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RS-NMS-85-009
Communication No. 87

U.S. Nuclear Regulatory Commission
Division of Waste Management
Geotechnical Branch
MS 623-SS
Washington, DC 20555

Attention: Mr. Jeff Pohle, Project Officer
Technical Assistance in Hydrogeology - Project B (RS-NMS-85-009)

Re: Comments on Proposed Revisions to 10 CFR Part 60

Dear Mr. Pohle:

Please find attached comments from Nuclear Waste Consultants (NWC) on the proposed revisions to 10 CFR Part 60. The review was performed by Adrian Brown and Mark Logsdon under Task 5 of the current contract, per your letter of July 7, 1986.

The attached comments raise concerns related to five matters, including:

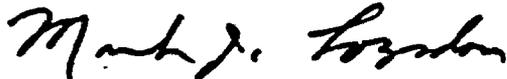
- o The requirement to include performance assessments in the Safety Analysis Report (60.21(c)(1)(C));
- o The requirement addressing retrievability of waste (60.111(b));
- o The requirement addressing minimum pre-emplacment groundwater travel time from the disturbed zone to the accessible environment (60.113(b));
- o The proposed revision addressing multiple barriers (60.113(d));
- o The proposed requirements for post-closure monitoring (60.144).

You will note that three of the five areas of concern address matters that are not of themselves subjects of the proposed revisions. However, it is our understanding from the Office of the Secretary of the Commission that comments on all aspects of the Rule that are affected by the proposed changes are welcomed in response to a Notice of Public Rulemaking. The comments on pre-emplacment groundwater travel time and retrievability echo written positions that NWC has transmitted to the NRC staff over the last year and that the two commenters have raised in a variety of forums with the staff over several years.

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Thank you for forwarding these comments to Dr. Fehringer in WMRP. If you or other members of the Staff have any questions about our comments or positions, please do not hesitate to contact me.

Respectfully submitted,
NUCLEAR WASTE CONSULTANTS



Mark J. Logsdon, Project Manager

Att: Comments on Proposed Revisions to Part 60

cc: US NRC - Director, NMSS (ATTN PSB)
DWM (ATTN Division Director)
Mary Little, Contract Administrator
WMGT (ATTN Branch Chief)

M. Galloway, TTI
L. Davis, WWL
J. Minier, DBS

COMMENTS ON PROPOSED REVISIONS TO 10 CFR PART 60

1.0 INTRODUCTION

The United States Nuclear Regulatory Commission (NRC) has published a Notice of Public Rulemaking (51 FR at 22288, June 19, 1986) proposing revisions to 10 CFR Part 60 that will conform the Commission's rule to the generally applicable environmental standards of the United States Environmental Protection Agency (EPA) (40 CFR Part 191). Nuclear Waste Consultants (NWC) have been asked by the NRC Project Officer to provide comments on the proposed changes to the rule (Letter from J. Pohle, NRC, to M. Logsdon, NWC, dated July 7, 1986). The following comments have been prepared by Adrian Brown and Mark Logsdon of Nuclear Waste Consultants.

The NWC comments address five matters of concern:

- o The requirement to include performance assessments in the Safety Analysis Report (60.21(c)(1)(C));
- o The requirement addressing retrievability of waste (60.111(b));
- o The requirement addressing minimum pre-emplacement groundwater travel time from the disturbed zone to the accessible environment (60.113(b));
- o The proposed revision addressing multiple barriers (60.113(d));
- o The proposed requirements for post-closure monitoring (60.144).

Nuclear Waste Consultants

Three of the five areas of concern address matters that are not of themselves subjects of the proposed revisions. However, it is our understanding from the Office of the Secretary of the Commission that comments on all aspects of the Rule that are affected by the proposed changes are welcomed in response to a Notice of Public Rulemaking. The comments on pre-emplacment groundwater travel time and retrievability echo written positions that the two commenters have raised in a variety of forums with the staff over several years and that NWC has transmitted to the NRC staff over the last year (e.g., NWC Communication Numbers 7, 21, 65, 66, 78; Staff/Contractor meetings for Contracts RS-NMS-85-002; RS-NMS-85-009).

2.0 GENERAL COMMENTS

Nuclear Waste Consultants consider that the proposed revisions that address the numerical requirements of 40 CFR Part 191 are well incorporated by the proposed revisions to Sections 60.112 and the addition of Section 60.115. Additionally, NWC considers that the approaches to incorporating the EPA assurance requirements addressing institutional controls and natural resources are fully satisfactory from our perspective.

However, NWC has several specific comments on the approaches presented to accommodating the EPA assurance requirements addressing use of multiple barriers, removal of wastes, and post-emplacment monitoring. The comments on

multiple barriers and removal of wastes lead to our comments on the portions of 10 CFR Part 60 that address pre-emplacment groundwater travel time and retrievability.

3.0 SPECIFIC COMMENTS

3.1 PERFORMANCE ASSESSMENTS IN THE SAFETY ANALYSIS REPORT (60.21(c)(1)(C));

In discussing the approach to evaluating compliance with the EPA standards, the staff cites section 60.21(c)(1)(C), addressing quantitative performance assessments as part of the Safety Analysis Report. The cited section reads:

(C) An evaluation of the performance of the 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.

The proposed revision to this section would add a requirement that the results of these analyses be incorporated into an overall probability distribution of cumulative releases to the extent practicable.

NWC considers that the staff is well advised to use the qualifying "to the extent practicable" in light of the numerous sources of uncertainty that will exist. However, NWC also considers that a similar qualifying scheme be added to the portion of the existing wording that stipulates "...giving the rates and quantities of releases...". As the paragraph is currently stated, NWC considers that it could be interpreted to require an analysis that is more rigorously quantitative than either the data available may justify or than would be required in order to construct a CCDF that would demonstrate with reasonable assurance that the standards could be met. We believe that the substance of the Staff's discussion in 51 FR @ 22292, Pars. 2, 3, 4 indicates that the staff would find bounding calculations to be an acceptable approach to evaluating compliance. We concur with this approach, and we consider that the wording of the requirement for performance assessments would serve better if this approach to addressing inherent uncertainties were incorporated.

3.2 RETRIEVABILITY OF WASTE (60.111(b))

NWC is not well qualified to comment on EPA's intent in including an assurance requirement addressing removal of wastes in 40 CFR 191.14(f). We concur with the staff that there appears to be no necessary contradiction between the EPA assurance requirement and the NRC's retrievability requirement.

However, NWC would point out that there is a growing body of geotechnical information suggesting that no repository in salt would likely meet a

retrievability requirement beyond a handful of years, certainly much less than the 50 years that are currently given in the regulation. At the same time, there is a substantial, and still growing, body of earth science and engineering information indicating that for a broad range of anticipated and unanticipated events and processes, salt is a medium that would provide outstanding long-term isolation of the wastes from the accessible environment. (In saying this, NWC is not prejudging the proposed Deaf Smith County site as being acceptable: the licensing case needs to be made on the basis of site-specific data and analyses. We are merely commenting that there are sound technical reasons to believe that a salt basin in a tectonically stable region would be a reasonable geologic and hydrogeologic setting to consider .. for a potential high-level waste repository from the point of view of long-term isolation of waste.) NWC understands that Section 60.111(b) reserves to the Commission flexibility in the period of retrievability. However, NWC also considers that it would be well to avoid regulation by exception to the maximum extent practicable.

Since it now appears likely that an exception to the 50-year retrievability period would be required for any salt site, NWC recommends that the staff reconsider the 50-year retrievability period. As an alternative to the current wording, NWC suggests the following:

(b) retrievability of waste. (1)... To satisfy this objective, the geologic operations area shall be designed so that any or all of the emplaced waste may be retrieved on a reasonable schedule

that shall be established on a case-by-case basis consistent with the likelihood of failure of the geologic repository system, the emplacement schedule and the planned performance confirmation schedule as they are set out in the License Application (see 60.21...)

This approach would also require an amendment to 60.21 to include the appropriate information in the license application.

NWC considers that this approach is consistent with the original purpose of the retrievability requirement and with the EPA assurance requirement (based on the same rationale presented by the staff in 51 FR @ 22294), while at the same time removing the likelihood of regulation by exception and preserving salt as a viable disposal medium.

3.3 MINIMUM PRE-EMPLACEMENT GROUNDWATER TRAVEL TIME FROM THE DISTURBED ZONE TO THE ACCESSIBLE ENVIRONMENT (60.113(b))

As the staff points out in presenting the proposed changes (51 FR @ 22295), the proposed reduction in the maximum extent of the controlled area reopens, at least in terms of discussion, the Commission's position on pre-emplacment groundwater travel time from the disturbed zone to the accessible environment.

NWC considers that the proposed rulemaking provides an excellent opportunity to reconsider the issue of pre-emplacment groundwater travel time (GWTT) as a performance objective that is reasonably related to post-emplacment

performance (as its inclusion in Section 60.113 would indicate). NWC has discussed with the Staff its reservations about the GWTT requirement on a variety of occasions (e.g., NWC Communication Nos. 7, 21, 65, 66, 78). Rather than repeat the concerns in detail, the following list summarizes the principal areas of our concern:

- o GWTT is not a good measure of post-emplacment flux of radionuclides to the accessible environment.
- o The inclusion of a siting measure in the post-emplacment portion of the rule is not consistent.
- o Since the Rule requires an evaluation of post-emplacment performance, the inclusion of the GWTT requirement duplicates rather than simplifies the evaluations that are required in any event.
- o There is a high likelihood that application of the GWTT requirement would eliminate any site where fracture flow may be an important flow mechanism, regardless of the long-term isolation capability of the system related to low mass flux (and physical and/or geochemical controls on radionuclide flux in a fracture-dominated system).
- o Alternatively, the Commission could be placed in a position of having to regulate by exception if it were to find that the EPA standard is likely to be met but that the GWTT requirement could not be met.

For details on these and other aspects of our concerns, please see the referenced written communications.

NWC considers that the Commission should reconsider the advisability of retaining the GWT requirement in the current form. We consider that an appropriate performance measure (post-emplacment groundwater travel time) is incorporated into the evaluations of the overall EPA standards and that the matter of an appropriate siting measure is adequately dealt with through 10 CFR 960, the DOE Siting Guidelines, over which the Commission has concurrence. Thus, we consider that the Commission's ability to protect the public health and safety and the environment is fully retained without the GWT requirement, which therefore should be dropped from the Rule.

3.4 MULTIPLE BARRIERS (60.113(d))

When related to the definition of "Barrier" presented in Section 60.2, the proposed wording of Section 60.113(d) seems likely to limit the flexibility that the Commission has to waive or modify subsystem performance objectives, so long as the overall EPA standards are likely to be met, by requiring that each barrier "prevent or substantially delay(s) movement of water or radionuclides". Our concern with the potential loss of flexibility is particularly acute if the Staff and Commission retain the GWT requirement, as described above.

NWC proposed that the Staff act to retain the Commission's flexibility by applying one or more of the following options:

- o Modify the definition of barrier in 60.2 to emphasize reduction in radionuclide flux (rather than travel time, which would act to reduce the ultimate dose to individuals or populations only through the mechanism of radioactive decay rather than through the direct isolation capability that exists with minimization of flux);
- o Move proposed 60.113(d) to some place in the Rule where it has less impact on the flexibility set out in the current wording of 60.113(b);
- o Revise the wording of proposed 60.113(d) to include provisions for the sort of flexibility that is inherent in the current wording of 60.113(b).

NWC also recommends that the definition of "Barrier" be modified to include the proposed limitation on radionuclide flux regardless of the Staff's position on the broader question of incorporation of the EPA assurance requirement, for the reasons stated in the first bulleted suggestion above.

3.5 POST-CLOSURE MONITORING (60.144)

NWC recognizes that conformance with the EPA assurance requirement for post-disposal monitoring seems to lead to the need for additional requirements in Part 60. In general, NWC considers that the approach of addressing the issue in the License Application (60.21) and in the amendment for termination of the license (60.52) as well as in the specific requirement of a post-closure monitoring system (60.144) is sound. However, our experience with required monitoring programs in other environmental actions is that they must be carefully designed to specific technical (including temporal) criteria if they are to be effective and closed-ended. There must be a clear understanding of the types, quantities and schedule of information that are required to reach a decision. In the absence of such direction there is a tendency (and substantial history) of inefficiently designed monitoring programs that do not lead to timely or improved decision-making, in large part because neither applicant nor regulator has a clear idea of how the additional information would or could be used to reach a decision.

While NWC appreciates the attraction of making DOE responsible for defining and developing appropriate post-closure monitoring, we are concerned with two aspects of this approach. First, it risks a charge that NRC is effectively delegating part of its licensing function to DOE. Secondly, and probably more importantly, it invites the intrusion of new areas of controversy (and delay) into the license review process by leaving potentially important aspects of

the license application and review process without criteria for evaluation by the Staff and Commission.

The Staff will ultimately need to evaluate what types, quantities and schedules of information it would find acceptable for demonstrating compliance with post-closure monitoring requirements. Since this step needs to be taken at some time, NWC recommends that the Staff consider expanding the appropriate sections of the proposed Rule to include specific types of post-closure performance that need to be monitored and criteria for demonstrating satisfactory performance to the standard of reasonable assurance. At a minimum, we consider that the Staff should spell out the purpose of such monitoring in considerably more detail, as a preliminary step to defining criteria. We consider that such rationale and modifications would need to be based on an evaluation of how a licensing decision could be affected by monitoring data.

NWC appreciates that this is no simple matter and could be very time-consuming. Thus, as an alternative, NWC would recommend that the current proposal go forward, but that the Staff develop a program to address criteria with the intent of pursuing the matter through subsequent rulemaking or some quasi-regulatory mechanism such as Format and Content Guides.