Rulemaking1CEm Resource

From: RulemakingComments Resource
Sent: Thursday, January 16, 2014 7:24 AM
To: Rulemaking1CEm Resource
Subject: FW: Waste Confidence Draft GEIS Comments - EPA
Attachments: NCR Waste Confidence Draft GEIS Comment letter 1-15-14.pdf

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From: Rountree, Marthea [mailto:Rountree.Marthea@epa.gov]
Sent: Wednesday, January 15, 2014 4:47 PM
To: RulemakingComments Resource
Cc: Lopas, Sarah
Subject: Waste Confidence Draft GEIS Comments - EPA

Dear Sir/Madam:

Attached are EPA's comments on the Waste Confidence Draft GEIS for your consideration. Pleas feel free to contact me if you have any questions.

Regards,

Marthea Rountree
Environmental Protection Agency
Office of Federal Activities
NEPA Compliance Division
1200 Pennsylvania Ave., N.W.
Room 7239A ARS: MC 2252A
Washington, DC 20460

202-564-7141

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WASHINGTON, D.C. 20460

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OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Ms. Annette Vietti-Cook
Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attn: Rulemakings and Adjudications Staff

Dear Ms. Vietti-Cook:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality's (CEQ) NEPA regulations, the Environmental Protection Agency (EPA) has reviewed the Nuclear Regulatory Commission's (NRC) Waste Confidence Draft Generic Environmental Impact Statement (GEIS) to support the rulemaking to update the Commission's Waste Confidence Decision and Rule. The Docket ID is NRC-2012-0246 (CEQ # 20130269).

The draft GEIS examines the potential environmental impacts that could occur as a result of the continued storage of spent nuclear fuel both at "at-reactor" sites and "away-from-reactor" sites. Three different time frames are evaluated; short-term (60 years beyond a reactor's licensed life for operation), long-term (160 years beyond a reactor's licensed life for operation), and indefinite (assumes that a repository does not become available).

Given that fuel, cladding and assembly hardware are not currently designed for storage for more than 100 years after irradiation, as well as the need for periodic repackaging and transfers, we recommend that the final GEIS provide additional information concerning the practicality and technical feasibility of constructing and operating facilities for long-term extended storage. To assist with this effort, we have are providing specific comments/recommendations for your consideration (enclosed). We have rated the draft GEIS as "Environmental Concerns - Insufficient Information" (EC-2) (see enclosed "Summary of EPA Rating System").

We appreciate the opportunity to review and comment on this draft GEIS. If you have any further questions, please contact me or Marthea Rountree at (202) 564-7141.

Sincerely,

Susan E Bromm

Susan E. Bromm
Director
Office of Federal Activities

Enclosures

EPA Comments - NRC Waste Confidence Draft Generic Environmental Impact Statement, January 2014

Dry Transfer Systems Facility (DTS) Availability

For its "indefinite storage" scenario, the draft GEIS assumes that DTS facilities will be licensed, built, and replaced periodically on an as-needed basis (Sections 2.1.4 and 2.2.2.1). In support of this assumption, the draft GEIS refers to the submission by the Department of Energy (DOE) to the NRC for the review of a topical safety analysis report (TSAR) on the Transnuclear-EPRI DTS design, and the NRC's issuance of a license in 2004 to DOE for the Proposed Idaho Spent Fuel Facility. However, we are concerned that the applicability of these precedents may be limited, as neither of these proposed facilities has as yet been constructed. We also note that these facilities were conceptually less complex than the DTS envisioned in the draft GEIS.

Recommendation:

Acknowledge that these facilities have not yet been constructed and discuss how that may affect any assumptions. Provide a discussion that addresses the technical and regulatory challenges that have hindered the development of such systems in the past, as well as the potential for these challenges to be encountered in future efforts to construct and license more sophisticated facilities.

Provide additional discussion of the past development and capabilities of DTS facilities. Include the following information: (i) the current status of these facilities, (ii) whether these facilities were licensed to retrieve, inspect, and repackage the fuel after prolonged storage as proposed for DTSs, (iii) whether high-burnup commercial fuel was licensed for storage, (iv) the reasons why facilities have not been constructed, and (v) whether these reasons would prevent licensing, construction and operation of similar facilities in the future.

Fuel Transfer/Repackaging

The feasibility of safe fuel transfers after long-term storage is uncertain. For example, when "new" replacement DTS facilities are built in the future, based on the degree of fuel and storage system degradation, fuel inspections may determine that it would be safer to leave some fuel in the "old" casks rather than transferring it to a "new" receiving cask. This scenario may be more likely if fuel must be transferred more than once in intervals of 100 years. Another scenario is that after an inspection, it may be determined that it would be unsafe to transfer assemblies to a new cask. These scenarios would essentially have the same consequences as not having a DTS facility available, with the additional potential for damage to the existing assembly (and subsequent releases of radionuclides) as it is being inspected.

The draft GEIS discusses cladding degradation issues of high burnup fuel and, should cladding degradation occur, notes that "greater care could be required during handling operations" (p. B-13). However, the draft GEIS does not provide information to clarify what specific measures would be taken during handling operations. Furthermore, we expect that cladding conditions of some assemblies would be such that it would not be safe to transfer fuel without cladding rupture, regardless of any additional handling measures. In this case, it may be safer to leave the fuel in the "old" cask instead of risking the spread of radioactive materials due to cladding rupture. EPA believes that such a "leave as is" sub-scenario is not speculative because: (i) the data on fuel conditions exists only for 12 rods after 15 years of storage in a fully controlled experimental environment while the draft GEIS assumes a 100-year long storage period, (ii) there are significant uncertainties concerning the potential for future accidents and off-normal conditions during loading and transfers at a storage site, and (iii) there is no data on fuel conditions after long-term storage that is similar to the data for low burnup fuel. Accidents and off-normal conditions may cause beyond the design basis conditions, i.e., beyond those for which the storage systems are licensed. One example is an assembly misload caused by a human error, which can lead to cladding temperatures increasing beyond the design basis limit. In addition, with hundreds of thousands of assemblies to be loaded and transferred, even a low frequency of misload events may cause a release of radioactive materials during the lifetime of one or several independent spent fuel storage installations (ISFSIs).

Recommendation:

Provide an additional discussion of circumstances that would affect the feasibility of repackaging in the DTS. Include fuel, cladding, and storage system degradation over long-term storage, and the likelihood of encountering such conditions. Consider the consequences of a "leave as is" scenario.

Provide information on the frequency of assembly misloads based on industry data. Based on this information, provide an evaluation on how many assemblies will be impacted during long-term storage and what the radiological consequences would be during fuel storage and transfers.

High Burnup Fuel

The draft GEIS states that it is expected that industry will utilize fuel to higher burnups in the near future, but does not distinguish low and high burnup fuels in its analyses, except for pool fires. The draft GEIS indicates that its analyses are for low burnup fuel because these fuels will require more space for storage in the future. This position would not have much significance if the condition of the high burnup fuel deteriorates significantly more than low burnup fuel in long-term storage. However, while data exists for low burnup fuel conditions after 15 years of dry

storage, no data exists for high burnup fuel after 15-years of dry storage. We recognize that high burnup fuel studies are on-going (Billone, 2013) and that no definitive results are currently available.

Recommendation:

Discuss how forthcoming information on high burnup fuel conditions after long-term storage will be addressed in future licensing actions.

The draft GEIS states that studies performed to date have not identified any issues that would call into question the technical feasibility of the long-term use of dry storage for low burnup spent fuel, however, it is not clear that long-term storage would be feasible for high-burnup fuel.

Recommendation:

Provide information on the projected amount of high-burnup fuel that will be stored, repackaged, and transferred at DTS/ISFSI facilities for the three scenarios. In addition, provide information on whether there are any potential issues regarding the technical feasibility of long-term use of dry storage for high burnup spent fuel.

The NRC's Interim Staff Guidance "The Use of a Demonstration Program as Confirmation of Integrity for Continued Storage of High Burnup Fuel Beyond 20 Years" (NRC ISG-24 (2013)) indicates that data supporting readily retrievable storage of high-burnup fuel beyond 20 years is not presently available. The guidance also recommends that a demonstration program could provide an acceptable method for an applicant to demonstrate compliance with regulations for storage of high-burnup fuel for periods of greater than 20 years. This demonstration program appears to require a cladding inspection at the end of 20 years. If a reactor license is terminated and a pool is not available, this cladding inspection is likely to include cutting the canisters open and inspecting the cladding for degradation, which would then potentially require construction and operation of a DTS for all three time frame scenarios.

Recommendation:

Provide information on whether high-burnup fuel will likely be inspected every 20 years. If this is the case, discuss how such inspections and associated operations and transfers may impact the assumption that no DTS is needed for 100-year storage period, especially when reactor licenses are terminated and pools are no longer available.

Fuel Inspections

Page 2-21 of the draft GEIS states that "…For the purposes of analysis in this draft GEIS, the NRC relies primarily on the facility description of the Transnuclear-EPRI DTS…" However, it is EPA's understanding that the proposed Transnuclear-EPRI DTS did not have the capability of fuel inspection and remediation. Fuel inspection and remediation capabilities are critical for the assumed DTS. To support this assumption, the GEIS references pages 17 and 24 of the Carlsen (2012) report. Page 17 states that "…The two primary DTS functions are to retrieve fuel for inspection and to transfer fuels into another package…" Page 24 states "…repackaging and remediation capability should be integrated into the design of future facilities."

In addition, the draft GEIS provides a theoretical description of a conceptual DTS but not for an operating DTS. These conceptual descriptions do not include information on how fuel inspections will be performed or the potential impacts. Fuel inspections would likely require cutting canisters open and repackaging the fuel in new canisters. In addition, it is our understanding that neither the license to Private Fuel Storage LLC (PFS) or to DOE for the Proposed Idaho Spent Fuel Facility included authorization to cut canisters open and inspect fuel for degradation and damages. It is also our understanding that although PFS submitted a request to the NRC to terminate its ISFSI license, DOE's facility was not licensed to handle commercial fuel that is used in commercial reactors.

Recommendation:

> Provide information on how fuel inspections and remediation will be implemented at the assumed DTS facility in Section 2.1.4. Include potential radiological consequences of these operations. In addition, provide information on the potential public health and environmental impacts of the proposed fuel inspection, repackaging, and remediation at the DTS.

The draft GEIS relies on the fuel inspection performed during repackaging. While it may be inferred that inspections will take place within the DTS ("without the need to return the spent fuel to a pool"), this is not stated directly and the details on fuel inspections are not provided. In addition, information is not provided on the remediation actions if the fuel fails the inspection.

Recommendation:

> Provide information on the fuel inspections during repackaging. Specifically, clarify whether the inspection will be performed in the pool under water or in inert atmosphere, or in air. Also provide information on remediation actions if the fuel fails the inspection.

Where fuel inspections will need to be performed at a DTS either underwater or in an inert atmosphere, provide a discussion on the practicality and current regulations that would support licensing, construction, and operation of such an additional pool facility at DTSs. If fuel inspections will be performed in air, provide a discussion on potential fuel oxidation during inspections.

Design Basis Events in Dry Cask Storage Systems

The draft GEIS assumes that during repackaging, hundreds of thousands of assemblies will have to be transferred one-by-one across all DTS facilities. The draft GEIS also uses a "stuck assembly" accident as bounding for the accident scenario analyses. However, a "stuck assembly" accident does not include rupture of the cladding and release of radioactive material, while a cask/assembly drop scenario would be likely to include a release. It is not clear why the "stuck assembly" accident is used for bounding the accident scenario analyses when the consequences of a cask/assembly drop would be more severe than those of a "stuck assembly" accident.

The draft GEIS also states that since the postulated fuel assembly or cask drop is among the design basis accidents analyzed by licensees, the environmental consequences associated with these accidents during continued storage would be small. It is our understanding, however, that existing facilities are not currently licensed for extended fuel storage, and they are not licensed to perform fuel inspections and repackaging involving multiple assembly transfers.

The number of projected assembly transfers during ISFSI/DTS operations is not provided in the draft GEIS, although we expect the number of such transfers will likely be significant. With a large number of transfers, even low frequency events may have a non-negligible, non-speculative likelihood of occurring during the lifetime of all of the assumed DTS facilities. The draft GEIS does not provide information provided on the number, frequency and consequences of assembly drops anticipated during ISFSI/DTS operations for all three timeframes.

Recommendation:

Provide the following information in the final GEIS in Section 4.18.1.2:

(i) total number and annual frequency of assembly drops across the industry,

(ii) projected frequency of assembly drops during transfers of assemblies in the course of loading, repackaging, inspection, and other pertinent ISFSI/DTS operations for all three timeframes,

(iii) whether cask/assembly drops could occur at least once in the lifetime of any of the assumed DTS facilities, and

(iv) projected consequences of these cask/assembly drops during transfer operations.

Assume high burnup fuel and degraded cladding for all three scenarios, and provide information on why the consequences of "stuck assembly" accidents are considered more severe than consequences of the cask/assembly drops during transfer operations.

Regulation Requirements

The draft GEIS states that the analyses are based on current technology and regulations, and assume that a DTS will be licensed, constructed, operated, and completely replaced on a 100-year cycle. However, it is not clear which current regulations address the DTS's licensing, construction, operation, and 100-year cycle replacement. The stated capacity of the assumed DTS (to handle assembly transfers at an ISFSI licensed to store 40,000 MTU) is large, yet the draft GEIS does not discuss the practicality and feasibility of licensing, constructing, operating, and periodic replacements of a DTS at this scale.

Recommendation:

Provide information on the current regulations that address the construction, operation, and periodic replacement of DTSs with a stated capacity to serve an ISFSI storing up to 40,000 MTU and fuel inspection, remediation, and repackaging capabilities.

Provide a discussion of the practicality and feasibility of constructing, operating, and periodically replacing DTSs at existing and future ISFSIs.

Natural Phenomena Hazard Events

The draft GEIS does not discuss the potential for an increased likelihood of the occurrence of natural phenomena hazard events, such as seismic events, given extended storage time frames. We also note that because the fuel, cladding and assembly hardware are not designed for storage beyond 100 years after irradiation, the potential degradation of the hardware may exacerbate the impact of natural phenomena hazard events.

Recommendation:

Provide information on the potential for an increased likelihood of the occurrence of natural phenomena hazard events over extended time frames, as well as the potential

degradation of the hardware and how that may exacerbate the impacts of natural phenomena hazard events.

Aging Management Program

The draft GEIS indicates that an aging management program is required by the NRC, however, no specifics are provided.

Recommendation:

Provide information on facility/storage aging management program on specifically how:

(i) the integrity of dry storage system components will be monitored during a 100-year storage time frame, and

(ii) the potential emissions specific to dry storage systems will be monitored during the 100-year storage time frame.

Aquatic Resources - Groundwater and Surface Water

The description of potential impacts to groundwater does not consider potential leaks from spent fuel storage pools that could develop after reactors shutdown.

Recommendation:

Provide an analysis of potential leaks at spent fuel pools and potential impacts to ground and surface water sources.

Clean Water Act National Pollutant Discharge Elimination System (NPDES)

Page 3-16, line 33 - Insert the following sentence after the sentence ending in "water quality-based limits."

"The technology-based limits applicable to nuclear power generating plants are cited at 40 CFR Part 423."

Page 3-16, line 34 - Insert the following parenthetical phrase after the "not to exceed 5 years":

"(unless administratively continued)"

Page 3-17, line 8 - Add the following sentence:

"The intake of cooling water from waters of the US is regulated under Clean Water Act Section 316(b), and the thermal component of any effluent discharges from power

generating plants may be regulated by either the applicable state water quality standard or by Clean Water Act Section 316(a)."

References

Billone, M.C. , T.A. Burtseva, and R.E. Einziger, "Ductile-to-Brittle Transition Temperature for High-Burnup Cladding Alloys Exposed to Simulated Drying-Storage Conditions," in the Journal of Nuclear Materials Volume 433, Issues 1–3, pages 431–448, February 2013. http://www.sciencedirect.com/science/article/pii/S0022311512005181.

Carlsen, Brett W. and Michaele BradyRaap. Dry Transfer Systems for Used Nuclear Fuel. INL/EXT-12-26218. 2012. http://www.inl.gov/technicalpublications/Documents/5516346.pdf.

NRC ISG -24 (2013) Division of Spent Fuel Storage and Transportation Interim Staff Guidance-24, Revision 0 Issue: The Use of a Demonstration Program as Confirmation of Integrity for Continued Storage of High Burnup Fuel Beyond 20 Years http://pbadupws.nrc.gov/docs/ML1305/ML13056A516.pdf

NRC, 2000. ASSESSMENT REPORT (NRC, 2000) Docket 72-1024 U. S. DEPARTMENT OF ENERGY DRY TRANSFER SYSTEM http://curie.ornl.gov/system/files/documents/38/NRC%20Assessment%20report%20with%20letter.pdf.

SUMMARY OF EPA RATING SYSTEM

Rating the Environmental Impact of the Action

- **LO (Lack of Objections)** The review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposed action.
- **EC (Environmental Concerns)** The review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact.
- **EO (Environmental Objections)** The review has identified significant environmental impacts that should be avoided in order to adequately protect the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). The basis for environmental objections can include situations:

1. *Where an action might violate or be inconsistent with achievement or maintenance of a national environmental standard;*
2. *Where the Federal agency violates its own substantive environmental requirements that relate to EPA's areas of jurisdiction or expertise;*
3. *Where there is a violation of an EPA policy declaration;*
4. *Where there are no applicable standards or where applicable standards will not be violated but there is potential for significant environmental degradation that could be corrected by project modification or other feasible alternatives; or*
5. *Where proceeding with the proposed action would set a precedent for future actions that collectively could result in significant environmental impacts.*

- **EU (Environmentally Unsatisfactory)** The review has identified adverse environmental impacts that are of sufficient magnitude that EPA believes the proposed action must not proceed as proposed. The basis for an environmentally unsatisfactory determination consists of identification of environmentally objectionable impacts as defined above and one or more of the following conditions:

1. *The potential violation of or inconsistency with a national environmental standard is substantive and/or will occur on a long-term basis;*
2. *There are no applicable standards but the severity, duration, or geographical scope of the impacts associated with the proposed action warrant special attention; or*
3. *The potential environmental impacts resulting from the proposed action are of national importance because of the threat to national environmental resources or to environmental policies.*

Adequacy of the Impact Statement

- **Category 1 (Adequate)** The draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.
- **Category 2 (Insufficient Information)** The draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the proposal. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3 (Inadequate) The draft EIS does not adequately assess the potentially significant environmental impacts of the proposal, or the reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. The identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. This rating indicates EPA's belief that the draft EIS does not meet the purposes of NEPA and/or the Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS.