MOX Integrated Safety Analysis RAI
Nuclear Criticality Safety

The following request for additional information (RAIs) relate to the Integrated Safety Analysis (ISA) Summary and supporting review of the Mixed Oxide Fuel Fabrication Facility and follow-up to the RAIs that were previously issued on the criticality aspects of the License Application (LA).

General

NCS-61

In your response to RAI NCS-23, you revised LA Section 6.4.4. to state that sensitivity studies will be performed to demonstrate sub-criticality under all credible conditions. As part of these "tolerances on controlled parameters are conservatively taken into account in establishing operating limits and controls." During several of the in-office reviews, reference was made to an Operating Limits Manual as well as a Safety Limits Manual. Revise the application to explain when and how these will be developed, in sufficient detail to provide assurance that there will be "margins to protect against uncertainties in process variables and against limits being accidentally exceeded" (License Application Sections 6.4.4.1-6.4.4.12).

10 CFR 70.61(d) states: "the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical." NUREG-1718, Section 6.4.3.3.4(D), states: "The applicant commits to determining operation limits for controlled parameters, such that there is an adequate margin of safety to ensure the subcritical limit will not be exceeded. The applicant should commit to performing studies of the sensitivity of k_{eff} to variations in the parameters. The margin of safety should be based on these sensitivity studies and the ability of the control to maintain the operating limits." This information is needed to ensure that processes are adequately subcritical.

NCS-62

During previous in-office reviews, staff identified that, in several cases, it appears that MOX Services has set operating limits equal to your safety limits (subcritical limits) in the Nuclear Criticality Safety Evaluations (NCSE), since the safety limits were also termed "permissible limits." Revise the application to show how these "permissible limits" would be used in operations, since margin required to prevent exceeding the safety limits has not been described in the NCSEs. Provide definitions and/or a diagram of the following terms: "safety limit," "analytic limit," "permissible limit," "trip setpoint," and "operating limit," and explain how they are related.

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NCS-63

In your response to RAI NCS-29, it was indicated that Department of Energy will be required to provide doubly contingent controls on isotopic and moisture content, and singly contingent controls on other criticality-significant material characteristics. It was also stated that "the details will be governed by an Interface Control Document (ICD) and controlled by QA requirements. However, these details are not firmly established yet." Staff noted that ICD-02-001-02, Rev. 1, "Plutonium Dioxide Powder Interface Control Document," does not contain an explicit requirement to provide doubly contingent controls on isotopic or moisture content. Explain how these requirements will be incorporated into ICDs or other appropriate documents to ensure compliance with double contingency.

10 CFR 70.61(d) states: "the risk of nuclear criticality accidents must be limited by assuring that under normal and credible abnormal conditions, all nuclear processes are subcritical." NUREG-1718, Section 6.4.3.3.2.4(B), states: "When physical measurement of isotopics is needed, the measurement is obtained by using instrumentation subject to facility quality assurance measures as specified in 10 CFR 70.22(f)." How control will be exercised over measurements of isotopic and moisture content without confirmatory measurement at the MFFF is not apparent. This information is needed to ensure that processes are adequately subcritical.

NCS-64 through NCC-96

Withheld based on Official Use Only – Security Related Information.

Staff reviewed the responses dated August 22, 2008, and determined that most of them were adequate. Those RAIs requiring further discussion are listed below:

NCS-1 The response notes that the requirement for who has authority to make commitments to the NRC is found in a procedure and not the LA. The LA should be revised to ensure the commitment is made.

NCS-7 The response states that a paragraph in Section 6.3 of the LA will be revised to include "immediately implementing compensatory measures" and clarifying that "compensatory measures will be approved by the nuclear criticality function." However, the response states there is "no change to the LA in response to this RAI." The paragraph in Section 6.3 was not revised with any of the aforementioned changes. The section should be revised.

NCS-10 Explain why the information describing the external review (i.e., review by the interdiscipline reviewer, design verifier, and responsible manager) of NCSEs was removed from License Application Section 6.4.1. This information is contained in the RAI response, but was removed from the application.

NCS-29 Justify why your response states that there is no limit on the uranium content of PDCF material, and why there is no limit on density of AFS material. Explain the reason for different limits for these two types of feed material) which physically both consist of PuO_2 powder).

Explain why Section 2.4 of your response states “For AFS material, redundant samples analyzed in the MFFF laboratory are used to ensure that the density is less than 7 g/cc” while Section 2.1 states that the density of AFS powder is not limited.

Sections 2.0, 2.2, and 2.4, discuss impurities in the discussion on uranium content. Explain the similarities and differences in methods used to determine impurity levels and uranium content.

NCS-46 Provide examples of types of conditions that would constitute process variable control. Explanatory text was removed from Section 6.4.4.13 because the MFFF does not currently use process variable control. However, the section still states that it may be used in “those situations when process variables are monitored and can affect one of the other twelve parameters.” Given that its future use is allowed, there needs to be an explanation of what this would constitute and what conditions would be met for it to be acceptable or remove the allowance to use process variable control.

NCS-49 Explain why not all of the validation criteria from Section 6.4.3.3.1 of NUREG-1718 have been included in License Application Section 6.4.5.3. Specifically, explain why the validation report is not required to describe the hardware and software used.

NCS-54 The exception for Section 4.3.6 of ANSI/ANS-8.1-1998 is not explicitly stated in the response or in the LA page changes. Other expectations for other ANSI standards are explicitly stated. Explain why this one was not.

NCS-55 Regarding the exception to 10 CFR 70.24 in the last paragraph of the response, it is stated that a statement has been added to Section 6.3 of the LA for clarity, but it is not apparent what this statement is that was added.