

## MFFFNPEm Resource

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**From:** David Tiktinsky  
**Sent:** Wednesday, February 18, 2009 7:58 AM  
**To:** Gwyn, Dealis W.  
**Cc:** MFFFHearingFile Resource  
**Subject:** FW: Emergency Plan RAIs  
**Attachments:** 12-18-08 Emergency Plan Evaluation RAIs v6.doc

fyi

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**From:** Kevin Morrissey  
**Sent:** Tuesday, February 17, 2009 9:39 AM  
**To:** David Tiktinsky  
**Subject:** FW: Emergency Plan RAIs

[use these instead of the previous file](#)

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**From:** Matthew Bartlett  
**Sent:** Tuesday, February 17, 2009 9:37 AM  
**To:** Kevin Morrissey  
**Subject:** RE: Emergency Plan RAIs

Kevin,

My revised draft RAIs with red-line strike out are attached. I don't know if I ever sent you a copy. They are significantly different than the original draft.

Sincerely,

Matt Bartlett  
Project Manager  
U.S. Nuclear Regulatory Commission  
NMSS/FCSS/FMB  
(301)-492-3119

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**From:** Kevin Morrissey  
**Sent:** Tuesday, February 17, 2009 9:35 AM  
**To:** David Tiktinsky  
**Cc:** Margie Kotzalas; Matthew Bartlett  
**Subject:** Emergency Plan RAIs

Attached are draft EP RAIs for discussion with MOX.

**Hearing Identifier:** MixedOxideFuelFabricationFacility\_NonPublic  
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**From:** David Tiktinsky

**Created By:** David.Tiktinsky@nrc.gov

**Recipients:**

"MFFFHearingFile Resource" <MFFFHearingFile.Resource@nrc.gov>  
Tracking Status: None  
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Tracking Status: None

**Post Office:** HQCLSTR02.nrc.gov

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## Emergency Plan Evaluation

The licensee seeks to comply with 10 CFR 70.22(i) by providing an evaluation which demonstrates compliance with the dose and chemical exposure limits to a member of the public offsite, rather than submitting an emergency plan (EP). In order to achieve this regulatory hurdle, the licensee must demonstrate, 1) the release of radioactive materials and direct exposure can not result in a dose of 1 rem to a member of the public, and 2) the release can not result in the intake of 2 milligrams of soluble uranium.

### RAI #1

The submittal evaluates two scenarios, 1) the release of soluble uranium from large storage drums in the Secured Warehouse Building, and 2) the release and exposure due to a criticality event. Both of these scenarios have unmitigated high consequence events in the Integrated Safety Analysis summary (ISAS) with IROFS applied to ~~ensure the events~~ comply with the Part 70.61 performance requirements. The licensee's conclusion that these two evaluated scenarios are bounding, ~~appears inappropriate~~ is not supported since sections 5.3.1 through 5.3.11 of the ISAS identify a significant number of additional, credible, independent events which could result in a release of radioactive materials. ~~\_with unmitigated intermediate and high consequences.~~

The regulatory threshold for emergency evaluation is located in 10 CFR 70.22(i)1i which states, "An evaluation showing that the maximum dose to a member of the public offsite due to a release of radioactive materials would not exceed 1 rem effective dose equivalent or an intake of 2 milligrams of soluble uranium." This requirement must be demonstrated for each accident type identified in the ISAS. ~~In addition,~~ NUREG-1718, section 14.4.3.1.2 states, "The applicant's evaluation describes each type of accident identified by the Integrated Safety Analysis (ISA) Summary that has the maximum offsite consequences exceeding the limit of 10 CFR 70.22(i)1i." ~~Section 5.4.3.2(B)x (page 5.0-31) indicates that, "types of accidents differ if they consist of a different set of failures of IROFS."~~

The second paragraph of the evaluation lists nine separate accident types including: "Loss of Confinement, Fire, Load Handling, Explosion, Criticality, Natural Phenomena, External Man Made Events, External Radiation Exposure, and Chemical Release." Accident sequences within these types must be evaluated to determine whether the 70.22(i)1i threshold has been met. Consistent with 70.22(i)1i and NUREG-1718, section 14.4.3.1.2, demonstrate that all the analyzed accidents meet the emergency evaluation thresholds in 70.22(i)1i, including independent accident sequences listed in the ISAS. Justify that the two scenarios addressed in the emergency evaluation are bounding on all credible accidents. If unable to make the justification, demonstrate the accidents will not exceed the regulatory thresholds for an emergency plan. ~~beyond the phrase "bounding," that the two events in the EP evaluation bound all credible events listed in the ISAS involving the release of radioactive material. In response to this RAI, describe the criteria being used to determine that only two events from the ISAS meet the NUREG-1718, section 14.4.3.1.2 phrase "each type of accident identified by the ISA Summary." Also, discuss why the two events in the EP evaluation, which are determined to be highly unlikely, require an EP evaluation, yet all the other credible events involving releases of radioactive material do not require an EP evaluation. Clarify why two accident sequences with ISA properties of unmitigated high consequence to member of the IOC were evaluated and multiple similar accident sequences with similar ISA properties were not evaluated.~~

~~At a minimum, consistent with NUREG 1748 section 14.4.3.1.4(A) which states, "Type of accident (e.g., fire, exposure, chemical release, nuclear criticality)," provide an evaluation for~~

~~each type of bounding accident identified in the ISAS including: Loss of confinement, Fire, Load handling, Explosion, Criticality, Natural phenomenon, External man-made event, External radiation exposure, and Chemical release.~~

~~(Note to PM: NUREG-1718 indicates the licensee should evaluate “each type of accident identified by the ISAS.” According to NUREG-1718 section 5.4.3.2 (page 5.0-31), they should address credible events with accident types defined as having a different set of failures of IROFS. However, this level of evaluation is probably an unrealistic hurdle to meet for large facilities (which may be the intent). It would be more difficult than developing an emergency plan. On the other hand, the evaluation of just two accidents from the ISAS appears over simplistic and too high level. At a minimum, the EP evaluation should consider the main accident types identified by the licensee in the ISAS including: Loss of confinement, Fire, Load handling, Explosion, Criticality, Natural phenomenon, External man-made event, External radiation exposure, and Chemical release. This would at least be consistent with NUREG-1748 section 14.4.3.1.4(A) which states, “Type of accident (e.g., fire, exposure, chemical release, nuclear criticality).”)~~

#### **RAI #2**

~~NUREG-1718 section 14.4.3.1.1 – 14.4.3.1.4 provides summarize the minimum set of information needed for a complete 70.22(i)1i evaluation. Significant pThe “detection of accidents information” defined in NUREG-1718 section 14.4.3.1.3 appears to be missing from the evaluation. ortions of this information have not been provided for the accidents identified in the current submittal.~~

~~Consistent with 10 CFR 70.22(i)1i and NUREG-1718 section 14.4.3.1.1 – 14.4.3.1.4, for each accident type, provide the detection of accidents information including: means of detecting the accident; means of detecting any release of radioactive or other hazardous material; means of alerting the operating staff; and anticipated response of the operating staff. This information may be used in conjunction with 70.22(i)2vi as supporting information for the evaluation. the complete information necessary to evaluate each accident scenario with the potential to exceed the 70.22(i)1i limits.~~

#### **RAI #3**

~~10 CFR 70.22(i)2 provides a list of methods the licensee may use to support the evaluation. The licensee applies three of these options (70.22(i)2i, 70.22(i)2iv, and 70.22(i)2vi) in a general statement without specifying how they apply to materials stored on site, the solubility of those materials, or any particular procedures. The first two do not automatically eliminate credible events identified in the ISAS, since unmitigated events based on the materials~~

~~70.22(i)2 states, “One or more of the following factors may be used to support an evaluation submitted under paragraph (i)(1)(i) of this section.” In addition NUREG-1718, section 14.4.3.1.4 states, “The applicant should demonstrate why the factors used in the evaluation are appropriate when compared with the factors in NUREG-1140.”~~

~~Consistent with the 10 CFR 70.22(i) and NUREG-1718, section 14.4.3.1.4, describe how the 70.22(i)2i, 70.22(i)2iv, and 70.22(i)2vi support the evaluation for credible events identified in the ISAS involving the release of radioactive material. State how the amount of material and solubility support the evaluation, particularly in light of the ISAS which indicates sufficient material and their/or solubilities have are present to result in high or intermediate consequence events. Clarify whether 70.22(i)2vi applies to IROFS or some other procedures and describe~~

how it is being applied. If 70.22(i)2vi does apply to IROFS, demonstrate that events which require IROFS to meet part 70.61 (less than 5 rem) also comply with the more stringent requirements in 70.22(i)1i (less than 1 rem and less than 2 milligram soluble uranium). Note that events which meet the performance requirements in the ISAS do not necessarily must also be shown to comply with the 70.22(i)1i thresholds.

#### **RAI #4**

Section 5.1 of the ISAS states in the first paragraph that, “Events with unmitigated consequences satisfying the low dose limits established by 10 CFR §70.61 (i.e., less than “intermediate”) ... are dispositioned and not analyzed further.” These unmitigated, low consequence events do not appear to have been addressed in the EP evaluation. Although the ISAS Table 5.3.2-2 indicates the doses for these events are below 1 rem to the IOC, they are not addressed in the EP evaluation. Also there is no corresponding chemical evaluation for soluble uranium for these events.

Consideration of low consequence events from the ISAS in the EP evaluation is consistent with 70.22(i)1i, NUREG-14.4.3.1.2, and Interim Staff Guidance (FCSS-ISG-02) which provides the following direction. “However, the concerns with respect to low consequence accidents should not be ignored.”

Consistent with 70.22(i), clarify that unmitigated, low consequence events identified in the ISAS (section 5.3.2) have been evaluated to meet the thresholds listed in 70.22(i)1i. Justify that the doses identified in the ISAS Table 5.3.2-2 are accurate and bounding and address the 2 milligram soluble uranium limit.

#### **RAI #5**

The evaluation references the ISAS and the LA in order to incorporate a general description of the facility. However, the ISAS is proprietary and withheld from public disclosure.

10CFR Part 70.22(i)(1) requires (1) an evaluation showing limited exposure to a member of the public offsite, or (2) an emergency plan. Chapter 14 of NUREG-1718, Section 14.4.3.1.1, subsections A, B, and C provides guidance on the content of Facility Description information to include in an evaluation.

Consistent with the requirements in 10 CFR 70.22(i)1 and the criteria listed in NUREG-1718, section 14.4.3.1.1, provide a brief Facility Description section, so that the evaluation is a stand-alone public document, rather than referring to the Integrated Safety Analysis Summary for the site description. The section should include:

- a. Drawing of the site showing Controlled Area Boundary, MOX Stack, BSW, and location of IOC
- b. Stack heights, typical stack flow rates, and the efficiencies of emission control devices
- c. A general description of the proposed licensed, major activities.
- d. Etc.

#### **RAI #6**

The fourth paragraph of the introduction section of the EP evaluation (page 3) contains the following statement, “It is based on exposure to the Individual Outside the Controlled Area Boundary (IOC), which is a more conservative assumption than the dose to ‘a member of the public offsite’.” This reference to an Individual Outside the Controlled Area Boundary is not well defined.

10 CFR 70.22(i)1i states that the evaluation must consider the maximum dose to a member of the public offsite. In addition, NUREG-1718 section 14.4.3.1.2(B) indicates the evaluation must address possible onsite and offsite consequences for accidents identified by the ISAS.

Consistent with 10 CFR 20.1003 and 20.1301, clarify whether individuals in the IOC are members of the public as defined in Part 20. If members of the IOC are not members of the public, clarify whether they will be considered occupational workers subject to the license. Consistent with 10 CFR 70.22(i)1i and NUREG-1718 section 14.4.3.1.2(B), demonstrate that doses to a members of the IOC ~~is~~ are bounding. If member of the IOC are not members of the public, provide an estimate of the distance to the nearest member of the public. Also, provide a basic description of the exposure reduction (e.g. a reduction factor) due to the increased distance.

#### **RAI #7**

For each accident identified in the evaluation, ~~IROFS have been established to mitigate the consequences~~ certain quantities of material are used as the basis of the calculation, 34 55-gallon drums of urinal nitrate, 66.3 kg Pu, etc. However, no corresponding management measures have been established.

10 CFR ~~70.22(i)2vi~~ 70.62(d) requires each applicant shall establish management measures to ensure compliance with the performance requirements of Part 70.61. allows the licensee to apply restrictions and procedures to prevent a release that exceeds the 70.22(i) threshold for a emergency evaluation.

Consistent with 70.22(i)2vi, D describe the ~~management measures~~ restrictions or procedures that will be in place to ensure assumptions made in the accident analysis remain valid during the lifetime of the facility (e.g. tank inventory of 66.3 kg Pu for criticality event, ~~34~~ 34 drums of uranyl nitrate for chemistry event, etc.).

#### **RAI #8**

Fix the following typographical errors in the plan.

On page 11, the 5 factor formula is missing the respirable fraction (RF) factor.

Identify the LPF as 1 for noble gases.

The sub-section headings for section 2 in the Table of Contents do not match the sub-section headings in the body of the submittal.

The acronym SW in table 3 of the evaluation has not been defined. In addition the SW TEDE in table 3 is 2.11rem which exceeds the 20.22(i)1i limit of 1rem. Consistent with 70.9 and 20.22(i)1i, provide the definition of SW and SW TEDE. Clarify how the 2.11rem relates to the 20.22(i)1i limit of 1rem. In addition, provide a basis for the 2.83 kg/hr – Uranium Release Rate listed for the Chemical Consequence Analysis Results in section 3.1.5.

#### **RAI #9**

Part 70 contains two separate requirements for emergency commitments, 10 CFR 70.22(i) and 10 CFR 70.64(a)6. 10 CFR Part 70.64(a)(6) requires the applicants to provide an emergency capability to maintain control of: licensed material and chemical products, evacuation of personnel, and onsite emergency facilities that support the use of available offsite services. In addition, as indicated in NUREG-1718, section 14.1, ~~also show~~ describe how the emergency management facilities will coexist and interact with the US Department of Energy's emergency planning requirements.

Consistent with 70.64(a)6 and NUREG-1718, section 14.1, ~~provide a demonstrate compliance with the emergency capability requirements in 70.64(a)6. Provide a description of how the emergency management facilities and procedures comply with NRC regulations and discuss the relationship and coordination with the US Department of Energy's emergency planning requirements for commitment in the license application that the MFFF Emergency Plan will be an annex to the Savannah River Site emergency plan and reference the commitment in the evaluation.~~

**RAI #10**

Provide a "standard" criticality scenario assuming pulses of  $10^{19}$  fissions every hour in addition to the "boiling" criticality scenario that assumes constant pulsing.