval be possible.

**RATIONALE/BASIS:**

This uncertainty was included in the document "Analysis and Evaluation of Regulatory Uncertainties in 10 CFR 60." There exists a potential inconsistency with the wording in 10 CFR 60.46(a)(1) and the present understanding of the intent of 10 CFR 60.111(b). As expressed in NUREG-0804. If the intent is that the repository only be designed not to preclude retrieval, then changes to the repository design that make retrieval more difficult but still possible remain consistent with this intent. Thus, the requirement to amend the license is unnecessary.



There is another interpretation that may be argued relative to 10 CFR 60.46(a)(1). Retrieval methods are site and design specific. Consequently, individual technical criteria may change considerably because of specific site conditions. Because of this site-specific nature, retrievability will be defined by the design/plan submitted in the safety analysis report [(60.21(c)(12))] When that design/plan is approved by the NRC and incorporated in the license. Any action which would result in a substantial increase in the difficulty of retrieving emplaced waste (relative to the plan in the license), would require an amendment.

If this interpretation reflects the NRC intent, the incorporation in the public record of a statement such as that above would (1) divorce 60.46(a)(1) from any uncertainty in 60.111(b) and (2) answer, for all parties, the question "substantially increase difficulty relative to what?"

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Actions that "... substantially increase the difficulty of retrieving" waste encompass a range of actions that might be undertaken without precluding waste retrieval. However, this does not represent any inconsistency with 10 CFR 60.11 (a) or other provisions of Part 60. The objective of 10 CFR 60.46(a) is to ensure that the judgment as to whether such action should be undertaken is not made unilaterally by DOE. Rather, DOE must describe its intended action to the Commission [under 10 CFR 60.46(b)], which will be guided by the considerations that govern the issuance of the initial license. Accordingly, the DOE submission is to be judged by the same performance objectives as set out in 10 CFR 60.111(b), 60.112, and 60.113, and if the action is acceptable under that standard, an amendment will be issued.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The existing requirement is appropriate since it ensures that actions affecting retrievability are reviewed by the NRC before irreversible steps are taken by the DOE. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.46(a)(1)

**LARP (REVIEW PLAN) NUMBER:** None

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I009

**LAST UPDATE:** 12 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Compliance demonstration/determination regarding human intruders and record archiving

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

In the absence of specific criteria, the phrase "that would likely be consulted by potential human intruders" does not lend itself to explicit definition and requires clarification so that realistic archiving can be accomplished.

**RATIONALE/BASIS:**

It may be very difficult to identify "potential human intruders" or to project the likelihood of "potential human intruders" consulting archives in the United States or anywhere in the world, in the future after permanent closure.

Per 10 CFR 60.21(c)(15)(vi), the license application Safety Analysis Report (SAR) must include plans for permanent closure, which includes the use of archives. The provision, for example, of generic high-order decision criteria for archive selection would clarify the NRC intent for all parties without loss of regulatory flexibility in any detrimental sense.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

10 CFR 51(a) calls for the DOE to submit an updated license application, before permanent closure, that is to include a detailed description of the measures to be employed to regulate or prevent activities that could impair the long-term isolation of emplaced waste within the geologic repository and to ensure that relevant information will be preserved for the use of future generations. It is in that context that the regulations require placement of records in archives and land record systems that would be likely to be consulted by potential human intruders.

There are good reasons why the regulations are not more specific. In the first place, the appropriate data repositories are not to be defined until the time of permanent closure. This is several decades away, and it is not practicable to identify just what the appropriate archives and record systems will be. Second, the appropriate location for such records is, to some degree, dependent on the specific site of the geologic repository. If, for example, the geologic setting is characterized by the presence of certain economic minerals or by the occurrence of peculiar seismic phenomena, the appropriate archives might include those that relate to the minerals or phenomena that are or may be present. Third, the regulations clearly articulate the policy framework by which the adequacy of the archive and record systems is to be judged -- namely, the regulation or prevention of activities that could impair long-term isolation.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." Archives that are likely to be consulted by potential human intruders are to be identified in the license amendment for permanent closure and should be commensurate with the state of knowledge and data-handling technology. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.51(a)(2)(ii)

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I010

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** "Construction problems" needs clarification

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "construction problems" requires further definition in order to ensure documentation of all those problems of interest to the Commission, and to clearly identify appropriate recordkeeping requirements for DOE.

**RATIONALE/BASIS:**

In response to this requirement, the DOE might define threshold criteria for "construction problems" that are not consistent with the intent of the Commission and, hence, not sufficiently conservative. It would seem desirable for the NRC to require, for example, documentation of those problems that could ultimately have an effect on the ability of the repository to function as designed. The extent of documentation required by the Commission in the regulation is not clear.

In the absence of decision criteria, the "construction problems" reported by the licensee under Section 60.72(b) will be the result of situational judgement and may vary depending on the individual involved. The uncertainty resides in the possibility of inconsistent and inadequate implementation of the regulation, given its reliance on individual interpretation.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The term "construction problems" is adequately defined by its context. That is, the "construction problems" at issue are -- as stated in the introductory text of 10 CFR 60.72(b) -- those for which records are "... required under paragraph (a)." This means, in turn, that the construction problems that must be documented are those that pertain to "usability for future generations in accordance with 10 CFR 60.51(a)(2)." The latter reference requires the DOE, before permanent closure, to update its license application so as to include a detailed description of measures to be employed to ensure that relevant information will be preserved for future generations. Accordingly, if the construction problems are relevant to future generations -- particularly, as stated in 10 CFR 60.51(a)(2), for the purpose of regulating or preventing activities that could impair the long-term isolation of emplaced waste -- then they fall within the scope of 10 CFR 60.72(b). Other construction problems may also be of interest, and may need to be documented as part of DOE's quality assurance program or pursuant to a condition of the construction authorization [see 10 CFR 60.31(b)(1)], but they are not addressed by 10 CFR 60.72(b).

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." NRC intends the "construction problems" to mean those that need to be documented to ensure the long-term information availability to future generations to provide a basis for regulating or preventing activities that may be detrimental to long-term isolation of waste. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.72(b)(6)

**LARP (REVIEW PLAN) NUMBER:** 7.5

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.



## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I011

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** "Anomalous condition" needs clarification

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

The term "anomalous conditions" requires further definition in order to ensure documentation of all those conditions of interest to the Commission, and to clearly identify appropriate recordkeeping requirements for the DOE.

### **RATIONALE/BASIS:**

In response to this requirement, the DOE might define threshold criteria for "anomalous conditions" that are not consistent with the intent of the Commission and, hence, not sufficiently conservative. It would seem desirable for the NRC to require, for example, documentation of those problems that could ultimately have an effect on the ability of the repository to function as designed. The extent of documentation required by the Commission in the regulation is not clear.

In the absence of decision criteria, the "anomalous conditions" reported by the licensee under Section 60.72(b) will be the result of situational judgement and may vary depending on the individual involved. The uncertainty resides in the possibility of inconsistent and inadequate implementation of the regulation, given its reliance on individual interpretation.

### **RECOMMENDATIONS:**

None

## **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

## **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The term "anomalous conditions" is adequately defined by its context. The anomalous conditions are those that are relevant "... to regulate or prevent activities that could impair the long-term isolation of emplaced waste within the geologic repository and to assure that relevant information will be preserved for the use of future generations" [10 CFR 60.51 (a)(2)].

## **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991- NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." NRC considers the term "anomalous conditions" to be adequately defined by its context in the regulation. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.72(b)(7)

**LARP (REVIEW PLAN) NUMBER:** 7.5

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

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**OITSID:** OREGUNC090003I012

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Substantial safety hazard

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "substantial safety hazard" requires further definition in regard to the characteristics of the Site and the design and construction of the geologic repository operations area. More specific guidance is needed to ensure that those hazards reported by DOE satisfy the regulatory intent of the Commission.

**RATIONALE/BASIS:**

The use of the word "substantial" in the regulation implies that only a specific class of safety hazards are to be reported to the Commission and that minor hazards apparently should be excluded from these reports. However, division between "minor" and "substantial" hazards is unclear. More explicit guidance would serve to clarify the intent of the Commission.

The definition of "substantial safety hazard" in 10 CFR Part 21, also appears to have an uncertainty ("... major reduction ..."). However, neither 10 CFR 21, nor the hearing records associated with Part 21 were included in the regulatory analysis for this potential uncertainty. 10 CFR Part 60 does not reference Part 21; however, 10 CFR Part 60 is within the scope of Part 21.

**RECOMMENDATIONS:**

None

## **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

## **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Section 206 of the Energy Reorganization Act of 1974, U.S.C. 5846, imposed upon certain parties an obligation to notify the NRC of defects that "... could create a substantial safety hazard, as defined by regulations which the Commission shall promulgate."

In implementing this provision, the Commission defined the term "substantial safety hazard" [in 10 CFR 21.3(k)] to refer to a "... loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety ... ."

The Commission's statement of considerations, accompanying the promulgation of the rule (42 FR 28801, June 6, 1977), expressly declared that "... insufficient experience has been accumulated to permit the writing of a detailed regulation at this time that would provide a precise correlation of all factors pertinent to the question of what is a significant safety hazard." Rather, the Commission identified certain criteria that it indicated to be "... appropriate for determination of creation of a substantial safety hazard" -- namely: - Moderate exposure to, or release of, licensed material; - Major degradation of essential safety-related equipment; and - Major deficiencies involving design, construction, inspection, test, or use of licensed facilities or material.

In view of this policy direction from the Commission, the staff regards the existing regulation to provide an adequate basis for determining compliance. However, as the Commission indicated when it issued the rule, "... additional guidance in the form of regulatory guides may be developed should experience with the application of Part 21 indicate the need for such guidance." Such experience would be derived from ongoing activities licensed under other parts of NRC regulations and would be applied to a geologic repository, as appropriate.

## **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." "Substantial safety hazard" is defined by NRC as a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.73

**LARP (REVIEW PLAN) NUMBER:** 7.5

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

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**OITSID:** OREGUNC090003I013

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Definition of "significant deviation"

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "significant deviation" requires further definition in regard to "design criteria and design bases stated in the application." More specific guidance will ensure that those deviations reported by DOE satisfy the regulatory intent of the Commission.

**RATIONALE/BASIS:**

The use of the word "significant" in the regulation implies that only a specific class of deviations are to be reported to the Commission. That is, minor issues are apparently intended to be excluded from these reports. However, given the present wording of the regulation, the Commission's intent regarding the division between "minor" and "significant" deviations is unclear.

The definition of "deviation" in 10 CFR Part 21 does not serve to clarify the meaning in 60.73(b). However, neither 10 CFR 21, nor the hearing records associated with Part 21 were included in the regulatory analysis for this potential uncertainty. 10 CFR Part 60 does not reference Part 21; however, 10 CFR Part 60 is within the scope of Part 21.

**RECOMMENDATIONS:**

None

## **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The term "significant deviation" is not unique to 10 CFR Part 60. On the contrary, in similar context, a holder of a construction permit is required to notify the Commission of every deficiency found, in design and construction, that could adversely affect the safe operation of a nuclear power plant and that represents, *inter alia*:

"... a significant deviation from performance specifications which will require extensive evaluation, extensive redesign, or extensive repair to establish the adequacy of a structure, system, or component to meet the criteria and bases stated in the safety analysis report or construction permit or to otherwise establish the adequacy of the structure, system, or component to perform its intended safety function." [10 CFR 50.55(e)(1)(iv)].

The requirement in 10 CFR 60.73 -- that the DOE is to promptly notify the Commission of each deficiency that represents "... a significant deviation from the design criteria and design bases stated in the application ..." -- does not stand alone. It must be read in conjunction with 10 CFR 60.32(b), which, among other things, states that "The Commission will incorporate, in the construction authorization, provisions requiring DOE to furnish periodic or special reports regarding ... (2) any data about the site obtained during construction which are not within the predicted limits upon which the facility design was based, (3) any deficiencies in design and construction which, if uncorrected, could adversely affect safety at any future time ..." Thus, there is in place a mechanism to specify the conditions that would call for reports to be filed during construction, pursuant to 10 CFR 60.73. There may be a need to be more specific regarding matters that might need to be reported once a license to receive and possess waste has been issued. However, since "significant deviation" is a departure from the technical requirements in the content of a construction permit, these might be handled by license conditions, with no compelling need to address the matter for many years to come.

### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.



TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The reporting requirements will be clarified as appropriate by provision of the construction authorization. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.73(b)

**LARP (REVIEW PLAN) NUMBER:** 7.5

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I014

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Reference clarification

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

Criteria are needed to determine the lowest level of referenced regulations which are to be incorporated in order to determine the extent of applicability of referenced regulations.

**RATIONALE/BASIS:**

If one were to list the regulations incorporated by reference in one regulation, then add to the list those additional regulations incorporated by reference in those referenced regulations, etc., very few levels of references would, in general, produce a very large list of regulations. In the absence of specific citations of applicable sections, descriptions of limited applications of the references, or similar criteria, the user of the regulation has no guidance for determining the extent of applicability of referenced regulations.

Following chains of references frequently leads to regulations which are not intended to apply, and it is uncertain what actions are required for compliance. 10 CFR 60.111(a) references 10 CFR 20, without citation to a specific applicable section. The wording of the reference in 111(a) ("... radiation exposures and radiation levels, and releases of radioactive materials to unrestricted area, will at all times be maintained within the limits specified in Part 20 of this chapter ...") would apparently delimit the sections of 10 CFR 20 which apply. Interpretation of which sections of Part 20 which

apply is unclear, however, for certain specific cases. For example, 10 CFR 20.405(c) requires a report if limits specified in 40 CFR 190 are exceeded. The limits in 40 CFR 190 are not specified as applicable to the geologic repository operations area, however. It is, therefore unclear as to which sections of 40 CFR 190 are applicable.

It should be noted that the NRC policy that is the subject of this uncertainty would also apply to referenced regulations in 10 CFR 20, 10 CFR 51, and any EPA standards to be cited (e.g., the revised 40 CFR 191).

This uncertainty is generic in nature, and is an excellent example of staircasing regulations. Its resolution will also resolve the same question in other Regulatory Requirements.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

For the Commission to issue a license to receive and possess (radioactive) material at a geologic repository under Part 60, the Commission must find that: "Construction of the geologic repository operations area has been substantially completed in conformity with ... the rules and regulations of the Commission." [10 CFR 60.41(a)] and "The activities to be conducted at the geologic repository operations area will be in conformity with ... the rules and regulations of the Commission." [10 CFR 60.41(b)].

Among the regulations of the Commission is 10 CFR Part 20, the scope of which is defined in 10 CFR 20.2, as follows: "The regulations in this part apply to all persons who receive, possess, use or transfer material licensed pursuant to the regulations in Parts 30 through 35, 39, 40, 60, 61, 70 or 72 of this chapter, including persons licensed to operate a production or utilization facility pursuant to Part 50 of this Chapter."

As this provision explicitly states, therefore, all the regulations in 10 CFR Part 20 must be construed as applicable to a geologic repository.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As noted in the rationale for uncertainty reduction method selection, all regulations in 10 CFR Part 20, as referenced in 10 CFR 60.111(a), must be considered applicable to a geologic repository. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.111(a)

**LARP (REVIEW PLAN) NUMBER:** 4.2-4.4; 4.5.1; 5.5; 8.4

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I015

**LAST UPDATE:** 12 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Design radiation dose criteria

**RESPONSIBLE BRANCH/SECTION:** PAHB/Performance Assessment and Health Physics Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

Regulations referenced by 10 CFR 60.111(a) provide different radiation dose criteria for both normal operations and accidents. These differences need to be reconciled to provide clear performance objectives for both conditions.

### **RATIONALE/BASIS:**

10 CFR 60.111(a) states that radiation exposures, levels, and releases to unrestricted areas will be maintained "... within the limits specified in Part 20 of this chapter and such generally applicable standards for radioactivity as may have been established by the U.S. Environmental Protection Agency." This statement leads the reader to a number of sources which cite different values for these limits for both normal operations and accident conditions.

The first of these is found in the statement of the Commission in the currently applicable source for 10 CFR Part 60, Subpart E, to wit: "There must be an "unrestricted area" to which releases of radioactive materials will be maintained within the limits specified in 10 CFR Part 20 [10 CFR 60.111(a)]. The establishment of this unrestricted area must also take accidents into consideration, since structures, systems, and components "important to safety," as defined in 10 CFR 60.2 must be designed so as to limit radiation doses under accident conditions to 0.5

rem at the boundary of the unrestricted area." The Part 20 limit is the same as that established by the EPA as an alternative standard for "infrequent exposure" of "any member of the public". The EPA has promulgated a different standard for exposure of "any member of the general public" to doses from the management and storage of spent nuclear fuel or high-level or transuranic radioactive wastes. 40 CFR 191.03 states that the "... combined annual dose to any member of the general public in the general environment resulting from ... discharges of radioactive material and direct radiation from such management and storage ... shall not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other critical organ." This reference is not specific regarding its applicability but silence on this subject implies it could apply to both normal operations and accident conditions.

Other pertinent passages from the published criteria for the final rule state that structures, systems, and components important to safety, in the event they fail to perform their intended function, will comply with 10 CFR 20.105(a). This latter regulation states that the anticipated dose limits are not likely to cause any individual to exceed 0.5 rem to the whole body in an unrestricted area in any one calendar year. 10 CFR 20.105(b) further specifies dose limits in unrestricted areas of 2 millirems in any one hour and 100 millirems in any seven consecutive days if an individual were continuously present. 10 CFR 20.105 does not refer to normal or off-normal operations or accident conditions, but the terminology of "anticipated" and "likely" may lead to the debatable interpretation that the limits are for normal operations and not for unanticipated and unlikely operations or accident conditions.

10 CFR Part 72, which is applicable to surface storage facilities with functions similar to a repository, adopts the EPA standard maximum dose to the general public - 25 millirems to the whole body, 75 millirems to the thyroid - "During normal operations and anticipated occurrences ..." [10 CFR 72.104(a)], but sets the design basis accident dose criteria to any individual on or beyond the controlled area boundary at 5 rems to the whole body [10 CFR 72.106(b)].

These citations show that the phrase "... within the limits specified in Part 20 of this chapter and such generally applicable standards for radioactivity as may have been established by the U.S. Environmental Protection Agency" in 10 CFR 60.111(a) encompasses a wide range of possible dose criteria. Thus, 10 CFR 60.111(a) is not sufficiently specific to determine design basis dose criteria for normal and accident conditions, and needs further clarification or interpretation.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

Although there is no NRC precedent for specifying a separate dose criterion for accidents (Design Basis Accident), NRC is investigating the requirement for a separate site suitability dose criteria for a geologic repository operations area.

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

As is the case with NRC regulation for other types of facilities, no serious dose criterion is specified for accidents. Although regulation for some facilities (i.e., those licensed under 10 CFR Part 50 and 10 CFR Part 72) have dose criteria for site suitability (which are determined by assuming serious or major design basis accidents), neither 10 CFR Part 20 nor 10 CFR Part 60 contain such criteria. As a result, on April 19, 1990, the DOE filed a Petition for Rulemaking requesting that NRC amend 10 CFR Part 60 to include quantitative accident dose criteria. DOE believes that specific accident dose criteria are necessary to reduce perceived uncertainties in the current regulation and to provide specific guidance for the protection of public health and safety. The subject matter of this DOE petition relates closely to the potential rulemaking actions, under consideration by NRC, published in the NRC Regulatory Agenda (Nuclear Regulatory Commission, 1990a). NRC is now performing studies related to repository operation criteria that will address potential regulatory uncertainties in this area. These studies will provide technical support for any regulatory action that may be needed.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.111(a)

**LARP (REVIEW PLAN) NUMBER:** 4.2-4.4, 4.5.1, 5.5, 8.4

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990a. NRC Regulatory Agenda. NUREG-0936. Volume 8, No. 4. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990b. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.



## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I016

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Facilitate versus not prevent waste retrieval

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The NRC intent needs to be clarified as to whether the geologic repository is to be designed to facilitate waste retrieval, or only that the design must not preclude waste retrieval (i.e., not make retrieval impossible). DOE needs guidance regarding what design action, if any, is intended by the regulation, particularly with respect to the waste package and its handling equipment, in order to respond with an acceptable design. Such guidance will also permit NRC to evaluate the DOE compliance demonstration effectively.

### RATIONALE/BASIS:

Several phrases are used in 10 CFR Part 60 to describe retrievability. These include "... designed to preserve the option of waste retrieval ..." and "... designed so that ... waste could be retrieved ..." [60.111(b)(1)], and "... designed to permit retrieval ..." [60.133(c)]. Although these phrases seem to be consistent, a question arises regarding whether the design process and the resulting facility and equipment designs should (1) make provisions for and, to some degree, facilitate retrieval, or (2) simply not do anything to prevent retrieval.

The intent of the waste retrieval regulatory requirement as discussed in NUREG-0804 (Reference 10) supports the "not precluded" interpretation. NRC adheres to the position that retrievability is an important design consideration, but rephrases the requirement in functional terms.

NRC recognizes that any actual retrieval would be an unusual event and may be expensive. The expressed intent is that it should not be made impossible or impractical to retrieve the waste if such retrieval turns out to be necessary to protect the public health and safety.

The language of the NWPA, 10 CFR 60.111(b)(1), and the requirement for underground openings [10 CFR 60.133(e)(1)] do not seem to support this interpretation. The NWPA reads "... any repository constructed on a site approved under this part shall be designed and constructed to permit the retrieval of any spent nuclear fuel placed in such repository, during an appropriate period of operation of the facility, for any reason pertaining to the public health and safety, or the environment, or for the purpose of permitting the recovery of the economically valuable contents of such spent fuel." 10 CFR 60.111(b)(1) requires that the repository "... be designed to preserve the option of waste retrieval ..."; and 10 CFR 60.133(e)(1) specifies that "Openings ... shall be designed so that ... the retrievability option (is) maintained." The structure and wording of all of these requirements would in the engineering context of "design and construct" be interpreted to require specific action. Such action would typically include explicit consideration of retrieval needs and features in design criteria, equipment designs, and design reviews. In contrast, a requirement that retrieval simply not be made impossible or impractical requires no active attention in design. This is because, from an engineering perspective, it is entirely possible and practical if necessary to remove the entire mountain from around the waste in significantly less than the time presently planned for construction and emplacement.

As a practical matter, the range of possible interpretations can have an impact on the schedule and cost of the geologic repository operations area functions, particularly in relation to equipment design. For example, a vehicle designed to transport waste packages to their position in the repository and emplace them could be fitted with a means of waste package retrieval as part of its initial design. Such a design which would comply with a "facilitate" requirement, would require only a slight difference in schedule. To not make the vehicle capable of retrieval initially, which would comply with a "not prevent" requirement, could result in a major delay for designing and constructing a modification, or even another vehicle, should retrieval be required later.

Similarly, design of the waste package from the beginning to facilitate retrieval, consistent with the first interpretation, would have little impact on the schedule, but it could prevent a lengthy program to develop a means of retrieving packages not made with a convenient means of interfacing to the retrieving vehicle.

The minimum degree to which the design must "facilitate" the act of waste retrieval seems to be specified in 10 CFR 60.111(b)(1), 10 CFR 60.111(b)(3), 10 CFR 60.133(c), 10 CFR 60.133(e)(1) and 10 CFR 60.133(i). However, the interpretation provided in NUREG-0804 (Reference 10) seems to run counter to requirements such as 10 CFR 60.133(e)(1) and 10 CFR 60.133(i) in that it is possible and practical to cut rock from around the waste package. There could, of course, be an associated increase in risk of accidental loss of containment.

The foregoing highlights an additional potential uncertainty relative to the meaning of the second of two phrases in 10 CFR 46(a)(1): "Any action ... which would substantially increase the difficulty of retrieving such emplaced waste." Use of the term "permit" in several of the texts tends to preserve the uncertainty because it does not make the commitment that either "facilitate" or "not prevent" would make.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

This perceived uncertainty pertains to a number of design criteria that refer to potential retrieval of waste. The question presented is whether these design criteria should be interpreted actually to facilitate waste retrieval or merely to accommodate necessary measures, should retrieval prove to be needed.

In the staff's view, the requirements must be viewed in the sense stated in 10 CFR 60.131, which defines the scope of all the design criteria. Those design criteria are meant to be minimum safety features "... needed to achieve the performance objectives." The pertinent performance objective, of course, is [as stated in 60.111(b)] to "... preserve the option of waste retrieval ..." during the preclosure phase. The design criteria should be construed in a manner that is consistent with the performance objectives, and, as the Commission made clear, are intended to require a design that does not make retrieval impracticable, but there is no requirement that retrieval be otherwise facilitated. Thus in issuing its technical criteria, the Commission indicated its concern "... that retrievability requirements not unnecessarily complicate or dominate repository design." Further, the Commission, in discussing the definition of "retrieval," added to the final rule, that the retrievability requirement "... does not imply ready or easy access to emplaced waste -- the idea is that it should not be made impossible or impractical to retrieve the wastes if such retrieval turns out to be necessary to protect the public health and safety." (48 FR 28197)

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As noted in the rationale for uncertainty reduction method selection, the design objective is merely to accommodate necessary measures should retrieval prove to be needed. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.111(b)(1)

**LARP (REVIEW PLAN) NUMBER:** 4.3; 4.4; 4.5.2

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I017

**LAST UPDATE:** 12 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Anticipated and unanticipated processes and events

**RESPONSIBLE BRANCH/SECTION:** PAHB/Performance Assessment and Health Physics Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The terms "anticipated processes and events" and "unanticipated processes and events" require further definition to permit uniform interpretation of the regulatory requirement.

**RATIONALE/BASIS:**

A clear basis for distinguishing between these categories of processes and events is required because of their key position in the design and evaluation processes. Specifically,

(1) Anticipated Processes and Events (APEs) provide the primary design basis for the waste package and the balance of the engineered barriers;

(2) APEs, together with Unanticipated Processes and Events (UPEs), provide the basis for determination of compliance with the overall system performance objective of 10 CFR 60.112.

This uncertainty has been addressed previously. Initial criteria for identifying anticipated and unanticipated events appear in a Draft Technical Position entitled "Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events." Clarification of these terms is necessary to determine if the natural barriers, waste package, or engineered barrier system are sufficient to comply with the required performance objectives of 10 CFR Part 60.

In the definition in 10 CFR 60.2, the distinction between anticipated and unanticipated processes and events is made by whether or not it is "... reasonably likely to occur ..." and "... sufficiently credible to warrant consideration ...." In NUREG-0804, it is noted that "... the distinction between anticipated and unanticipated processes and events relates solely to natural processes and events affecting the geologic setting ...." This excludes anticipated and unanticipated processes related to and events initiated by the Engineered Barrier System. For example, items like unexpected fatigue failure or unexpected change in microstructure of materials would not be considered, unless these are caused by external natural processes and events. It also excludes human activities when evaluating the engineered system except under the specific conditions in the 60.2 definition of UPEs.

From the same reference, unanticipated processes and events are those which "... include processes and events which are not evidenced during the Quaternary Period or which, though evidenced during the Quaternary, are not likely to occur during the relevant time frame ... ." The criteria for "likely to occur" need to be defined to avoid inappropriate responses by DOE. Additionally, the Commission viewed the proposed U.S. Environmental Protection Agency (EPA) Standard (40 CFR Part 191) as being directed to the evaluation of releases arising out of the categories that have been defined as "anticipated processes and events" and "unanticipated processes and events."

NUREG-0804 states that "... Such processes or events would not be anticipated unless they were reasonably likely, assuming that processes operating in the geologic setting during the Quaternary Period were to continue to operate but with the perturbations caused by the presence of emplaced waste superimposed thereon. Unanticipated processes and events would include those that are judged not to be reasonably likely to occur during the period the intended performance objective must be achieved, but which nevertheless are sufficiently credible to warrant consideration ... ."

In the EPA rule, the term "significant processes and events" is used instead of "anticipated and unanticipated processes and events." The difference between these two terms should be resolved at the time of amending 10 CFR Part 60 to conform to 40 CFR Part 191.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

As defined within 10 CFR 60.2, the terms "anticipated processes and events" and "unanticipated processes and events" are two categories of processes and events that could occur within the "geologic setting" during the period following permanent closure of the geologic repository. Determination of these categories of processes and events is required because: (1) "Anticipated

processes and events" are the primary design basis processes and events for the design of the waste package and engineered barrier system; and (2) "Anticipated processes and events," together with "unanticipated processes and events" are to form the basis for analysis to determine compliance with the overall system performance objectives of 10 CFR Part 60.

It therefore cannot be determined if the natural barriers, waste package, or engineered barrier system will comply with the performance objectives of 10 CFR Part 60 until the "anticipated processes and events" and "unanticipated processes and events" have been determined.

The NRC staff has recognized the uncertainty that is contained within these phrases and as a result has included these terms in the strategy for rulemaking (see Nuclear Regulatory Commission 1988a and 1990). This series of uncertainties was originally addressed in the draft "Generic Technical Position (GTP) on Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events" (Nuclear Regulatory Commission, 1988b). Following public comment on this draft GTP, it was determined that it was in the best interest of this program to deal with this uncertainty in the rulemaking to conform 10 CFR Part 60 to the EPA Standard, to ensure a correlation between the NRC terms "anticipated processes and events," and "unanticipated processes and events" and the EPA terms "undisturbed performance" and "all significant processes and events." The NRC staff has been meeting with the EPA staff with the expectation that this concern can be resolved in the final EPA Standard, so that there is a common terminology within the two rules.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale. This uncertainty is scheduled to be resolved in the rulemaking conforming 10 CFR Part 60 to the final EPA Standard.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.112

**LARP (REVIEW PLAN) NUMBER:** 6.1-6.3

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1988a. Regulatory Strategy and Schedules for the High-Level Waste Repository Program. SECY-88-285. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1988b. Availability of Draft Generic Technical Position on "Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events." 53 FR 39. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.



**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I018

**LAST UPDATE:** 10 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Amendments to 10 CFR 60.112 to conform to EPA standard

**RESPONSIBLE BRANCH/SECTION:** PAHB/Performance Assessment and Health Physics Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

It is uncertain what amendments will have to be made to 10 CFR 60.112 to conform to the forthcoming revision of the EPA standard, 40 CFR Part 191. Since 10 CFR 60.112 refers to conformance to EPA standards, any changes in those standards must be addressed to assure that performance objectives of 10 CFR 60.112 are met.

**RATIONALE/BASIS:**

10 CFR 60.112 refers to but does not further specify the standards established by the EPA. The Nuclear Waste Policy Act requires that the NRC requirements and criteria not be inconsistent with any comparable standards promulgated by the U.S. Environmental Protection Agency (EPA). Once the final EPA standard is promulgated, certain amendments to 10 CFR Part 60, particularly 10 CFR 60.112, may be needed to achieve the consistency required by the Act.

In discharging its statutory responsibility, NRC must conform 10 CFR Part 60 to the EPA standard. Provided EPA does not make significant changes in subparts of 40 CFR Part 191 that were not cited by the court on remand, possible conforming amendments are not expected to have significant impact on the DOE site characterization program.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The Commission has recognized the uncertainty that is contained within 10 CFR Part 60 due to the need to conform the rule to incorporate the finalized EPA standard. During the promulgation of the final rule, the Commission stated; "The Commission will review these criteria after EPA's environmental standards are published in final form and will initiate subsequent rulemaking actions, as necessary, to take such standards into account." (48 FR 28195) Thus, the uncertainty will be resolved in rulemaking conforming 10 CFR Part 60 to the final EPA standard.

Before the EPA Standard was remanded by the courts, the NRC had initiated rulemaking to conform to the EPA standard (see 51 FR 22288); however, this action was put in abeyance until the final standards are again published.

The need for this action has also been presented in SECY 88-285 (Nuclear Regulatory Commission, 1988) and SECY 90-207 (Nuclear Regulatory Commission, 1990).

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.112

**LARP (REVIEW PLAN) NUMBER:** 6.1-6.3

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1983. Disposal of High-Level Radioactive Wastes in Geologic Repositories, Technical Criteria. 48 FR 120 (June 21, 1983). Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1986. Disposal of High-Level Radioactive Wastes in Geologic Repositories; Conforming Amendments. 51 FR 118 (June 19, 1986). Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1988. Regulatory Strategy and Schedules for the High-Level Waste Repository Program. SECY 88-285. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUN090003I019

**LAST UPDATE:** 12 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Substantially complete containment

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "substantially complete containment" needs interpretation and clarification that is sufficiently specific to permit Engineered Barrier System designers to respond with an acceptable design and to provide NRC technical reviewers with a clear-cut basis for the development of EBS evaluation criteria.

**RATIONALE/BASIS:**

In NUREG-0804, the Commission recognized the statistical probability that some percentage of containers would fail, and so revised the original phrase "containing all radionuclides" to "substantially complete" containment. The original wording "containing all radionuclides" was too restrictive (given the technological limitations) because realistic design criteria could not be formulated considering the extended time required for containment. Changing the terminology to "substantially complete" allowed DOE latitude in proposing EBS designs but (1) did not provide a clear standard or criterion for determining compliance and (2) did not consider whether such containment could be predicted with a high level of confidence. This terminology must be supplemented by, at a minimum, high-order decision criteria in order to provide a basis both for design and for demonstration/determination of compliance.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The staff agrees that the term "substantially complete containment" needs further clarification and interpretation to ensure that there is no misunderstanding regarding the meaning of this term, and a joint Center for Nuclear Waste Regulatory Analyses (CNWRA)/staff effort is currently underway to assess various alternatives for reducing the regulatory uncertainty associated with the "containment" requirement. Various alternatives for uncertainty reduction have been identified, including alternatives that would provide numerical meaning to the term "substantially complete containment." The alternatives considered range from providing clarification outside the existing structure of the rule in a technical position or regulatory guide to modifying the existing language in the rule, to quantify the "containment" requirement. A structured approach is being employed for assessing the merits of each of the various alternatives for uncertainty reduction, and a determination will be made regarding the best choice for reducing the regulatory uncertainty. After a recommendation for the uncertainty reduction alternative (i.e., regulatory guide, technical position, rule change) is made, further analysis will be needed to develop the specifics of the alternative selected.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991a) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

May 10, 1995 - NRC presented their Staff Technical Position (STP) on SCC to the ACNW. This STP relates SCC to a cumulative release requirement of less than  $10^4$  of the inventory at closure. This STP is under discussion at the DOE, but at present, is being held in abeyance pending the recommendation of the National Academy of Science on the remanded EPA standard.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(a)(1)(i)(A)

**LARP (REVIEW PLAN) NUMBER:** 5.4

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Bunting, J. 1989. Scoping Paper for Proposed Rulemaking to Minimize the Regulatory Uncertainty regarding Substantially Complete Containment. Memo to R. Browning, HLWM/Nuclear Regulatory Commission, March 29, 1989. Washington, DC: Nuclear Regulatory Commission.
- Bunting, J. 1989. Scoping Paper on Technical Feasibility Assessment of an Approach to Provide Quantitative Criteria in Lieu of Substantially Complete Containment. Memo to R. Browning, HLWM/Nuclear Regulatory Commission, October 18, 1989. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990a. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1990b. Technical Considerations for Evaluating Substantially Complete Containment of High-Level Waste within the Waste Package. NUREG/CR-5638. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990c. Substantially Complete Containment Feasibility Assessment and Alternatives Report. CNWRA 90-007. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR Part 60, "Disposal of High-Level Radioactive Waste in Geologic Repositories". NUREG-0804, pages 23 & 24. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991a. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991b. Uncertainty Evaluation Methods for Waste Package Performance Assessment. NUREG/CR-5639. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

Weiner, R.W., and W.C Patrick. 1989. Analysis and Evaluation of Regulatory Uncertainties in 10 CFR 60 Subparts B and E. CNWRA 89-003, Uncertainty #13. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I020

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Solid Waste Form

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

It is uncertain if the statement in 10 CFR 60.135(c)(1), "... all such radioactive wastes shall be in solid form," applies to spent fuel rods, where fission product gases are contained and generated. Clarification of the Commission's intent regarding permanent disposal of the radioactive gases contained in spent fuel rods is needed to achieve consistent interpretation and compliance.

### RATIONALE/BASIS:

It has been argued that (1) Congress established in the NWPA that spent fuel is to be disposed of in a deep geologic repository, (2) the Commission, which is well aware that spent fuel contains gaseous fission products, chose not to raise the existence of such gases as a concern, and (3) this is an implied Commission approval of the disposal of such gases as part of the spent fuel. However, there appears to be no written evidence that this was the Commission's intent. The presumption of approval would be difficult to substantiate in the absence of a record in the rulemaking.

In this case, there is (1) an explicit regulatory requirement that "All ... wastes shall be in solid form ..."; (2) radioactive gases are present in the wastes; and (3) there are open questions regarding the migration and release of gaseous nuclides in a fractured, unsaturated medium. Due to the specificity of the existing regulatory provision and the apparent inconsistency with the actual state of the waste, this perceived uncertainty regarding the NRC's intent remains.



From the current wording of 10 CFR 60.135(c)(1), it could be included that spent fuel rods, which contain radioactive gases, must be processed or treated so that no radioactive gases are left. If processing or treatment is required, consideration must be given to the containment of such radioactive gases during processing or treatment.

Another interpretation might be that spent fuel rods meet the requirement as a solid waste form, since radioactive gases are contained within the solid boundary of each fuel rod. This shows that the current wording allows a broad range of interpretation so that completely opposite meanings can be derived from the same text.

The Nuclear Waste Policy Act, as Amended, is explicit in its intent that spent nuclear fuel from nuclear reactors be disposed of in the repository. However, 10 CFR 60.135(c)(1) states that "All such radioactive wastes shall be in solid form and placed in sealed containers." The fact that the "solid form" refers specifically to radioactive wastes implies that the irradiated reactor fuel itself (not the Zircalloy tubing which contains it) must be of solid form.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance.

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The requirement for such waste to be in a solid form applies to the macroscopic properties of the waste form (e.g., spent fuel rods, vitrified high level waste). Spent fuel contains gaseous fission products (e.g., Kr-85) both within the matrix of the fuel and in the fuel/cladding gap. Notwithstanding this fact, it has always been clear that spent fuel was an expected waste form at a geologic repository. The Commission has never suggested that spent fuel would have to be treated to isolate or remove gaseous fission products, to comply with the requirement that emplaced high-level wastes be in a solid form. In fact, "spent nuclear fuel" a waste that is intended to be disposed of in a geologic repository is defined by the Nuclear Waste Policy Act as fuel withdrawn from a nuclear reactor, "... the constituent elements of which have not been separated by reprocessing." The intent of the rule was to recognize the role that the waste form provides as a key component of the engineered barrier system. Waste in solid form (as opposed to liquid or gaseous waste forms) can contribute significantly to meeting the waste package and engineered barrier system performance objectives.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As noted in the rationale for uncertainty reduction method selection, the intent of the regulation is that fission by-product gases were not to be considered as non-solid waste forms. Spent fuel rods should be considered to be in solid form notwithstanding the presence of fission product gases. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.135(c)(1)

**LARP (REVIEW PLAN) NUMBER:** 5.2

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR Part 60 "Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

U.S. Congress. 1982. The Nuclear Waste Policy Act of 1982. 42 USC 10101. Washington, DC:  
U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I021

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Anticipated processes and events

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "anticipated processes and events" requires further definition to permit uniform interpretation of the regulatory requirement.

**RATIONALE/BASIS:**

A clear basis for distinguishing between these categories of processes and events is required because of their key position in the design and evaluation processes. Specifically,

(1) Anticipated Processes and Events (APEs) provide the primary design basis for the waste package and the balance of the engineered barriers;

(2) APEs, together with Unanticipated Processes and Events (UPEs), provide the basis for determination of compliance with the overall system performance objective of 10 CFR 60.112.

This uncertainty has been addressed previously. Initial criteria for identifying anticipated and unanticipated events appear in a Draft Technical Position entitled "Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events." Clarification of these terms is necessary to determine if the natural barriers, waste package, or engineered barrier system are sufficient to comply with the required performance objectives of 10 CFR Part 60.

In the definition in 10 CFR 60.2, the distinction between anticipated and unanticipated processes and events is made by whether or not it is "... reasonably likely to occur ..." and "... sufficiently credible to warrant consideration ... ." In NUREG-0804, it is noted that "... the distinction between anticipated and unanticipated processes and events relates solely to natural processes and events affecting the geologic setting ... ." This excludes anticipated and unanticipated processes related to and events initiated by the Engineered Barrier System. For example, items like unexpected fatigue failure or unexpected change in microstructure of materials would not be considered, unless these are caused by external natural processes and events. It also excludes human activities when evaluating the engineered system except under the specific conditions in the 60.2 definition of UPEs.

From the same reference, unanticipated processes and events are those which "... include processes and events which are not evidenced during the Quaternary Period or which, though evidenced during the Quaternary, are not likely to occur during the relevant time frame ... ." The criteria for "likely to occur" need to be defined to avoid inappropriate responses by DOE. Additionally, the Commission viewed the proposed U.S. Environmental Protection Agency (EPA) Standard (40 CFR Part 191) as being directed to the evaluation of releases arising out of the categories that have been defined as "anticipated processes and events" and "unanticipated processes and events."

NUREG-0804 states that "... Such processes or events would not be anticipated unless they were reasonably likely, assuming that processes operating in the geologic setting during the Quaternary Period were to continue to operate but with the perturbations caused by the presence of emplaced waste superimposed thereon. Unanticipated processes and events would include those that are judged not to be reasonably likely to occur during the period the intended performance objective must be achieved, but which nevertheless are sufficiently credible to warrant consideration ... ."

In the EPA rule, the term "significant processes and events" is used instead of "anticipated and unanticipated processes and events." The difference between these two terms should be resolved at the time of amending 10 CFR Part 60 to conform to 40 CFR Part 191.

This uncertainty is scheduled to be resolved in the rulemaking conforming 10 CFR Part 60 to the final EPA Standard.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

See regulatory uncertainty No. 17.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(b)

**LARP (REVIEW PLAN) NUMBER:** 3.5; 5.4

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I022

**LAST UPDATE:** 10 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Unanticipated processes and events

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The term "unanticipated processes and events" requires further definition to permit uniform interpretation of the regulatory requirement.

**RATIONALE/BASIS:**

A clear basis for distinguishing between these categories of processes and events is required because of their key position in the design and evaluation processes. Specifically, (1) Anticipated Processes and Events (APEs) provide the primary design basis for the waste package and the balance of the engineered barriers; (2) APEs, together with Unanticipated Processes and Events (UPEs), provide the basis for determination of compliance with the overall system performance objective of 10 CFR 60.112.

This uncertainty has been addressed previously. Initial criteria for identifying anticipated and unanticipated events appear in a Draft Technical Position entitled "Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events." Clarification of these terms is necessary to determine if the natural barriers, waste package, or engineered barrier system are sufficient to comply with the required performance objectives of 10 CFR Part 60.

In the definition in 10 CFR 60.2, the distinction between anticipated and unanticipated processes and events is made by whether or not it is "... reasonably likely to occur ..." and "... sufficiently credible to warrant consideration ... ." In NUREG-0804, it is noted that "... the distinction between anticipated and unanticipated processes and events relates solely to natural processes and events affecting the geologic setting ... ." This excludes anticipated and unanticipated processes related to and events initiated by the Engineered Barrier System. For example, items like unexpected fatigue failure or unexpected change in microstructure of materials would not be considered, unless these are caused by external natural processes and events. It also excludes human activities when evaluating the engineered system except under the specific conditions in the 60.2 definition of UPEs.

From the same reference, unanticipated processes and events are those which "... include processes and events which are not evidenced during the Quaternary Period or which, though evidenced during the Quaternary, are not likely to occur during the relevant time frame ... ." The criteria for "likely to occur" need to be defined to avoid inappropriate responses by DOE. Additionally, the Commission viewed the proposed U.S. Environmental Protection Agency (EPA) Standard (40 CFR Part 191) as being directed to the evaluation of releases arising out of the categories that have been defined as "anticipated processes and events" and "unanticipated processes and events." NUREG-0804 states that "... Such processes or events would not be anticipated unless they were reasonably likely, assuming that processes operating in the geologic setting during the Quaternary Period were to 10). The original comparison of the regulations was as follows: 10 CFR 72.73(a) states that spent fuel handling, transfer, and storage systems shall be designed to be maintained subcritical and to prevent a nuclear criticality accident. 10 CFR 60.131(b)(7) states that all systems for processing, transporting, handling, storage, retrieval, emplacement and isolation of radioactive waste shall be designed to ensure that a nuclear criticality accident is not possible unless at least two unlikely, independent, and concurrent or sequential changes have occurred.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

See Uncertainty No. 17.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.



April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - This uncertainty is scheduled to be resolved in the rulemaking conforming 10 CFR Part 60 to the final EPA Standard.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(c)

**LARP (REVIEW PLAN) NUMBER:** 5.4

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I023

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Milestone for land ownership and control

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The implied interpretation that land use and control need not be established until construction authorization has been granted needs clarification. The NRC review and approval of the construction authorization (license) application will provide the only opportunity to evaluate a demonstration of adequate land ownership and control.

**RATIONALE/BASIS:**

The requirement for unencumbered ownership and control must be established and demonstrated to the NRC at the time of application of construction authorization to provide assurance that the applicant can both limit access and prevent intrusion during construction, operation and closure. A clarification to this effect in the public record or a similar action would eliminate any question as to the extent of control and the timing by which it must be accomplished.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The regulatory policy is clear—namely, that DOE must exercise control in a manner that is sufficiently timely for the Commission to make the licensing determinations set out in 10 CFR 60.31 and 10 CFR 60.41. With reference to 10 CFR 60.31, this calls for the Commission to consider whether the site complies with the land ownership and control requirements of 10 CFR 60.121, and, based on the consideration of this and other factors, to determine whether there is reasonable assurance of safety. DOE is required to describe the controls it "... will apply to restrict access and to regulate land use" (10 CFR 60.23(c)(i)); it is not, however, required to document its having actually acquired the necessary land interests. The license application shall be "... as complete as possible in the light of information that is reasonably available at the time of docketing," but other information not available at the construction authorization stage may be submitted before issuance of a license (10 CFR 60.24). Thus, if DOE has described the needed controls, but has not as yet acquired them, the circumstances must be such that the Commission has reasonable assurance of safety. This will involve a review of both the controls deemed to be necessary and DOE plans for exercising those controls (including, as appropriate, acquisition or withdrawal of lands for DOE use). To the extent that the Commission finds conditions relating to such controls to be necessary to protect health and safety, these will be included in the construction authorization (10 CFR 60.32).

As a practical matter, it should be borne in mind that Congress might be reluctant to authorize a permanent withdrawal of public lands for DOE's use until the NRC has issued a construction authorization (or license). The regulation recognizes and accommodates this consideration.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As indicated in the Rationale for Resolution Method Selection, the regulatory policy is clear that DOE must exercise control in a manner that is sufficiently timely for the Commission to make the licensing determinations. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.121(a)(1)

**LARP (REVIEW PLAN) NUMBER:** 9

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I024

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Clarification of "geologic setting"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The definition of the term "geologic setting," as used throughout 10 CFR 60.122 and defined in 10 CFR 60.2, is ambiguous. A rulemaking (Nuclear Regulatory Commission, 1988) is currently underway and will include clarification of the definition of the term.

### RATIONALE/BASIS:

The NRC staff determined that the term "geologic setting" contained ambiguity. The DOE, at a Tectonics Technical Exchange on October 31, 1989, questioned the meaning of "geologic setting" relative to the area which was supposed to be considered as a part of the "geologic setting." The DOE did not know how the setting was to be bounded or whether "geologic setting" would apply to different sized regions for the different types of geologic processes which might be found at a site.

There are eighteen (18) occurrences of the term in the Regulation. The term is found in the following paragraphs: 10 CFR 60.2, 60.21(c)(1)(ii)(F), 60.21(c)(13), 60.32(c), 60.101(a)(2), 60.102(c), 60.102(e)(2), 60.112, 60.113(a)(1)(i)(B), 60.113(a)(2), 60.122(a)(1), 60.122(b)(1), 60.122(b)(6), 60.122(c)(14), 60.122(c)(17)(ii), 60.133(h), 60.135(a)(1), and 60.140(d)(2).

### RECOMMENDATIONS:

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Further analysis is needed to determine if present 10 CFR Part 60 allows multiple geologic settings and if the term is for use in pre-closure, post-closure or both pre- and post-closure analysis. Within the definition of "geologic setting" in 10 CFR Part 60, there is an uncertainty as to whether there is a singular geologic setting" that is applicable to all natural systems, or if there are multiple "geologic settings," each applicable to its own system (e.g., a geologic setting" for the hydrologic system). The staff has been in general agreement that there should be multiple geologic settings, each applicable to its own system; however, there has been disagreement as to whether the exact wording of 10 CFR Part 60 allows this usage. In addition, it is uncertain if the term is only applicable for the period following permanent closure, or if the term is applicable for both pre- and post-closure concerns. The NRC staff agrees, therefore, that the term "geologic setting" is an uncertainty within the rule. This was originally addressed in the draft Generic Technical Position on Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events (Nuclear Regulatory Commission, 1988). It had been planned that final clarification of this term would be included in the rulemaking on "Anticipated Processes and Events and Unanticipated Processes and Events"; however, with the planned inclusion of the "Anticipated Processes and Events and Unanticipated Processes and Events" rulemaking, in the rulemaking conforming 10 CFR Part 60 to the final U.S. Environmental Protection Agency (EPA) Standard rulemaking (see Nuclear Regulatory Commission, 1990), the staff is considering the use of a staff technical position to resolve the uncertainty.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(b)(1)

**LARP (REVIEW PLAN) NUMBER:** 3.2.1.1, 3.2.1, 3.2.3.1

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1988. Notice of Availability: Availability of Draft Generic Technical Position on "Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events." 53 FR 39 (February 29). Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

OITSID: OREG090003I025

LAST UPDATE: 20 Sep 1995

STATUS: [recommended] Resolved

DATE RESOLVED: TBD

TOPIC OF THE OPEN ITEM/UNCERTAINTY: Taking into account the degree of resolution

RESPONSIBLE BRANCH/SECTION: ENGB/Geosciences & Geotechnical Engineering Section

ACTION AGENCY: NRC

IDENTIFICATION DATE: 28 Feb 1990

SOURCE TYPE: CNWRA Report

SOURCE DOCUMENT: Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

DOE ACTIVITY CODE/WBS NO.: N/A

UNCERTAINTY TYPE: Regulatory

SPECIFIC TECHNICAL TYPE: Issue

### OPEN ITEM TEXT:

The intended meaning of the phrase "taking into account the degree of resolution of the investigations" should be clarified so that DOE has clear guidance on the NRC requirement to adequately investigate aspects of the given adverse condition necessary to support the license application.

### RATIONALE/BASIS:

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" may be interpreted as the precision (scale of numerical assessment) with which the potentially adverse condition is evaluated, or the relative importance of differing types of evaluations. Alternatively, "taking into account the degree of resolution" could mean that the evaluations recognize the uncertainties inherent in any geologic investigation, such as the resolution of exploratory seismic methods in detecting faults. Another interpretation might be that the accuracy of measurement of the potentially adverse condition be used to assess the relative importance of the measured values and that this relative importance be used in the overall assessment.



It has been suggested that the perceived uncertainty in the Regulation was intended. There seems to be limited value in such regulatory flexibility in this instance when one considers the potential for License Application evaluation delays in which the alleged cause of unacceptable DOE investigations/analyses may be ambiguous NRC requirements. At some point the NRC must define the License Application evaluation criteria. It would appear to be advantageous to all parties if the generic, high-order decision criteria were developed prior to the start of or at least early in the conduct of the site characterization activities to which they apply. The NRC should clarify the meaning of the existing language "taking into account the degree of resolution achieved by the investigations" and define the criteria by which the adequacy of the "taking into account" will be judged.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows: "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." [10 CFR 60.122(a)(2)(i)] Consideration of the sufficiency of both the program on investigations and the program of analysis must be predicated on an understanding of the technical limitations of the program of investigations that was used to obtain the data for design and analysis. In any NRC licensing action, during the review of the program of investigations, it is expected that the applicant will present his program of investigations and describe the degree of resolution achieved. For example, if there is a question, concerning faulting, that could affect the groundwater flow system at the site [see 10 CFR 60.122(c)(4)], and a geophysical program is used to investigate potential faulting, NRC would expect the DOE to describe the geophysical methods used, along with the resolution of the method. If the method, for example, could not detect faults with less than 10 feet of offset, NRC would expect DOE to clearly state this fact, along with a clear recognition that faults of lesser offset may be present and undetected.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The Rationale for Resolution Method Selection, above, indicates that "taking into account the degree of resolution" is common in NRC licensing, and is a method for accounting for uncertainties in site characterization. The phrase is intended to convey a requirement that the DOE must factor into both the design and analysis of a geologic repository the technical limitations of the investigative methods employed. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(a)(2)(i)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5; 3.3; 5.4; 6.1; 6.2; 6.3

## **REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I026

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** "Not to affect significantly"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The meaning of the phrase "not to affect significantly" in 60.122(a)(2)(iii)(A) should be clarified in order for DOE to demonstrate that the activity or condition in question does or does not exceed the level of effect considered important in the ability of a geologic repository to meet the performance objective.

**RATIONALE/BASIS:**

The meaning of "not to affect significantly" is not clear even when the words of NUREG-0804 are considered. It is not possible to determine if the Commission intends for "significant effects" to be those that imperil the performance objectives or whether the "significant effects" are those effects which are perceived as larger than normal and which might affect the geologic setting, though not egregiously, with respect to the performance objectives.

If the NRC intended the Regulation to be specific to the breaching of performance objectives but did not so state, there is the possibility that the DOE will incorrectly consider some effects as significant even though the effects do not cause the performance objectives to be breached. The NRC needs to clarify the meaning of the existing language for DOE by identifying whether a significant effect is one which causes the performance objectives to be breached or is defined by some other criteria.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows: "The potential 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 ... ." [10 CFR 60.122(a)(2)(iii)(A)]

Upon completion of the analysis, it will be necessary to determine if the performance objectives have been met. The staff considers that an adverse condition that prevents a finding that the performance objectives have been met would be a significant effect, whereas an adverse condition that does not prevent such a finding would be one that would be judged "not to affect significantly." This reasoning is supported in the rulemaking record in such places as NUREG-0804, where in response to Comment 542, the staff stated:

"The presence of only one significant condition not adequately compensated by favorable conditions or capable of remedy by design would render the site unsuitable, since the performance objectives would not be met."

The licensing board will evaluate the evidence presented to it and make a determination if the performance objectives have been met. It is the staff opinion that this phrase "not to affect significantly" is an intended uncertainty in the rule, as, until such time as the actual licensing hearing, it will be impossible to determine if the DOE will be able to present a case that the performance objectives have been met.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As stated in the rationale, "The staff considers that an adverse condition that prevents a finding that the performance objectives have been met would be a significant effect, whereas an adverse condition that does not prevent such a finding would be one that would be judged "not to affect significantly." The phrase is intended to convey, in a qualitative sense, the relationship between the effects of the adverse conditions and the ability to achieve a finding of reasonable assurance that the performance objectives relating to waste isolation have been met. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(a)(2)(iii)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5; 3.3; 5.4; 6.1; 6.2; 6.3

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I027

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Need for criteria for "adequately evaluated"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The high-order criteria for adequacy of investigations should be defined to guide DOE in determining what types of evaluations are appropriate and how extensive and intensive they should be. Since technical means of evaluating the 24 potentially adverse conditions will vary considerably, evaluation criteria should be specific to the particular adverse condition. The different evaluation criteria will be critical to the NRC assessment of the completeness of the individual technical evaluations that will be presented by DOE in the license application.

**RATIONALE/BASIS:**

A Workshop group on Extreme Erosion at NRC headquarters, June 20 -24, 1989, decided that the Regulation was not clear as to what constitutes an "adequate evaluation." The only direction given in 10 CFR 60.122(a)(2)(ii) bearing on "adequate evaluation" refers to "analyses which are sensitive ... and assumptions which are not likely to underestimate its (the condition's) effect." The definition of "adequately evaluated" will change with each potentially adverse condition that is considered and with each method of analysis used on the collected information.

It has been suggested that the perceived uncertainty in the Regulation was intended. There seems to be limited value in such regulatory flexibility in this instance when one considers the potential for License Application evaluation delays in which the alleged cause of unacceptable DOE investigations/

analyses may be ambiguous NRC requirements. At some point the NRC must define the License Application evaluation criteria. It would appear to be advantageous to all parties if the generic, high-order decision criteria were developed prior to the start of or at least early in the conduct of the site characterization activities to which they apply. The NRC should clarify the meaning of the existing language "adequately evaluated" and define the criteria by which the adequacy of the "adequate evaluation" will be judged.

It has been argued that the terms "adequately investigated" and "adequately evaluated" should not be identified as uncertainties because any uncertainty inherent within them would be subsumed by a Commission finding of "reasonable assurance" that the performance objectives would be met at a given site. It was argued that the relationship between these uncertainties and the establishment of "reasonable assurance" (explicitly called for in 60.122(a)(1) and required in order to adjudge performance in 60.112 and 60.113) is such that these uncertainties are resolved by a finding that the performance objectives will be met with "reasonable assurance." An examination of this argument led to the following definition of the relationship of 60.112 and 60.122: A complete understanding of one set of requirements is only possible in the context of the other; however, the Regulatory Requirements of 60.122 are distinct from those of 60.112. Consequently, the uncertainties associated with those requirements are distinct from each other, the subject uncertainties are Regulatory Uncertainties in as much as they address what must be done (as opposed to how it may be done) in investigating and evaluating the Potentially Adverse Conditions, assessments of compliance with 60.122 must be separate from assessments of compliance with 60.112 but done in the context of the performance objectives of 60.112, and a determination that the subject condition was adequately investigated and adequately evaluated is an essential prerequisite to a determination of reasonable assurance.

More complete discussions and conclusions on each of these aspects follow.

#### (1). RELATIONSHIPS OF THE BASIC REGULATORY REQUIREMENTS

The subsections of 60.122 comprise Regulatory Requirements, in and of themselves. These Regulatory Requirements are distinct from those in 60.112, but the associated compliance determinations are not independent. The bases for this conclusion are as follows:

- The structure of the regulation at the highest level makes this distinction, i.e., the Regulatory Requirements of 60.122 are Siting Criteria whereas 60.112 (as well as 60.111 and 60.113) are Performance Objectives for the geologic setting and the engineered barrier systems.
- The need and general method for separate evaluations of compliance are stated explicitly within 60.122.
- The text of 60.101 explicitly requires evaluations of compliance with regard to both the "objectives" and the "criteria" of Subpart E.

Although the language and structure of 60.122(c) indicates that these are separate requirements, they logically "roll up": first to be combined with the favorable conditions in 60.122(b) [in accordance with the provisions of 60.122(a)], and then to satisfy the Performance Objectives of 60.112. As noted above, the relationship between 60.122 and 60.112 may also exist with respect to 60.113 but was not addressed.

## (2). RELATIONSHIPS OF THE UNCERTAINTIES

The noted terms are Regulatory Uncertainties inasmuch as neither DOE nor NRC knows what (or "how much") is needed to support a finding of "reasonable assurance" regarding the Performance Objectives. Technical Uncertainties arise when there are questions concerning methods, e.g., how one would conduct an investigation, perform an evaluation, obtain data, etc. There may also be Technical Uncertainties regarding, for example, the methodology that would produce an adequate investigation of a particular condition or parameter, but such uncertainties are separate from the uncertainties in the language or intent of the regulatory text.

The uncertainties in the language of 60.122 are uncertainties in and of themselves. This follows directly from 1) above in that the Regulatory Requirements from which these uncertainties arise are themselves separate. As a consequence, the uncertainties in 60.122 require clarification separately from any uncertainties which may be present in 60.112.

An argument was made that the subject uncertainties do not exist because "adequately investigated" and "adequately evaluated" are defined in the context of the Performance Objectives. The principal points supporting this argument are as follows:

- If a finding is made in the affirmative regarding 60.112, then the investigation must have been "adequate" (for example).
- Conversely, it is impossible to make an affirmative finding (i.e., it is impossible to satisfy the Performance Objectives) without, for example, an "adequate investigation."
- Implicitly, DOE knows what to do regarding characterization simply by virtue of knowing that the Performance Objectives must be satisfied. Hence, DOE knows what the various terms such as "adequately evaluated" mean.

The argument that the Uncertainties accrue from 60.122 to 60.112 was not accepted for the following reasons:

- Performance Objectives can "appear" to be met or "be judged" to be satisfied, but an intervening party or the NRC could still question the "adequacy" of the investigation or evaluation that supported that judgment. For example, the argument could be made that the investigation was not "adequate" to support a finding with reasonable assurance.



- The accrual position must (of necessity) delay judging such matters as the "adequacy" of the investigation or evaluation until after a determination has been made regarding compliance with the Performance Objectives. This judgment would come very late in the process, almost certainly leading to delays in the license review process. Even taking into account the concept of iterative performance assessment, the process of coming to closure on such matters as the "adequacy" of investigation could be protracted because the finding of "reasonable assurance" comes at the end of the process. Such an approach would appear to be contrary to the goal of streamlining the licensing process.
- Several examples exist (including those arising during the Site Characterization Plan comment process) which suggest that DOE does not have a clear understanding of what constitutes, for example, an "adequate investigation." This suggests that simply knowing that the Performance Objectives must be met does not provide sufficient criteria for determining the operational meaning of such terms as "adequately investigate." (Note, however, that the prelicensing consultative process may be an effective means of providing such additional criteria and guidance as may be needed.)

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows:

"The effect of the potential adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potential adverse human activity or natural condition, and assumptions which are not likely to underestimate its effect .... 11 [10 CFR 60.122(a)(2)(ii)]

Once the program of investigations has been completed, the data obtained must be analyzed and evaluated against the performance objective. As was stated in NUREG-0804 (Nuclear Regulatory Commission, 1983a), in response to Comment 542:

"... it should be understood that the incorporation of the favorable and unfavorable conditions provides an analytical framework for applying the performance objectives."

The analysis needs to determine which conditions are those most important in determining compliance with the performance objectives, and accordingly, should serve as feedback into the investigation program to ensure that those conditions that have the largest potential of showing the site in non-compliance are given the proper priority and attention. This is the underlying assumption behind the various NRC comments on the performance allocation process presented by the DOE in the site characterization plan. (See, for example, Nuclear Regulatory Commission, 1989, Comment 1). In

performing the analysis itself, both sensitivity analysis and uncertainty analysis should be presented so that the true understanding of the effect of the phenomena under consideration on the performance objectives can be displayed. The various analyses should demonstrate a conservative approach such that the potential effects from the various conditions should not be presented in an overly optimistic manner. This concept was presented in the statement of consideration (Nuclear Regulatory Commission, 1983b) in such places as the discussion of anticipated processes and events and unanticipated processes and events, where the Commission stated:

There are two principal elements that will go into the Commission's application of this "reasonable assurance" concept. First, the performance assessment which has been performed must indicate that the likelihood of exceeding the EPA standard is low. Second, the Commission must be satisfied that the performance assessment is sufficiently conservative, and its limitations are sufficiently well understood, that the actual performance of the geologic repository will be within the predicted limits.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As indicated above in the rationale, the regulation is adequate in defining "adequately evaluated" from a perspective of reasonable assurance. The criterion to determine adequacy of evaluations (and investigations) is that the DOE evaluation be sufficient to provide reasonable assurance that the performance objectives related to waste isolation have been met. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(a)(2)(i)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5; 3.3; 5.4; 6.1; 6.2; 6.3

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
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- Nuclear Regulatory Commission. 1989. NRC Staff Site Characterization Analysis of the Department of Energy's Site Characterization Plan, Yucca Mountain Site, Nevada. NUREG-1347. Washington D.C: Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards, August, 1989.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

OITSID: OREGUNC090003I028

LAST UPDATE: 10 Jul 1995

STATUS: [recommended] Resolved

DATE RESOLVED: TBD

TOPIC OF THE OPEN ITEM/UNCERTAINTY: Meaning of "not likely to underestimate effect"

RESPONSIBLE BRANCH/SECTION: ENGB/Geosciences & Geotechnical Engineering Section

ACTION AGENCY: NRC

IDENTIFICATION DATE: 28 Feb 1990

SOURCE TYPE: CNWRA Report

SOURCE DOCUMENT: Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

DOE ACTIVITY CODE/WBS NO.: N/A

UNCERTAINTY TYPE: Regulatory

SPECIFIC TECHNICAL TYPE: Issue

### OPEN ITEM TEXT:

The meaning of the term "not likely to underestimate its effect" is unclear. The criteria for acceptability of a given estimated value, in order for the value to be judged acceptable within the definition "not likely to underestimate its effect" should be provided to DOE to allow an appropriate DOE assessment.

### RATIONALE/BASIS:

The Erosion Workshop group in June, 1989, identified this portion of the requirement as an uncertainty because it was not thought possible to determine what level of estimation was sufficient to satisfy the requirement. Would a marginal estimation (i.e., one that barely crossed a preferred threshold) be considered adequate as an estimation that provided a major margin of safety? Additionally, how would the DOE decide on the threshold for estimations?

In NUREG-0804, the following is found: "The wording "conservative analyses and assumptions" has been replaced with "assumptions which are not likely to underestimate its effect." The staff considered this change to alleviate the concern expressed in the comment." The original concern was expressed as follows: "This paragraph should be changed to read " ... evaluated using realistic analyses and assumptions, ... " The use of "conservative analyses and assumptions" (originally proposed by the NRC) in analyzing potential events could result in a lack of balance in the evaluation of a site and the rejection of what is, in fact, a good site."

It has been suggested that the perceived uncertainty in the Regulation was intended. There seems to be limited value in such regulatory flexibility in this instance when one considers the potential for License Application evaluation delays in which the alleged cause of unacceptable DOE investigations/analyses may be ambiguous NRC requirements. At some point the NRC must define the License Application evaluation criteria. It would appear to be advantageous to all parties if the generic, high-order decision criteria were developed prior to the start of or at least early in the conduct of the site characterization activities to which they apply. The NRC should clarify the meaning of the existing language "not likely to underestimate its effect" and define the criteria by which the adequacy of the DOE "estimation of effect" will be judged.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows:

"... the effect of the potential adverse human activity or natural condition on the site has been adequately evaluated using analyses which are sensitive to the potential adverse human activity or natural condition and assumptions which are not likely to underestimate its effect."

Once the program of investigations has been completed, the data obtained must be analyzed and evaluated against the performance objective. As was stated in NUREG-0804, in response to Comment 542:

"... it should be understood that the incorporation of the favorable and unfavorable conditions provides an analytical framework for applying the performance objectives."

To the extent that assumptions are required, they must be documented, and the effect that they have on performance assessment must be evaluated. In performing the analysis, DOE should present both sensitivity analysis and uncertainty analysis, so that the true understanding, of the effect of the phenomena under consideration, on the performance objectives, can be displayed. The various analyses should demonstrate a conservative approach such that the potential effects from the various conditions should not be presented in an overly optimistic manner. This concept was presented in the statement of consideration (June 21, 1983) in such places as the discussion of anticipated processes and events and unanticipated processes and events, where the Commission stated:

"There are two principal elements that will go into the Commission's application of this reasonable assurance concept. First, the performance assessment which has been performed must indicate that the likelihood of exceeding the EPA standard is low. Second, the Commission must be satisfied that the performance assessment is sufficiently conservative, and its limitations are sufficiently well-understood, that the actual performance of the geologic repository will be within the predicted limits."

In performing the various analyses, it may or may not be necessary to use "worst-case" scenarios, depending on "... the extent to which they may be encompassed by the definition of unanticipated processes and events; however, if compliance can be demonstrated under "worst case conditions," it is obvious that this would lend confidence that under the expected or nominal case, the performance objectives could be met.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The rationale (above) indicates that this term is adequately defined in the regulation and statement of consideration. The criterion to determine acceptability of any part of the evaluation procedures is that the DOE be able to provide reasonable assurance that the performance objectives related to waste isolation have been met. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(a)(2)(i)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5; 3.3; 5.4; 6.1; 6.2; 6.3

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

- Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREG090003I029

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Need for criteria for "adequately investigated"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

The criteria for "adequately investigated" should be defined sufficiently to guide DOE in determining what types and scopes of investigations are appropriate.

### **RATIONALE/BASIS:**

Since the precise technical nature of the different potentially adverse conditions varies considerably, these criteria should include the factors specific to each condition that will be viewed as critical in the NRC evaluation of the completeness of individual technical investigations presented by DOE in the license submittal. The NRC and Center attendees at the Erosion Workshop agreed that the term requires clarification if DOE is to respond acceptably to the Regulation in their license application.

It has been suggested that the perceived uncertainty in the Regulation was intended. There seems to be limited value in such regulatory flexibility in this instance when one considers the potential for License Application evaluation delays in which the alleged cause of unacceptable DOE investigations/analyses may be ambiguous NRC requirements. At some point the NRC must define the License Application evaluation criteria. It would appear to be advantageous to all parties if the generic, high-order decision criteria were developed prior to the start of or at least early in the conduct of the site characterization activities to which they apply. The NRC should clarify the meaning of the existing language "adequately investigated" and define the criteria by which the adequacy of the "investigation" will be judged.



It has been argued that the terms "adequately investigated" and "adequately evaluated" should not be identified as uncertainties because any uncertainty inherent within them would be subsumed by a Commission finding of "reasonable assurance" that the performance objectives would be met at a given site. It was argued that the relationship between these uncertainties and the establishment of "reasonable assurance" (explicitly called for in 60.122(a)(1) and required in order to adjudge performance in 60.112 and 60.113) is such that these uncertainties are resolved by a finding that the performance objectives will be met with "reasonable assurance."

An examination of this argument led to the following definition of the relationship of 60.112 and 60.122: A complete understanding of one set of requirements is only possible in the context of the other; however, the Regulatory Requirements of 60.122 are distinct from those of 60.112. Consequently, the uncertainties associated with those requirements are distinct from each other, the subject uncertainties are Regulatory Uncertainties since they address what must be done (as opposed to how it may be done) in investigating and evaluating the Potentially Adverse Conditions, assessments of compliance with 60.122 must be separate from assessments of compliance with 60.112 but done in the context of the performance objectives of 60.112, and a determination that the subject condition was adequately investigated and adequately evaluated is an essential prerequisite to a determination of reasonable assurance.

More complete discussions and conclusions on each of these aspects follow.

#### (1). RELATIONSHIPS OF THE BASIC REGULATORY REQUIREMENTS

The subsections of 60.122 comprise Regulatory Requirements, in and of themselves. These Regulatory Requirements are distinct from those in 60.112, but the associated compliance determinations are not independent. The bases for this conclusion are as follows:

- The structure of the regulation at the highest level makes this distinction, i.e., the Regulatory Requirements of 60.122 are Siting Criteria whereas 60.112 (as well as 60.111 and 60.113) are Performance Objectives for the geologic setting and the engineered barrier systems.
- The need and general method for separate evaluations of compliance are stated explicitly within 60.122.
- The text of 60.101 explicitly requires evaluations of compliance with regard to both the "objectives" and the "criteria" of Subpart E.

Although the language and structure of 60.122(c) indicates that the above bases are separate requirements, they logically "roll up": first to be combined with the favorable conditions in 60.122(b) [in accordance with the provisions of 60.122(a)], and then to satisfy the Performance Objectives of 60.112. As noted above, the relationship between 60.122 and 60.112 may also exist with respect to 60.113 but was not addressed.

## (2). RELATIONSHIPS OF THE UNCERTAINTIES

The noted terms are Regulatory Uncertainties inasmuch as neither DOE nor NRC knows what (or "how much") is needed to support a finding of "reasonable assurance" regarding the Performance Objectives. Technical Uncertainties arise when there are questions concerning methods, e.g., how one would conduct an investigation, perform an evaluation, obtain data, etc. There may also be Technical Uncertainties regarding, for example, the methodology that would produce an adequate investigation of a particular condition or parameter, but such uncertainties are separate from the uncertainties in the language or intent of the regulatory text.

The uncertainties in the language of 60.122 are uncertainties in and of themselves. This follows directly from (1) above in that the Regulatory Requirements from which these uncertainties arise are themselves separate. As a consequence, the uncertainties in 60.122 require clarification separately from any uncertainties which may be present in 60.112.

An argument was made that the subject uncertainties do not exist because "adequately investigated" and "adequately evaluated" are defined in the context of the Performance Objectives. The principal points supporting this argument are as follows:

- If a finding is made in the affirmative regarding 60.112, then the investigation must have been "adequate" (for example).
- Conversely, it is impossible to make an affirmative finding (i.e., it is impossible to satisfy the Performance Objectives) without, for example, an "adequate investigation."
- Implicitly, DOE knows what to do regarding characterization imply by virtue of knowing that the Performance Objectives must be satisfied. Hence, DOE knows what the various terms such as "adequately evaluated" mean.

The argument that the Uncertainties accrue from 60.122 to 60.112 was not accepted for the following reasons:

- Performance Objectives can "appear" to be met or "be judged" to be satisfied, but an intervening party or the NRC could still question the "adequacy" of the investigation or evaluation that supported that judgment. For example, the argument could be made that the investigation was not "adequate" to support a finding with reasonable assurance.
- The accrual position must (of necessity) delay judging such matters as the "adequacy" of the investigation or evaluation until after a determination has been made regarding compliance with the Performance Objectives. This judgment would come very late in the process, almost certainly leading to delays in the license review process. Even taking into account the concept of iterative performance assessment, the process of coming to closure on such matters as the "adequacy" of investigation could be protracted because the finding of "reasonable assurance" comes at the end of the process. Such an approach would appear to be contrary to the goal of streamlining the licensing process.

- Several examples exist (including those arising during the Site Characterization Plan comment process) which suggest that DOE does not have a clear understanding of what constitutes, for example, an "adequate investigation." This suggests that simply knowing that the Performance Objectives must be met does not provide sufficient criteria for determining the operational meaning of such terms as "adequately investigate". (Note, however, that the precicensing consultative process may be an effective means of providing such additional criteria and guidance as may be needed.)

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows:

"The potential 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 investigation."

The evaluation of the adequacy of a program of investigations must be based on consideration of the type, quality, and adequacy of the data obtained, to resolve the question of repository performance in compliance with NRC regulations. For example, if, to demonstrate compliance with the performance objectives, it is necessary to show that there were no faults present, in the area of investigations, that had offset of greater than 5 feet, an assumed 10-foot detection limit would be a clear example of an inadequate investigation. On the other hand, if it could be demonstrated that faults of 20 feet or less offset could be present and not prevent the performance objectives to be met, the program of investigations would be judged adequate for its purpose. The adequacy of the program of investigations can only be judged in the context of its ability to provide the necessary information to demonstrate compliance with the performance objectives.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD -[recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." As indicated in the rationale above, "The adequacy of the program of investigations can only be judged in the context of its ability to provide the necessary information to demonstrate compliance with the performance objectives." Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(a)(2)(i)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5; 3.3; 5.4; 6.1; 6.2; 6.3

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUN090003I030

**LAST UPDATE:** 10 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Definition of Geologic Setting

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The definition of the term "geologic setting," as used throughout 10 CFR 60.122 and defined in 10 CFR 60.2, is ambiguous. A rulemaking ("Generic Technical Position, Guidance for Determination of Anticipated Processes and Events and Unanticipated Processes and Events") is currently underway and will include clarification of the definition of the term.

**RATIONALE/BASIS:**

The NRC staff determined that the term "geologic setting" contained ambiguity. The DOE, at a Tectonics Technical Exchange on October 31, 1989, questioned the meaning of "geologic setting" relative to the area which was supposed to be considered as a part of the "geologic setting." The DOE did not know how the setting was to be bounded or whether "geologic setting" would apply to different sized regions for the different types of geologic processes which might be found at a site.

There are eighteen (18) occurrences of the term in the Regulation. The term is found in the following paragraphs: 10CFR60.2, 60.21(c)(1)(ii)(F), 60.21(c)(13), 60.32(c), 60.101(a)(2), 60.102(c), 60.102(e)(2), 60.112, 60.113(a)(1)(i)(B), 60.113(a)(2), 60.122(a)(1), 60.122(b)(1), 60.122(b)(6), 60.122(c)(14), 60.122(c)(17)(ii), 60.133(h), 60.135(a)(1), and 60.140(d)(2).

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

See Uncertainty Number 24

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(b)(1)

**LARP (REVIEW PLAN) NUMBER:** 7.10; 9

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I031

**LAST UPDATE:** 25 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Treatment of combinations of potentially adverse conditions

**RESPONSIBLE BRANCH/SECTION:** HLUR/ HLW Project and QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### **OPEN ITEM TEXT:**

There is an inconsistency in the treatment of combinations of potentially adverse conditions between 10 CFR 60.21(c)(1)(ii)(C) and 10 CFR 60.122. The former allows combinations of adverse conditions to be used in scenario development, whereas the latter allows only one adverse condition to be compared to a combination of favorable conditions. Thus, synergistic effects of adverse conditions would not be considered when evaluating the site during site selection and validation process.

### **RATIONALE/BASIS:**

During the review of the NRC scoping document for the proposed Technical Position on Scenario Identification and Screening, it became evident that the intent of the NRC staff regarding scenario development may not be consistent with the regulatory intent expressed in 10 CFR 60.122. Specifically, the Technical Position calls for combining events and processes to form scenarios for use in performance assessment. Although this is a logical and technically reasonable approach, it appears not to be supported by the provisions of 10 CFR 60.122 regarding potentially adverse conditions. This section of the regulation clearly requires that the potentially adverse condition be addressed singly. It does not, however, forbid combining such conditions. (Note that 60.122(a)(2)(iii)(B) does allow combinations of favorable conditions.)



The language of 10 CFR 60.21(c)(1)(ii)(C) calls for two assessments of repository performance: one addressing anticipated processes and events and one addressing unanticipated processes and events. Use of the plural form could imply that these are to be addressed in combination; although an alternative interpretation is that the regulation uses the plural because there would be several such analyses, each of which would use a single potentially adverse condition and one or more of the favorable conditions. The inconsistency between the regulations is an uncertainty which should be clarified.

Arguments have been made both for and against the inclusion as an uncertainty of the apparent inconsistency between 60.21(c)(1)(ii)(B) and 60.122(a)(2). One view is that no inconsistency exists because the objective of 60.122 is to assess individually the significance of the potentially adverse conditions present at the site (their presence alone causes a concern that the isolation capability of a site may be compromised) albeit in terms of site performance as a measure for judging the condition's "significance." That information is to be presented in the Safety Analysis Report. A technical reviewer needs to know the sensitivity of the site's performance to individual conditions present.

In contrast, the objective of analyses undertaken with respect to 60.112 and 60.21(c)(1)(ii)(C) is to determine the bottom-line performance of the repository with respect to the EPA standard. Whether this is done in one analysis where all conditions, processes, and events are combined or in a series of analyses of individual conditions, processes, and events with the results added together at the end is not a concern at the level of the rule, although it may be a technical concern with respect to the method employed (analyses of individual conditions, processes, and events could ignore potential coupling, synergism, or interrelationships between processes, for example). A second view discounting the identified inconsistency is that, since the regulation does not forbid combining adverse conditions, it is not clear where the inconsistency lies.

10 CFR 60.122 provides criteria by which to judge the acceptability of a site, while 60.21(c)(1)(ii) focuses on evaluation of performance. Though related, the structure of the two regulatory requirements is quite different in that 60.122(a)(2) speaks of the potentially adverse conditions entirely in the singular while 60.21(c)(1)(ii) does not. The text of 60.21(c)(1)(ii)(B) is as follows: "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." The text of 60.21(c)(1)(ii)(C) is as follows: "An evaluation of the performance of the proposed geologic repository for the period after permanent closure, assuming anticipated processes and events, giving the rates and quantities of releases of radionuclides to the accessible environment as a function of time; and a similar evaluation which assumes the occurrence of unanticipated processes and events." Clearly, scenarios of different combinations of favorable and adverse conditions will be identified and evaluated in response to 60.21(c)(1)(ii)(C).

10 CFR 60.122 is written in the singular and does not refer to combinations of potentially adverse conditions implying that only a single adverse condition is to be evaluated against a multitude of the favorable conditions. Moreover, 10 CFR 60.122(a)(2)(iii)(B) specifically suggests that combinations of favorable conditions can offset the effects on the performance objectives of any single potentially adverse condition. If the NRC intent is to allow combining adverse conditions, then the regulatory basis and the conditions and constraints for combinations of adverse conditions in response to 60.122 should be placed into the public record.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

The synergistic effects of the adverse (and favorable) conditions are to be considered in the site evaluation and will be discussed extensively in the License Application Review Plan LARP).

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The rulemaking record is clear that the synergistic effects of the favorable and adverse conditions should be considered and documented in the license application. For example, in NUREG-0804, in response to Comment 542, the NRC staff stated:

"The presence of only one significant condition not adequately compensated for by favorable conditions or capable of remedy by design would render the site unsuitable since the performance objectives would not be met. 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 ... ."

And, in response to Comment 541, the staff stated:

"The requirement for a "combination" recognizes the interactive nature of geologic systems."

During the promulgation of 10 CFR Part 60, as shown by the discussion in NUREG-0804, it was the intent of the Commission that the favorable and adverse conditions be evaluated in the context of the performance objectives. In addition, the Commission also recognized the interactive or "synergistic" effects of the geologic system. Although 10 CFR 60.122(a)(2) does require that each potentially adverse condition must be considered individually, the analysis must be performed in a reasonable way, i.e., in a manner that recognizes the interactive nature of the geologic systems.

The applicant must not ignore relevant characteristics of the carrying out the analysis called for by 10 CFR 60.122(a)(2)(ii). Rather, the impact of the potentially adverse condition must be evaluated in the context of those other characteristics so as to form the basis for a judgement of whether its presence significantly affects the ability of the geologic repository to meet the performance objectives relating to isolation of the waste. 10 CFR 60.122(a)(2) provides guidance on factors that must be considered in this evaluation, and 10 CFR 60.21(c)(1)(ii)(C) is the paragraph requesting that this analysis be presented in the license application. At the time the rule was promulgated, the U.S. Environmental Protection Agency (EPA) Standard had not been finalized; therefore, several sections of the rule were written in general language, with the intent that upon finalization of the EPA Standard, 10 CFR Part 60 would be revised to ensure conformance. Before the courts set aside the EPA Standard, the NRC staff had prepared a conforming amendment that was in agreement with the then final EPA Standard. Included in this draft amendment was a revised version of

10 CFR 60.21(c)(1)(ii)(C). Upon finalization of the EPA Standard, this specific paragraph of 10 CFR Part 60, along with other necessary paragraphs, will be revised, as necessary, to reflect the final standard. The need for rulemaking to conform 10 CFR Part 60 to the EPA Standard has already been documented in SECY 88-285 and SECY 90-207. However, this revision is necessary to conform 10 CFR Part 60 to 40 CFR Part 191, not to clarify the intent of the rule. Although the staff does not consider that there is any inconsistency between these two sections, the staff also recognized that the analysis requested by 60.21(c)(1)(ii)(c), to demonstrate compliance with the overall system performance objective, will require extensive discussion in the LARP. The staff believes that requirements can be clarified best within the context of this guidance document.

#### **HISTORY:**

02 Feb 1990 - This uncertainty was identified in CNWRA Report 90-003, with the uncertainty text and basis.

07 Jun 1990 - SECY 90-207 issued with this uncertainty identified.

29 Jul 1991 - SECY 91-225 issued with this uncertainty identified.

01 Apr 1991 - NRC issues Report on Uncertainty Reduction which adds the resolution method type and rationale.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.21(c)(1)(ii)(C)

**LARP (REVIEW PLAN) NUMBER:** 3.2.5, 4.3, 5.4, 6.1-6.3

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Washington, DC: Nuclear Regulatory Commission, Division of High-Level Waste Management, Nuclear Material Safety and Safeguards.

Nuclear Regulatory Commission. 1983. "Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories." NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1988. "Regulatory Strategy and Schedules for the High-Level Waste Repository Program." SECY-88-285. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990. "First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program." SECY-90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. "Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program." James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I032

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Meaning of regional groundwater flow system

**RESPONSIBLE BRANCH/SECTION:** PAHB/Hydrologic Transport Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The term "regional groundwater flow system" can refer to differing geographical regions depending on the geologic process of interest and the intended breadth of the investigation. A clarification of the intended breadth of the investigations meant to consider "regional groundwater flow system" will allow DOE to respond appropriately to the regulation in the License Application.

### RATIONALE/BASIS:

The extent of the "regional groundwater flow system" can be different depending on the geophysical, geochemical, and hydrological mechanisms of interest. For example, a "regional groundwater flow system" could refer to an entire basin and range province, to a basin or set of basins in that province, to the groundwater flow beneath a portion of a basin, to the groundwater system of a river valley, or to a single stream and its tributary drainage area. The NRC should clarify which of the "regional" systems are to be considered in any instance.

The uncertainty arises from the possible differing geographical extents assigned to various "regional groundwater flow systems." It is possible for an effect to be measured in the "regional groundwater flow system" down gradient from any location even though that effect is not measured at that location. Similarly, an effect could be measured or observed at a particular location that is not apparent in the larger regional system. The regulation may be intended to apply to any localized

effect on the groundwater flow beneath the proposed repository as well as to the broader implications of a local effect on regional flow, and vice versa.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The Center for Nuclear Waste Regulatory Analyses (CNWRA) report (CNWRA 90-003) suggests that use of the term "regional" should be clarified. Most scientific studies at Yucca Mountain are referred to as either "regional" or "site" studies. These terms generally refer to the spatial scale of the studies. In 10 CFR 60.2, the definition of "site" is "... the location of the controlled area." The NRC staff refers to studies on the scale of the controlled area or smaller as site studies. Studies on a larger scale, which includes the controlled area and areas beyond, are referred to as regional studies. The regional groundwater flow system is a subset of the geologic setting. The investigations must be of sufficient extent so that any change that might reasonably be thought to affect isolation triggers detailed analysis. Such analysis is necessary to determine whether the performance objectives have been met. See also responses to Comments 24 and 29.

Information needs for the varying scales of regional and site hydrogeology are provided in NRC's Draft Regulatory Guide DG-3003, "Format and Content for the License Application for the High-Level Waste Repository" (Nuclear Regulatory Commission, 1990b).

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990b) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The regional groundwater flow system is a subset of the geologic setting and must be of sufficient breadth for the necessary investigations to demonstrate compliance with the performance objectives. As indicated in the rationale above, "NRC staff refers to studies on the scale of the controlled area or smaller as site studies. Studies on a larger scale, which includes the controlled area and areas beyond, are referred to as regional studies." Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(c)(3)

**LARP (REVIEW PLAN) NUMBER:** 3.2.2.7

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990a. Format and Content for the License Application for the High-Level Waste Repository. DG-3003. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990b. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I033

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** 13 Mar 1991

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Meaning of regional groundwater flow system  
(Identical to OREGUNC090003I032)

**RESPONSIBLE BRANCH/SECTION:** PAHB/Hydrologic Transport Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The term "regional groundwater flow system" can refer to differing geographical regions depending on the geologic process of interest and the intended breadth of the investigation. A clarification of the intended breadth of the investigations meant to consider "regional groundwater flow system" will allow DOE to respond appropriately to the regulation in the License Application.

### RATIONALE/BASIS:

The extent of the "regional groundwater flow system" can be different depending on the geophysical, geochemical, and hydrological mechanisms of interest. For example, a "regional groundwater flow system" could refer to an entire basin and range province, to a basin or set of basins in that province, to the groundwater flow beneath a portion of a basin, to the groundwater system of a river valley, or to a single stream and its tributary drainage area. The NRC should clarify which of the "regional" systems are to be considered in any instance.

The uncertainty arises from the possible differing geographical extents assigned to various "regional groundwater flow systems." It is possible for an effect to be measured in the "regional groundwater flow system" down gradient from any location even though that effect is not measured at that location. Similarly, an effect could be measured or observed at a particular location that is not



apparent in the larger regional system. The regulation may be intended to apply to any localized effect on the groundwater flow beneath the proposed repository as well as to the broader implications of a local effect on regional flow, and vice versa.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Refer to Uncertainty Number 32

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The regional groundwater flow system is a subset of the geologic setting and must be of sufficient breadth for the necessary investigations to demonstrate compliance with the performance objectives. As indicated in the rationale above, "NRC staff refers to studies on the scale of the controlled area or smaller as site studies. Studies on a larger scale, which includes the controlled area and areas beyond, are referred to as regional studies." Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(c)(4)

**LARP (REVIEW PLAN) NUMBER:** 3.2.2.8

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I034

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Sorption of radionuclides

**RESPONSIBLE BRANCH/SECTION:** PAHB/Hydrologic Transport Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The term "sorption of radionuclides" refers to only one of several possible geochemical processes. The regulatory intent needs to be clarified to ensure a complete and accurate assessment of all the geochemical conditions affecting radionuclide migration.

### RATIONALE/BASIS:

During the Geochemistry Workshop, June 14-17, 1989, at NRC Headquarters, the consensus of the assembled group was that 10 CFR 60.122(c)(8) was intended to include geochemical processes that would significantly inhibit radionuclide transport, not just sorption, in the geochemical conditions to be considered as potentially adverse. The DOE will not fully address the movement of radionuclides as a potentially adverse condition if they consider only the sorption portion of the entire transport scenario. In order to be complete, other aspects of transport such as colloidal suspension, gaseous transfer, and desorption must be a part of the DOE investigation and evaluation.

It was also identified at the Geochemistry Workshop that the potentially adverse conditions listed in the siting criteria were inconsistent with the corresponding favorable conditions. For example, precipitation of radionuclides is listed under favorable conditions, but not under potentially adverse conditions. Consequently, the DOE could respond to the letter of the rule in determining only the conditions that would reduce sorption, and fail to characterize geochemical conditions that might increase transport of the radionuclides, a more inclusive measure of site suitability.

The accepted NRC definition of a Regulatory Uncertainty includes as criteria, in addition to the meaning of a Regulatory Requirement, the adequacy and completeness of the requirement, and the omission of an essential requirement. This definition as found in TOP-001-02, page A98 allows for the classification of "sorption of radionuclides" as a Regulatory Uncertainty because the existing language constrains the DOE study of the radionuclides as an adverse condition by identifying for study only one form of transport; i.e. sorption. In order to study the problem, the DOE must consider all the means which may affect radionuclide transport. The need to include all forms of transport in the evaluation of radionuclides in the adverse geochemical condition should be made clear to the DOE.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Sorption is only one of several geochemical processes that could reduce radionuclide mobility. Some other processes that could reduce radionuclide mobility are matrix diffusion and filtration of radiocolloids. If the Commission intended for this section of the rule to identify all geochemical conditions that could affect radionuclide mobility, then consideration of these other retardation processes and conditions affecting them would be required. The list of potential adverse conditions may need to be expanded to include other geochemical conditions (processes) affecting radionuclide migration.

Further analysis is needed to determine whether and how the rule should be changed and to determine what form any such change might take.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990a) issued with this uncertainty identified.

November, 1990 - NRC issues Draft Regulatory Guide DG-3003 Format and Content for the License Application for the High-Level Waste Repository (Nuclear Regulatory Commission, 1990b). This identifies all of the geochemical information that DOE needs to include in their LA related to geochemistry governing radionuclide mobility. The list includes information on sorption and other geochemical processes which might increase the sorption of radionuclides.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale. 29 Jul 1991

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(c)(8)

**LARP (REVIEW PLAN) NUMBER:** 3.2.3.5

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR Part 60, "Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990a. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990b. Format and Content for the License Application for the High-Level Waste Repository. DG-3003. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I035

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Clarification of extreme erosion

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

The meaning of "extreme erosion" in this regulatory context needs to be clarified as to whether it means (1) the highest rate of erosion of a potential site area that might be anticipated based on the rates of erosion experienced during the Quaternary Period, or (2) the rate, which if it were to occur in the foreseeable future, would cause the performance objectives of the geologic repository to be breached and against which the projected erosion rates based on Quaternary data are to be evaluated.

### RATIONALE/BASIS:

The potential uncertainty was originally identified on the basis that a literal interpretation of the wording and construction of 60.122(c)(10), (15), (16), (18) and (19) in the context of 60.122(c) was inconsistent with the intention of the regulation. The potential adversity in these subsections is, in each case, literally identified as the "evidence of" some condition (e.g. extreme erosion). The intent of the regulation is that the condition itself is potentially adverse not the "evidence of" its existence. However, further deliberation has led to the view that the language of 60.122(a)(2) provides an adequate basis for placing these rules in their proper context and thus, no uncertainty is present.

### RECOMMENDATIONS:

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The full text of the regulation containing this potential uncertainty is as follows: "Evidence of extreme erosion during the Quaternary Period."

Within NUREG-0804, in response to Question 543, the staff stated the following:

"The staff has used the term "extreme erosion" to refer to the occurrence of substantial changes in land forms (as a result of erosion) over relatively short periods of time."

The staff considers that this adverse condition implies a straightforward concept that has been adequately explained in the context of the above reference. If the controlled area or areas sufficiently close to the controlled area display evidence that there were relatively short periods of time during the Quaternary in which substantial changes in land forms occurred, the recurrence of which could affect the ability of the site to meet the performance objectives, the staff would consider this as evidence of extreme erosion.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." The term "extreme erosion" is interpreted to mean evidence "of substantial changes in land forms (as a result of erosion) over relatively short periods of time, during the Quaternary period. The concern is that if extreme erosion would occur during the period of performance, it could affect the ability of the site to meet the performance objectives. Thus, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(c)(16)

**LARP (REVIEW PLAN) NUMBER:** 3.2.1.10

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.



**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I036

**LAST UPDATE:** 10 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** "Air-filled" pore spaces

**RESPONSIBLE BRANCH/SECTION:** PAHB/Hydrologic Transport Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

Clarification needs to be provided as to whether "air-filled pore spaces" is meant to be interpreted literally as (1) those spaces filled with a mixture of nitrogen, oxygen, and other constituents, or (2) "gas-phase filled pore spaces." The latter interpretation would require pores filled with methane, carbon dioxide, and various mixtures of earth-derived and barrier system-derived gases to be considered in potential transport mechanisms involving radionuclides.

**RATIONALE/BASIS:**

"Air" has a specific meaning and composition, and the Commission may not have intended the regulation to be limited by this meaning. Also, air, per se, is found only within a few meters below the surface of the earth.

The Commission, in defining the unsaturated zone in 10CFR60.2, used the following words "... some of the voids may contain air or other gases at atmospheric pressure." The Commission clearly intended that the unsaturated zone be considered to have air and/or other gases as constituents of the pore spaces. That intent should be carried out uniformly in the implementation of the Regulation. Clarification of the term "air-filled" in 60.122(c)(24) to the effect that the word "air" is intended to encompass any gas-phase would satisfy the regulatory intent by requiring the evaluation of unsaturated pore space which might contain any one or a combination of different gases.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

This specific adverse condition was added to 10 CFR Part 60 in the amendment to Part 60 to contain specific criteria for disposal in the unsaturated zone. In the supplementary information (50 FR 29641) and supporting technical information (Nuclear Regulatory Commission, 1985), it was recognized that "... surface air can be connected with water and air at the horizon of the underground facility through open pores and fracture channels within the host rock." (See Nuclear Regulatory Commission, 1985, p. 15) and "...the unsaturated geologic media surrounding the underground facility will be partially drained and will possess connected air-filled pores that can form potential pathways for gaseous movement" (see Nuclear Regulatory Commission, 1985, p. 20) and "vapor transport might only be expected to occur in the portion of the host rock where voids are not completely filled or refilled with groundwater (see 50 FR 29046). It is obvious from these and other statements contained within these documents that the Commission was considering the "air-filled pore spaces" in the context of the primary states of matter -- gas, liquid, and solid -- i.e., pore spaces not filled with solid or liquid matter. Furthermore, these references recognize transport of radionuclides in the gaseous state as encompassing all potential conditions, as there are specific references to carbon dioxide, methane, hydrogen, krypton, iodine, and aerosol-size particles of groundwater -- among others -- as possible means of radionuclide transport in the unsaturated zone. (See, for example, Nuclear Regulatory Commission, 1985, P. 21.) In the "Statement of Considerations" for 10 CFR Part 60, the Commission stated: "The term "vapor transport" as used in the proposed amendments, referred to both water vapor and the gaseous state of some constituents' contaminants ... . The Commission believes the revised wording will more accurately convey its original intent." The staff considers that there is no uncertainty in this section of the rule.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." "Air-filled" pore spaces should be interpreted in the context of the three primary states of matter - gas, liquid, and solid. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.122(c)(24)

**LARP (REVIEW PLAN) NUMBER:** 3.2.3.7

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1985. Disposal of High-Level Radioactive Wastes in the Unsaturated Zone: Technical Considerations and Response to Comments. NUREG-1046. Washington, DC: Nuclear Regulatory Commission

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I037

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Design all utility testing for essential function

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

Additional guidance is needed regarding on-line operability testing of auxiliary and redundant systems. On-line operability testing should be explicitly required for redundant, auxiliary, and backup elements of the utility systems. This uncertainty needs to be addressed to ensure adequacy of design and operation of systems important to safety under normal and accident conditions.

### RATIONALE/BASIS:

Utility services important to safety are commonly designed with features that require periodic on-line testing to verify the functionality of each subsystem.

Periodic on-line testing of all critical utility systems should be required to ensure their continued operability at all times. While redundant systems for utility services important to safety are specified, it is most important to specify the testing regimen since redundant systems are rarely called upon to respond until an accident occurs. Most redundant systems are periodically inspected and tested off-line because of convenience. While 10 CFR 60.131(b)(6) specifies that the systems must be designed to permit this periodic testing, it does not specify the requirement of operability testing or exercising the critical utility systems for full-scale on-line response on a periodic basis. Critical utility systems would necessarily have a more rigid inspection and maintenance schedule.

10 CFR 60.21(c)(15)(v) addresses the plans for periodic testing of the structures, systems, and components of the geologic repository operations area. However, it does not address exercising the critical utility systems on a regular basis to ensure timely operability under adverse conditions.

10 CFR 60.74(a)(4) was examined for its applicability to this uncertainty. While it addresses testing for the administration of the regulations in this part, it does not seem appropriate to rely on such a broad contingency provision for key design and operations requirements for crucial utility systems important to safety.

10 CFR 60.43(a) discusses license conditions to be derived from analyses and evaluations included in the license application. The conditions in the license would be an appropriate location for specific operability testing details for utility systems "important to safety." However, general testing requirements must be known early enough to be considered in the design process.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The question is whether existing regulations provide adequately for on-line operability testing of auxiliary and redundant utility systems. Apparently, the Center for Nuclear Waste Regulatory Analyses (CNWRA) recognizes that the primary systems are already subject to appropriate testing requirements -- a view shared by the staff. This interpretation rests on the view that those primary systems are "important to safety" and that they must be subject to on-line operability testing, so as to satisfy the requirement in 10 CFR 60.131(b)(5)(i) for design so that essential safety functions can be performed. The redundant and backup systems, if important to safety, would be equally subject to the on-line operability testing requirement.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." On-line operability testing of auxiliary and redundant systems is already encompassed in 10 CFR 60.131(b)(5). As stated in the rationale, the redundant and backup systems, if important to safety, would be equally subject to the on-line operability testing requirement. Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(5)

**LARP (REVIEW PLAN) NUMBER:** 4.2; 4.3; 4.4

## **REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I038

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Design to permit nonperiodic inspection

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

10 CFR 60.131(b)(6) provides for designing to permit periodic inspection, testing and maintenance as necessary, to ensure their continued functioning and readiness. Regulatory guidance needs to be provided to require designing for maintenance that is nonperiodic.

Guidance regarding nonperiodic (i.e., corrective) maintenance should clarify for DOE the overall maintainability required in the design of structures, systems and components important to safety.

### RATIONALE/BASIS:

The regulatory text is clear as to designing to permit periodic inspection and testing of structures, systems, and components important to safety. These items, once designated, will have associated preventive maintenance schedules generated to ensure their continued readiness.

The regulatory text does not require that the design provide for non-periodic maintenance. The ability to rapidly repair random failures requires design for maintenance (maintainability) and the provision of qualified repair personnel, on-site replacement parts, and operational plans to perform emergency repairs in-place to maintain the safety of personnel, short-term transit of waste packages, timely emplacement, etc. Requirements (design criteria) need to be provided to DOE that apply to items that

fail randomly or prior to their scheduled maintenance. A key aspect of "continued functioning and readiness" (or design for maintenance) is the ability to rapidly isolate, diagnose, and repair/replace failed components or systems.

This crucial design criterion warrants specific treatment rather than being left to a broad, general provision such as 10 CFR 60.130. It is necessary to specify minimum design criteria for maintainability to ensure that the structures, systems, and components will include the essential safety features to meet performance objectives.

#### **RECOMMENDATIONS:**

None

#### **UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

#### **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The term "periodic" most often implies the occurrence of an event at regular intervals. But, it can also mean "occurring repeatedly from time to time" (as in "one of Bermuda's periodic power failures" – an example cited in Webster's Third New International Dictionary). In the context of 10 CFR 60.131, it is clear that the latter meaning is intended, as the aim is to ensure "inspection, testing, and maintenance, as necessary, to ensure ... continued functioning and readiness." It would be illogical to design for testing only at fixed intervals, if testing on other occasions is also necessary. And in any event, the regulations provide an alternative adequate basis for this design element, in that 10 CFR 60.130 declares that omissions in 10 CFR 60.131 do not relieve the DOE from any obligation to provide safety features needed to achieve its performance objectives.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." Designing for non-periodic maintenance is included in 10 CFR 60.131(b)(6). Therefore, this issue is resolved, and no further action is necessary.



**CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(6)

**LARP (REVIEW PLAN) NUMBER:** 4.2; 4.3; 4.4

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090003I039

**LAST UPDATE:** 20 Sep 1995

**STATUS:** [recommended] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Insufficient guidance in design criteria

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

Additional or more generic guidance is needed for the design of waste conveyances, to assure that the performance objectives will be met if the waste transfer system includes transfer methods other than shafts and hoists (e.g., ramps and vehicles).

### RATIONALE/BASIS:

Four shafts and two ramps have been proposed by DOE for the underground facility at the GROA. If conditions are favorable, ramp access to the GROA may be acceptable for excavating and constructing the underground facility and for transporting waste. The use of a ramp with a 9% slope for waste transport, as has been proposed in the Site Characterization Plan (SCP), presents passage and conveyance design considerations significantly different from those of shafts. In order to assure the safe transport of waste into or out of the repository and to preserve the performance objectives of the geologic repository, regulatory guidance is needed for the design of conveyance methods other than through shafts and hoists.

The Center agrees with the original NRC intent to provide specific safety-related requirements for crucial elements of waste-handling subsystem design rather than relying upon a broad provision like 10 CFR 60.130. The uncertainty exists because 10 CFR 60.131(b)(10) refers specifically to vertical conveyance systems. This highly site/design-specific guidance should be supplemented or made sufficiently generic to apply to ramps and vehicles.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

This uncertainty calls for additional or more generic guidance for waste transfer methods other than shafts and hoists (which are often bottlenecks and safety concerns), i.e., ramps and vehicles. The staff agrees that the latter transfer methods are not addressed by the paragraph in question. The issue, thus, is not what the regulation means, but rather, whether there is a need for analogous provisions for waste transfer methods other than shafts and hoists. The staff believes there is no such need, as the regulations already contain a number of relevant design features (e.g., protection against dynamic effects of equipment failure (10 CFR 60.131(b)(2), instrumentation and control systems (10 CFR 60.131(b)(8), etc.), as well as the overall requirement (10 CFR 60.130) for design to achieve the performance objectives.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [recommended] NRC accepts CNWRA report "Recommendations for Updating the Status of Regulatory and Institutional Uncertainties." Safety of waste transfer methods other than shafts and hoists are covered in several sections of 10 CFR Part 60 [i.e., 10 CFR 60.131(b)(2), and 10 CFR 60.131(b)(8)]. As stated above, the issue, thus, is not what the regulation means, but rather, whether there is a need for analogous provisions for waste transfer methods other than shafts and hoists. The staff believes there is no such need, as the regulations already contain a number of relevant design features (e.g., protection against dynamic effects of equipment failure (10 CFR 60.131(b)(2), instrumentation and control systems (10 CFR 60.131(b)(8), etc.), as well as the overall requirement (10 CFR 60.130) for design to achieve the performance objectives. Therefore, this issue is resolved, and no further action is necessary.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(10)

**LARP (REVIEW PLAN) NUMBER:** 4.3

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Updating the Status of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I040

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Subpart I

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 28 Feb 1990

**SOURCE TYPE:** CNWRA Report

**SOURCE DOCUMENT:** Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

10 CFR 60.31(a)(5) requires the NRC to ensure compliance of the DOE emergency plan with Subpart I of 10 CFR Part 60. 10 CFR 60.21(c)(9) requires DOE to include plans for coping with radiological emergencies in the Safety Analysis Report. However, it is uncertain that this is possible, since Subpart I has not been published.

**RATIONALE/BASIS:**

The absence of criteria for emergency planning, which will be included in Subpart I, is an uncertainty that needs to be addressed so that a complete application can be prepared by the DOE. The Commission may issue a construction authorization if it determines that DOE's application includes an emergency plan which is compliant with Subpart I of 10 CFR Part 60. The Regulations of the Federal Emergency Management Agency may be useful in the preparation of Subpart I.

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Major Rule Change

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

The reserved Subpart I, "Emergency Planning Criteria," is intended to resolve this uncertainty when completed.

Because 10 CFR 60.31(a)(5) requires the DOE's emergency plan to be in compliance with 10 CFR Part 60, Subpart I, at the time a Construction Authorization is issued, DOE must know the NRC's "Emergency Planning Criteria," to prepare the License Application. A policy and technical basis for the intended rulemaking will be developed and rulemaking undertaken as set forth in SECY 90-207.

**HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60 Subpart I

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I041

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [proposed] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Applicability of siting criteria to performance objectives

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The phrase in 10 CFR 60.122, "... to meet the performance objectives relating to isolation of the waste," could be interpreted to mean that the siting criteria in 10 CFR 60.122 apply only to the overall system performance objective in 10 CFR 60.112 or to the subsystem performance objectives in 10 CFR 60.113, as well.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance



**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Section 10 CFR 60.122(a) contains the phrase "performance objectives relating to isolation of the waste" in several places. The question is: What are the "performance objectives relating to isolation of the waste" that must be considered? The term "isolation of waste" is discussed in 10 CFR 60.102, "Concepts," and is as follows:

"(e) Isolation of waste. (1) During the first several hundred years following permanent closure of a geologic repository, when radiation and thermal levels are high and the uncertainties in assessing repository performance are large, special emphasis is placed upon the ability to contain the wastes by waste packages within an engineered barrier system. This is known as the containment period. The engineered barrier system includes the waste packages and the underground facility ... .

(2) Following the containment period special emphasis is placed upon the ability to achieve isolation of the wastes by virtue of the characteristics of the geologic repository. The engineered barrier system works to control the release of radioactive material to the geologic setting and the geologic setting works to control the release of radioactive material to the accessible environment. Isolation means inhibiting the transport of radioactive material so that amounts and concentrations of the materials entering the accessible environment will be kept within prescribed limits." [emphasis in original]

It is clear that the term isolation is used only in reference to the period following permanent closure. The performance objectives for the period of repository operations contained in 10 CFR 60.111 relate to radiation protection during preclosure repository operations and do not pertain to isolation of the waste following permanent closure. Therefore, the staff has concluded that the preclosure performance objectives of 10 CFR 60.111 are unrelated to waste isolation and are not encompassed by the term "performance objectives relating to isolation of the waste" in 10 CFR 60.122.

The Performance objectives of 10 CFR 60.112, which implement the overall U.S. Environmental Protection Agency (EPA) Standard in 40 CFR 191 by reference, establish limits for amounts and concentrations of material entering the accessible environment following permanent closure. Thus, it is clear that in using the term "performance objectives relating to isolation of the waste," the Commission had in mind at least the overall EPA Standard.

The staff considers that the performance objectives set out in 10 CFR 60.113 also relate to isolation of the waste and that they should be considered when applying 10 CFR 60.122. Justification for this position can be found in the Statement of Considerations accompanying the proposed technical criteria for Subpart E in 10 CFR Part 60, 46 FR 35280, July 8, 1981 (at pp. 35283-84). There, the Commission observed that in order to have confidence in the ability of a geological repository to contain and isolate the wastes for an extended period of time, the repository must consist of multiple barriers -- specifically, it concluded, two major engineered barriers (waste packages and underground facility-), in addition to the natural barrier provided by the geological setting. The Commission emphasized these elements "... to take advantage of the opportunity to attain greater confidence in the isolation of the waste."

It is clear, therefore, that when the Commission referenced "performance objectives relating to isolation of the waste," it had in mind the multiple performance objectives set out in 10 CFR 60.113, as well as the overall EPA Standard that is implemented by 10 CFR 60.112.

This staff position reflects sound policy considerations. It calls for the applicant to consider the siting criteria, as specified in 10 CFR 60-122, to demonstrate - for each of the relevant performance objectives referenced above - that the favorable conditions, together with the engineered barrier system, are sufficient to provide reasonable assurance that such objectives will be met, and that any potentially adverse condition will not compromise the ability of the geologic repository to meet such objectives. If the applicant is unable to make such a demonstration, it seems unlikely that it could otherwise satisfy the requirements of 10 CFR 60.113 that the Commission so emphasized.

Finally, it should be noted that the current position is a clarification of the applicability of 10 CFR 60.122. It does not modify the performance objectives. In fact, the scope of 10 CFR 60.122 is limited by the specific language of those performance objectives. In particular, the position does not imply the need for additional analysis of favorable or potentially adverse conditions, where such conditions have no relevance to a given performance objective.

#### **HISTORY:**

February 2, 1990 - This uncertainty was identified in CNWRA Report 90-003 (Center for Nuclear Waste Regulatory Analyses, 1990), with the uncertainty text and basis.

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [proposed] NRC accepts CNWRA report "Recommendations for Disposition of Regulatory and Institutional Uncertainties." Staff Position SP 60-002, published August 8, 1990, states: In 10 CFR 60.122(a), the phrase "performance objectives relating to isolation of the waste" refers to the performance objectives set out in 10 CFR 60.112, "Overall System Performance Objective for the Geologic Repository After Permanent Closure," and 10 CFR 60.113, "Performance of Particular Barriers After Permanent Closure," but does not refer to the performance objectives set out in 10 CFR 60.111. Therefore, this issue is resolved, and no further action is necessary.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.112 and 60.122

**LARP (REVIEW PLAN) NUMBER:** PACs and FACs

**REFERENCES:**

- Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.
- Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090207I042

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [proposed] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Applicability of thermal load requirement to performance objectives

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The thermal-load requirement in 10 CFR 60.133(i) could be interpreted to apply to only the pre-closure performance objectives in 10 CFR 60.111, or to the post-closure performance objectives in 10 CFR 60.112 and 10 CFR 60.113, as well.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

10 CFR 60.133(i) falls within a portion of the rule entitled, "Design Criteria for the Geologic Repository Operations Area." The "Geologic Repository Operations Area" is defined in 10 CFR 60.2 as:

"Geologic Repository Operations Area means a high-level radioactive waste facility that is part of a geologic repository, including both surface and subsurface areas where waste handling activities are conducted" (emphasis added).

The presence of the word "are" in the last sentence seems to limit the applicability of the regulations under this heading to the preclosure period, thus excluding the performance objectives stated in 10 CFR 60.112 and 60.113.

On the other hand, 10 CFR 60.112 and 60.113 identify postclosure performance objectives that must be considered when designing the Engineered Barrier System (EBS). The EBS includes the underground facility. 10 CFR 60.133(i) is a design criterion for the underground facility. Thus, since 60.133(i) is a design criterion for the underground facility, it appears to be a design criterion applicable to achieving the postclosure performance objectives of 10 CFR 60.112 and 60.113.

However, both the language and regulatory history of 10 CFR 60.133 afford ample support that the design of the underground facility should consider short-term and long-term thermal loads. Thus, in proposing its technical criteria (46 FR 35285), the Commission explained that the technical criteria required the design of the repository to accommodate potential interaction of the waste, the underground facility, and the site. The rationale for this policy was stated thus: "The Commission believes such requirements are necessary to assure that the ability of the repository to contain and isolate the wastes will not be compromised by the construction of the repository." The rule as it was then being proposed, 10 CFR 60.132(k), called for the underground facility to be designed so that the predicted thermal and thermomechanical response of the rock will not degrade significantly the performance of the repository or the ability of the natural or engineered barriers to retard radionuclide migration. This was an unequivocal reference to long-term (postclosure) performance. Although the final regulation was modified, there was no change in intent, for the Commission indicated that the specific reference to retardation of radionuclide migration -- which was deleted ... is already covered by requiring that the performance objectives be met." (48 FR 28215)

Moreover, the regulations reveal that the drafters consciously restricted the scope of the performance objectives to preclosure concerns, where that was the intent - as in 10 CFR 60.133(g)(1), which requires design of the ventilation facility to control certain functions "... in accordance with the performance objectives of 10 CFR 60.111(a)" - i.e., preclosure criteria.

#### **HISTORY:**

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN44.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [proposed] NRC accepts CNWRA report "Recommendations for Disposition of Regulatory and Institutional Uncertainties." Staff Position SP 60-003, published August 8, 1990 states: "The term "performance objectives," as used in Section 60.133(i) of 10 CFR Part 60, is considered by the NRC staff, to apply to both the preclosure and postclosure performance objectives identified in 10 CFR 60.112 and 113." Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.133; 60.111; 60.112; and 60.113

**LARP (REVIEW PLAN) NUMBER:** 3.3; 4.2; 4.3; 4.4; 4.5.1; 4.5.2; 5.3; 5.4; 6.1; 6.2; 6.3

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC09207I043

**LAST UPDATE:** 11 Jul 1995

**STATUS:** [proposed] Resolved

**DATE RESOLVED:** TBD

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Waste package containment time frame

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The phrase "... not less than 300 years nor more than 1000 years ..." from 10 CFR 60.113(a)(1)(ii)(A) can possibly be taken out of context and interpreted to mean (1) that the waste package must be designed to have a lifetime no greater than the stated period or (2) that, in assessing the performance of the waste package and the engineered barrier system, one must assume that the waste package fails at the end of the stated period.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

# **RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Staff Position 60-001 (Nuclear Regulatory Commission, 1990a) states "The requirement in 10 CFR 60.113(a)(1)(ii)(A) for substantially complete containment of high-level wastes within the waste packages for a period not less than 300 years nor more than 1000 years following repository closure is a minimum performance requirement that is not intended, and should not be interpreted, as a cap on the waste-package lifetime or a limitation on the credit that can be taken (in engineered barrier system and overall repository system performance assessments), if the waste package is designed to provide containment in excess of 1000 years."

## **HISTORY:**

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990b) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN45.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

TBD - [proposed] NRC accepts CNWRA report "Recommendations for Disposition of Regulatory and Institutional Uncertainties." Staff position SP 60-001 published July 27, 1990 (Nuclear Regulatory Commission, 1990b) states: "The requirement in 10 CFR 60.113(a)(1)(ii)(A) for substantially complete containment of high-level wastes within the waste packages for a period not less than 300 years nor more than 1000 years following repository closure is a minimum performance requirement that is not intended, and should not be interpreted, as a cap on the waste-package lifetime or a limitation on the credit that can be taken (in engineered barrier system and overall repository system performance assessments), if the waste package is designed to provide containment in excess of 1000 years." Therefore, this issue is resolved, and no further action is necessary.

## **CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(a)(1)(ii)(A)

**LARP (REVIEW PLAN) NUMBER:** 5.4

## **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.



- Nuclear Regulatory Commission. 1990a. SP 60-001 (July 27, 1990). Washington, DC: Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards.
- Nuclear Regulatory Commission. 1990b. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090003I044

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Engineered barrier system release rate limit

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The annualized radionuclide release rate limits in 10 CFR 60.113(a)(1)(ii)(8) are based on the inventory of radionuclides present at 1000 years following permanent closure of the repository. As such, for some radionuclides (e.g., Am-241 and Pu-240), the allowed releases from the engineered barrier system (EBS) can be several orders of magnitude greater than releases to the accessible environment permitted by the overall performance objective (i.e., the U.S. Environmental Protection Agency (EPA) Standard). The underlying purpose of the EBS release rate limit, together with other subsystem performance objectives, is to enhance the Commission's confidence that the EPA standard will be met.

Additionally, the uncertainty regarding the method of estimating annual release (either averaged over a certain time period or calculated for each year) needs to be resolved.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Further analysis is needed to determine how a technical relationship between the EBS release rate limit and EPA standard can best be developed and formulated. The staff recognizes that there is a lack of a technical nexus between the EBS release rate limit and the EPA standard, and that permitted releases are more dependent on radionuclide half-life and emplaced inventory than on any linkage with the EPA Standard. Accordingly, there is an open question about whether the subsystem requirement satisfies its intended purpose of enhancing the Commission's confidence that the EPA standard will be met, given the fact that allowed releases from the EBS under 10 CFR Part 60 can be several orders of magnitude greater than releases to the accessible environment permitted by the EPA standard. In this regard, the staff believes that for some radionuclides, there is a technical inconsistency, between the EBS release rate limit and the EPA standard, that can place an undue burden on the geologic setting (the natural barrier) and undermine the multiple barrier concept. As such, there is a need to examine this with a view to the possibility of establishing a clear technical nexus between the EBS release rate limit and the EPA standard.

**HISTORY:**

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN46.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(a)(1)(ii)(B)

**LARP (REVIEW PLAN) NUMBER:** 5.4

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1983. Staff Analysis of Public Comments on Proposed Rule 10 CFR 60, Disposal of High-Level Radioactive Wastes in Geologic Repositories. NUREG-0804. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090207I045

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Reference to applicable mine safety standards

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The reference in 10 CFR 60.131(b)(9) to the applicable mine safety requirements does not reflect the reorganization and renumbering of mine safety requirements in 30 CFR, Chapter I which occurred after 10 CFR Part 60 was issued.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Although only minor amendments are needed to address the specific uncertainty, further analysis is needed in order to deal with related issues. 10 CFR 60.131(b)(9) references mine safety regulations 30 CFR, Chapter 1, Subchapters D, E, and N. The cited regulations have been revised, and the references in the NRC regulations are now out of date and incorrect. A straightforward resolution

would be a minor rulemaking that simply updates these references. However, there are certain related issues that should be addressed concurrently. The first of these involves possible deletion of all references to the cited Mine Safety and Health Administration (MSHA) regulations. A second matter concerns elimination of the reference to MSHA jurisdiction, since the issue of MSHA jurisdiction no longer remains open (since the geologic repository presently being characterized will not be considered a "mine").

#### **HISTORY:**

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN47.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

#### **CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(9)

**LARP (REVIEW PLAN) NUMBER:** 4.2; 4.3; 4.4

#### **REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1995. Recommendations for Disposition of Regulatory and Institutional Uncertainties. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC090207I046

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Topical guidelines for Licensing Support System

**RESPONSIBLE BRANCH/SECTION:** HLUR/HLW Project & QA Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

Interim topical guidelines, drafted by the parties to the Licensing Support System (LSS) negotiated rulemaking, were adopted by the NRC with the statement that the topical guidelines would be revised later and set forth as a regulatory guide. The interim topical guidelines, partially modeled after the U.S. Environmental Assessments prepared in connection with the DOE's site selection process, need to be revised to describe all the information that should be submitted to the LSS to support the high-level waste repository licensing process. This revision will clarify the list of topics for which the LSS participants should submit documentary materials for entry into the LSS under 10 CFR 2.1003.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Guidance

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

NRC has committed to prepare an LSS topical guidelines regulatory guide, as noted in SECY 90-207 (Nuclear Regulatory Commission, 1990) and a draft topical guideline will be published for public comment in the Federal Register.

**HISTORY:**

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991a) issued with this uncertainty identified as UN48.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 2.1003

**LARP (REVIEW PLAN) NUMBER:** None

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

Center for Nuclear Waste Regulatory Analyses. 1990. Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60. CNWRA 90-003. San Antonio, TX: Center for Nuclear Waste Regulatory Analyses.

Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991a. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1991b. Submission and Management of Records and Documents Related to the Licensing of a Geologic Repository for the Disposal of High-Level Radioactive Waste. 54 FR 71 (April 14, 1991). Washington, DC: Nuclear Regulatory Commission.

Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.



## OPEN ITEM STANDARD REPORT

Page 1

**OITSID:** OREGUNC090207I047

**LAST UPDATE:** 11 Jul 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Criteria for containment of Greater-than-Class-C

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** 07 Jun 1990

**SOURCE TYPE:** SECY Paper

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

### OPEN ITEM TEXT:

Notwithstanding the general applicability of 10 CFR Part 60 to waste types other than high-level waste (HLW) that might be emplaced in a repository, some of the specific 10 CFR Part 60 waste package design and performance requirements are applicable only to HLW and are inapplicable to Greater than Class C (GTCC) Low-level Waste (LLW). Specifically, the waste package containment requirement of 10 CFR 60.113(a)(1)(ii)(A) is applicable only to HLW, whereas the release rate requirement of 10 CFR 60.113(A)(1)(ii)(B) is applicable to both HLW and GTCC LLW. The waste package containment requirement of 10 CFR 60.113(a)(1)(ii)(B) is applicable to both HLW and GTCC LLW. The staff does not believe that it was the Commission's intent, in 10 CFR Part 60, to specify a performance requirement for GTCC LLW, for the post-containment period while specifying none for the containment period. Thus, in its present form, 10 CFR Part 60 is incongruous with respect to performance requirements for waste other than HLW.

### RATIONALE/BASIS:

None

### RECOMMENDATIONS:

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

Further Analysis

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

Further analysis is needed to determine whether the existing incongruity in 10 CFR Part 60 related to the performance requirements for GTCC LLW should be resolved. The difference between the requirements for HLW and other wastes does not necessarily imply the need for rulemaking. For one thing, GTCC LLW may never be disposed of in a repository, as DOE has the option of proposing disposal of such material in an intermediate waste facility that would not be licensed under 10 CFR Part 60. In this regard, the staff understands that DOE is currently assessing a variety of options for the disposal of GTCC LLW, including disposal in a geologic repository. As part of this assessment, DOE is also developing a better understanding of the projected volume and characteristics of GTCC LLW, to aid in the planning process for disposal. Until DOE completes these assessments and formulates its plans for disposal of GTCC LLW, the staff does not intend to pursue any further resolution.

This is consistent with the statement of the Commission when it adopted its technical criteria:

"Since the Commission does not know what other radioactive wastes, if any, will also be emplaced, and what their chemical, radiological, thermal, and other characteristics may be, it has decided to leave pertinent waste package requirements to be determined on a case by case basis as the need arises."  
(48 FR 28201)

**HISTORY:**

June 7, 1990 - SECY 90-207 (Nuclear Regulatory Commission, 1990) issued with this uncertainty identified.

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN49.

April 1, 1991 - NRC issues Report on Uncertainty Reduction (Ballard et al., 1991) which adds the resolution method type and rationale.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.113(a)(1)(ii)(A)

**LARP (REVIEW PLAN) NUMBER:** 5.4

**REFERENCES:**

Ballard, R.L. et al. 1991. Report on Uncertainty Reduction. Internal Memorandum to B.J. Youngblood. Division of High-Level Waste Management, Nuclear Material Safety and Safeguards. Washington, DC: Nuclear Regulatory Commission.

- Bunting, J.O. Forwarding scoping paper for proposed rulemaking, "Disposal of Greater-than-Class-C Low-Level Radioactive Waste in a Geologic Repository." Memorandum to R. E. Browning, Nuclear Regulatory Commission, July 26, 1990. Washington, DC: Nuclear Regulatory Commission.
- Coleman, J. 1990. Letter to J. Linehan, Nuclear Regulatory Commission, July 2, 1990. Washington, DC: U.S. Department of Energy.
- Nuclear Regulatory Commission. 1988. Regulatory Strategy and Schedules for the High-Level Waste Repository Program. SECY 88-285. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1990. First Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 90-207. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.
- Nuclear Regulatory Commission. 1995. Disposal of High-Level Radioactive Wastes in Geologic Repositories. Title 10, Energy, Part 60 (10 CFR Part 60). Washington, DC: U.S. Government Printing Office.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC091225I048

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Relationship between subsystem performance objectives and overall system performance objective (EPA standard)

**RESPONSIBLE BRANCH/SECTION:** PAHB/Performance Assessment and Health Physics Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** N/A

**SOURCE TYPE:** SECY

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

Compliance with 10 CFR Part 60 subsystem performance objectives is not necessarily sufficient to constitute compliance with the EPA overall system performance objective. This has been identified as a regulatory uncertainty because there is not a direct and complete linkage between the subsystem performance objectives and overall system performance objective (EPA standard).

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

None

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

None

**HISTORY:**

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN51.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.112 and 60.113

**LARP (REVIEW PLAN) NUMBER:** 3.3; 5.4; 6.1; 6.2; 6.3

**REFERENCES:**

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC091225I049

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Criticality control

**RESPONSIBLE BRANCH/SECTION:** ENGB/Engineering and Material Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** N/A

**SOURCE TYPE:** SECY

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

The criticality control requirements in 10 CFR Part 60 could be interpreted to apply just to the time period of operations before repository closure, or to apply in the post-closure time frame, as well.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

None

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

None

**HISTORY:**

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN53.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60.131(b)(7)

**LARP (REVIEW PLAN) NUMBER:** 4.2; 4.3; 4.4; 4.5.2

**REFERENCES:**

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**OPEN ITEM STANDARD REPORT**

Page 1

**OITSID:** OREGUNC091225I050

**LAST UPDATE:** 20 Sep 1995

**STATUS:** Open

**DATE RESOLVED:**

**TOPIC OF THE OPEN ITEM/UNCERTAINTY:** Use of the phrase "Quaternary Period"

**RESPONSIBLE BRANCH/SECTION:** ENGB/Geosciences & Geotechnical Engineering Section

**ACTION AGENCY:** NRC

**IDENTIFICATION DATE:** N/A

**SOURCE TYPE:** SECY

**SOURCE DOCUMENT:** Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.

**DOE ACTIVITY CODE/WBS NO.:** N/A

**UNCERTAINTY TYPE:** Regulatory

**SPECIFIC TECHNICAL TYPE:** Issue

**OPEN ITEM TEXT:**

10 CFR Part 60 and the accompanying statements of consideration appear inconsistent in the treatment of the phrase "Quaternary Period." In addition, the technical literature has proposed many different chronological time periods for this period of geologic time.

**RATIONALE/BASIS:**

None

**RECOMMENDATIONS:**

None

**UNCERTAINTY RESOLUTION METHOD TYPE:**

None

**RATIONALE FOR UNCERTAINTY RESOLUTION METHOD SELECTION:**

None



**HISTORY:**

July 29, 1991 - SECY 91-225 (Nuclear Regulatory Commission, 1991) issued with this uncertainty identified as UN54.

**CROSS REFERENCE**

**CITATION:** 10 CFR 60 (numerous)

**LARP (REVIEW PLAN) NUMBER:** (numerous)

**REFERENCES:**

Nuclear Regulatory Commission. 1991. Second Update of the Regulatory Strategy and Schedules for the High-Level Waste Repository Program. James M. Taylor. SECY 91-225. Washington, DC: Nuclear Regulatory Commission.