

March 23, 2005

MEMORANDUM TO: Luis A. Reyes  
Executive Director for Operations

FROM: Jack R. Strosnider, Director /RA/  
Office of Nuclear Material Safety  
and Safeguards

SUBJECT: NOTIFICATION OF NMSS LICENSING ACTION

The Office of Nuclear Material Safety and Safeguards (NMSS) plans to issue Duke Cogema Stone & Webster (DCS) a construction authorization (CA) for the Mixed Oxide (MOX) Fuel Fabrication Facility (MFFF). Issuance of the CA is based on (1) the evaluations and recommendation in NUREG-1767, the final "Environmental Impact Statement on the Construction and Operation of a [MFFF] at the Savannah River Site, South Carolina" (FEIS), published in January 2005, and (2) the safety findings in the "Final Safety Evaluation Report on the Construction Authorization Request for the [MFFF] at the Savannah River Site, South Carolina" (FSER). NMSS plans to issue the FSER concurrently with the CA. The FSER evaluates the DCS construction authorization request (CAR) dated October 31, 2002 (as supplemented by letters dated December 20, 2002, February 18, 2003, April 1, 2003, April 10, 2003, July 28, 2003, June 10, 2004, July 1, 2004, January 27, 2005, and February 9, 2005) and references the approved MOX Project Quality Assurance Plan (dated March 26, 2002).

The planned issuance of the CA will occur before a related differing professional opinion (DPO) is resolved. On January 19, 2005, an NMSS staff member filed DPO-2005-002, on the staff's evaluation and acceptance of the DCS safety strategy for preventing red-oil explosions in processing equipment at the proposed MFFF. NMSS management had tried earlier to resolve the filer's concerns (see memorandum to H. Peterson dated April 12, 2004, ADAMS Accession No. ML041040656). Also, by letter dated February 24, 2005 (ML050550254), the Advisory Committee on Reactor Safeguards (ACRS) summarized the results of the Committee's review of the staff's safety evaluation. After specifically considering the red-oil hazard, the ACRS concluded that the FSER should be issued. A panel to consider DPO-2005-002 was established on March 2, 2005.

The NMSS staff consensus is that the MOX CA should be issued, whether or not DPO-2005-002 has been resolved. In reaching this consensus, the staff considered the applicable regulatory requirements concerning when and how DCS must demonstrate adequate safety. The staff also considered the characteristics and operating history of the specific process in question, which is based on the La Hague facility design.

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The licensing process for a plutonium processing and fuel fabrication plant involves two steps, a construction authorization followed by a license application approval. For construction authorization, the applicant must provide acceptable design bases for the principal structures, systems, and components (PSSCs) of the plant, including provisions for protection against natural phenomena. In accordance with 10 CFR 70.23(b), construction of the PSSCs of a plutonium processing and fuel fabrication plant will be approved when the Commission determines that the design of the PSSCs and the quality assurance program provide reasonable assurance of protection against natural phenomena and the consequences of potential accidents. The PSSCs are based on a preliminary design, rather than on an integrated safety analysis (ISA) of the final design, which must be completed when the license application is submitted. The underlying purpose of the construction authorization is to assure that adequate preliminary consideration has been given to natural phenomena hazards and postulated accidents at the proposed facility so that subsequent extensive retrofits will not be necessary to meet the Nuclear Regulatory Commission's requirements for possessing and using licensed materials.

For construction authorization, DCS has completed a safety assessment (SA) at the systems level and has identified design bases of PSSCs that are reference bounds for later facility design. At issue in the red-oil DPO is one process unit, the acid recovery evaporator. For reasons relating to the efficient design and operation of this unit, DCS has decided not to provide a big enough offgas vent for the evaporator to relieve potential overpressures resulting from a red-oil event. DCS has proposed several other controls for this unit: (1) a safety margin on evaporative cooling rates within the unit, (2) limits on unit temperature, (3) limits on the residence time of organic compounds in the presence of oxidizers and radiation fields, (4) provisions for the addition of aqueous phase in the event of temperature excursions, and (5) use of organic diluents which are resistant to red-oil phenomena. In addition, the FSER documents a DCS commitment to conduct further research on the initiation temperature for red-oil excursions, which includes a commitment to evaluate the effect of impurities on the initiation temperature. The staff's consensus view is that DCS' proposed red-oil safety strategy is adequate. The staff's analysis of this issue is more fully set forth in FSER Section 8.1.2.5.5.

If it is later determined that the proposed PSSCs and their design bases are not sufficient to meet the performance requirements of 10 CFR 70.61, DCS has several design options that require neither a significant redesign nor a retrofit of the facility. Those design options are to upgrade the planned organic phase decanter to a safety-grade item relied on for safety (IROFS) and/or to use an existing IROFS, consisting of a system of sensors which detect the presence of organic matter in the acid recovery feed tanks and can be interlocked with the fluid transfer system to provide a reliable means to preclude the introduction of organic material into the acid recovery evaporator.

Consequently, the staff believes that DCS can proceed with facility construction while completing the ISA for the acid recovery evaporator. Natural phenomena hazards and postulated accidents at the proposed facility have been adequately analyzed to ensure that subsequent extensive retrofits will not be necessary to meet safety requirements for possessing and using licensed materials.

On March 3, 2005, two NMSS staff members filed a non-concurrence memorandum on the FSER. The non-concurrence process in the NMSS' Division of Fuel Cycle Safety and Safeguards (FCSS) affords an opportunity for staff to constructively resolve disagreements. In the non-concurrence memorandum, the chemical safety reviewer expressed concerns over changes in the FSER text that had been made by concurring managers, including such areas as: 1) modeling of hazardous chemical releases, 2) depleted uranium hazards, and 3) solvent fire and explosion hazards. The electrical reviewer does not concur with changes that were made to a section of the FSER which describes the prevention of fires in plutonium dioxide dissolution electrolyzers. The non-concurrence memorandum accompanied the FSER concurrence package, and concurring management has been informed of the disagreement. I have reviewed the changes made by FCSS management and conclude that none of the changes resulted in substantive changes to the staff's conclusions. Rather, the changes were focused on ensuring that the staff's evaluation and conclusions are clear.

Therefore, NMSS concludes that the DPO filer's concerns reflected in DPO-2005-002, and the NMSS staff concerns expressed in the March 3, 2005, non-concurrence memorandum, have previously received serious and deliberate consideration and that issuance of the CA is now warranted.

On December 3, 2004, you issued a decision on a Differing Professional Opinion (DPO) Appeal (NMSS-DPV-2002-03) that had been filed by a member of the NMSS technical review staff who had worked on the CAR review. The DPO Appeal raised concerns regarding the staff's use of specific computer models to estimate downwind dispersion of hazardous chemicals following postulated chemical spills. In the December 3 decision, after consideration of the views of NMSS management, the DPO submitter, and the Differing Professional View (DPV) panel, you closed this DPO Appeal.

On March 8, 2005, you issued a decision on a second DPO Appeal (DPO-2003-02). The DPO Appeal raised concerns regarding the staff's evaluation of the applicant's provisions for worker and facility safety following postulated chemical spills. In the March 8 decision, after consideration of the views of NMSS management, the DPO submitter, and the DPV panel, you also closed this DPO Appeal.

Your decisions on the two DPOs described above, which require no further action on the part of NMSS, support the NMSS decision to issue the CA.

I have prepared a separate notification to the Commissioners (with you on concurrence) of the staff's intention to issue the CA. The staff wants to issue the CA no later than March 31, 2005. To issue the CA by this date and to meet the 5-day advance notice requirement to the Commission, your concurrence will be needed by March 25, 2005.

cc: J. Silber, DEDIA  
W. Kane, DEDH  
W. Dean, AO  
K. Cyr, OGC  
C. Miller, OEDO  
R. Pedersen, OE

M. Virgilio, DEDMRS  
E. Merschoff, DEDR  
R. O'Connell, NMSS  
J. Moore, OGC  
F. Congel, OE

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      K. Cyr, OGC                    J. Moore, OGC                      C. Miller, OEDO  
      F. Congel, OE                  R. Pedersen, OE

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L. Reyes

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