

MEMORANDUM TO: Eric J. Leeds, Chief
Special Projects Branch
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Thru: Joseph G. Giitter, Chief
Enrichment Section
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FROM: Andrew Persinko, Sr. Nuclear Engineer
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Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

SUBJECT: SEPTEMBER 19-20, 2001 MEETING SUMMARY: DUKE COGEMA
STONE & WEBSTER DISCUSSED SEISMOLOGY, GEOLOGY, AND
GEOTECHNICAL ENGINEERING FOR THE MIXED OXIDE FUEL
FABRICATION FACILITY

On September 19-20, 2001, U.S. Nuclear Regulatory Commission (NRC) staff met with representatives from Duke Cogema Stone & Webster (DCS) in Aiken, South Carolina, to discuss seismology, geology, and geotechnical engineering information associated with the proposed mixed oxide (MOX) fuel fabrication facility. The information discussed is included in the construction authorization request (CAR) submitted to NRC in February 2001 and other related submittals. The attendance list, meeting agenda, and slides used in the presentation are attached (Attachments 1, 2 and 3, respectively).

Andrew Persinko, NRC MOX project manager, opened the meeting stating that the purpose of the meeting is to discuss seismological, geological, and geotechnical engineering information so that NRC technical reviewers can more fully understand the analyses that were performed by DCS. As stated at the outset, NRC did not make any conclusions at this meeting regarding the adequacy of the analyses performed by DCS.

The meeting on September 19 centered on site geology, seismology, the Savannah River site-specific probabilistic seismic hazard analysis, and the selection of the MOX fuel fabrication facility seismic design basis, including acceleration level and response spectrum.

The September 20 meeting focused on geotechnical engineering matters as described in the "MOX Fuel Fabrication Facility Site Geotechnical Report," dated August 2001 and submitted to NRC by letter dated August 10, 2001.

As the design earthquake for the MOX facility, DCS has chosen an earthquake having a Regulatory Guide 1.160 spectrum, anchored to a zero-period acceleration of 0.20g, which DCS stated is the same seismic design basis for the Vogtle nuclear power plant located near in the general vicinity of the Savannah River Site. Such a design basis is in between the Department of Energy's (DOE) PC-3 and PC-4 criteria (PC-3 is DOE's criteria for fuel cycle facilities such as this one and PC-4 is DOE's criteria applicable to nuclear reactors).

Regarding geotechnical engineering matters, DCS described the soil below the proposed MOX facility based on borehole and soil testing data. DCS described what it has called "soft zones" - localized areas where the soil properties (tip stress and standard penetration test N-values) are below specified thresholds. Based on its investigations at the MOX facility site, DCS concluded that the soil below the proposed MOX facility is consistent with soil at other locations in F-area at the Savannah River site.

At the conclusion of the meeting, the staff requested the following:

1. Meeting summaries of meetings between DOE and the Defense Nuclear Facilities Safety Board where DOE seismic standards, or seismic analyses, applicable to Savannah River Site were discussed.
2. Draft inputs for seismic hazard logic tree.
3. Slide 9 presented by J. Kimball concerning Charleston earthquake spectral acceleration.
4. Information regarding number, location, and magnitude of Charleston earthquake aftershocks.
5. Data (reports, articles) that constrain position and orientations of the Ashley River fault and the Woodstock fault. Confirm that displacement on the Woodstock fault is right lateral and the dip is vertical.
6. Reference information with respect to attenuation models and U.S. Geological Survey. In particular, discussions of inclusion and one-third weighting of Atkinson and Boore attenuation function.
7. Documents presenting Conoco seismic reflection profiles and interpretations, including Mr. Domoracki's dissertation, Carolina Geological Society 2000 field trip guidebook, and other relevant documents.
8. Description of how cyclic stress ratios were determined, considering uncertainties.
9. White paper discussing the relationship between cone penetration and standard penetration test results.
10. Safety factor contours from FLAC modeling of soft zones.

J. Giitter

3

Additionally, the staff indicated that it may want to review some of the calculations performed by DCS and its geotechnical consultants. DCS indicated that such calculations are available for NRC review at the offices of its geotechnical engineering consultant in Denver.

Docket: 70-3098

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

cc: J. Johnson, DOE, MD-12
H. Porter, SC Dept. of HEC
J. Conway, DNFSB
Don Moniak, BRDL
Glenn Carroll, GANE
Ruth Thomas, Environmentalists, Inc.

- 9. White paper discussing the relationship between cone penetration and standard penetration test results.
- 10. Safety factor contours from FLAC modeling of soft zones.

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ATTENDEES ATTENDING ALL OR PART OF THE SEISMOLOGY, GEOLOGY, AND
 GEOTECHNICAL ENGINEERING MEETING ON
 SEPTEMBER 19-20, 2001

<u>NAME</u>	<u>AFFILIATION</u>
Andrew Persinko	Nuclear Regulatory Commission (NRC)
Simon Hsiung	Center for Nuclear Waste Regulatory Analyses (CNWRA) - NRC consultant
David Ferrill	CNWRA - NRC consultant
Ed Brabazon	Duke Cogema Stone & Webster (DCS)
Peter Hastings	DCS
John McConaghy	DCS
Don Chamberlain	DCS
Jamie Johnson	Department of Energy (DOE)/NNSA
Jeff Kimball	DOE / NNSA
Allison Blackmon	DOE / NNSA
Brent Gutierrez	DOE / Savannah River
Jim Bolen	DOE/ Savannah River
Kent Sullivan	Westinghouse Savannah River Corporation (WSRC)
Doug Wyatt	WSRC
Mike Lewis	WSRC
Lawrence Salomone	WSRC
Richard Lee	WSRC
Bill Martin	WSRC
Don Stevenson	WSRC
Russ Beckmeyer	WSRC
Richard Tansky	WSRC
Virgil Autry	South Carolina Dept of Health and Environmental Control
Dusty Houser	Senator Max Cleland staff
Rene Ann Tenkesbury	Congressman Lindsey Graham staff
Peter Rieck	SDE
Thomas Houston	SDE
Don Moniak	Blue Ridge Environmental Defense League
William Willoughby	Member of the public
John Austin	Link Technologies

**MEETING AGENDA
MOX FUEL FABRICATION FACILITY
SEISMOLOGY, GEOLOGY, AND GEOTECHNICAL ENGINEERING
SEPTEMBER 19 - 20, 2001**

September 19

- 8:00 Introduction
Savannah River Site (SRS) geology
Probabilistic Seismic Hazard Analysis Process overview
SRS seismology
- 12:00 Lunch
- 1:00 SRS seismology (continued)
Site investigations
Selection of MOX fuel fabrication facility seismic design basis
- 4:00 Summary / Actions

September 20

- 8:00 Introduction
Site investigations and testing
Engineering properties
Soft zones
Bearing capacity and settlements
Subsurface profile
Liquefaction analyses
Post earthquake dynamic settlements and soft zones
- 1:00 Summary / Actions
- 1:30 Conclusion