

August 16, 2007

MEMORANDUM TO: Joseph G. Giitter, Deputy Director
Special Projects and Technical
Support Directorate
Division of Fuel Cycle Safety
and Safeguards

THRU: Margie Kotzalas, Chief
MOX Branch /RA/
Special Projects and Technical
Support Directorate, FCSS

FROM: David Tiktinsky, Sr. Project Manager /RA/
MOX Branch
Special Projects and Technical
Support Directorate, FCSS

SUBJECT: SUMMARY OF THE TECHNICAL MEETING WITH SHAW AREVA
MOX SERVICES ON CHEMICAL SAFETY FOR THE MIXED OXIDE
FUEL FABRICATION FACILITY TO BE BUILT NEAR AIKEN, SC

On July 18 and 19, 2007, Nuclear Regulatory Commission (NRC) staff met with representatives from Shaw AREVA MOX Services (MOX Services) to discuss items related to the chemical safety review of the dechlorination/dissolution unit of the Mixed Oxide Fuel Fabrication Facility (MFFF). The meeting was closed to the public due to discussions of Official Use Only Information (OUO). Please see the meeting summary for more details (Enclosure 1). The meeting attendance list is also enclosed (Enclosure 2). Handouts can be found in Enclosures 3-12. Enclosures 4-12 (OUO-Security Related Information (SRI) and/or OUO-Proprietary Information) are being withheld from public release. When separated from Enclosures 4-12, this memorandum does not contain sensitive information.

CONTACT: David Tiktinsky, NMSS/FCSS
(301) 492-3229

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Enclosures:

1. Meeting summary (non-sensitive)
2. List of attendees (non-sensitive)
3. Meeting handout entitled Nuclear Regulatory Commission (NRC) Alternate Feedstock (AFS) Chemical Safety (non-sensitive)
4. Meeting handout entitled NRC AFS Chemical Safety - Chlorine/Chloride Electrolyzer Lessons Learned/Experience (OUO-SRI and Proprietary)
5. Meeting handout entitled NRC AFS Chemical Safety - Chlorine/Chloride Electrolyzer Chemistry (OUO-SRI and Proprietary)
6. Meeting handout entitled NRC AFS Chemical Safety - Chlorine/Chloride Electrolyzer Relevant Testing (OUO-SRI and Proprietary)
7. Meeting handout entitled NRC Chemical Safety - AFS for the MFFF (OUO-SRI and Proprietary)
8. Meeting handout entitled NRC AFS Chemical Safety - Sampling and Process Controls for Chlorine in Dechlorination (OUO-SRI and Proprietary)
9. Meeting handout entitled NRC AFS Chemical Safety - Chloride/Chlorine Safety (OUO-SRI and Proprietary)
10. Meeting handout entitled NRC AFS Chemical Safety - Hydrogen Peroxide Chemistry (OUO-SRI and Proprietary)
11. Meeting handout entitled NRC AFS Chemical Safety - Sampling and Process Controls for Hydrogen Peroxide (OUO-SRI and Proprietary)
12. Meeting handout entitled NRC AFS Chemical Safety - Hydrogen Peroxide Safety (OUO-SRI and Proprietary)

w/o enclosures 4-12

cc: G. Smith, NNSA
J. Olencz, NNSA
H. Porter, SC Dept. Of HEC
D. Silverman, Esq., MOX Services
D. Gywn, MOX Services

A.J. Eggenberger, DNFSB
L. Zeller, BREDL
G. Carroll, Nuclear Watch South
D. Curran, Esq., Nuclear Watch South

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 August 16, 2007

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1. Meeting Summary (unclassified)
2. List of Attendees (unclassified)
3. Meeting Handout entitled Nuclear Regulatory Commission (NRC) Alternate Feedstock (AFS) Chemical Safety (unclassified)
4. Meeting Handout entitled NRC AFS Chemical Safety - Chlorine/Chloride Electrolyzer Lessons Learned/Experience (OUO-SRI and Proprietary)
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cc:	G. Smith, NNSA	A.J. Eggenberger, DNFSB
	J. Olencz, NNSA	L. Zeller, BREDL
	H. Porter, SC Dept. Of HEC	G. Carroll, Nuclear Watch South
	D. Silverman, Esq., MOX Services	D. Curran, Esq., Nuclear Watch South
	D. Gwyn, MOX Services	

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M. Kotzalas, FCSS	D. Tedder, FCSS	M. Norato, FCSS	K. Morrissey, FCSS

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OFFICE	MB	FCSS	MB	MB
NAME	DTiktinsky	LWilliamson	WTroskoski	MKotzalas
DATE	8/ 06 /07	8/ 06 /07	8/ 16 /07	8/16 /07

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**SUMMARY OF TECHNICAL MEETING WITH SHAW AREVA MOX SERVICES ON
CHEMICAL SAFETY FOR THE MIXED OXIDE FUEL FABRICATION FACILITY (MFFF)**

Date: July 18-19, 2007

Place: Rockville, MD

Attendees: See Enclosure 2

Purpose:

The purpose of this meeting was to discuss items related to the chemical safety review of the MFFF. The meeting specifically focused on the dechlorination/dissolution units and the use of alternate plutonium feedstock (AFS).

Discussion:

This meeting was closed to the public due to discussions of information designated as Official Use Only. All of the meeting handouts were designated as OUO except for the introductory presentation.

The following is a summary of the topics that were discussed during the meeting:

a) Chlorine/Chloride Electrolyzer Lessons Learned Experience

MOX Services discussed AREVA's French experience performing dechlorination/dissolution at LaHague. There was a detailed discussion of chemical reactions and the conditions used in the electrolyzer.

b) Chlorine/Chloride Electrolyzer Chemistry

The applicant discussed dechlorination chemical reactions and implementation in the electrolyzer, redox reactions, and thermodynamic stability of chlorine species in solution.

c) Chlorine/Chloride Electrolyzer Chemistry - Relevant Testing

The applicant discussed electrolytic dechlorination experience from processes that were developed for an AREVA LaHague waste treatment facility for decontamination of plutonium bearing waste. This included laboratory and full scale testing.

Enclosure 1

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d) AFS for the MFFF

AFS refers to plutonium oxide feed to the MFFF that is derived from the stabilization of legacy weapons-grade plutonium in Department of Energy (DOE) facilities other than the Pit Disassembly and Conversion Facility (PDCF). The AFS typically has higher levels of impurities than the PDCF generated material. There was discussion of the type and amounts of impurities in the material. AFS material that is outside of the acceptable specifications. The staff stated that it would pursue additional contacts with the DOE regarding AFS materials.

e) Sampling and Process Controls for Chlorine in Dechlorination

The applicant discussed the sampling process for AFS, laboratory testing, the dechlorination process in the electrolyzers, dechlorination monitoring, and impurities analyses. They also discussed the grouping of AFS for materials with and without chlorides.

f) Chloride/Chlorine Safety

The applicant discussed safety issues associated with the formation of higher oxidized forms of chlorine including corrosion in the dechlorination/dissolution unit. Items relied on for safety (IROFS) for this unit were also discussed.

g) Hydrogen Peroxide Chemistry

The applicant discussed the use of hydrogen peroxide in the dechlorination/dissolution unit. This included the hazardous properties, concentrations, and stability of hydrogen peroxide.

h) Sampling and Process Controls for Hydrogen Peroxide

The applicant discussed the IROFS sampling for hydrogen peroxide, spectrophotometric monitoring during reduction of the plutonium, the metering of the hydrogen peroxide into the tanks, and sampling for plutonium valence state.

i) Hydrogen Peroxide Safety

The applicant discussed potential safety issues associated with hydrogen peroxide, sampling and addition controls, and controls to prevent over-pressurization, criticality, and explosions.

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Summary of Near-Term in the Chemical Safety Review

The following is a summary of the staff's near-term steps that were discussed at the meeting.

1) Staff will look at the material balances (energy and mass flow) of the electrolyzer in which the dechlorination will occur. The purpose of this portion of the review is to evaluate whether the safety systems have been designed and controlled sufficiently in order to justify the applicant's conclusion that events with high consequences are highly unlikely. MOX Services staff will guide the staff through the background information, flow charts and processes to ensure an efficient review.

2) The presentations and discussions at the meeting provided additional information regarding other applicable experiences with the dechlorination process at La Hague. Additionally, the MOX Services staff from France have developed additional bases for their conclusions that the dechlorination/dissolution process would operate safely and that issues related to impurities in the alternate feedstock have been addressed. MOX Services should provide this additional information for staff review at future onsite reviews. NRC and MOX Services staff will also share reference materials that are being used by both parties.

3) The staff will look at the qualifications of the MOX Services Intergrated Safety Analysis (ISA) team evaluating the AFS. The time period of the document review is from the point in time that MOX Services was directed to consider AFS to the present. The ISA team qualifications will be evaluated in a future onsite review.

4) NRC staff will meet with the cognizant staff from the DOE who are knowledgeable about the contents and variations of the AFS materials. The staff wants to better understand the knowledge base for the materials that make up AFS, the screening process for which AFS cans will be sent to MOX Services, and rejection criteria related to cans that are sent to MFFF but after analyses indicate that specifications are not met.

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July 18-19, 2007 Chemical Safety Meeting Attendees

- David Tiktinsky NRC
- Kelli Markham NRC
- Bill Troskoski NRC
- Dan Tedder NRC
- Margie Kotzalas NRC
- Christopher Tripp NRC
- Joe Giitter NRC
- Michael Norato NRC
- Diana Diaz-Toro NRC
- Denise Edwards NRC
- Kevin Morrissey NRC
- Gary Hedrick MOX Services
- Sven Bader MOX Services
- Walt Elliott MOX Services
- Bill Hennessy MOX Services
- Dealis Gwyn MOX Services
- Gerald Serencz MOX Services
- Philippe Rondet MOX Services
- Amandine Spiteri MOX Services
- Earl Friend MOX Services
- Don Williams ORNL

Enclosure 2

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