INL USQ PROCESS
POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
(DO NOT USE FOR PROPOSED CHANGES)

Facility or Activity: NMIS

USQ Process No.: RTC-USQ-2006-517

Subject: Uranium Powder Hazard

Describe the New Information/Discovery:
A recent project for the permanent removal of non-ATR fuel from NMIS is ongoing. It has prompted a review of the inventory of powdered material that is stored in the NMIS to determine if it was within the safety basis to repackage and permanently remove the material from the facility. The quantity of material in some of the individual packages was large enough to question the validity of the hazard evaluation of powders in the SAR.

Identify the applicable safety basis document(s) (e. g., DSA, SAR, BIO, TSRs, etc.):
SAR-154, "Safety Analysis Report for the Nuclear Materials Inspection and Storage Facility"
TSR-154, "Nuclear Material Inspection and Storage Facility (NMIS) TRA-621"

I. PISA ASSESSMENT

a. Is there a potential inadequacy in the analytical methodology and/or tools used in the safety basis?
☐ Yes ☒ No

b. Is there a potential discrepancy between the safety basis assumptions, provisions, or conditions, in the accident analysis and the facility operation or parameters?
☒ Yes ☐ No

c. Is the actual physical condition of the facility different than as described in the safety basis (discrepant as-found condition)?
☐ Yes ☒ No

d. Has an actual or postulated operational event or incident revealed a potential inadequacy in the safety basis?
☐ Yes ☒ No

e. Is this an activity or condition not analyzed in the existing safety basis?
☐ Yes ☒ No

Provide an explanation of the assessment result:

(a) No, the methodology prescribed for hazard evaluation is discussed in DOE standards and company guide [NS 18104] and includes using a qualitative evaluation. In this SAR, a qualitative analysis was completed as allowed and is discussed in sections 3.3.2.3.6 and 3.3.2.3.8.

(b) Yes, the assumptions used to complete the qualitative hazard analysis seemed to be based on several premises that may not be valid. First although there is claim that some of the fuel is in powdered form [section 3.3.2.1.2] there is no quantitative assessment of the facility powder inventory in section 3.3.2.1 as listed on Table 3-7 of the SAR. The assumption inferred is that the other fuel types will be enveloping in the hazard evaluation. Section 3.3.2.3.4 states that "...radiotoxic properties of uranium were considered to be enveloping due to the high enrichment of the uranium, and thus the chemical toxicity of uranium was not analyzed." This seems to be based on the assumption that none of the packages contain more than 300 grams of uranium [ID-LITC-TRA-1999-0010] as well as being highly enriched. The current inventory does not support these inferences. Based on the recent available inventory masses of the powder packages range from 22 to 3355 grams of total uranium and enrichment varies from 1.8% to 23.7%.

(c) No, there is no difference in the physical condition of the facility from that described in the safety basis.

(d) No, event directly precipitated an inadequacy in the safety basis.

(e) No, the hazard of storing and handling of powders has been analyzed in the safety basis albeit qualitatively.

C Satterwhite	CSatterwhite	7/24/2006
USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
B Clements	B. P. Clements	7/24/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

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If the answer to ALL of the assessment questions above is No, file the completed form. Do not complete Section II, III, or IV.
If the answer to any one of the assessment questions is Yes, there is a potentially inadequate safety analysis (PISA):

- Nuclear Facility Manager document actions (Section **II**), including interim operating restrictions, taken to place or maintain the facility in a safe condition.
- Nuclear Facility Manager execute reporting process per MCP-190 or AWP-3.1, for PISA.
- USQ evaluator proceed to Section **III**.

II. DOCUMENT ACTIONS TAKEN TO PLACE OR MAINTAIN FACILITY IN A SAFE CONDITION AND PROVIDE THE BASIS FOR THE SELECTION OF ANY INTERIM CONTROLS

No immediate action was necessary since all powders are in approved storage and thus the facility is already in a safe condition. To maintain the facility in a safe condition it is necessary prohibit the removal of all powders from approved storage unless the following conditions are met. The selection of interim controls includes:

Uranium powders are prohibited in the clean room.

Uranium powders may not be taken from approved storage without procedures which implement the appropriate level of approved controls and the emergency management plan containing the appropriate Emergency Response Planning Guidelines [ERPGs] for the facility. This does not preclude removing unopened drums from the facility.

C Satterwhite	C Satterwhite	7/24/2006
Safety Analyst Print/Type Name	Safety Analyst Signature	Date
B Clements	B. F. Clements	7/24/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

Is independent technical review required? Yes ☐ No ☒

Nuclear Facility Manager Signature or Initials

Independent Reviewer Print/Type Name	Independent Reviewer Signature	Date

III. DETERMINATION

Identify applicable section(s) of the safety basis document(s) (e.g., DSA, SAR, BIO, TSRs, etc.).
SAR-154 sections 3.3.2.1.2, 3.3.2.3.4, 3.3.2.3.6 and 3.3.2.3.8.
SAR-154 Chapter 6A
TSR 5.154.1
ID-LITC-TRA-1999-0010, " Review of Nuclear Material Inspection and Storage (NMIS) Facility SAR Results in Positive USQ Concerning Uranium Powder Handling"

IIIa: POTENTIAL FOR AN INCREASE IN PROBABILITY OR CONSEQUENCE OF AN ACCIDENT OR MALFUNCTION EVALUATED IN THE SAFETY BASIS

1. Could the PISA increase probability of occurrence of an accident previously evaluated in the safety basis?
Yes ☐ No ☒

Explain:

The probability of an accident is within the bounds of the previously evaluated accidents. Therefore there is no impact on the occurrence of a drop accident postulated in a facility DSA so the probability of occurrence of accidents is not changed.

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2. Could the PISA increase the consequences of an accident previously evaluated in the safety basis?
Yes ☒ No ☐
Explain:
The consequences resulting from the qualitative evaluation in the SAR for powder handling accidents is "low". A reevaluation of consequenses using the methodology of comparing a calculated room airborn concentration against the ERPG limits results in a consequence of "high". Thus there is impact on the consequence of the drop accident postulated in a facility DSA.

3. Could the PISA increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the safety basis? Yes ☐ No ☒
Explain:
The proposed changes do not impact any equipment important to safety.

4. Could the PISA increase the consequences of a malfunction of equipment important to safety previously evaluated in the safety basis? Yes ☐ No ☒
Explain:
The proposed changes do not impact any equipment important to safety.

IIIb: POTENTIAL FOR CREATION OF AN UNANALYZED ACCIDENT OR MALFUNCTION OF A DIFFERENT TYPE

5. Could the PISA create the possibility of an accident of a different type than previously evaluated in the safety basis? Yes ☐ No ☒
Explain:
The methodology for the development of accident scenarios in the facility safety bases is not impacted by the new information. Therefore, the possibility of an accident is not changed.

6. Could the PISA create the possibility of a malfunction of equipment important to safety of a different type than previously evaluated in the safety basis? Yes ☐ No ☒
Explain:
The proposed changes do not impact any equipment important to safety.

IIIc: POTENTIAL FOR REDUCTION IN A MARGIN OF SAFETY

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7. Could the PISA reduce a margin of safety as defined in the safety basis? Yes ☒ No ☐

Explain:

The evaluations completed in the facilty safety basis to support the derivation of safety controls for powder handling are impacted. Therefore, the margin of safety is effected.

IIId: USQ DETERMINATION CONCLUSION

8. Based on the responses to questions 1 – 7 above, does the PISA constitute an Unreviewed Safety Question?
Yes ☒ No ☐

Explain:

This does constitute an unreviewed safety question since the consequences of the drop accident are changed.

NOTE: If USQ determination result is positive, additional notification for ORPS is required per MCP-190 or AWP-3.1.

IV. APPROVAL/CONCURRENCE SIGNATURES

APPROVAL:

C Satterwhite	C Satterwhite	7/24/2006
USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
B Clements	B. P. Clements	7/24/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

CONCURRENCE:

A Hoskins	Alan G Hoskins	7-24-06
Independent Review Committee Chair Print/Type Name	Independent Review Committee Chair Signature	Date