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B. JOE YOUNGBLOOD

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MEMORANDUM FOR: B. Joe Youngblood, Director Division of High-Level Waste Management

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Joseph J. Holonich, Director High-Level Waste Repository Licensing and Quality Assurance Project Directorate Division of High-Level Waste Management

FROM:

Mark S. Delligatti, Project Manager and Chairman, Structural Task Force High-Level Waste Repository Licensing and Quality Assurance Project Directorate Division of High-Level Waste Management

SUBJECT: REPORT OF THE JOINT U.S. NUCLEAR REGULATORY COMMISSION-CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES STRUCTURAL TASK FORCE ON THE COMPATIBILITY OF THE STRUCTURES OF DG-3003, "FORMAT AND CONTENT OF THE LICENSE APPLICATION FOR THE HIGH-LEVEL WASTE REPOSITORY" AND REGULATORY REQUIREMENTS AND REGULATORY ELEMENTS OF PROOF OF THE SYSTEMATIC REGULATORY ANALYSIS

INTRODUCTION: The Structural Task Force (STF) consisting of staff from the U. S. Nuclear Regulatory Commission (NRC) and the Center for Nuclear Waste Regulatory Analyses (CNWRA) has reviewed three issues related to the reconciliation of the structures of Draft Regulatory Guide DG-3003, "Format and Content of the License Application for the High-Level Waste Repository" (FCRG) and the Systematic Regulatory Analysis (SRA). A list of task force members is included as Enclosure 1. In a work plan (Enclosure 2) accepted by management of the NRC Division of High-Level Waste Management (HLWM) and CNWRA management, three broad issues were identified for the task force's review:

- The need to make the SRA's Regulatory Requirement/Regulatory Element of Proof (RR/REOP) and FCRG structures mutually compatible;
- The need to reach closure on the relationship of the technical criteria and Performance Objectives of 10 CFR Part 60 and to reflect this relationship in the FCRG and RR/REOPs (known as the "roll-up" issue) and;

- The need for a review and approval by the NRC staff of the RR/REOP structure.

The STF met during the first two weeks of December 1991, and this report reflects the completion of the first phase of its NHIV 920113

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work. It recommends structural changes to resolve the compatibility issue, actions needed to resolve the roll-up issue, and provides some initial guidance for the working groups which will implement these recommendations during the second phase of the STF's work after the recommendations are approved by HLWM and CNWRA management. Any additional guidance for the working groups will be provided by the December 31, 1991 milestone contained in the workplan. The STF will coordinate and oversee the working groups who will be responsible for implementing the recommendations.

DUND: Prior to the establishment of the STF, the issues of compatibility of the FCRG and RR/REOP structures had been recognized and addressed in a report to the Director of the Repository Licensing and Quality Assurance Project Directorate (see Enclosure 3). That report outlined the major structural inconsistencies between the RR/REOPs and the FCRG and formed the basis for the STF's analyses. Basically, the compatibility problem can be defined as the need to reconcile the FCRG and RR/REOP structures so that licensing guidance to the NRC staff and to the U.S. Department of Energy, including the FCRG and the Licence Application Review Plan (LARP), is consistent.

> Immediately before the establishment of the STF, another task force had been formed to specifically address the question of roll-up. Its report is included as Enclosure 4. The report of the Roll-Up Task Force formed the basis for the STF's considerations and recommendations on roll-up. The Roll-Up Task Force determined that the potentially adverse conditions of 10 CFR 60.122(c) do roll-up into the performance objectives of 10 CFR 60.112 and 10 CFR 60.113. However, the case was not clear for the potentially favorable conditions, given the current wording of 10 CFRPart 60. Roll-up of the design requirements of 10 CFR 60.130 - 135 was determined to be a more complex issue.

The review and approval of the RR/REOP structure has been a goal of the NRC Waste Systems Engineering and Integration Program Element because it is a necessary step before proceeding with the SRA and development of the LARP. The NRC staff has not been able to complete its review because of the problems related to the incompatibility and roll-up issues.

DISCUSSION: The STF recommendations and associated rationales are discussed below for roll-up, compatibility, and initial guidance to the working groups.

BACKGROUND:

I. <u>Roll-up</u>

The concept of roll-up considers the extent to which the design and siting criteria from 10 CFR Part 60, Subpart E support (should be evaluated in the context of) the repository performance objectives delineated in 10 CFR 60.111, 112, and 113. In other words, do these criteria roll-up when the assessment of overall system and subsystem performance is the mechanism for determining the extent of their fulfillment? The Roll-Up Task Force examined the roll-up of 10 CFR 60. Subpart E and found that (1) the potentially adverse conditions of 10 CFR 60.122(c) do roll up, (2) the favorable conditions of 10 CFR 60.122(b) do not roll-up, but it is desired that they should do so, and (3) that some of the design requirements of 10 CFR 60.130 through 135 do roll-up. The Roll-Up Task Force recommended that (1) the roll-up of 10 CFR 60.122 into 10 CFR 60.112 and 113 should be affirmed in a high-level document such as the FCRG, (2) certain language should be added to 10 CFR 60.122(a) to clarify the roll up of the favorable and potentially adverse conditions, (3) with slight modifications, the present language of 10 CFR 60.122(a) should remain in Part 60 since it provides valuable guidance on how the siting criteria are to be perceived and investigated, and (4) changes should be made to the language in 10 CFR 60.122(a) which suggests that the potentially adverse conditions need to be analyzed as separate and independent entities.

Aside from an examination of the potentially adverse conditions of 10 CFR 60.122(c) and the favorable conditions of 10 CFR 60.122(b), the Roll-Up Task Force did not have time to examine roll-up in sufficient detail to allow a precise determination to be made concerning the extent of roll-up for each of the criteria in Subpart E to each of the performance objectives.

The STF recommends the development of a matrix which displays the specific relationship of each of the criteria to each of the performance objectives (see example format in Enclosure 5). In those cases where that specific relationship is not clear from the language of the regulation or other supporting documentation, the matrix will serve as a basis for decisions by management with respect to the specific intended roll-up. Specific guidance on the use of the matrix will be provided during a training session for working groups. The STF also recommends that the approved relationships identified in the matrix be incorporated into the FCRG and LARP for guidance to DOE and the NRC staff, respectively. Furthermore, the working groups should consider how these relationships should be

reflected in the revised RR/REOP structure. Roll-up should be considered concurrently with the compatibility issue because roll-up must be considered in revising RRs.

The Roll-Up Task Force's proposed rulemaking language is intended to clearly reflect roll-up of the Potentially Adverse Conditions of 10 CFR 60.122(c) and the Favorable Conditions of 10 CFR 60.122(b) to the performance objectives of 10 CFR 60.112 and 113. A specific identification of roll-up resulting from the implementation of this language will provide confidence that such language reflects NRC intent. Any discrepancies can then be corrected by modifying the proposed language. A specific analysis of roll-up for each of the citations from the design criteria in Subpart E, as supported by the development of the matrix discussed above, will identify the extent to which roll-up now exists. This part of the roll-up matrix should be based on the current staff interpretation that 10 CFR 60.111(a) is for normal conditions and not accident conditions. Should this interpretation change in the future, a change in the roll-up matrix would be needed. This information may then be considered by the NRC with respect to the need and desirability of further implementing roll-up by additional rulemakings or other regulatory action.

All analyses of potential roll-up to develop the roll-up matrix need to consider both the relationship of design and siting criteria to the performance objectives as well as the relationship of the performance objectives to the criteria. The question must be asked if demonstrating compliance for the particular criteria is dependent on compliance with its related performance objectives, as well as whether demonstrating compliance with a particular performance objective is dependent on demonstrating compliance with its related criteria.

The STF also recommends examination of the interrelationships and the extent of roll-up existing among the total system and subsystem performance objectives and the considerations for a safety determination in 10 CFR 60.31. Such an examination should allow a determination to be made concerning the structural consistency and interrelationships of the regulation at the broadest level and should support an evaluation of the acceptability of the nature of the findings which will be made at the end of the License Application review process. The matrix discussed above will support this examination.

II. Compatibility

The FCRG was developed to support the most effective License Application review by the staff. The RR/REOP structure was developed to support a detailed analysis of the regulation itself and to reflect regulatory topics identified by an analysis of the wording of the regulation. The fact that these two structures are not directly compatible results not from the incorrectness of one or the other but from the differing nature of the intent from which they were each developed. However, if both structures are legitimate representations of the regulatory content in 10 CFR Part 60, then it is logical that they could be made compatible. The limited analyses conducted by the STF during their deliberations revealed no instances where this would not be the case. The more detailed analyses to be conducted by follow-on working groups will include the requirement to evaluate this concept further. Again, during STF deliberations, examples were found where modifying the existing RR/REOP structure to conform to the FCRG structure provided opportunities to combine some RRs and make them more broadly applicable.

The STF's analysis involved studying current RRs and related sections of the FCRG to determine how regulatory questions or topics were addressed in each. The STF then attempted to define how the structures could be made more compatible so that the staff's development of the LARP and the license application review could be better supported by the RR/REOPs, while maintaining the appropriate analytical discipline of SRA. The result is a recommended restructuring of some of the RR/REOPS. The STF has developed appropriate rationales for the restructurings. Potential LARP outlines were discussed and examples developed to illustrate compatibility of the FCRG with the revised RRs are given in Enclosure 6. The STF believes that RRs modified or developed, as necessary, to be compatible with the FCRG structure have not resulted in loss of any regulatory interrelationships or deleting any requirements from the regulation. In the process RRs reflecting a significantly more consistent and integrated structure will be developed and refined.

Except for the first section on 10 CFR 60.21, the discussion below follows the chapter headings of the FCRG. Each discussion includes recommended structural changes followed by a rationale.

A. 10 CFR 60.21 (Content of the License Application)

1. Discussion and Recommendation

A major difference between the FCRG and the RR/REOP structures is the manner in which 10 CFR 60.21 has been treated. 10 CFR 60.21 describes the requirements for information to be included in the license application. Many of the requirements of 10 CFR 60.21 are repeated in other sections of 10 CFR Part 60. However, certain of the requirements are found only in 10 CFR 60.21 and therefore, need to specifically recognized for inclusion in, and review of, a license application. The requirements of 10 CFR 60.21 were included in the applicable portions of the FCRG. In contrast to the FCRG, 10 CFR 60.21 was considered as a single RR in the RR/REOP structure. This was based on an understanding that this RR could provide a vehicle upon which to conduct the acceptance review for the entire license application.

The STF recommends deletion of RR0074 and insuring that each of the requirements in 10 CFR 60.21 is met through their development as individual RRs or their inclusion as REOPs in RRs, and that the LARP will include acceptance review criteria in each individual review plan to address the requirements of 10 CFR 60.21. New individual RRs are recommended in the appropriate sections below.

2. <u>Rationale</u>

10 CFR 60.21 contains many specific requirements that are specifically addressed by the FCRG sections. Separate RRs which will allow for development of review plans for these requirements will be consistent with these sections of the FCRG. Having the requirements of 10 CFR 60.21 included in acceptance review criteria for individual review plans within the LARP is consistent with historical NRC practice.

B. General Information

1. Discussion and Recommendation

Among the topics which are currently aggregated in the single RR0074 are the requirements of 10 CFR 60.21(a) through (c) which are contained in Chapter 1 of the FCRG (General Information). The STF recommends that these requirements be developed as an RR or RRs.

The STF also recommends that certain of the requirements in 10 CFR 60.21(c) would need to be developed as an RR or RR's.

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consistent with the general information requirements which have been placed in Chapter 2 of the FCRG (General Information for the Safety Analysis Report).

When considering the development of these RRs, it will be necessary to analyze the regulation to determine if there are any required subordinate REOPs.

2. Rationale

The information associated with 10 CFR 60.21(a) through 10 CFR 60.21(b)(5) is most logically represented within Chapter 1 of the FCRG. These citations must be presented as part of a specific RR(s) to facilitate developing a review plan within the LARP which is consistent with the FCRG.

In a manner similar to that discussed above, the citations from 10 CFR 60.21(c) will need to be examined to determine the need for developing RRs based on them.

C. Natural System

1. Discussion and Rationale

Chapter 3 of the FCRG addresses the natural systems of the geologic setting of the repository. In Chapter 3, the discussions of the natural systems of the geologic setting are divided into three parts which include a description of the individual systems characteristic of the site, a description of the anticipated and unanticipated processes and events, and an assessment of compliance with 10 CFR Part 60 including, under each system, the individual assessment sections for each favorable and potentially adverse condition and the groundwater travel time performance objective. An assessment is also included for the effectiveness of natural barriers as required by 10 CFR 60.21(c)(1)(ii)(D). In contrast, the RR/REOP structure discusses these three basic considerations, providing a total of 26 RRs. These include individual RRs for the Potentially Adverse Conditions listed in 10 CFR 60.122 and one RR for the Favorable Conditions. There is also an RR for the groundwater travel time performance objective in 10 CFR 60.

The STF recommends that the individual RRs for each Potentially Adverse Condition be retained. However, based on the language in 10 CFR 60.21(c)(1)(ii)(B), it also recommends that new RRs be created for consideration of each Favorable Condition. It was also recognized that the current RR which aggregates the favorable conditions should be maintained to meet the requirements of 10 CFR 60.122(a)(1). The STF believes that it will be necessary for the applicant to demonstrate compliance with the 10 CFR 60.21(c)(1)(ii)(D) requirement for assessing the Effectiveness of Natural Barriers Against the Release of Radioactive Material to the Environment and therefore an additional RR should be identified to address this requirement.

The STF recognizes that the current discussions of Potentially Adverse and Favorable conditions in the FCRG does not clearly address the requirement of 10 CFR 60.122(a)(1) regarding analyses of these conditions in combination. Therefore, it is also recommending that consideration be given to clarifying the wording of Chapter 3 with regard to treatment of this requirement and the requirement of 10 CFR 60.21(c)(1)(ii)(D). The STF recommends either a revision to Section 3.3.6, or addition of another section to address this.

The STF recommends maintaining the single RR for the Groundwater Travel Time Performance Objective.

2. Rationale

Maintaining RRs for each Potentially Adverse Condition allows them to be treated individually in the context of 10 CFR 60.122(a)(2) and 10 CFR 60.21(c)(1)(ii)(B). Both of these citations prescribe conditions for individual analyses and this is consistent with the FCRG. Additionally, because the nature of each Potentially Adverse Conditions may require analyses of differing degrees of complexity, keeping them as individual RRs promotes the development of compliance determination strategies and compliance determination methods tailored to their specific technical needs.

Maintaining existing RR2001 (Favorable Conditions) allows the Favorable Conditions to be evaluated in combination as required by 10 CFR 60.122(a)(1). However, developing new RRs to treat each favorable condition individually allows compliance with the individual analysis requirements of 60.21(c)(1)(ii)(B) and consistency with the FCRG.

FCRG Section 3.3.6 addresses the requirement of 10 CFR 60.21(c)(1)(ii)(D) to assess the effectiveness of engineered and natural barriers. Therefore this recommendation will cause the consideration of the development of a new RR which deals with this requirement in terms of the natural system and potentially a similar RR which deals with this requirement in terms of the engineered barrier systems.

Irrespective of the analysis underway to consider the appropriateness of the Groundwater Travel Time rule, the existing language of 10 CFR Part 60 requires that this RR be maintained. Any future changes to this requirement will be incorporated into the RR/REOP structure when appropriate.

D. Geologic Repository Operations Area

1. Discussion and Recommendation

Chapter 4 of the FCRG addresses the Geologic Repository Operations Area (GROA) Physical Facility. It is organized into descriptive and assessment sections for the three GROA systems: surface facilities, shafts and ramps, and underground facilities. The assessments are divided into assessments with the design criteria for each of the three systems and assessments with the two performance objectives.

There are currently 20 RRs related to the GROA, and integrated GROA compliance with the performance objectives in accordance with 10 CFR 60.130. The RR/REOP structure was developed primarily based on functions, such as containment and retrievability. Currently, there are two RRs dealing with radiation health and safety in the GROA, each from a different perspective. RR0004 (Radiation Exposures and Releases primary citation 10 CFR 60.111(a)) represents the radiation exposures and release performance objective. RR0035 (Radiological Protection - primary citation 10 CFR 60.131(a)) represents GROA design criteria related to radiation health and safety and requires that the GROA be designed to maintain radiation exposures and releases within the limits expressed in 10 CFR Part 20. There are twenty other existing RRs which represent the GROA design criteria. There is no existing RR which incorporates the requirements of 10 CFR 60.134.

The STF recommends consolidating all existing design RRs to develop three new RRs for surface, shafts and ramps, and underground facility. Each RR would contain (as REOPs) all relevant general and specific design criteria.

The two performance objectives most closely associated with the GROA are radiation protection and retrievability (currently represented by RR0004 - Radiation Exposures and Releases, and RR0002 - Retrievability of Waste, respectively). The STF recommends that these two RRs be retained, but that any radiation protection related design criteria contained in them be relocated to the three new proposed design criteria RRs. This action would provide consistency, since no other proposed performance objective RRs contain specific design criteria.

2. Rationale

The GROA design criteria requirements in 10 CFR Part 60 are organized around the same systems which appear in the FCRG (surface facilities, shafts and ramps, and underground facility). The existing RRs could be modified by grouping them similarly by systems into three RRs (one each for surface facilities, shafts and ramps, and the underground facility). Those design requirements which currently exist as individual RRs would remain as requirements, since they would become REOPs within the three composite RRs. Each of these three proposed RRs could then be comprised of REOPs consisting of 10 CFR 60.130 as a primary text which supports roll-up to the performance objectives, the general design criteria in 10 CFR 60.131, and the appropriate specific design criteria in 10 CFR 60.132, 10 CFR 60.133, or 10 CFR 60.134, as appropriate. The proposed new RR for shafts and ramps would ensure that design requirements from 10 CFR 60.134 (currently missing from the RR/REOP structure) are accounted for. Maintaining the two performance objective RRs is consistent with the two sections in the FCRG for assessing compliance with these two performance objectives.

Engineered Barrier Systems

1. Discussion and Recommendation

In chapter 5 of the FCRG, the Engineered Barrier Systems (EBS) are considered--waste package, waste form, and underground facility. The FCRG also requires discussion of the containment and release rate performance objectives. The STF notes that the FCRG is currently unclear regarding the discussion of the 10 CFR 60.21(c)(1)(ii)(D) requirement for Effectiveness of Engineered Barriers Against the Release of Radioactive Material to the Environment. It recommends that a new subheading be added after 5.2.2 to correspond with the similar discussion in Section 3.3.6.

There are two RRs for the Performance Objectives--RR1002 -EBS Performance After Permanent Closure (containment) and RR1003 -EBS Release of Radionuclides After Permanent Closure (gradual release). Design criteria from 10 CFR Part 60 were incorporated to each of the two existing RRs. As a result, RR1002 and RR1003 each contain REOPs from 60.135 (Waste Package Design Criteria) and 60.133 (Underground Facility GROA Design Criteria). These two RRs also contain performance confirmation related citations specific to EBS performance.

The STF recommends that the two RR for the containment and release rate performance objectives be maintained, but that the Design Requirements be split from these two existing RRs. This would allow for the development of three new RRs for waste package, waste form, and the underground facility, respectively. This approach would promote consistency and compatibility with the recommended approach for the other design requirement RRs. As was the case with the natural system, the STF recommends that it will be necessary for a new RR to be developed related to the compliance demonstration with the 60.21(c)(1)(ii)(D) requirement for Effectiveness of Engineered Barriers Ágainst the Release of Radioactive Material to the Environment.

2. Rationale

The two RRs which currently express the performance objectives of containment and gradual release have REOPs with specific design criteria from 60.133 and 60.135. This is inconsistent with other proposed performance objective RRs which do not contain such specific design criteria. Separating the design requirements from the EBS performance RRs would provide the benefit of making the containment and gradual release RRs consistent with other performance objective RRs and with the structure of the FCRG while not omitting any requirements contained in the regulation.

The design criteria which now appear as REOPs in the EBS performance objective RRs can be separated into individual RRs. The resultant three new RRs (one each for the waste package, waste form, and underground facility) would be consistent with the FCRG structure. Separating the EBS design criteria into waste form and waste package RRs would also be consistent with actions recommended for GROA design criteria requirements.

The assessment of compliance with the EBS performance objectives is presented in the FCRG in two parts. There is an assessment of compliance with the performance objectives of containment and gradual release (section 5.2.2), and there is a separate assessment section for the performance objective related to radiation protection (section 5.2.3) (to the extent that such information was not previously presented in GROA section). This arrangement recognizes the aspects of the underground facility as well as certain waste package design criteria aspects (such as consolidation of particulate waste

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form) associated with the performance objectives normally identified with the GROA (radiation protection during operations and retrievability).

F. Total System Performance

1. Discussion and Recommendation

Total System Performance is considered in Chapter 6 of the FCRG and by one current RR (RR1001--System Performance After Permanent Closure). Chapter 6 of the FCRG (Total System Performance) and this one RR address the EPA Standard (40 CFR 191 subpart b) which, in the remanded 1985 version, consists of three distinct requirements: individual protection. groundwater protection, and cumulative release to the accessible environment. Each provides a framework for consideration of this highly complex set of requirements in a way that the NRC staff feels is appropriate. The STF recommends further consideration of the approach of maintaining one RR which contains REOPs for the three parts of the EPA standard which NRC will adopt, or developing three new RRs for individual protection, groundwater protection, and cumulative release. Some members of the STF saw merit in each approach. There is a strong recognition of the need to further consider this question. It is recognized that the RR/REOP structure cannot be finalized until the EPA Standard has been revised in final form and the appropriate NRC conforming amendments are finalized. However, work should proceed in on the basis of the expected structure of the EPA Standard. The STF also recommends that the working group responsible for this area include either D. Fehringer or S. Coplan who can discuss the question of previous activity related to development of conforming amendments, particularly the NRC staff's proposed approach to review and consideration of the various parts of the incorporated standards.

2. Rationale

In developing a course of action under this recommendation, so long as all requirements of 10 CFR Part 60 and the EPA standard are properly considered, the emphasis should be on supporting the most efficient and effective review of the License Application. In its preliminary deliberations on this, the STF was of the opinion that the expected three-part form of the EPA standard would lead to the development of a separate RR for each of these parts. This approach would appear more consistent with the approach of having separate RRs and separate review plans within the LARP for each performance objective within 10 CFR 60.111 and 10 CFR 60.113.

G. Repository Operations

1. Discussion and Recommendation

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Repository Operations are considered in Chapter 7 of the FCRG. Chapter 7, along with the associated RRs were analyzed by the STF and inconsistencies were identified. This is another particular case where citations from 10 CFR 60.21(c) receive dissimilar treatment in the two structures. The current RR0074 (License Application and Content) contains all requirements for 60.21(c) while the FCRG treats the requirements individually in various sections. Ten citations from within 10 CFR 60.21(c) constitute requirements related to repository operations which are not found elsewhere in 10 CFR Part 60, and these have been identified as candidates for new RRs. There are also existing RRs for sections on Personnel Qualification (7.3.3), Records and Reports (7.5), and Training Programs (7.6) which are compatible with the FCRG structure. Many of the cited requirements for Chapter 7 are from 10 CFR 60.21(c). The STF recommends developing new RRs which utilize these requirements or to incorporate the requirements into existing RRs so there is compatibility between RRs and the sections of Chapter 7 of the FCRG.

The STF discussed the question of the Radiation Protection section of Chapter 7 which, at first glance, appears redundant since various aspects of radiation protection appear in the GROA, EBS, Operations, and Performance Confirmation sections of the FCRG. However, assessment of radiation protection in Chapter 7 focuses on the health physics plans and the hardware necessary to monitor radiation exposures.

The STF recommends that the working group include a member from the Office of the General Counsel (OGC) to provide input regarding the status of the various parts of 10 CFR 60 Subpart D in terms of the license application. The working group should also include staff experienced in the Repository Operations Criteria (ROC) task.

2. Rationale

Since staff involved with ROC have analyzed part 60 for sufficiency regarding operations, they will lend necessary familiarity and expertise to the review of Section 7 and its associated RRs. An output of the ROC activity has been the identification of regulatory uncertainties and suggested methods of resolution. These activities may help clarify the regulatory connection between the requirements in 10 CFR Part

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60 and the subsections in FCRG Chapter 7 which have no currently identified regulatory basis.

Revised repository operations RRs will be compatible with the structure of Chapter 7 of the FCRG and will facilitate the development of LARP sections which are consistent with the FCRG structure.

H. Performance Confirmation

1. Discussion and Recommendation

The requirements for a performance confirmation program are found in Chapter 8 of the FCRG which is based on Subpart F of 10 CFR Part 60. 10 CFR 60.137, a GROA design criterion, links GROA design to the performance confirmation program, and is the primary citation of RR0087 "Design for Performance Confirmation Program Implementation." RR0087 includes all of Subpart F among its elements of proof. RR3014 "Tests and Performance Confirmation Program", has 10 CFR 60.74 ("Tests") as its primary citation. The two RRs are essentially the same, except for approaching performance confirmation from differing perspectives: RR0087 from the perspective of a GROA design criterion, and RR3014 from the perspective of testing.

The STF recommends revising the current RRs for compatibility and consistency with other review activities for the repository systems, as was done in the FCRG. This would involve consideration of an appropriate way to address the requirements for performance confirmation for each system and development of new RRs for Natural System, GROA, EBS, and Radiation Protection. It is also recommended that 10 CFR 60.137 be treated in the same way as the general design criteria in 10 CFR 60.131, as a REOP under each of the new GROA and EBS design criteria RRs.

The STF also recommends that the working group consider the applicability of 10 CFR 60 Subpart D to the activities covered by the license application.

2. Rationale

The FCRG considers performance confirmation as applicable to the three major systems and to the performance objective of radiation protection. Developing individual RRs associated with each of these major systems and radiation protection, with REOPs made up of the citations specifically applicable to each, will facilitate development of review plans consistent with FCRG section in Chapter 8. - 15 -

I. Land Ownership and Control

1. Discussion and Recommendation

Land Ownership and Control is the subject of Chapter 9 of the FCRG and two existing RRs--RR0055 (Land Ownership and Control) and RR0056 (Water Rights and Controls Outside the Controlled Area). The STF did not find significant incompatibilities. The STF recognizes the special nature of these requirements and recommends that appropriate staff from the NRC Office of the General Counsel (OGC) be included in the working group for this subject. The STF further recommends that consideration be given to the utility of combining the two existing RRs. The STF also notes that consideration needs to be given as to whether the requirements related to land ownership and control roll-up into the performance objectives. The STF also suggests that the working group consider a revision to FCRG Section 9.2 to include Water Rights.

2. Rationale

The texts of 10 CFR 60.121 and Chapter 9 of the FCRG were prepared by staff of the OGC; therefore, any consideration for change to either as well any analysis of potential impacts of such change should conducted with OGC participation.

The two existing RRs group 10 CFR 60.121's three paragraphs into 10 CFR 60. 121(a) (associated with RR0055) and 10 CFR 60.121(b) and (c) (associated with RR0056). Since paragraph (c) applies to water rights within and outside the controlled area it is appropriate to consider it in both RR0055 and RR0056. Consequently, it may be possible to most effectively support the FCRG structure by combining these two RRs.

The previous discussions of roll-up with respect to site and design criteria in this report have considered all portions of Subpart E, except 10 CFR 60.121. 10 CFR 60.121(b) appears to relate to the performance objectives through its discussion of human actions as they effect isolation. Therefore, the work group assigned to examine this FCRG section and its related RRs must consider the performance objectives and the extent of any roll-up.

J. Quality Assurance

1. Discussion and Recommendation

The FCRG considers quality assurance (QA) in Chapter 10.

There is one RR for QA. The two structures appear to be compatible. 2.

Rationale

None required, no structural changes recommended.

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K. Emergency Planning

1. Discussion and Recommendation

The STF notes that both structures have left space for consideration of Emergency Planning when the rulemaking in that area is completed.

2. Rationale

None required, no structural changes recommended.

III. Implementation of Recommendations

A. Approval of RR/REOP Structure

The STF recommends that approval of the revised RR/REOP structure be considered by HLWM management upon review of a subsequent final STF report containing the recommended revised RR/REOP structure. However, individual RR/REOPs which are subject to activities associated with the FY91 NRC HLWM Operations Plan should be given top priority and should be reviewed individually, as restructuring work is completed. Final review and approval for these RR/REOPs should occur in the review of the final STF report of the revised RR/REOP structure.

B. Creation and Coordination of Working Groups

Pursuant to the enclosed approved workplan, the HLWM and CNWRA management should appoint several working groups to implement the recommendations described above. The STF recommends that it should remain the overall coordinator of the implementation activities. All products of the working groups shall be provided to the STF for review for consistency and compatibility. Products will only be provided to HLWM/CNWRA management by the STF. In addition, the STF should serve, with appropriate staff/CNWRA consultants, as the Performance Objectives Working Group and the General Information Working Group. The STF also recommends that its individual members should also be members of the appropriate working groups. In this way the STF can help assure the consistency of the activities of the working groups. In addition, to two working groups mentioned above, there be working groups for: Natural System, GROA, EBS, Total System Performance, Performance Confirmation, Repository Operations, and Land Ownership and Control and Quality Assurance. (For Quality Assurance it is expected that the working group will only need to review the existing RRs and make a recommendation regarding approval of the RRs).

Additional Guidance to Working Groups

The working groups who will implement the recommendations described above shall be provided with as much specific guidance as possible. This guidance should include this paper and its enclosures and will be the subject of training for all task force members during the week of January 6, 1992. It is particularly important that the working groups understand the recommendations contained in this paper. Review of the RR/REOP structure is not limited to new RRs which are created as part of the implementation of the recommendations in this paper. Existing RRs (e.g., the Potentially Adverse Condition RRs) should be reviewed and recommendations for their approval or for changes to them should be included in the work of these groups groups as should review and revision, as needed, for the REOPS. In RRs, the working groups should consider consolidation where simplifying might help streamline the review process without loss of effectiveness (this recommendation should not be construed to condone the deletion of any requirement from 10 CFR Part 60).

SUMMARY OF

RECOMMENDATIONS: The STF has considered the three issues described in the approved workplan which are included on the first page of this report. The STF's recommendations regarding these issues are summarized below:

Roll-up

Implement the recommendations of the Roll-up Task Force. STF will provide a matrix format to the working groups to assist them in reviewing each criterion for potential roll-up into the Performance Objectives.

Identify specific roll-up for each favorable condition and potentially adverse condition to the appropriate performance objectives, based on the proposed rulemaking language of the Roll-Up Task Force report. Identify whether or not each criterion of 130-135 rolls up.

Identify the extent of roll-up and/or relationship of subsystem performance objective to total system performance objective and to the 60.31 consideration for safety determination.

Compatibility

The STF believes that RRs modified or developed, as necessary, can be included within the FCRG structure without loss of any regulatory interrelationships or without deleting any requirements from the regulation. In the process RRs reflecting a significantly more integrated structure will be developed and refined.

General Compatibility Recommendation

The STF recommends deletion of RR0074 and insuring that each of the requirements in 60.21 is met through their development as individual RRs or their inclusion as REOPs in RRs, and that the LARP will ensure that the appropriate acceptance criteria have been met.

Specific Compatibility Recommendations

General Information

Consider development of specific RR's for 10 CFR 60.21(a) through 10 CFR 60.21(b)(5) to correspond with information requirements currently found in Chapter 1 of the FCRG.

Consider whether certain of the requirements in 10 CFR 60.21(c) would also need to be developed as RR's, consistent with the general information requirements which have been placed in Chapter 2 of the FCRG.

Natural System

Identify specific roll-up for each favorable condition and potentially adverse condition of the appropriate performance objectives, based on the proposed rulemaking language of the Roll-up Task Force report.

Identify the extent of roll-up and/or relationship of subsystem performance objective to the total system performance objective and to the 10 CFR 60.31 consideration for a safety determination.

Maintain individual RRs for potentially adverse conditions.

- 19 -

Develop individual RRs for favorable conditions.

Maintain single RR for the groundwater travel time performance objective.

Clarify language of FCRG regarding analysis of favorable and potentially adverse conditions in combination.

GROA

Consolidate existing Design RRs to develop three new RRs (surface, shafts and ramps, underground facility). Each would contain (as REOPs) all relevant general and specific design criteria.

Maintain two performance objective RR's--one for radiation protection and one for retrievability.

EBS

Maintain two RRs for the containment and release rate performance objectives, but split the design requirements from the two existing EBS RRs.

Develop three new RRs for waste package, waste form, and underground facility. The waste form and waste package RRs would promote consistency and compatibility with other design requirement RRs.

Develop a new RR for evaluation of Effectiveness of Engineered Barriers Against the Release of Radioactive Material to the Environment (10 CFR 60.21(c)(1)(ii)(D). Similarly, clarify section of the FCRG which relates to this requirement.

Total System Performance

Either maintain one RR which contains REOPs for the three parts of the EPA standard which NRC will adopt, or develop three new RRs for individual protection, groundwater protection, and cumulative release. Working group should include D. Fehringer and/or S. Coplan who can discuss the question of previous activity related to development of conforming amendments to 10 CFR Part 60.

Repository Operations

Recognize ROC activities and include appropriate staff on working group.

Develop appropriate RRs for current requirements such that

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- 20 -

compatibility and consistency are maintained for the development of review plans to assist staff review activities.

Performance Confirmation

Develop new RRs for Natural System, GROA, EBS, and Radiation Protection.

Land Ownership and Control

Working group must include appropriate staff from OGC.

Consider the utility of combining the two existing RRs.

Consider whether RR(s) on this topic roll-up into the performance objectives.

Suggest need to revise FCRG section 9.2 regarding Water Rights.

Quality Assurance

Appears to be compatible as is.

Emergency Planning

Appears to be compatible at this time.

Implementation of STF Recommendations

The STF has also recommended that it remains the coordinator of working groups' implementation phase activities and that consideration be given to a review process for individual RRs which allows for an expedited management review of the revised RRs which are on the critical path. $|_{S}|$

Mark S. Delligatti, Project Manager and Chairman Structural Task Force Repository Licensing and Quality

Division of High-Level Waste Management

Assurance Project Directorate

Enclosures: As Stated

cc:	JLatz, CNW WPatrick,	IRA CNWRA				
OFC	:HLPD	:HLPD	:HLPD	:	•	:
NAME	:Dellostti	:RJohnson R	:JHolonich	:	:	:
Date	: 12 /20 /91	: 12/20/91	: 1/13/92	:	:	:

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On-Site Reps	JHolonich, HLPD	MDelligatti,HLPD	RJohnson, HLPD

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Enclosure 1

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STRUCTURAL TASK FORCE

CNWRA

Mark Delligatti	Pat Mackin
Robert Johnson	Steve Spector
Rex Westcott*	Pat LaPlante
Harold Lefevre	Mike Miklas
Kien Chang*	Chuck Tschoepe
Dinesh Gupta**	Bob Brient

Consultants

NRC

Janet Lambert, RES

Kathryn Winsberg, OGC

*Unable to attend all session because of conflict with IPA Meeting. **Unable to attend any working sessions because of section staffing constraints, available for specific consultations.

Enclosure 2

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х. . PROPOSED WORK PLAN FOR A STRUCTURE TASK FORCE (STF) TO RESOLVE SRA-RELATED STRUCTURAL ISSUES

pcm 11/27/91

BACKGROUND:

Two task forces were established to evaluate problems which have been determined to be associated with SRA-related structural issues. These structural issues are such that their resolution is required in order to permit work to progress under NRC and Center Operations Plans. Fundamentally, there are three such structural issues as follows:

- (1) The Center identified uncertainty in 10 CFR Part 60 regarding the manner in which the potentially adverse conditions in 10 CFR 60.122 were to be considered by the NRC staff when evaluating the License Application. In a similar fashion, the relationship of 10 CFR 60.130 through 10 CFR 60.135 to the performance objectives in 10 CFR 60.111 and 10 CFR 60.113 requires clarification. It is likely that NRC resolution of these uncertainties will necessitate revisions to the RR/REOF structure. Center and NRC operations plans require extensive work on several RRs associated with these problems. This work must be held in abeyance or be subject to significant modification until resolution of these uncertainties and completion of any resultant changes to the RR/REOF structure.
- (2) The Format and Content Regulatory Guide (FCRG) and the RR/REOF structures are dissimilar. The Program Architecture was designed such that the FCRG would proceed directly from the RR/REOP structure, thereby providing coherency and supporting streamlining and efficiency in the licensing process. NRC staff prepared the FCRG using a structural organization different from the RR/REOP structure. Similarly, the Compliance Determination Strategies (CDS) and Compliance Determination Methods (CDM) would proceed directly from the RR/REOF structure and would be primary constituents of the License Application Review Plan (LARP). The LARP is to be prepared in a format consistent with that of the FCRG, yet at the same time, the CDMs which comprise the LARP are to be developed directly from the RR/REOP structure. Therefore, the incompatibility between the RR/REOF, FCRO, and LARP structures serves to complicate the licensing process. The task force established to investigate this problem concluded that any process which was designed to link these structures might, add confusion and inefficiency to the licensing process, thereby detracting from the benefits expected from a systems approach.
- (3) The Genter developed the RR/REOP structure as the foundation for further development of the Program Architecture through SRA. This structure has not yet been subjected to formal NRC review and approval. Continuation of SRA in accordance with approved operations plans (e.g., CDS and TRC development) awaits such review and approval. Furthermore, the NRC Division Operating Plan calls for such review and approval as a first step in the continuing SRA work. Within the Center, further examination of the RR/REOP structure in view of changing programmatic development and increased understanding of NRC regulatory intent reveals that there is benefit to be gained from participation in any review of the RR/REOP

structure undertaken by the NRC.

TASK FORCE OBJECTIVES:

A task force of NRC and Center personnel shall be established to investigate and make recommendations to resolve SRA-related structural issues. This task force shall be called the Structure Task Force (STF). Spacific objectives for this task force include:

- Clarifying and documenting NRC intent with respect to the relationship between 10 CFR 60.112 and 10 CFR 60.122.
- Making recommendations for the implementation of NRC intent with respect to 10 CFR 50,112 and 10 CFR 60.122.
- Clarifying and documenting NRC intent with respect to the relationship between 10 CFR 60.130 through 10 CFR 60.135 and the performance objectives.
- Making recommendations for the implementation of NRC intent with respect to 10 CFR 60.130 through 10 CFR 60.135 and the performance objectives.
- Examining the relationships between the FCRG and the RR/REOP structures and identifying recommendations for changes required to these structures to ensure compatibility.
- Recommending techniques for implementing any necessary changes to the RR/REOF structure and the FGRG including development of new logical relationship diagrams, preparation of rationales for revised structures, and entry of information into the FADE.

GROUNDRULES:

- Any revised RR/REOP structure must reflect a flowdown of requirements and must be consistent with 10 CFR Part 60.
- Any revised RR/REOF structure must coincide with the structure of the FCRG and support the development of CDMs which will in turn form a part of a LARF which is also compatible with the FCRG.
- Revisions to the FCRG can be made where necessary, but must be minimized.
- The task force shall report its progress weekly to NRC and Center management.
- All task force recommendations will require approval by NRC and Center management prior to implementation.
- Where RR/REOP structure is divided in any fashion in order to produce new RRs which are compatible with the FCRG structure, specific provision must be made to document this division so that it can be accounted for during review of the License Application.

- Task force efforts will be prioritized to support tasks contained within the Center and NRC Operations Plans.
- All task force members must receive training on FCRG structure and development and RR/REOP structure and development prior to commencement of task force activities.
- Staff members assigned to the task force must have task force work as their primary (highest priority) assignment.
- The NRC STF leader shall be M. Delligatti. The Center STF leader shall be P. Mackin.
- The effort described in this work plan shall be conducted in two phases. In the first phase (Resolution), the STF shall meet as a working group to develop a high-order resolution of the issues presented in the "BACKGROUND" and "TASK FORCE OBJECTIVES" sections of the work plan, subject to NRC and Center management approval. During the second phase (Implementation) the STF will serve as an integrating and coordinating body for work done by smaller working groups made up of NRC and Center technical staff personnel in the implementation of the recommendations which were approved by management from the "Resolution" phase.

TASK DESCRIPTION AND SCHEDULE:

* Signifies an action which will require NRC and Center management approval.

RESOLUTION PHASE:

- Assign STF team members* -- 11/27/91
- Concur in the results of the "Roll-up Task Force" and brief Mr. Youngblood -- 12/4/91
- Train STF team members on RR/REOP development and structure, FCRG development and structure, the 112/122 and 130/135 issues, and the results of previous task force efforts -- 12/6/91
- STF analyzes the three structural issues and presents recommendations (including examples to substantiate these recommendations) for resolution to NRC and Center management --12/20/91
- STF assigns RRs by NRC Section/Center Element* -- 12/31/91
- Center/NRC management selects and approves specific recommendations for resolution and assigns members of smaller working groups* --12/31/91
- STF provides specific direction to be used by smaller working groups to include (1) criteria for assignment of an RR to a section(s) of the FCRG, (2) the nature and content of any RR interface information to be developed when nacessary to provide linkage between sections of the FCRG, and (3) specific identification of

the actions to be taken by the smaller working groups, including limits on these actions -- 12/31/91

IMPLEMENTATION PHASE:

(The STF shall integrate and coordinate the work of the smaller working groups and shall review any results produced by these groups before they are submitted for management review. The priority for working on specific RRs shall be determined by examination of Operations Plans tasks.)

- Train working groups as appropriate to the nature of their assigned RRs (ongoing, per Operations Plan schedule) -- 1/10/92
- Working task groups review assigned RRs and appropriate sections of the FORG, propose revisions to the RRs or the FORG as required to correct any deficiencies and to promote compatibility with the FCRG*
 - 1/13/92 (commence)
- Prepare new RR Synopses or prepare changes to the FCRG as appropriate* -- 1/13/92 (commence)
- Place approved results under configuration control in the PADB --1/21/92 (commence)

Enclosure 3

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OCT 2 4 1991

NOTE TO: J. Holonich

FROM:

R. Johnson, HLPD Koluf Hurgert

P. Mackin, CNWRA *

S. Spector, CNWRA +

P. LaPlante, CNWRA *

SUBJECT: RESULTS OF THE EVALUATION OF THE RELATIONSHIP BETWEEN RR/REOP AND FCRG STRUCTURES

On September 20, 1991, a task group of NRC and CNWRA staff began an evaluation of the relationship between the RR/REOP and FCRG structures. The objectives of the task group were to: 1) identify and evaluate concerns with the compatibility/relationship between the RR/REOP and FCRG structures and 2) recommend actions needed (in a subsequent task(s)) to change either structure and/or to establish a clear relationship between both structures.

To date, our task group has completed the first objective-- we have identified and evaluated concerns with the relationship between the RR/REOP and FCRG structures. These concerns are documented in the attachment, and include a description of each concern along with its programmatic significance. In response to your request, we are providing you with these results. Although we started work on the second objective to recommend actions to resolve the concerns we identified, we have, at your request, discontinued these evaluations. The reason for this was the fact that a second task group is addressing the implementation of 10 CFR 60 Subpart E. The findings of this second task group may lead to changes to the RR/REOP structure. This might make some of the concerns identified by our task group moot. Therefore, until the second task group completes its evaluation, it would not be prudent to continue our work. However, at the appropriate time we would like to complete our evaluations and recommendations.

Please let us know if you would like to discuss any of our attached concerns.

Enclosure: As stated

CC: B. J. Youngblood J. Linehan W. Patrick

* CNWEA staff concerned in 10/23/51 telephone conversations with Ridolinson.

CONCERNS WITH THE RELATIONSHIP OF THE RR/REOP AND FCRG STRUCTURES October 22, 1991

1. DIFFERENT SCOPE OF INFORMATION INCLUDED IN BOTH STRUCTURES

Description

o The draft regulatory guide "Format and Content for the License Application for the High-Level Waste Repository" (FCRG) and Regulatory Requirements/Regulatory Elements of Proof (RR/REOP) have different information, both consistent with their intended purposes.

- The FCRG includes both 10 CFR Part 60 requirements and the information needed (guidance) for DOE to demonstrate compliance with the requirements.

- The RR/REOP structure includes Regulatory Requirements (RRs), Regulatory Elements of Proof (REOP), and their interrelationships.

o The FCRG does not explicitly differentiate the 10 CFR Part 60 requirements from information needs, although doing this may not be simple and could detract from the flow of the document.

Significance

o The difference is important to understand when comparing the two, or relating the two.

o Not having the 10 CFR Part 60 requirements clearly distinguished from information needs in some manner will make establishing a clear relationship more difficult.

2. DIFFERENT LOGICS FOR ORGANIZATIONAL STRUCTURES

Description

o Different logics for the organizational structures were used for RR topics and FCRG chapters and sections. Neither are incorrect because both reflect, in some way, 10 CFR Part 60.

o The RR structure is based on grouping related requirements. The nature of these groups range from functions, to performance objectives, to siting criteria reflecting the nature of the requirements themselves.

o The FCRG structure is predominantly based on systems and subsystems with a discipline substructure for each of the natural systems. This structure reflects the systems defined in 10 CFR 60.21 and the systems/multiple barrier approach taken by 10 CFR Part 60.

o In addition to addressing each element of the rule (i.e., performance objectives and criteria) the FCRG system structure integrates the rules elements into a repository systems view, which is consistent with required assessments of 10 CFR 60.21. The RR topic structure does not have a repository systems view.

o The FCRG organizational structure is a system framework based on the repository systems, as described in 10 CFR 60.21. The 10 CFR Part 60 requirements are then included under the relevent chapter headings. The RR/REOP structure is based on a system of RRs and REOPs. First, the RR topics were developed. Then REOPs were identified and associated with each RR. REOPs were to be applied, eventualy, to the individual systems later in the SRA process.

Significance

o Using two different structures can appear to others as a program inconsistency. It is difficult to explain the purpose or benefit of having two different logic structures.

o Using two different structures adds unnecessary complexity to the program, thereby possibly contributing to inefficiency, confusion, and nonacceptance.

o The goal of all the staff's pre-licensing activities should be to streamline the licensing process where possible and definitely not make it more difficult. The complexity of having two different logics does not streamline and could make work more difficult.

o Having two different logics could also add comprehensiveness to the total process as long a they are compatible. Therefore, greater complexity is not necessarily detrimental if effectiveness is enhanced. 3. "LUMPING OF SOME 10 CFR PART 60 REQUIREMENTS INTO RR TOPICS

Description .

o Some RRs (not REOPs) consist of individual 10 CFR Part 60 requirements or parts of requirements (e.g., performance objectives, siting criteria, and design criteria) "lumped" together. "Lumping" does not preserve each individual requirement at the RR level. It is recognized that every requirement has one or more REOPs, but not every requirement is considered a primary requirement, which is the focus of an RR.

o The FCRG preserves the individual performance objectives and criteria but within the system framework.

o Where "lumped" RRs occur, an inconsistency results with the structure of the rule which identifies individual performance objectives and criteria. (Note that the rule also recognizes that the interrelationships of these individual elements must also be considered).

o Examples of "lumped" RRs include: EBS, favorable conditions, retrievability, LA content in 60.21, and some GROA criteria. A specific example is for EBS, where there are two RRs focused on the two EBS performance objectives in 60.113 that also include the waste package design criteria. These waste package design criteria are not separate RRs like most of the GROA criteria. Another example is the rock excavation underground facility design criterion in 60.133(f), which is not a separate RR like other GROA design criteria, but it is lumped under the EBS RRs. All of 10 CFR 60.21 is "lumped" into one RR, which is the source of numerous incompatibilities between the two structures.

Significance

o The RR topics which are "lumped" make relating the FCRG to the RR structure indirect and more complex.

.o Since the Systematic Regulatory Analysis (SRA) steps are being applied to the RR topic level to prepare the License Application Review Plan (LARP) inputs, and if the LARP parallels the FCRG structure, then preparing and manipulating the SRA output into LARP format is complicated for the "lumped" RRs. This transfer appears to be simpler for the RRs that are not "lumped" (e.g., potentially adverse conditions). 4. REPETITION OF SOME 10 CFR PART 60 REQUIREMENTS IN MANY FCRG SECTIONS

Description

o Some individual GROA criteria are repeated in many FCRG sections, while there is a single RR topic. Radiation protection criterion is an example.

o The GROA Chapter of the FCRG suggests sections of the LA for each GROA system and subsystem and that the design criteria be applied and assessed as appropriate for each system or subsystem. This will result in repeating many criteria for the systems.

o FCRG repetition is considered to be what is required by the rule where the design criteria are to be applied as appropriate for each system, structure, or component important to safety.

o The same type of repetition will occur using SRA. The primary difference is that the two approaches reach the stage where requirements must be allocated to structures, systems, and components at different times. This allocation has already been done at the broad system level in the FCRG, while it has not yet been accomplished from the SRA process.

Significance

o Two different approaches makes relating the information between the two structures indirect; however, the rule already leads to an indirect relationship between the criteria and each system. This does not seem to be a significant concern that couldn't be easily resolved.

5. MAJOR FCRG SECTIONS WITH NO CORRESPONDING RR TOPIC

Description

o Some major FCRG sections do not have a corresponding RR.

o One example is for the design criteria for seals in 60.134, which is a special case involving inadvertent omission of 60.134 from the RR/REOP structure.

o Another example is for conduct of repository operations in Chapter 7 of the FCRG, where much of the information in the FCRG does not support the RRs for this subject area. However, the RRs accurately reflect the more limited requirements of 10 CFR 60.160, 60.161, and 60.162. Much of the information in the FCRG is related to requirements of 10 CFR 60.21, but because 10 CFR 60.21 is "lumped" into one RR, the specific 10 CFR 60.21 requirements can not be specifically related to the sections of Chapter 7 of the FCRG.

o A final example includes FCRG sections on integrated natural system response to thermal loads and effectiveness of natural barriers. Both of these subjects are major sections of the FCRG for which there are no separate RRs because these two assessments are required by 10 CFR 60.21, and there is only one RR for 10 CFR 60.21.

Significance

o Based on the current approach of applying the SRA steps to the RRs to develop LARP inputs, there would not be sections in the LARP for the above topics which would be presented in the license application.

6. DEFINING REGULATORY OR LEGAL RELATIONSHIPS

Description .

o REOPs are more than just pieces of the rule; they are based on a relationship or linkage with a primary piece of the rule that a RR topic is built on. Thus, an individual REOPs identity is in relation to its RR. As a result one design criterion which is related to more than one RR will result in more than one REOP.

o The RR/REOP and the REOP logic structure (diagrams and rationales) define relationships of 10 CFR Part 60 requirements that are based on explicit wording in 10 CFR Part 60. Thus, these relationships are considered by the CNWRA to be legal relationships. These relationships, therefore, define how the rule is integrated.

o While the FCRG describes some general relationships among the requirements of the rule, the FCRG does not identify them in the same explicit way that is done by the RR/REOPs and logic structures and rationales. While the FCRG team considered relationships in developing the draft FCRG, it decided not to identify them explicitly because the staff preferred that the "burden" be on DOE to identify specific relationships based on the wording of the rule as it developed its program. This approach is different than the RR/REOP structure.

o Another aspect of this concern is with the "roll-up" nature of the REOP logic structures as designed for data base manipulation. The binary nature of the logic structures, necessary for data base use, requires the conclusion that if all lower-level REOPs are complied with then the higher-level requirement is automatically complied with. In other words, the lower-level REOPS are both necessary and sufficient to meet the higher-level REOP. While the Center believes this concept of roll-up is applicable to 10 CFR Part 60, the NRC staff are evaluating its applicability, including consideration of the staff's present understanding of the necessary but not sufficient relationship of the subsystem performance objectives to the overall system performance objective.

o Also related is the observation that the explicit relationships in the REOPs might not be all the important relationships because of the "silent" or implied/assumed or intended relationships that exist in the rule.

Significance

o This difference shows a difference in policy regarding explicitness and specificity of identifying regulatory relationships and whether NRC or DOE should identify these relationships.

o It also raises the question of whether the relationships should be considered legal requirements. If so, should DOE be given guidance on regulatory relationships, and should the guidance be part of the FCRG?

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7. IMPLEMENTING THE RR/REOP STRUCTURE ALONG WITH THE FCRG APPEARS TO BE A COMPLEX TASK THAT MAY NOT CONTRIBUTE TO STREAMLINING THE LICENSING PROCESS

Description

o The FCRG and the RR/REOP's are sophisticated structures. The FCRG structure reflects an attempt to help ensure that a license application will be presented in a format which provides for an efficient and effective staff review. The RR/REOPs reflect an attempt to comprehensively define complex regulatory relationships to help ensure that the staff can perform a complete license review. Relating these two structures is an added complexity to the licensing process. Continuing with the development of Compliance Determination Strategies and Compliance Determination Methods in the RR/REOP structure and attempting to develop a single set of Technical Review Components within both structures may lead to additional difficulty, confusion, and complexity.

Significance

o The effort required to relate the two present structures may not support a streamlining of the licensing process. Developing a LARP using information from SRA and the structure from the FCRG may be difficult. The follow-on process of actual license application review may also be complicated if the results are to be related back to the present RR/REOP structure. Understanding and assessing repository performance is, on its own, technically complex and challenging. Therefore, minimizing additional complexity introduced by regulatory structures would be desireable.

o The effort required to understand and implement/maintain two complex structures could make excessive demands on limited staff resources, thus detracting from understanding and evaluating technical issues.

o This concern might continue to frustrate the staff and lead to continual difficulties with nonacceptance of SRA.

o If the logical interrelationships identified within the RR/REOP structure are valid legal requirements, then they must be accounted for in the license application review. Enclosure 4

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

DEC 06 1991

MEMORANDUM FOR: B.J. Youngblood, Director Division of High-Level Waste Management

THRU:

Joseph J. Holonich, Director Repository Licensing and Quality Assurance Project Directorate Division of High-Level Waste Management Office of Nuclear Material Safety and Saféguards

Newton K. Stablein, Senior Project Manager and Chairman, Part 60 Roll Up Task Force

Division of High-Level Waste Management

Office of Nuclear Material Safety

Repository Licensing and Quality Assurance Project Directorate

Office of Nuclear Material Safety

and Safeguards

FROM:

SUBJECT:

and Safeguards REPORT OF THE JOINT U.S. NUCLEAR REGULATORY COMMISSION (NRC)-CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES (CNWRA) TASK FORCE ON ROLL UP OF PART 60, SUBPART E, INTO PARTS 60.111, 60.112, and 60.113 (PERFORMANCE OBJECTIVES)

INTRODUCTION: On October 21-24, 1991, a task force consisting of six NRC staff members (Kien Chang, Dick Codell, Dinesh Gupta, John Trapp, Rex Wescott, and King Stablein [chairman]) and two CNWRA staff members (Mike Miklas and Stephen Spector) met for the purpose of examining the relationship of the requirements in Part 60, Subpart E, to the performance objectives identified in Sections 60.111, 60.112, and 60.113. In particular, the task force was to determine how many of the siting and design criteria requirements of Subpart E could be rolled up into the performance objectives such that the number of analyses needed to address the requirements of Part 60 could be minimized. Having attempted to implement a roll up approach to Subpart E, the task force was to make recommendations to NRC management concerning ways to facilitate implementation of the roll up concept to the extent desirable and practicable. This memorandum contains the determinations and recommendations of the task force. All members of the NRC-CNWRA task force have reviewed and are in agreement with this report.

212000

B. J. Youngblood

BACKGROUND:

Prior to establishment of this task force, the issue of the relationship between (1) Part 60.112 and (2) the potentially adverse conditions of 60.122(c) and the implementation requirements of 60.122(a)(2) was initially raised as a regulatory uncertainty in CNWRA report CNWRA 90-003, "Identification and Evaluation of Regulatory and Institutional Uncertainties in 10 CFR Part 60," February 1990. These potential regulatory uncertainties were subsequently evaluated in the NRC staff's "Report on Uncertainty Reduction", April 1, 1991, in which the staff expressed the opinion that the regulatory intent was clear that the potentially adverse conditions should be evaluated in the context of the performance objectives. Although the CNWRA agreed that there is a strong logical relationship between the two portions of the regulation (i.e., the requirements of 60.122 are evaluated "in the context of the performance objectives"), the CNWRA stated that the current wording of Part 60 calls for additional, distinct analyses under 60.122. Furthermore, the CNWRA identified (see Report CNWRA 90-003) a number of uncertainties which suggest the need for several additional analyses to be made for each of the potentially adverse conditions in 60.122. Since the issuance of the NRC staff report, the NRC and CNWRA have had several interactions on this subject.

The NRC staff has interpreted the siting criteria of 60.122(c)as supporting the performance objectives and has considered that all the analyses for 60.122(c) requirements will be done as part of the evaluation of 60.112 and 60.113. Hence, the NRC staff considers the assessments of overall system and subsystem performance to be the primary mechanism for determining the extent to which the requirements of 60.122(a)(2) have been fulfilled. The staff considers that 60.122(a)(2) assures that such assessments are made with sufficient scope and detail, but that it does not require investigation and analysis beyond that required to adequately understand the effect on performance and support a finding with reasonable assurance.

On the other hand, the CNWRA staff originally considered that the language of 60.122(a) requires an assessment of the siting criteria distinct from that done for 60.112 and 60.113. Under this interpretation, an evaluation of the favorable and potentially adverse conditions independent of that required to demonstrate compliance with 60.112 and 60.113 is necessary.

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During later NRC-CNWRA discussions, it was noted that a similar issue exists concerning the relationship of the design requirements in 60.130 through 60.135 to the performance objectives in 60.111, 60.112, and 60.113. Eventually the larger issue became whether all the individual requirements of Subpart E are to be rolled up in the performance objectives.

Resolution of these matters has a profound effect on the NRC. staff development of the Format and Content Regulatory Guide and on the CNWRA staff's effort on the Regulatory Requirements and Required Elements of Proof (RR/REOP) structure. Until these matters are resolved, neither staff effort can proceed with the confidence that it is headed in the correct direction. NRC management "recognized the stalemate and established a task force to take a fresh look at the whole subject of rollup of Subpart E into the performance objectives. The task force was given one week to attempt to implement a roll up approach to Subpart E and to make recommendations to NRC management based upon its collective judgment regarding the roll up approach.

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DETERMINATIONS: Based upon four full days of intensive deliberations, the task force considers that the benefits and ramifications of implementation of a roll up approach are not easy to characterize or understand. The difficulties that this task force encountered in attempting to apply the roll up approach suggest that it be used cautiously, with full recognition of the problems that the language of Part 60 inevitably creates (e.g., the potential open-ended approach to engineering solutions conveyed by the term "to the extent practicable") and that expectations regarding the benefits of roll up be restrained.

> In particular, it is important to appreciate that a roll up approach cannot be expected to result in a reduction in the number of staff evaluations or the amount of staff technical work that will be involved in the review of the license application. By this statement the task force means to emphasize that no amount of analysis of Part 60 can reduce the required content of the license application or the staff time required for assessment of that license application. However, there will be a reduction in the amount of additional work that could result from the incorrect identification of certain requirements as independent of others.

With respect to the roll up of the siting criteria of 60.122 into the performance objectives of 60.112 and 60.113, the task force concluded that under the current language of 60.122(a), the potentially adverse conditions of 60.122(c) do roll up into the performance objectives. By this the task force means that the requirements of 60.122(a)(2) are met if the requirements of 60.112 and 60.113 are met. This is consistent with the NRC position. In the Recommendations section of this memorandum, the task force has two specific recommendations (2 and 4) with respect to 60.122(a) that could further clarify the relationship of 60.122(c) to 60.112 and 60.113.

However, the task force concluded that, given the current language of 60.122(a)(1), the favorable conditions of 60.122(b) do not roll up into 60.112 and 60.113. Some of the favorable conditions appeared necessary for meeting the performance objectives, and others were considered to be independent of the performance objectives, but in neither case would meeting the requirements of 60.112 and 60.113 establish that the requirements of 60.122(a)(1) were met. The regulatory significance and potential problems of the favorable conditions not rolling up while the potentially adverse conditions do roll up were discussed but not resolved by the task force. In addition, depending on the precise definition of roll up, it is recognized that there are varying opinions as to whether the favorable conditions roll up under the existing language of 60.122. However, the intent of Part 60 is that the favorable conditions should roll up, and Recommendation 2 of this memorandum proposes adding language to 60.122(a) that would establish the roll up of 60.122(b)into the performance objectives of 60.112 and 60.113.

With respect to the roll up of the design requirements of 60.130-135 to 60.111, 60.112, and 60.113, the task force concluded that some, but by no means all, of the design requirements roll up into the performance objectives. This was due in large measure, but not entirely, to the task force's acceptance of Dan Fehringer's and Seth Coplan's interpretation that the exposures and release limits of Part 20 referenced in 60.111 address normal operations and not accident conditions, while 60.131(b) and some of the other design requirements clearly pertain to accident conditions. When the task force examined the language of Part 60, the Statement of Considerations, and NUREG-D804, prior to receiving the interpretation of Dan Fehringer and Seth Coplan, it was unable to come to a consensus as to whether 60.111 applied to accident conditions. Consequently, it appears that further action is needed to bring closure to the matter of whether and how 60.111 applies to accident and off-normal conditions.

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If it is deemed desirable to have 60.130-135 rolled up into the performance objectives, some vehicle--whether it be the Design Basis Accident rulemaking or something else--could partially effect that goal by such measures as establishing that 60.111 does apply to accident conditions. However, it needs to be recognized that even such an action would still leave certain design requirements independent of the performance objectives. Hence, other modifications to Part 60 would need to be made to accomplish a complete roll up of 60.130-135 into the performance objectives. The task force did not specifically address the question of what other changes would need to be made, nor of whether it would recommend that such changes be sought, but the feeling of the task force in general appeared to be that roll up is not something that needs to be forced onto the design requirements. This feeling reflects the determination expressed above about the difficulties of using the roll up approach and the need for employing it cautiously.

RECOMMENDATIONS: (1) The roll up of 60.122 into 60.112 and 60.113 should be affirmed in a high level formal document such as a Commission Paper, rulemaking, or the Format and Content Regulatory Guide. This is especially important because at the present time the most visible analysis of the relationship between 60.122(c) and the performance objectives is the CNWRA's Correlation of Regulatory Requirements and Regulatory Elements of Proof for 10 CFR Part 60, which expresses the results of an evaluation that are contrary to the roll up of 60.122(c) into 60.112 and 60.113.

- (2) Most of the task force considered that addition of the following sentence or similar language to 60.122(a) would clarify the roll up relationship of 60.122(b) and 60.122(c) to 60.112 and 60.113: "The following are favorable and potentially adverse conditions to be considered when evaluating the ability of a repository to meet the performance objectives relating to isolation of waste."
- (3) With a few slight modifications presented in Recommendation 4 below, the present language of 60.122(a) should remain in Part 60. Most of the members of the task force felt that the present language provides valuable guidance on how the siting criteria are to be perceived and investigated.

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(4) Proposed modifications to the current 60.122(a) language that would also clarify the 60.122(c)/60.112 and 60.113 relationship involve changing phrases that suggest that the potentially adverse conditions may need to be analyzed as separate and independent entities. For example, in 60.122(a)(2), instead of "If any of the potentially adverse conditions...is present...", the task force proposes that some expression such as "If one or more of..." or "If a combination of..." be substituted. There are a number of places in 60.122(a) where such substitutions would be advantageous.

Newton K. Stablein

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*Unable to attend all session because of conflict with IPA Meeting. **Unable to attend any working sessions because of section staffing constraints, available for specific consultations.

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Enclosure 5

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Enclosure 6

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DRAFT FCRG OUTLINE

- 3. Natural Systems of the Geologic Setting
- 3.1 Descriptions
 - 3.1.1 Geologic System
 - 3.1.2 Hydrologic System
 - 3.1.3 Geochemical System
 - 3.1.4 Clim.& Met. System
 - 3.1.5 Integrated Natural System

3.2 Assessments of Compliance

- 3.2.1 Geologic System
 - 3.2.1.1 Favorable Conditions Tectonic & Geomorphic Processes Minimum Depth

3.2.1.2 Adverse Conditions

Geomechanical Properties

- 3.2.2 Hydrologic System
- 3.2.3 Geochemical System
- 3.2.4 Clim.& Met. System
- 3.2.5 GWTT Performance Objective
- 3.2.8 Effectiveness of Natural Barriers

* This potential LARP outline is based on an approach that addresses both compliance information and the descriptive information supporting the assessments of compliance together in each review plan. This approach focuses the review on compliance similar to the way the SCP review was focused on the plans in Chapter 8. The determination of whether this approach or another approach is appropriate must await development of the revised RR/REOP structure.

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** Include individual review plans and RRs for each favorable and potentially adverse condition as shown in 3.2.

POTENTIAL LARP OUTLINE AND RECOMMENDED RRS*

3. Determinations of Compliance: Natural Systems of the Geologic Setting favorable Curdition -

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- 3.2 Compliance with Geologic System Siting Criteria 3.2.1 Tectonic & Geomorphic Processes Review Plan 3.2.2 Minimum Depth Review Plan RR RR Adverse Condition -3.2.14 Geomechanical Properties Review Plan RR
- 3.3 Compliance with Hydrologic System Siting Criteria** RRs
- 3.4 Compliance with Geochemical System Siting Criteria** RRs
- 3.5 Compliance with Clim. & Met. System Siting Criteria** RRs
- 3.6 Compliance with GWTT Performance Objective Review Plan RR
- 3.7 Compliance with Effectiveness of Natural Barriers
- Review Plan RR

DRAFT FCRG OUTLINE

4. Geologic Repository Operations Area: Physical Facilities 4.

- 4.1 Descriptions
 - 4.1.1 Surface Facilities
 - 4.1.2 Shafts and Ramps
 - 4.1.3 Underground Facility
 - 4.1.4 Radiation Protection
 - 4.1.5 Interface of Structures, Systems, Components
- 4.2 Assessment of Compliance for Surface Facilities
- 4.3 Assessment of Compliance for Shafts and Ramps
- 4.4 Assessment of Compliance for Underground Facility
- 4.5 Integrated GROA Compliance with Performance Objectives
- 4.5.1 Protection Against Radiation Exposures & Release 4.5.2 Retrievability of Waste

POTENTIAL LARP OUTLINE AND RECOMMENDED RRS

. Determinations of Compliance: Geologic Repository Operations Area: Physical Facilities

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- 4.1 Compliance with Surface Facility Design Criteria Review Plan
- 4.2 Compliance with Shafts and Ramps Design Criteria Review Plan RR
- 4.3 Compliance with Underground Facility Design Criteria Review Plan RR
- 4.4 Compliance with Radiation Protection Performance Objective Review Plan RR
- 4.5 Compliance with Retrievability Performance Objective Review Plan RR

COMPATIBILITY OF THE FCRG, LARP, AND RRS FOR THE ENGINEERED BARRIER SYSTEMS

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DRAFT FCRG OUTLINE

- 5. Engineered Barrier Systems
- 5.1 Descriptions
 - 5.1.1 Waste Package
 - 5.1.2 Waste Form
 - 5.1.3 Underground Facility
 - 5.1.4 Environment
 - 5.1.5 Radiation Protection
- 5.2 Assessment of Compliance
 - 5.2.1 Particular Barriers (Design Criteria)
 - 5.2.1.1 Waste Package Design Criteria
 - 5.2.1.2 Waste Form Design Criteria
 - 5.2.2 Performance Objectives
 - 5.2.2.1 Assessment of Effectiveness of Engineered Barriers
 - 5.2.2.2 Containment
 - 5.2.2.3 Release Rate
 - 5.2.3 Radiation Protection

POTENTIAL LARP OUTLINE AND RECOMMENDED RRS

5. Determinations of Compliance: Engineered Barrier Systems 5.1 Compliance with Waste Package Design Culturely

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	Review Plan	Haste rackage Design Criteria	
5.2	Compliance with	Waste Form Design Criteria	RR
	Review Plan		DD
5,3	Compliance with	Underground Facility Design	nn
	Criteria Review	Plan	DD
5.4	Compliance with	Effectiveness of Engineered	пп
	Barriers Review	Plan	ъÐ
5.5	Compliance with	Containment Performance Objective	RR
	Review Plan		55
5.6	Compliance with	Release Rate Performance Objective	nn
	Review Plan	service and retroimance objective	DD
5.7	Compliance with	Provincian Dratastic D. 1. Dr.	RR
	comprisince with	nauration rrotection Review Plan	RR

COMPATIBILITY OF THE FCRG, LARP, AND RRS FOR THE OVERALL SYSTEM

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DRAFT FCRG OUTLINE

6. Overall System Performance Assessment

- 6.1 Basic Approach
- 6.2 System Description
- 6.3 Assessment of Compliance: Cumulative Release

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- 6.4 Assessment of Compliance: Undisturbed Performance
 - 6.4.1 Individual Protection
 - 6.4.2 Groundwater Protection
- 6.5 Siting Criteria

POTENTIAL LARP OUTLINE AND RECOMMENDED RRS*

6. Determinations of Compliance: Overall System

- 6.1 Compliance with Cumulative Release Review Plan
- 6.2 Compliance with Individual Protection Review Plan
- 6.3 Compliance with Groundwater Protection Review Plan RR

RR

RR

* This outline shows three review plans and RRs. One review plan and one RR is an alternative.

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