January 24, 2001

MEMORANDUM TO: Eric J. Leeds, Chief
Special Projects Branch, FCSS

THRU: Yawar H. Faraz, Acting Section Chief
Enrichment Section
Special Projects Branch, FCSS

FROM: Andrew Persinko, Sr. Nuclear Engineer
Enrichment Section
Special Projects Branch, FCSS

SUBJECT: SUMMARY OF MEETING WITH DUKE COGEMA STONE & WEBSTER TO DISCUSS DESIGN BASIS FOR THE MIXED OXIDE FUEL FABRICATION FACILITY

On January 4-5, 2001, NRC staff met with representatives from Duke Cogema Stone & Webster (DCS) to discuss information to be included in the construction authorization request (CAR) for the mixed oxide (MOX) fuel fabrication facility. Information discussed included project status, format of the construction authorization application, and design basis. The attendance list, meeting agenda and slides used in the presentation are attached (Attachments 1, 2 and 3, respectively).

Eric Leeds, Special Projects Branch Chief, opened the meeting by encouraging DCS to meet with the staff often to assure that the staff has the information needed to perform its review rather than exchanging information solely via letters. Mr. Leeds also urged DCS to include sufficient information in its application for the staff to be able to perform its review. If the information is insufficient, either the staff may not accept the application or the staff's review will be delayed as DCS responds to NRC requests for additional information (RAI).

Andrew Persinko, NRC MOX project manager, described the NRC regulations governing the content of the CAR and emphasized the importance of including adequate system and facility descriptions in the CAR to support staff evaluation of the safety assessment/hazards evaluation and design bases. DCS reiterated its intent to submit the CAR to the NRC by February 28, 2001. The staff indicated that it would take approximately 18 months after receipt of the CAR for the staff to complete its technical and environmental reviews. DCS presented a short overview of the MOX facility and the major processes.

Most of the meeting was devoted to discussing the design basis level of detail to be included in the CAR. Mr. Persinko summarized the definition of design basis included in an NRC letter to DCS, dated October 26, 1999. That definition, which is the same as in 10 CFR 50.2, states that design bases consist of functions to be performed by a structure, system, or component and values, or ranges of values, chosen for controlling parameters as reference bounds for design.

Mr. Persinko also noted that Regulatory Guide 1.186, "Guidance and Examples for Identifying 10 CFR 50.2 Design Bases," contains information on this subject. Although the information is specific to reactors, the examples in the guide provide insight into the level of detail associated with design bases, as defined in 10 CFR 50.2, with respect to functions and values. Summaries of the main points discussed at the meeting are as follows:

1. NRC encouraged DCS to provide justification for all assumptions or conclusions in the CAR. Statements like "...it is low..." or "...assumed no blockages..." with no further justification often require additional information to be provided.

2. With respect to the definitions of likelihood, DCS stated that it will not use the "unlikely' category and that all events that rely on preventive features will be made "highly unlikely." Using only "highly unlikely" would eliminate potential differences of opinion with respect to the definition of "unlikely." While the proposed definitions appear to have merit even though they differ from the MOX Standard Review Plan, NRC staff stated that it would need to consider the proposed definitions further. At the meeting, NRC stated that although the proposed definitions do not make use of explicit numerical likelihoods, the underlying failure rates of the proposed active or passive controls should be considered in order to assure that the event is in fact highly unlikely as suggested in the MOX Standard Review Plan. Applying the definitions without considering the underlying failure rates may lead to unacceptable likelihoods.

3. DCS indicated that in performing its analysis, it considered individuals outside the controlled area (approximately 5 miles from the MOX facility), and individuals located 100 meters from the MOX facility and within the MOX facility. The Savannah River Site personnel who are not working within the protected area of the MOX facility are considered "workers" by DCS and subject to the "worker" limits in Part 70. The staff stated that this is allowed by Part 70, provided that the provisions in 10 CFR 70.61(f) are met.

4. For fire protection, DCS indicated that the CAR may conclude that only fire barriers (which includes dampers, ventilation, filters and spark arresters) are needed as principal structures, systems and components to meet the Part 70 performance requirements. This approach would also take credit for an administrative control limiting combustible materials. NRC staff emphasized that if this is the conclusion, then the CAR should contain an adequate justification that includes potential human error associated with penetration seals and fire doors. Suppression is considered Quality Level 2 in the Quality Assurance Plan. If the safety analysis concludes that suppression is required and, if it is needed to meet the Part 70 performance requirements, then it must be an item relied on for safety (IROF). In response to NRC questions, DCS stated that the high efficiency particulate air (HEPA) filters would be protected in case of a fire by limiting air temperature to levels acceptable to HEPA performance by mixing with cooler air; and that the aqueous polishing parts of the plant would have air and not be inerted whereas the powder processing areas (i.e., gloveboxes) would be inerted with nitrogen using a once through system. DCS indicated that with respect to the effects of a fire external to a ventilation duct on the ventilation system and with respect to maintaining the fire barrier, the fire barrier around the duct would remain intact, perhaps by the use of stiffeners. DCS indicated that the CAR would contain a summary of the preliminary

fire hazards analysis (FHA). The NRC staff stated that the summary should be sufficient for the NRC staff to conduct its review. If supplementary information is needed, the staff may review the actual FHA at DCS offices.

5. DCS indicated that ventilation systems would be designed and tested in accordance with the American National Standards Institute (ANSI) N509 and N510. NRC staff requested that if DCS is taking exception to any items in standards, that these exceptions ne identified.

6. DCS indicated that its use of the terms “internal” and “external” apply to physical locations (i.e., internal/external to the site boundary or building perimeter). In risk analyses, postulated accidents such as fires and flooding are considered to be “external” even though they may occur within a building. NRC stated that the CAR should describe DCS’s use of the terms “internal” and “external” since these terms can have different meanings to technical analysts.

7. With respect to external man-made events on the MOX facility, DCS indicated that most events had been screened out, leaving only loss of offsite power and external fire. Staff stated that the CAR should adequately describe this screening process given the relatively large quantities of radioactive materials processed and stored in F-area and the close proximity of the MOX facility. There was a discussion with respect to the effect of the activities in the F-area at Savannah River Site (SRS) on the MOX facility, since it is located adjacent to the MOX facility. DCS indicated that it was using results from safety analyses performed by DOE for F-area and had not redone those safety analyses. NRC staff indicated that DCS should perform some level of review of the input provided by DOE to assure that DOE’s analysis is current and reasonable. NRC staff also questioned how future changes at SRS and their effect on the MOX facility would be considered, if such changes had not been evaluated in the MOX facility safety assessment. DCS indicated that such changes would be continually considered.

8. NRC staff stated that the CAR should describe how the concept of defense-in-depth, required by 10 CFR 70.64, is addressed in the MOX facility.

9. NRC staff indicated that if provisions for inspection or maintenance are needed at the design stage, then the CAR should describe design bases for the design of those provisions. Assuring that appropriate inspection and maintenance is performed is important to achieve the desired availability and reliability. Examples where design provisions may be needed to accommodate inspection or maintenance are HEPA filter design, amount of redundancy as it relates to maintenance outage times, need for inspection ports/maintenance hatches, readily accessible to personnel. NRC staff also questioned placement of equipment where no access would be possible for maintenance and inspections, such as in the process cell rooms. The NRC staff stated that the CAR should describe any design bases that are related to monitoring of inaccessible equipment or justify the availability or reliability of such equipment without inspection or maintenance.

10. NRC questioned the lack of confinement around sintering furnaces (furnaces are slightly pressurized). Lack of confinement around sintering ovens should be justified in the CAR.

11. DCS stated that the K-effective used for nuclear criticality safety will be stated in the CAR.

12. NRC stated that the CAR should include a discussion of the philosophical approach taken for competing safety risks (e.g., criticality and fire water; egress and security).

13. NRC stated that the CAR should include a discussion of the role of the operator (e.g., level of supervisory control and monitoring functions) given the automation of the systems.

14. NRC stated that the CAR should describe the "soft" soil areas on the site including information such as the type of soil material in the "soft" zones and the locations of the zones. NRC questioned how would the location of the soft spots under site roads interfere with emergency response. DCS responded that the soft zones are approximately 100 feet below the surface. DCS would demonstrate that the spots would not collapse under earthquake loads. If these areas are not stable under earthquake loads, then other alternatives will be considered.

15. DCS indicated that the CAR will address all chapters in the MOX Standard Review Plan, but to varying degrees.

16. DCS stated its intent to commit to certain Institute of Electrical and Electronics Engineers (IEEE) standards. NRC staff noted that it has taken exception to some of the provisions in some IEEE standards and that the exceptions are described in a Division 1 Regulatory Guide. At the meeting, the NRC staff emphasized that although the exceptions are provided in power reactor regulatory guides, it is the underlying safety issue associated with the staff's exception that is of concern and should be addressed in the CAR.

17. Load Drop Accidents: DCS indicated that the load drop slide used in its presentation needs to be revised and that the actual controlling parameters will be in the CAR. The CAR will provide a detailed list of requirements, codes and standards, descriptions of crane types/capacity /protective features (such as single failure proof, passive features, mechanical stops, electrical interlocks), and safe load paths. The CAR will also provide information on design basis events involving: 1) damage to loads/targets containing nuclear materials, 2) damage to equipment providing support or other safety-related functions. NRC staff noted that NUREG-0612 provides "heavy load" information. As part of its load drop review, NRC staff will review design features that enhance safety by reducing challenges to IROFS (see 10 CFR 70.64b).

18. With respect to design basis level of detail, NRC staff believed that the controlling parameters listed in the DCS slides (slides 141-159) would have an associated value or range of values provided in the CAR. Shortly after the in-depth discussion of design basis began (starting on DCS slide 137), it became evident that DCS had not planned

on including values or ranges of values for many of these controlling parameters in the CAR. NRC staff stated at the meeting that controlling parameters should have values or ranges of values provided to the maximum extent possible considering that it may not be possible to provide such values in all cases. In some cases, NRC staff indicated that definitive descriptive commitments may be acceptable in lieu of actual numerical values (e.g., criticality safety controlling parameters such as geometry, moderation, etc., or commitment to keeping below the explosive limit for a given mixture), although the NRC staff expressed a preference for actual values or ranges of values. NRC reiterated the definition of design bases that it provided to DCS in October 1999, especially with respect to design bases consisting of functions and values or ranges of values, and noted again the guidance contained in Regulatory Guide 1.186 with respect to design basis level of detail. Both DCS and NRC agreed that there are varying levels of design basis detail and that more detail is developed as project design progresses. NRC indicated, however, that only design bases associated with the principal structures, systems and components is required to be included in the CAR, in accordance with NRC regulations.

19. The staff indicated that the design basis level of detail associated with natural phenomena events appeared to be at the level expected by the NRC staff. DCS indicated that these design bases will be justified by the safety analyses. Regarding lightning, DCS stated that it would be addressed using the provisions in applicable codes and standards.

20. DCS indicated that there are no items relied on for safety needed solely to meet the environmental performance requirements because items relied on for safety needed to meet the environmental performance requirements are also needed to meet worker performance requirements. NRC staff indicated that it would be useful to note in the CAR those principal structures, systems, and components that have a role in meeting the environmental performance requirements, and to describe their environmental function.

21. DCS indicated that no specific items relied on for safety have been identified that are needed for direct exposure scenarios. DCS also indicated that the CAR would describe the application of Part 20, including a radiation protection plan and ALARA.

22. RC staff noted that DCS had not identified specific values and limits for specific chemicals and suggested that DCS consider including such values. NRC staff also suggested that DCS consider potential chemical interactions and impacts upon radiological operations, operating areas, habitability, etc., per the Part 70 regulations.

Docket: 70-3098

Attachments:
1. Attendance List
2. Meeting Agenda
3. Meeting Slides

cc: James Johnson, DOE
Henry Potter, SC Dept. of Health
& Environmental Control
John T. Conway, DFNSB

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ATTENDEES AT ALL OR PART OF THE MEETINGS ON
JANUARY 4-5, 2001

NAME	AFFILIATION
Andrew Persinko	Nuclear Regulatory Commission (NRC)
Timothy Johnson	NRC
Fred Burrows	NRC
Wilkins Smith	NRC
Alex Murray	NRC
Sharon Steele	NRC
Christopher Tripp	NRC
Eric Leeds	NRC
Robert Martin	NRC
Mindy Landau	NRC
David Brown	NRC
Bill Gleaves	NRC
Vanice Perin	NRC
David Ayres	NRC
Edward McAlpine	NRC
Joel Kramer	NRC
Jennifer Davis	NRC
Tom Pham	NRC
Ed Brabazon	Duke Cogema Stone & Webster (DCS)
Peter Hastings	DCS
Bill Hennessy	DCS
Tom St. Louis	DCS
Dick Berry	DCS
John McConaghy	DCS
Gary Kaplan	DCS
Gary Bell	DCS
Don Silverman	DCS/Morgan Lewis
Charlie Sanders	FANF
Jamie Johnson	Department of Energy (DOE)
David Nulton	DOE
Patrick Rhoads	DOE
Jon Thompson	DOE
John Connelly	DOE
Michael Hillman	DOE
Daniel Ogg	Defense Nuclear Facilities Safety Board
Don Williams	Oak Ridge National Laboratory
Faris Badwan	Los Alamos National Laboratory
Steven Dolley	Nuclear Control Institute (NCI)
Edward Lyman	NCI
Thomas Trimbell	Washington Group International

AGENDA
MEETING WITH DUKE COGEMA STONE & WEBSTER (DCS)
JANUARY 4-5, 2001
NRC-HQ ROOM T8A1

Introduction (NRC/DCS) (9:00 am - 9:30 am))
- Introduce participants (NRC/DCS)
- Purpose of meeting (NRC)
- Summary of recent DCS letter requests - status of NRC responses (NRC)

MOX Project Status Update (9:30 am - 10:00 am)
- schedule for licensing submittals (DCS)-NRC review schedules (NRC)

MOX Fuel Fabrication Facility Overview (10:00 am-10:45 am)
- Construction authorization request format/general content (DCS)
- Facility overview and process description (DCS)

Design Basis (11:00 am-noon and 1:00 pm-4:00 pm on 1/4/01;
9:00 am-noon and 1:00 pm-3:00 pm on 1/5/01)
- Overview of NRC requirements/guidance (NRC)
- Site description
- Overview of safety assessment
- Baseline design criteria & primary safety functions
- Overview of design basis events, principal SSCs, and design bases
- Confinement/HVAC
- Criticality protection
- Natural phenomena hazards
- Man-made external events
- Load drop
- Fire/explosion protection
- Radiation protection
- Chemical protection
- Safeguards and security (1:00 pm-3:00 pm on 1/5/01; this portion of the meeting will be closed to the public)

The meeting will start at 9:00 am on January 4, 2001, and will proceed according to the agenda unless otherwise announced at the meeting. Times shown are approximate. It is estimated that the discussion of design basis will take approximately 45 minutes for each technical area. For each design basis discussion topic following "Overview of NRC requirements/guidance," DCS will make a presentation, followed by NRC/DCS discussion, before proceeding to the next design basis topic. The safeguards and security portion of the meeting will be closed to the public due to the sensitive nature of the information to be discussed.

Attachment 2