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U.S. Nuclear Regulatory Commission
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23 September 2004
DCS-NRC-000174

Subject: Docket Number 070-03098
Duke Cogema Stone & Webster
Mixed Oxide (MOX) Fuel Fabrication Facility
Response to Request for Additional Information

Reference: 1) Dave Brown (NRC) to Peter Hastings (DCS), *Request for Additional Information – Mixed Oxide Fuel Fabrication Facility Revised Construction Authorization Request*, 8 September 2004

This letter provides the Duke Cogema Stone & Webster (DCS), LLC response to the NRC's request for additional information (RAI, Reference 1) concerning the Mixed Oxide (MOX) Fuel Fabrication Facility Construction Authorization Request (CAR). For each question in the RAI, a response and action is provided; the *actions* refer to changes to the CAR necessitated by the response to the question. DCS is not revising the CAR at this time but expects to revise it later this year to incorporate these changes and others as a result of closure of the NRC's Draft Safety Evaluation Report Open Items.

If I can provide any additional information, please feel free to contact me at (980) 373-3787.

Sincerely,

Richard L. Sweigart
Vice President, Regulatory Affairs

RLS/KLA/gdh

Enclosure: 1) DCS Responses to NRC Request for Additional Information

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Enclosure 1
Response to NRC Request for Additional Information

Chapter 5, ISA

(1) Sections 5.5.2.1.6.4 (p. 5.5-7) and 5.5.2.3.6.1 (p. 5.5-24).

Request: Identify the correct bounding radiological consequence event and update Section 5, as appropriate.

In Section 5.5.2.1.6.4, "Leaks of AP process Vessels or Pipes within Process Cells," the bounding consequence event was changed from a leak inside the process cell containing the dissolution tanks to a leak in the process cell containing the Liquid Waste Reception Unit. In Section 5.5.2.3.6.1, the bounding radiological consequences were still identified as from the dissolution tanks. Section 70.22(f) requires applicants to submit a description and safety assessment of the design bases of principal structure, systems and components (PSSCs). Section 70.65(b) further requires information that demonstrates compliance with the performance requirements of Section 70.61.

Response: Section 5.5.2.3.6.1 will be revised to identify the Liquid Waste Reception Unit as the location of the bounding event.

Action: Update CAR section 5.5.2.3.6.1 as follows:

> The event with the bounding radiological consequences for this event group has been identified to occur within the AP cell containing the ~~dissolution tanks~~Liquid Waste Reception Unit. The resulting load handling event is postulated to result in a breach of the ~~AP dissolution tanks~~americium reception tank and subsequent release of ~~unpolished PuO_2~~americium in solution.

(2) Section 5.5.2.3.6.3, "Fuel Rod" (p. 5.5-27)

Request: Revise the supporting unmitigated event descriptions in Appendix 5A to reflect the new bounding radiological consequence event of a dropped strongback on three MOX fuel assemblies.

The event identified with bounding radiological consequences has been revised to be the drop of a strongback containing three fuel assemblies containing MOX (6%). The referenced accident sequences are AS-7, AS-9 and RD-10. The original bounding event was one assembly dropped on another assembly. It appears that the supporting unmitigated event descriptions in Appendix 5A have not been revised to reflect this new scenario. Section 70.22(f) requires applicants to submit a description and safety assessment of the design bases of PSSCs. Section 70.65(b) further requires information that demonstrates compliance with the performance requirements of Section 70.61.

Response: The three-fuel assembly drop is included in the bounding event AS-9. To clarify that the event includes the drop of multiple assemblies, the wording of event AS-9 (p. 5A-55) will be modified to expressly include assemblies.

Action: The CAR will be modified to update the description of event AS-9 (p. 5A-55) as follows:

> The drop of an assembly (or assemblies) onto the floor or onto another assembly while utilizing hoisting equipment results in breach of confinement and dispersal of radiological materials.

(3) Section 5.5.2.3.6.4,"C4 Confinement" (p. 5.5-29)

Request: Revise the reference to "C34 confinement system" in the last sentence to read "C3 confinement system."

70.22(f), requires applicants to submit a description and safety assessment of the design bases of PSSCs.

Response: This change will be made to the CAR.

Action: The CAR will be modified to read as follows:

> The C3 confinement system provides defense-in-depth protection to the IOC, the site worker, and the environment.

(4) Section 5.5.2.2, Potential Fire Events Involving the Solvent

Request: Clarify potential solvent fire events and solvent locations.

Parts 70.22(a) and 70.22(f) require a description of equipment, facilities, PSSCs, and design bases that protect health and minimize danger to life and property, and a safety assessment of the PSSCs and design bases. Part 70.61 requires compliance with the performance requirements.

Section 5.5.2.2, page 5.5-16, mentions fires in process cells and identifies the Liquid Waste Reception Unit as the bounding fire event for this group, even though it does not contain solvent or other combustible materials. This is inconsistent with Section 11.3.2.14, which indicates solvent is present in this unit.

The revised CAR includes a new unit entitled the Waste Organic Solvent Unit (KWS - page 11.3-37). This adds tankage to provide for sampling and analysis to determine compliance with the SRS WAC (waste acceptance criteria). Page 11.3-36 also mentions solvent and organic

waste collection in Unit KWD (the Liquid Waste Reception Unit). Clarify if this is a separate function from the new Waste Organic Solvent Unit.

Response: To address your comments three CAR changes are required. (1) Section 5.5.2.2 will be modified to show the Liquid Waste Reception Unit may contain trace quantities of organics. (2) The last bullet in Section 11.3.2.14.1, page 11.3-34 will be deleted to be consistent with other portions of the CAR to reflect that the solvent portions of the KWD unit have been moved to the KWS unit. (3) The descriptions of the solvent portions of the KWD unit will be removed from the CAR.

Action: The CAR will be modified as follows:

(1) Section 5.5.2.2 will be modified to show the Liquid Waste Reception Unit may contain trace quantities of organics.

> Fires are postulated in the AP process cells due to the presence of solvents and other chemicals with flash points that potentially could be exceeded. The AP process cell containing the Liquid Waste Reception Unit tanks was determined to result in the largest radiological consequence and is thereby taken as the bounding fire event for this event group. Although this cell ~~does not~~ contains only trace quantities of organics~~any solvent or other combustible materials~~, a fire was conservatively hypothesized to occur in this cell.

As noted in your comment, the solvent portions of the KWD unit have been moved to the new KWS unit. Therefore, descriptions of the solvent portions of the KWD unit will be removed from the CAR.

(2) The last bullet in Section 11.3.2.14.1, page 11.3-34, will be removed:

~~(1)(The excess solvent/organic liquid waste stream receives the organic waste constitutes from the solvent recovery unit.~~

3) The Solvent/Organic Liquid Waste description in Section 11.3.2.14.2, page 11.3-36, will be removed:

~~Solvent/Organic Liquid Waste~~

~~Waste solvent is pumped from the solvent recovery tank KPB-TK2000 to an intermediate holding tank where it is sampled to assure compliance with SRS WAC. The intermediate tank is fitted with mixing and sampling capabilities. Once the batch is confirmed to be in compliance with the SRS WAC, the solvent batch is transferred to a carboy located in a dedicated enclosure near the reagents building. The carboy is lifted and loaded onto a flatbed truck using an overhead monorail-mounted crane and driven to SRS for processing using existing procedures.~~

~~The annual amount of solvent transferred offsite ranges between 2800 to 4000 gallons. The maximum number of carboys transferred per year is 15.~~

Chapter 8, Chemical Process Safety

(5) Section 8.1, "Chemical Process Description"

Request: Provide information and clarification on the use of uranyl nitrate.

Parts 70.22(a) and 70.22(f) require a description of equipment, facilities, PSSCs, and design bases that protect health and minimize danger to life and property, and a safety assessment of the PSSCs and design bases.

Section 8 describes the storage of depleted uranium dioxide in the Secured Warehouse Building (BSW - Table 8-2b). No other chemicals are listed in the inventory for the BSW. The revised CAR has removed the description of the Uranium Dissolution Unit. On page 11.9-62, the CAR contains a description of a uranyl nitrate reagent system. The CAR states the uranyl nitrate solution is stored in drums in the BSW and moved by truck to the AP building. No inventory information is provided for the uranyl nitrate solution. The Environmental Report mentions a usage of 3,660 gallons of uranyl nitrate solution per year. However, other parts of the revised CAR (e.g., pages 11.3-10 and 11.3-17) indicate the addition of depleted uranium (DU) from the Uranium Dissolution Unit.

Response: Uranyl nitrate solution stored in drums will be added to the AP process through the uranyl nitrate reagent system as opposed to the dissolution of uranium powder in a dedicated system. The uranyl nitrate inventory will be added to the BSW inventory in Table 8-2b. In addition, the references to the Uranium Oxide Dissolution Unit will be changed to the Uranyl Nitrate Reagent System in Section 11.3.4.2, page 11.3-10, and in Section 11.3.2.6.2, page 11.3-17.

Action: Update the CAR as shown below.

Enclosure 1
Response to NRC Request for Additional Information

(1) Table 8-2b, p 8-53 will be modified in the CAR as follows:

Table 8-2b. Anticipated Chemical Inventory in Secured Warehouse

Chemical	Total Quantity Anticipated in Secured Warehouse
Uranium Dioxide (Powder)	37.5 MT (200 drums @ 187.5 kg/drum)
Uranyl Nitrate	440 gal (8 drums @ 200gU/l)

(2) The references to the Uranium Oxide Dissolution Unit will be changed to the Uranyl Nitrate Reagent System in Section 11.3.4.2, page 11.3-10, as follows:

In normal operation, draining solutions received in receiving tank TK3000 are transferred to dilution and sampling tank TK5000 via a pump and filter. Dilution and sampling tank TK5000 is made of 316L stainless steel and has a useful volume of 106 gal (400 L). This tank is used for diluting the dissolution solution to reduce the plutonium and ^{235}U concentrations before feeding the Purification Cycle. Dilution and sampling tank TK5000 is equipped with a depleted uranyl nitrate inlet from the Uranyl ~~ium~~Nitrate Reagent System ~~Oxide Dissolution Unit~~, a nitric acid inlet, an emergency scavenging air inlet, sparging pipes to homogenize the solution, and a sampling line.

(3) The references to the Uranium Oxide Dissolution Unit will be changed to the Uranyl Nitrate Reagent System in Section 11.3.2.6.2, page 11.3-17, as follows:

Uranium is stripped in a slightly acidic (0.02N HNO_3) solution in an eight stage uranium-stripping mixer-settler MIXS5000. The unloaded solvent from uranium-stripping mixer-settler MIXS5000 is directed to the Solvent Recovery Cycle. The stripped uranium stream is then diluent washed in the three stage mixer-settler MIXS5100. If an isotopic dilution of the uranium stream is required, the ^{235}U concentration can be decreased by the addition of depleted uranyl nitrate from the ~~Uranium Oxide Dissolution Unit~~Uranyl Nitrate Reagent System in the first stage of uranium-stripping mixer-settler MIXS5000. The aqueous phase from uranium diluent washing is sent to uranium buffer tank TK5200 then stored in tank TK5300 before being sent to the Liquid Waste Reception Unit. Depleted uranyl nitrate can also be added in TK5300 prior to this transfer.

(6) Section 8.4, "Chemical Accident Consequences"

Request: Clarify the assumptions for the chemical accident analysis.

Parts 70.22(a) and 70.22(f) require a description of equipment, facilities, PSSCs, and design bases that protect health and minimize danger to life and property, and a safety assessment of

the PSSCs and design bases. Part 70.61 requires compliance with the performance requirements. Part 70.64(a)(5) requires the applicant to address the BDC for chemical safety.

The revised CAR lists assumptions for chemical accident consequence analysis on page 8-11. Several assumptions have been deleted. There have also been some changes to the implied assumptions on pages 8-7 and 8-8. Please identify if there are any additional assumptions (e.g., temperature, meteorology) that should be added in place of those deleted and if very low air speeds (circa 0.1 m/sec or less) can still be present in some of the areas within the Mixed Oxide Fuel Fabrication Facility(MFFF).

Response: No additional assumptions are required. The deleted assumptions were required input to ALOHA and MACCs codes which had been used to determine public consequences when the Controlled Area Boundary was coincident with the SRS boundary, however, these codes were not used in determining consequences to the IOC at the MFFF site boundary. Meteorology assumptions are not required for ARCON-96, which uses 5 years of actual hourly, meteorological data as an input to determine the 95th percentile χ/Q. Descriptions of ALOHA and MACCs, and any associated requirements, were removed from the CAR.

Indoor wind-speeds were determined for each specific room per the guidance noted in Sections 8.3.3 and 8.4.1 of the CAR. Based on these calculations, air speeds of less than 0.1 m/sec can exist in some areas.

Action: No CAR changes are necessary