October 22, 2003

MEMORANDUM TO: Joseph G. Giitter, Chief
Special Projects and Inspection Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Thru: Brian W. Smith, Chief **/RA/**
Special Projects Section
Special Projects and Inspection Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

FROM: David Brown, Health Physicist **/RA/**
Special Projects Section
Special Projects and Inspection Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

SUBJECT: OCTOBER 16 & 21, 2003 SUMMARY OF PHONE CALLS WITH THE APPLICANT: CHEMICAL SAFETY OPEN ITEMS FOR THE MIXED OXIDE (MOX) FUEL FABRICATION FACILITY

On October 16 & 21, 2003, the U.S. Nuclear Regulatory Commission (NRC) discussed several of the chemical safety open items with Duke Cogema Stone & Webster (DCS) via phone. The open items are associated with the Revised Construction Authorization Request (CAR) for the Mixed Oxide Fuel Fabrication Facility (MFFF) submitted by DCS on October 30, 2002. The purpose of this memorandum is to document statements and requests that were made by NRC staff regarding the open items during the phone call. The statements are provided as an Attachment.

Docket No. 70-3098

Attachment: Phone Call Summary

cc: P. Hastings, DCS
L. Zeller, BREDL
G. Carroll, GANE
J. Johnson, DOE
J. Conway, DNFSB
D. Curran, GANE
D. Silverman, DCS
H. Porter, SCDHEC

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NAME	DBrown:dw		LGross		WTroskoski		BSmith	
DATE	10/ 22 /03		10/ 22 /03		10/22 /03		10/ 22 /03	

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PHONE CALL SUMMARY

The following statements and requests were conveyed by NRC staff (D. Brown, A. Persinko, W. Troskoski, B. Smith, N. Garcia-Santos) to DCS (K. Ashe, M. Klasky) during a phone call on October 16, 2003, with DCS. NRC staff (D. Brown, W. Troskoski, N. Garcia-Santos, B. Smith) followed up the October 16 call with a second call to DCS (P. Hastings, D. Gardener, G. Kaplan) on October 21, 2003.

Strategy for Preventing HAN Explosions (Open Item CS-2)

1. Staff is evaluating the adequacy of the design basis limiting solution temperature and design basis chemical concentrations of nitric acid, HAN, and hydrazine defined by DCS in its letter dated October 6, 2003. Staff is evaluating these design bases using the kinetic model presented in Enclosure 1, Table 2, of the same October 6, 2003, letter.

   To perform this evaluation, staff have estimated the initial conditions with respect to several parameters, including the initial, or starting, hydrazoic acid concentration. Of interest to the staff is a postulated event sequence in which hydrazoic acid is present initially at or near the design basis maximum value of 0.055 M/liter in the stripping solution. This maximum value of hydrazoic acid is proposed by DCS to prevent a hydrazoic acid vapor explosion, an event which is identified separately in the CAR. However, if nitrous acid is also present when the hydrazine is added to this system, the hydrazine could react with the nitrous acid to form additional hydrazoic acid, thereby increasing the amount of hydrazoic acid into the explosive regime above 0.055 M/liter.

   For the event postulated above, DCS clarified that since hydrazoic acid is among the species destroyed in the oxidation column downstream of the purification unit, and since specific administrative principal structures, systems, and components (PSSCs) (i.e., sampling) have been identified for this event, the assumption of 0.055 M/liter hydrazoic acid concentrations as an initial condition for the HAN explosion is not reasonable.

2. In response to a staff inquiry, DCS confirmed that the value of “K” used in Enclosure 1, Table 2, of the DCS October 6, 2003, letter is the hydrolysis constant for the reduction of Pu by hydrazine and is equal to 0.14.

Strategy for Preventing Titanium Metal Fires in Electrolyzers (Open Item AP-3)

3. In response to a staff inquiry, DCS clarified that the meaning of the phrase “seismically designed” in the October 10, 2003, letter is seismic qualification as per section 11.12.3.3 of the revised CAR, which addresses category B2 elements for seismic structural integrity.

4. In response to a staff inquiry, DCS confirmed that the function of the seismic trip system would include isolation of electrical power to the dissolution unit electrolyzers. However, DCS has proposed to rely on passive engineered PSSCs in this instance. Therefore, DCS noted that the seismic trip function, which is not relied on for safety in this instance, is irrelevant to the staff’s evaluation of the proposed PSSCs.

Attachment

5. Staff asked which management measures could apply to the proposed electrolyzer PSSCs, as stated in the DCS letter dated October 10, 2003. DCS offered that monitoring of electrical parameters could serve a surveillance function for degradation of credited electrolyzer components.

Strategy for Final HEPA Filter Protection from Uranium Burnback (Open Item MP-1)

6. In response to a staff inquiry, DCS confirmed that the 500 kg inventory of depleted uranium dioxide, which was assumed in the DCS letter dated October 10, 2003, is bounding. DCS cited Table 5.5-3b of the revised CAR as the source for this assumption.

Strategy for Control Room Habitability after a Chemical Release (Open Item CS-10)

7. In response to a staff inquiry, DCS explained that the design basis values for emergency control room (ECR) habitability after a nitrogen tetraoxide release are conservative. Staff had inquired as to the reason for the difference between proposed values for NO_2 and N_2O_4. DCS explained that, given the potential for N_2O_4 dissociation to NO_2 after a spill of N_2O_4 to the atmosphere, the NO_2 values would be applied. DCS further explained that the values for NO_2 are more conservative than the IDLH values specified by RG 1.78. Staff understand the DCS explanation, and will further consider DCS's position on this matter.

8. Staff expressed its interpretation of section 11.4.2.7.4 of the CAR, which identifies an operator action to don emergency self-contained breathing apparatus, as an implicit reliance by DCS on a safety function which is not identified in Chapter 5 of the CAR. DCS stated that this function is not a design basis safety function (the actual ECR design bases are described in CAR section 11.4.11.1.6, revision 02/18/03). Staff understand the DCS intent of CAR section 11.4.2.7.4, and will further consider DCS's position on this matter.