September 16, 2003

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 070-03098
DUKE COGEMA STONE & WEBSTER	)	
	)	
Mixed Oxide (MOX) Fuel Fabrication Facility (Construction Authorization Request)	)	

NRC STAFF'S RESPONSE TO MOTION FOR SUMMARY DISPOSITION SUBMITTED BY DUKE COGEMA STONE & WEBSTER

INTRODUCTION

On August 22, 2003, Duke Cogema Stone & Webster (DCS) submitted a motion for summary disposition[1] on the seismic contention made by Georgians Against Nuclear Energy (GANE) in this proceeding on the DCS construction authorization request (CAR) regarding the proposed MOX fuel fabrication facility. The seismic contention at issue alleges that the proposed MOX facility's seismic design, set forth in the CAR, is inadequate.

The technical issues raised by the DCS Motion and the Stepp Affidavit are discussed in the affidavit of Dr. John Stamatakos, attached hereto as NRC Staff Exhibit 1. As discussed below, the NRC Staff supports the DCS Motion.

BACKGROUND

As previously stated by the Commission in its 2001 order referring the hearing requests of GANE and others to the Atomic Safety and Licensing Board Panel (Board), the proposed MOX fuel fabrication facility is one which "would implement a significant objective of national security and

[1] *See* "[DCS'] Motion For Summary Disposition on Contention 3" (DCS Motion), and the supporting affidavit of Dr. Carl Stepp, included as Attachment C (Stepp Affidavit) to the DCS Motion.

policy: reducing the inventory of plutonium in the nation's nuclear weapons' inventory."[2] Accordingly, to help ensure the timely resolution of contested issues, the Commission ordered that the contention requirements and certain discovery provisions contained in the Subpart G hearing procedures be applied in this CAR proceeding, even though this proceeding is still generally governed by the 10 C.F.R. Part 2, Subpart L hearing procedures.[3] DCS filed the original CAR on February 28, 2001.[4] On August 13, 2001, GANE submitted a number of contentions opposing the CAR.[5] Contention 3, "Inadequate Seismic Design," alleges that DCS "has not performed a seismic analysis that is either adequate in scope or adequately documented."[6] The Board admitted contention 3 in its entirety.[7] The basis statement supporting contention 3 has been narrowed significantly by the mutual agreement of GANE and DCS.[8]

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[2]CLI-01-13, 53 NRC 478, 484 (2001).

[3]*See* CLI-01-13, 53 NRC at 480-84.

[4]Hearing File Document #29.

[5]*See* "Georgians Against Nuclear Energy Contentions Opposing a License for Duke Cogema Stone & Webster to Construct a Plutonium Fuel Factory at Savannah River Site" (GANE Contentions).

[6]GANE Contentions, at 13.

[7]*Duke Cogema Stone & Webster* (Savannah River Mixed Oxide Fuel Fabrication Facility), LBP-01-35, 54 NRC 403, 429-432 (2001).

[8]The basis statement was first narrowed when the Board granted an unopposed motion to narrow contention 3. *See Duke Cogema Stone & Webster* (Mixed Oxide Fuel Fabrication Facility), Memorandum and Order (June 20, 2003). The basis statement was further narrowed by agreement of the parties during the deposition of GANE's seismic expert, Dr. Leland Timothy Long. *See* Dr. Long's deposition transcript (Long Tr.), at 403:9-13; 405:11-15; 416:6–417:4. The contention and revised basis statement was marked as Dr. Long Deposition Exhibit 1, and was attached to the DCS Motion as Attachment A.

DISCUSSION

A. Standards Governing Summary Disposition Motions

The resolution of summary disposition motions is governed by 10 C.F.R. § 2.749.[9] To avoid summary disposition of a contention, its proponent must raise at least one "genuine issue" pertaining to a "material fact." 10 C.F.R. § 2.749(d). DCS has summarized the requirements of 10 C.F.R. § 2.749(a-b) and (d), and has discussed case law on summary disposition of contentions. *See* DCS Motion, at 3-5. There, DCS cites *Advanced Medical Systems, Inc.* (One Factor Row, Geneva, Ohio), CLI-93-22, 38 NRC 98 (1993), and acknowledges the relevancy of federal case law pertaining to analogous motions for summary judgment under Rule 56 of the Federal Rules of Civil Procedure. The Commission recognizes that an NRC licensing board, when ruling on a motion for summary disposition, "must view the record in the light most favorable to the party opposing such a motion." *Advanced Medical Systems,* 38 NRC at 102 (footnote omitted).

Federal case law applying Rule 56 makes clear that summary judgment is not appropriate where it would require a determination of the credibility of witnesses,[10] and Federal Rule of Evidence 702 also serves as guidance here[11] in determining whether Dr. Long's opinions preclude

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[9] Because 10 C.F.R. § 2.749 is contained in Subpart G of 10 C.F.R. Part 2, it is a procedural rule applicable to all types of NRC adjudicatory proceedings. *See* 10 C.F.R. § 2.2. Should any such general rule conflict with a special procedural rule in another subpart of 10 C.F.R. Part 2, the special rule governs. *See* 10 C.F.R. § 2.3. Because 10 C.F.R. § 2.749 does not conflict with any of the 10 C.F.R. Part 2, subpart L rules governing this proceeding, the DCS Motion is one which this Board may properly consider. Moreover, while the Commission in its 2001 referral order did not discuss the use of summary disposition motions, it did emphasize the need to timely resolve contested issues (*see* CLI-01-13, 53 NRC at 484), and summary disposition of contentions, if warranted, will help achieve this goal.

[10] *See, e.g., Leonard v. Dixie Well Service & Supply, Inc.,* 828 F.2d 291, 294 (5th Cir. 1987) (improper for court, in considering motions for summary judgment, to weigh evidence or make determinations on the credibility of prospective witnesses); *Neely v. St. Paul Fire and Marine Ins. Co.,* 584 F.2d 341, 344 (9th Cir. 1978) (in ruling on summary judgment motions, the court decides questions of law as opposed to judging the credibility of witnesses).

[11] *See Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-819, (continued...)

summary disposition of contention 3. Rule 702 provides that a witness qualifies as an expert by "knowledge, skill, experience, training, or education," and states that the opinion of an expert is admissible if it meets two standards. First, the opinion must assist the trier of fact to understand the evidence or to determine a fact in issue. Second, the opinion must be based upon sufficient facts or data, be the product of reliable principles and methods, and the witness must have applied the principles and methods reliably to the facts of the case. Under Rule 702, while expert testimony need not be based upon a technique that is generally accepted in the scientific community, the expert's opinion must be based on the "methods and procedures of science" rather than on "subjective belief or unsupported speculation" (i.e. the expert must have "good grounds" for his or her belief).[12] Federal courts have thus applied Rule 702 liberally, favoring admission of any evidence that might assist the trier of fact.[13] The applicable substantive law -- here, 10 C.F.R. § 70.23(b) -- determines which factual disputes are material in a proceeding. Disputes over facts that might affect the outcome will properly preclude the entry of summary judgment, while factual disputes that are irrelevant or unnecessary will not preclude summary judgment.[14] Consistent with these rulings, the Commission has stated that bare assertions or general denials are not sufficient to bar summary disposition.[15]

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[11](...continued)
22 NRC 681, 732 n. 67 (1985), *citing* Fed. R. Evid. 702. *See also Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 475 (1982). Federal Rule of Evidence 702 has thus expressly been accepted as guidance in determining the admissibility of proffered expert testimony in NRC proceedings, even though the Federal Rules of Evidence in general are not directly applicable to NRC proceedings.

[12]*Daubert v. Merrill Dow Pharmaceuticals*, 509 U.S. 579, 589-590 (1993).

[13]*See Kannankeril v. Terminix International*, 128 F.3d 802, 806 (3d Cir. 1997); *Holbrook v. Lykes*, 80 F.3d 777, 780 (1996); and *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 741-743 (1994).

[14]*See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986).

[15]*See Advanced Medical Systems*, 38 NRC at 102. *See also Houston Lighting and Power*
(continued...)

Accordingly, where there is disagreement among competing experts over material facts, it is not appropriate in ruling on summary disposition motions to "untangle the expert affidavits and decide which experts are more correct."[16] The trier of fact should be left to weigh competing expert opinions at the hearing, so long as such opinions are shown to be relevant to material facts.[17]

However, this does not mean that conflicting expert testimony precludes summary disposition. A court (and this Board) must focus on whether opinions supporting or opposing summary disposition are sufficiently grounded in a factual basis.[18] Thus, a party cannot avoid summary judgment simply by presenting the unsupported opinion of an expert.[19] Expert opinion is admissible and may defeat summary judgment only if it appears that the affiant is competent to give an expert opinion and the factual basis for the opinion is adequately stated in the affidavit.[20] As discussed further in Section C, *infra*, Dr. Long's opinions as reflected in his deposition testimony either lack an adequate factual basis or are not material to the outcome of the proceeding. Thus, the present record supports granting the DCS Motion.

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[15](...continued)
Co. (Allens Creek Nuclear Generating Station, Unit 1), ALAB-629, 13 NRC 75, 78 (1981) and *Virginia Electric Power Co.* (North Anna Power Station, Units 1 and 2), ALAB-584, 11 NRC 451, 455 (1980).

[16]*Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-01-39, 54 NRC 497, 510 (2001) *citing Norfolk Southern Corp. v. Oberly*, 632 F. Supp. 1225, 1243 (D.Del. 1986), *affirmed on other grounds*, 822 F.2d 388 (3d Cir. 1987).

[17]*Private Fuel Storage*, 54 NRC at 510, *citing Kannankeril v. Terminix International*, 128 F.3d 802, 807 (3d Cir. 1997).

[18]*Kannankeril*, 128 F.3d at 807.

[19]*Rohrbough by Rohrbough v. Wyeth Laboratories, Inc.*, 719 F.Supp. 470, (N.W.D.Va. 1989) *affirmed on other grounds* 916 F.2d 970 (4th Cir. 1990); *State Farm Fire and Cas. Co. v. Miles*, 730 F. Supp. 1462, (S.D.Ind. 1990) *affirmed* 930 F.2d 25 (7th Cir. 1991).

[20]*See Garside v. Osco Drug, Inc.*, 895 F.2d 46, 50 (1st Cir. 1990).

The requirements of 10 C.F.R. § 2.749(c) apply to any party opposing a motion for summary disposition. If such a party states in one or more affidavits that it cannot now "present by affidavit facts essential to justify" its opposition, the licensing board may deny the motion for summary disposition, defer ruling to permit additional opposing affidavits to be submitted, "or make such other order as is appropriate." 10 C.F.R. § 2.749(c). With respect to this last-quoted portion of 10 C.F.R. § 2.749(c), the Commission has made clear that such other order may be one granting the motion for summary disposition. *See Public Service Co. of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), CLI-92-8, 35 NRC 145, 151-52 (1992) (affirming a licensing board's grant of a motion for summary disposition[21]). The Commission stated that a party claiming the need to conduct discovery in response to a summary disposition motion must, pursuant to 10 C.F.R. § 2.749(c), "identify by affidavit what specific information it seeks to obtain," and that, in the absence of such specificity, summary disposition may be appropriate. *Seabrook,* CLI-92-8, 35 NRC at 152. Furthermore, under 10 C.F.R. § 2.749(c), if a licensing board finds there are no genuine issues of material fact, "it may grant summary disposition even before discovery is otherwise completed if the opposing party cannot identify what specific information it seeks to obtain through further discovery."[22]

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[21] *See Public Service Co. of New Hampshire, et al.* (Seabrook Station, Units 1 and 2), LBP-91-24, 33 NRC 446 (1991). There, the board granted a motion for summary disposition and terminated the proceeding even though the intervenor, in opposing the motion, had submitted an affidavit of an individual whom the board found was qualified to testify as an expert witness in the proceeding. *See Seabrook,* LBP-91-24, 33 NRC at 450 and n.9.

[22] *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1263 (1982) (footnote omitted).

B. GANE's Obligations in Responding to the DCS Motion

Should GANE choose to oppose the DCS Motion, in whole or in part, by claiming the need for further discovery pursuant to 10 C.F.R. § 2.749(c), GANE must do more than submit a generally-worded affidavit of Dr. Long. GANE must adequately specify in such an affidavit what further information it needs to obtain through discovery, and provide some plausible explanation of how such information may show the presence of disputed material facts. *See Seabrook*, CLI-92-8, 35 NRC at 152.

Similarly, to avoid summary disposition of contention 3, any Dr. Long affidavit opposing the DCS Motion must establish that a genuine issue of material fact remains in dispute regarding contention 3. *See Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), ALAB-950, 33 NRC 492, 496-99 (1991) (affirming licensing board's grant of motion for summary disposition despite difference of opinion between intervenor's metallurgy expert supporting motion and the licensee).

Moreover, in discussing changes made in 1989 to the contention requirements of 10 C.F.R. § 2.714 and the summary disposition criteria of 10 C.F.R. § 2.749, the Commission described as follows the higher level of evidentiary support needed to withstand summary disposition motions, compared to the standard for admitting contentions:

> The Commission expects that at the contention filing stage the factual support necessary to show that a genuine dispute exists need not be in affidavit or formal evidentiary form and need not be of the quality necessary to withstand a summary disposition motion. At the summary disposition stage the parties will likely have completed discovery and essentially will have developed the evidentiary support for their positions on a contention. Accordingly, there is much less likelihood that substantial new information will be developed by the parties before the hearing. Therefore, the quality of the evidentiary support provided in affidavits at the summary disposition stage is expected to be of a higher level than at the contention filing stage.[23]

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[23] 54 Fed. Reg. 33168, at 33171 col.3 (August 11, 1989) (emphasis added), *aff'd. sub nom. Union of Concerned Scientists v. NRC*, 920 F.2d 50 (D.C. Cir. 1990). An NRC appeal board earlier (continued...)

Thus, any GANE affidavits opposing the DCS Motion which simply reiterate previous statements made in support of contention 3 should be regarded by the Board as insufficient to defeat the DCS Motion.

C. Present Record Supports DCS Motion[24]

To approve construction of the MOX facility, the NRC must determine whether the "design bases of the principal structures, systems, and components" (principal SSCs) of the proposed facility, "and the quality assurance program provide reasonable assurance of protection against natural phenomena and the consequences of potential accidents." 10 C.F.R. § 70.23(b). As relevant to the DCS Motion, this provision limits the scope of the Staff's required pre-construction design findings to the issue of whether the principal SSC design bases of the proposed MOX facility adequately protect against the effects of earthquakes. Because contention 3 pertains to the seismic design of the MOX facility, this contention is properly within the scope of this proceeding.

However, as discussed further below, based on the present record, the Board should grant the DCS Motion.

1. Historical Check

Dr. Long suggested during his deposition that the Herman Crustal Model miscalculates the ground motions which the MOX facility site will experience in the event of a large earthquake, and that this miscalculation underestimates the ground motions in the range of 10-50%.[25] As discussed in ¶¶ 14-15 of NRC Staff Exhibit 1, the MOX facility's seismic design is sufficiently robust

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[23](...continued)
noted in similar fashion that a proper contention only gains an intervenor admission as a party to an NRC proceeding, and does not preclude later summary disposition of the admissible contention. *See Point Beach, supra*, 16 NRC at 1258 n.15.

[24] This section is organized into nine sub-sections, and the headings used herein are similar to the headings used by DCS in its "Statement of Material Facts on Which No Genuine Issue Exists in Support of [the DCS Motion]."

[25] Long Tr. at 428-29.

to accommodate even a 50% increase in postulated ground motion, and Dr. Long offers no opinion on what, if any, impact this alleged miscalculation would have on seismic hazards at a MOX facility. Thus, the present record contains no evidence that the MOX design is not sufficiently conservative to accommodate Dr. Long's theoretical 50% increase in ground motion. Dr. Long has not conducted any research to predict ground motions that would be substantially different from those based on either the Herrmann (1986) or Ou and Herrmann (1990) crustal models.[26] Moreover, as discussed in ¶ 11 of NRC Staff Exhibit 1, the design-basis ground motions used in designing the proposed MOX facility envelope the predicted ground motions which would be produced by a repeat of the 1886 Charleston earthquake, and Dr. Long proffered no opinions on whether this element of the MOX Facility design meets the technical requirements of 10 C.F.R. Part 70.[27]

Similarly, as discussed in ¶ 12 of NRC Staff Exhibit 1, the DCS performance calculation results demonstrate that critical SSCs in the seismic design for the proposed MOX facility would maintain their radiological safety for ground motions well beyond those associated with the design basis earthquake, and that a high consequence seismic event would thus be highly unlikely at the proposed MOX Facility. Dr. Long proffered no opinions on whether this element of the MOX Facility design meets the technical requirements of 10 C.F.R. Part 70.[28]

Accordingly, Dr. Long's opinions on these points lack materiality, and summary disposition on these issues is appropriate.

2. Site-specific Use of LLNL and EPRI PSHA Studies

Dr. Long states that the Lawrence Livermore National Laboratory (LLNL) and Electric Power Research Institute (EPRI) probabilistic seismic hazard analyses (PSHAs) were not intended for

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[26] As indicated in ¶ 10 of NRC Staff Exhibit 1, Dr. Long gives no indication of being aware that this 1990 modified Herrmann Crustal Model considered the "Moho Bounce" phenomena.

[27] *See* Long Tr., at 115, 139, and 143.

[28] *See* Long Tr., at 115, 139, and 143.

site-specific use.[29] However, the basis for this key claim is only his understanding from "asking someone about that and I don't remember who and when." [30] As discussed in ¶ 5 of NRC Staff Exhibit 1, the EPRI and LLNL studies are appropriate for site specific applications, and NRC Regulatory Guide 1.165 specifically authorizes such use. Unless GANE can offer some factual basis for Dr. Long's opinion, there is no genuine issue of material fact and summary disposition on this point is appropriate.

3. Floating Earthquakes of Large Magnitude

Dr. Long cites a recent technical paper discussing small earthquakes,[31] but as discussed in ¶¶ 16-18 of NRC Staff Exhibit 1, Dr. Long has provided no basis to support extrapolating data on small earthquakes to large ones. Absent evidence that data on small earthquakes is material to the MOX facility's design, summary disposition of this issue is appropriate.

4. Likelihood of Large Earthquakes in the Eastern Tennessee Seismic Zone

GANE alleges that DCS did not adequately consider studies that suggest that a magnitude 7.5 earthquake could occur in the Eastern Tennessee Seismic Zone.[32] As discussed in ¶ 19-20 of NRC Staff Exhibit 1, the possibility of large earthquakes occurring in this zone was considered in the EPRI and LLNL studies, and Dr. Long did not provide any factual basis for his assertion that such an earthquake could occur. Mere assertions without factual basis are not sufficient to oppose summary disposition.[33] Thus, summary disposition of this issue is appropriate.

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[29]Long Tr. at 28-29; 175-176.

[30]*Id.* at 176.

[31] Long Tr., at 33-34.

[32]Second GANE Supplemental Interrogatory Response 3.45(a).

[33]*See Advanced Medical Systems, Inc.* (One Factor Row, Geneva, Ohio), CLI-93-22, 38 NRC 98, 102 (1993). *See also Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-629, 13 NRC 75, 78 (1981) and *Virginia Electric Power Co.*

(continued...)

5. Bluffton and Georgetown as Potential Epicenters of Large Earthquakes

GANE alleges that DCS should have considered Bluffton and Georgetown as potential earthquake epicenters.[34] As discussed in ¶ 21 of NRC Staff Exhibit 1, the Talwani and Schaeffer scenarios were considered in NUREG/CR-5613, which was in turn considered in the seismic design of the MOX facility. Moreover, as depicted on Attachment D to the DCS Motion, neither Bluffton nor Georgetown is any closer to the SRS than the 120 kilometer distance used by DCS in the modeled historic check, so that GANE's claim, even if it was accurate, lacks materiality. *See* ¶ 25 of NRC Staff Exhibit 1. Accordingly, summary disposition of this issue is appropriate.

6. Shorter Return Period for a Magnitude 7+ Earthquake

GANE asserts that there is new information that the return period for a magnitude 7+ earthquake may be as little as 600 years.[35] As discussed in ¶¶ 22-23 of NRC Staff Exhibit 1, a postulated 600-year return period is not new information. The present record thus supports summary disposition on this point.

7. Increased Magnitude of Historical Earthquakes

GANE asserts that two articles on paleoliquifaction by Hu *et al.* suggest a greater magnitude for historic earthquakes than previously considered by the EPRI and LLNL studies.[36] Dr. Stepp's opinion is that the conclusions made in the Hu articles are not valid "because they did not consider how aging affects soil strength."[37] Dr. Stepp points to the fact that authors of the Hu

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[33](...continued)
(north Anna Power Station, Units 1 and 2), ALAB-584, 11 NRC 451, 455 (1980).

[34] *See* Dr. Long Deposition Exhibit 1, at 2 (included as Attachment A to the DCS Motion).

[35] *See* Dr. Long Deposition Exhibit 1, at 2 (included as Attachment A to the DCS Motion); and Long Tr., at 245.

[36]Long Tr. at 282.

[37]Stepp Affidavit, at ¶ 61.

papers oversaw a Master's thesis that did correct for soil aging, thereby reducing the estimated size of the prehistoric earthquakes at issue to less than magnitude 7.[38] Dr. Stepp's opinion goes to the credibility of the study, and an opinion from another expert that the study is still valid would create a genuine issue of material fact. However, both Dr. Stamatakos (NRC Staff Exhibit 1, ¶24, n.23) and Dr. Long (Long Tr. at 278; 280-281) acknowledge that they are not experts in the area of how soil properties can affect earthquake magnitude. Because there is evidence in the record indicating that the Hu studies are flawed, and no evidence to suggest that these studies -- relied upon by Dr. Long -- are still valid, there is now no genuine issue of material fact. Unless GANE produces expert testimony rebutting Dr. Stepp's opinion on this point, this issue is appropriate for summary disposition.

8. Appropriate Range of Viable Ground Motion Attenuation Models was Considered

GANE asserts that the EPRI and LLNL studies did not adequately consider recent attenuation models (*i.e.* Atkinson and Boore) which more accurately reflect the "Moho Bounce".[39] As discussed in ¶ 26 of NRC Staff Exhibit 1, consideration of attenuation models that incorporate the possible effects of a Moho Bounce would not materially affect the seismic design of the proposed MOX facility. In the absence of any evidence to the contrary, summary disposition of this issue is appropriate.

9. Higher Hazards Predicted by the USGS Seismic Hazard Maps

As discussed in ¶¶ 27-30 of NRC Staff Exhibit 1, Dr. Long has failed to show how the higher hazard predicted by the USGS Seismic Hazard Maps would materially affect the seismic safety of the proposed MOX facility. Dr. Long fails to address the ground vibration frequencies which would

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[38] *Id.*, at ¶¶ 62-63.

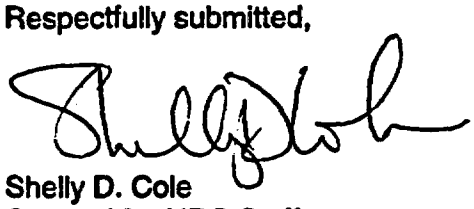
[39] Long Tr. at 28; 201-202.

affect the safety of any SSCs at the proposed MOX facility. Absent an adequate supplementation of the record by GANE on this point, summary disposition of this issue is appropriate.

CONCLUSION

As shown above, the burden is now on GANE to demonstrate that genuine issues of material fact remain in dispute between it and DCS on the nine seismic design issues discussed above. Absent such a demonstration by GANE, the Board should grant the DCS Motion, pursuant to 10 C.F.R. § 2.749(d).

Respectfully submitted,



Shelly D. Cole
Counsel for NRC Staff

John T. Hull
Counsel for NRC Staff

Dated at Rockville, Maryland
this 16th day of September, 2003

NRC Staff Exhibit 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket No. 070-03098
DUKE COGEMA STONE & WEBSTER	)	
	)	
Mixed Oxide (MOX) Fuel Fabrication Facility (Construction Authorization Request)	)	

AFFIDAVIT OF DR. JOHN STAMATAKOS

I, John Stamatakos, being duly sworn, declare as follows:

1. I am competent to make this affidavit, and the statements herein are true and correct to the best of my knowledge, information, and belief. The opinions expressed herein are based on my best professional judgment, and pertain to contention 3 submitted by Georgians Against Nuclear Energy (GANE). Contrary to contention 3, I believe that the seismic design of the proposed mixed oxide (MOX) fuel fabrication facility (MOX Facility) is adequate.

2. I am the lead technical reviewer for the NRC staff (Staff) on seismic issues pertaining to the request submitted by Duke Cogema Stone & Webster (DCS) for authority to construct the MOX Facility. I evaluated the geology and seismology of the proposed MOX Facility site, including the potential for surface fault displacements and vibratory ground motions from earthquakes, as well as the technical bases for the seismic hazard assessment used in the seismic design criteria. In this role, I assisted in preparation of the Staff's "Draft Safety Evaluation Report [SER] Concerning the Mixed Oxide Fuel Fabrication Facility," issued on April 30, 2003, and am also involved in preparing the final SER for the proposed MOX Facility. A summary of my educational training, professional experience, and employment history was provided as Exhibit 3 of the "NRC Staff's Identification of Expert Witnesses," filed in this proceeding on May 16, 2003.

3. This affidavit reflects my previous familiarity with and/or recent review of the following documents, among others: (a) August 22, 2003 motion titled "[DCS'] Motion for Summary Disposition on Contention 3" (DCS Motion); (b) affidavit of Dr. Carl Stepp, dated August 6, 2003 (Stepp Affidavit), submitted in support of the DCS Motion; (c) the initial DCS Construction Authorization Request (CAR) dated February 28, 2001, and the revised CAR dated October 31, 2002; and (d) deposition testimony of GANE's seismic expert, Dr. Leland Timothy Long, taken on June 25-26, 2003 (Long Tr.). Additional documents are identified in the footnotes below.

4. Included in this affidavit are my opinions on the Stepp Affidavit's technical arguments. Dr. Stepp is well-qualified to state opinions on GANE's contention 3, as he has extensive experience in seismic hazard analyses, seismic design, and seismic regulations, especially those applicable to nuclear facilities. By contrast, while Dr. Long is a well-qualified researcher in seismology issues, he admits he is not familiar with NRC regulations or regulatory guidance[1]. Except for his limited role in the initial LLNL studies, Dr. Long has not been involved in matters pertaining to the licensing of NRC facilities.

5. I concur in Dr. Stepp's opinion (Stepp Affidavit ¶¶ 9-17) that the Lawrence Livermore National Laboratory (LLNL) and Electric Power Research Institute (EPRI) probabilistic seismic hazard analyses (PSHAs) have been properly applied to the seismic hazard assessment performed for the proposed MOX Facility. Both the EPRI and LLNL PSHA studies have been widely used and accepted by the NRC for seismic hazard assessments in the central and eastern United States (CEUS). As stated in NRC Regulatory Guide 1.165[2], "For sites in the CEUS, the seismic hazard methods, the data developed, and seismic sources identified by [LLNL] and [EPRI] have been reviewed and accepted by the staff." In my opinion, the EPRI and LLNL PSHA studies are an

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[1] Long Tr. at 143-145.

[2] NRC Regulatory Guide 1.165, "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion" (March 1997).

adequate basis on which to perform a seismic evaluation for the site of the proposed MOX Facility, and Dr. Long has identified no cogent reasons which support a contrary view.

6. Dr. Stepp has accurately described (Stepp Affidavit ¶¶ 18-22) the performance categories (PCs) developed for the structures, systems, and components which would comprise the proposed MOX Facility, and the importance of a risk-graded approach in seismic design and performance. Probabilistic hazards for the site of the proposed MOX facility were developed according to DOE performance category PC–3 and PC–4 spectra. The DOE PC–3 and PC–4 spectra were developed following seismic design and evaluation criteria in the DOE STD–1020–94[3]. In DOE STD–1020–94, PC–3 systems, structures, and components (SSCs) deemed important to safety are designed to withstand ground motions with a mean annual probability of exceedance (MAPE) of 5×10^{-4}. PC–4 SSCs are designed to withstand ground motions with a MAPE of 1×10^{-4}. In terms of the annual return period ground motions, MAPEs of 5×10^{-4} and 1×10^{-4} correspond to mean 2000-year and 10,000-year return periods, respectively.

7. Moreover, in addition to the 2000-year or 10,000-year design requirements, the DOE methodology includes specified performance requirements. To ensure safe operation of the SSCs beyond the design ground motions[4], DOE 1020-94 developed performance goals associated with each performance category. The performance goals are defined in terms of the ability of the SSC to perform essential safety functions during and after the natural hazard phenomena (in this case an earthquake). The acceptable behavior limits for normal use SSCs -- such as buildings -- is "major damage," meaning that damage is limited in extent such that the occupants can still safely

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[3]DOE Natural Phenomena Hazards Design and Evaluation Criteria for Departments of Energy Facilities, DOE-STD-1020-94 Change Notice #1 (1996). Note that this DOE standard has been slightly modified and thus supplanted by DOE-STD-1020-2002 Natural Phenomena Hazards Design and Evaluation Criteria for Departments of Energy Facilities. DOE-STD-1020-2002: Washington DC: DOE. 2002.

[4] What Dr. Stepp referred to as "capacity against failure."

exit the building. For more critical SSCs -- such as nuclear containment structures -- damage at the performance goal should be limited such that the containment is not compromised. In DOE 1020-94, the seismic ground motion performance goals for PC-3 and PC-4 SSCs were established with MAPEs of 1×10^{-4} and 1×10^{-5}, respectively. In terms of the annual return period ground motions, MAPEs of 1×10^{-4} and 1×10^{-5} correspond to mean 10,000-year and 100,000-year return periods, respectively.

8. The difference between the MAPEs for design and performance[5] is achieved through conservatism in the design (factors of safety), elasticity in the structures, and conservatism in the evaluation of the design, as specified in the DOE design and evaluation criteria given in DOE-STD-1020-94 and DOE-STD-1023-95[6]. Demonstration that the SSCs meet the performance goals is through a dynamic analysis approach, as defined in DOE-STD-1020-94.

9. Pursuant to design criteria and NRC standard review plans, the conservatism between design and performance for NRC-licensed facilities (e.g., nuclear power plants) arises from factors such as prescribed analysis methods, specification of material strengths, and limits on inelastic behavior. Seismic conservatism in the NRC standard review plans is not explicitly keyed to risk reduction values. Nevertheless, the risk reduction factors achieved by applying NRC guidelines to evaluation of PC-4 SSCs have been shown to be equal to or even higher than those prescribed by DOE-STD-1020-94.[7]

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[5] This difference is known as the risk reduction factor, which is equal to the design basis mean annual exceedence probability divided by the performance goal mean annual exceedence probability.

[6] DOE Natural Phenomena Hazards Assessment Criteria, DOE-STD-1023-95 Change Notice #1 (1995).

[7] *See* Chapter 7 of R. K. McGuire et al., NUREG/CR-6728, "Technical Basis for Revision of Regulatory Guidance on Design Ground Motions: Hazard- and Risk-consistent Ground Motion Spectra Guidelines" (October 2001).

10. I agree with Dr. Stepp's description of the seismic design ground motions used by DCS (Stepp Affidavit ¶¶ 27-28 , *see also* Attachment E of the DCS Motion), his description of "Moho Bounce" (Stepp Affidavit ¶¶ 24-25), and that this phenomena was considered as part of the modified Herrmann Crustal Model[8].

11. I concur in Dr. Stepp's opinion (Stepp Affidavit ¶ 23) that the design-basis ground motions used in designing the proposed MOX Facility envelope the predicted ground motions which would be produced by a repeat of the 1886 Charleston earthquake. The referenced earthquake (as modeled with a moment magnitude equal to 7.3 and a source-to-site distance of 120 km) represents the most severe documented historical event applicable to the site of the proposed MOX Facility. In my opinion, this element of the MOX Facility design fully meets the technical requirements of 10 CFR § 70.64(a)(2).

12. Moreover, another important element of DCS's seismic design work for the proposed MOX Facility is its confirmatory seismic performance calculation. The results of this performance calculation -- provided by DCS in response to staff requests for additional information[9] -- is consistent with the performance requirements in DOE STD-1020-94 (*see* ¶¶ 6-9, above). The DCS calculation results demonstrate that critical SSCs in the seismic design for the proposed MOX Facility would maintain their radiological safety for ground motions well beyond those associated with the design basis earthquake. In particular, the performance calculation results show that, for spectral frequencies of structural interest (~2 to 9 Hz), the SSCs would maintain their safety

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[8] First provided in R.B. Herrmann, *Surface-Wave Studies of Some South Carolina Earthquakes*, Bulletin of Seismological Society of America 76(1): 111-121 (1986) and later updated in G.B. Ou, & R.B. Herrmann, *A statistical model for ground motions produced by earthquakes at local and regional distances*, Bulletin of the Seismological Society of America, Vol. 80, pp. 1397–1417 (1990).

[9] Letter from Peter Hastings of DCS to the NRC dated March 8, 2002, Enclosure B, "Natural Phenomena for MFFF Design" (Hearing File Document #93).

functions under ground motion loads with MAPEs of 1×10^{-5} or less.[10] These calculation results establish that a high consequence event[11] due to an earthquake would be highly unlikely at the proposed MOX Facility. In my opinion, this element of the MOX Facility design fully meets the technical requirements of 10 CFR § 70.61(b).

13. I agree with most of Dr. Stepp's discussion (Stepp Affidavit ¶¶ 29-31) about the inputs used by DCS to model a repeat of the Charleston 1886 earthquake, and that these inputs are properly conservative. But I disagree with Dr. Stepp's statement that "based on reports of damage from that earthquake, it is reasonable to assume that its moment magnitude was 7.0 or slightly lower." (Stepp Affidavit ¶ 31). A 1996 interpretation of the 1886 earthquake indicates that it had a moment magnitude of 7.3.[12] As Dr. Stepp noted (Stepp Affidavit ¶ 29), DCS used a moment magnitude of 7.3 to model a repeat of the Charleston earthquake. Such modeling was consistent with the A.C. Johnston study (*see* footnote 12).

14. I agree with Dr. Stepp's assessment (Stepp Affidavit ¶¶ 33-37) of Dr. Long's opinions concerning the Herrmann Crustal Model. As shown in Attachment F to the DCS Motion, the design spectra for the MOX facility -- based on Regulatory Guide 1.60[13] and anchored at 0.20-g

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[10] I am not a structural engineer, and did not myself perform these calculations. I am thus relying on the accuracy of the DCS calculation results.

[11] As defined in NUREG-1718, "Standard Review Plan for Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility" (2000).

[12] A.C. Johnston, *Seismic Moment Assessment of Earthquakes in Stable Continental Regions, III, New Madrid 1811–1812, Charleston 1886, and Lisbon 1755*, Geophysical Journal International Vol. 126, pp. 314–344 (1996). In a 1991 study for the K-Reactor site, Geomatrix Consultants Inc. estimated a series of magnitude and stress-drop tradeoffs, with a preferred moment magnitude of 7.5 and a stress drop of 100 bars. Geomatrix Consultants Inc., Ground Motion Following Selection of Savannah River Site Design Basis Earthquake and Associated Deterministic Approach. WSRC subcontract AA20210S. Westinghouse Savannah River Company. Aiken, SC, 1991.

[13] NRC Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants" (1973).

peak ground acceleration -- is sufficiently conservative to envelope a repeat of the Charleston 1886 earthquake (above 0.8 Hz.), even assuming an increase of the resulting ground motions by 50%, as suggested by Dr. Long.[14]

15. In my opinion, the 50% increase in ground motions suggested by Dr. Long is pure speculation on his part. Dr. Long freely admits that he has not conducted any specific research to predict ground motions that would be substantially different from those based on either the Herrmann (1986) or Ou and Herrmann (1990) crustal models.[15]

16. I concur in Dr. Stepp's rejection (Stepp Affidavit ¶¶ 42-46) of Dr. Long's claim regarding a large, floating (*i.e.* randomly located) earthquake. Dr. Long's claim is based on a recent paper by Dr. Alan Kafka.[16] The Kafka study is a statistical analysis of spatial distributions of small earthquakes. For the CEUS, the Kafka paper only considers earthquakes within the historic earthquake catalog that were recorded after 1924. All these earthquakes are too small (magnitudes less than 5.0) to be of concern in designing nuclear facilities.

17. Dr. Long offers no explanation of how or why the spatial variability of Kafka's small earthquakes should be extrapolated to include earthquakes with larger magnitudes. For the following reasons, it is my opinion that Dr. Long over-interprets or even misinterprets the results of the Kafka paper. The null hypothesis in this paper is that the location of future earthquakes will tend to occur where earthquakes have occurred in the past. Supporting this null hypothesis is the rather good statistical fit, in which about two thirds of larger earthquakes (M ≥4.5) recorded between 1988 and 2001 occurred in areas where there were prior smaller earthquakes (M ≥ 3.0)

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[14] Long Tr. at 428-29.

[15] Long Tr. at 122-24.

[16] A.L. Kafka, *Statistical Analysis of the Hypothesis that seismicity delineates areas where future large earthquakes are likely to occur in the central and eastern United States*, Seismological Research Letters, Vol. 73, pp. 992–1003 (2003).

recorded between 1924 and 1987. Thus, about two thirds of the larger earthquakes between 1988 and 2001 occurred in areas of past smaller earthquakes. The lack of a perfect statistical fit, however, does not necessarily establish the converse of the stated null hypothesis (i.e., that the location of future earthquakes will tend to occur in areas where earthquakes have not occurred in the past). This converse hypothesis is hard (if not impossible) to prove because it requires that the sampled populations of large and small earthquakes in the statistical study are unbiased representations of the total population of large and small earthquakes. In other words, that the spatial distributions of 1924-1988 small earthquakes or 1988-2001 large earthquakes would not change considerably if the sample records spanned longer periods of time. Yet, it is this converse hypothesis that Dr. Long argues in support of his position, where he stated that up to one third of future large earthquakes could occur anywhere, including right under the site of the proposed MOX Facility.[17]

18. Contrary to this position of Dr. Long's, in my opinion the prehistoric record of large earthquakes (as developed by numerous liquefaction studies) suggests that the spatial variability of small earthquakes should not be extrapolated to include earthquakes with larger magnitudes. Past large earthquakes which would be relevant to the Savannah River Site were not randomly located. According to recent papers by Talwani and Schaeffer[18] and Hu et al.,[19] large Charleston-type earthquakes over the past 6000 years were confined to the Charleston area or to several sites along the South Carolina-Georgia coastal plain. This finding that large-magnitude earthquakes

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[17] Long Tr. at 330-331.

[18] P. Talwani & W.T. Schaeffer, *Recurrence rates of large earthquakes in the South Carolina Coastal Plain based on paleoliquefaction data*, Journal of Geophysical Research, Vol.. 106, pp. 6621–6642 (April 2001).

[19] K. Hu et al., *Magnitudes of prehistoric earthquakes in the South Carolina Coastal Plain from geotechnical data*, Seismological Research Letters, Vol. 73, p. 979–991 (November/December 2002).

reoccur on the coastal plain -- as opposed to occurring randomly in the southeastern United States -- is contrary to Dr. Long's above-cited opinion that at least 30% of future large earthquakes will occur at sites that have no known prior seismic activity.

19. I agree with Dr. Stepp's statements (Stepp Affidavit ¶¶ 47-49) pertaining to earthquakes in eastern Tennessee. The possibility of large earthquakes occurring there were included in the EPRI and LLNL PSHA studies.

20. Due to my relative unfamiliarity with the geophysical structure underlying the eastern Tennessee zone, I can neither agree nor disagree with Dr. Stepp's opinion that this zone "is very unlikely to support magnitude 7+ earthquakes" (Stepp Affidavit ¶ 50). However, I disagree with Dr. Long's related opinion that "Southeast Tennessee is as viable a seismic zone as New Madrid."[20] Unlike Charleston or New Madrid, the eastern Tennessee zone lacks any historical or geological evidence for geologically- recent, large-magnitude earthquakes.

21. I concur in Dr. Stepp's view (Stepp Affidavit ¶¶ 51-55) that GANE, through Dr. Long, has failed to identify for evaluation any new information regarding the location of previous large, Charleston-type earthquakes. The scenarios for the location of past Charleston-type earthquakes as described in the Talwani and Schaeffer (2001) paper do not represent substantially new or different interpretations than those from earlier reports, specifically NUREG/CR-5613.[21] As stated by Dr. Stepp (Stepp Affidavit ¶ 55), these scenarios were included as part of the seismic source characterizations by seismic experts in both the LLNL and EPRI studies.

22. I concur in Dr. Stepp's view (Stepp Affidavit ¶¶ 56-58) that GANE, through Dr. Long, has failed to identify for evaluation any new information regarding the recurrence interval of large, Charleston-type earthquakes. With respect to such earthquakes, a postulated recurrence rate of

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[20] Long Tr. at 93-94.

[21] Amick et al, NUREG/CR-5613, "Paleoliquefaction Features Along the Atlantic Seaboard" (October, 1990).

about 600 years is not new information. As was stated in the staff's draft SER, a 500-600 year "recurrence interval for the Charleston-type earthquake is consistent with the LLNL and EPRI PSHA studies." [22]

23. This 500-600 year return interval for the Charleston-type earthquake is conservative. I concur with Dr. Stepp (Stepp Affidavit ¶ 57) that in order to get a 600-year recurrence interval, Talwani and Schaeffer (2001) placed greater weight on the most recent paleoliquefaction events. In my opinion, the estimated recurrence interval of Talwani and Schaeffer (2001) is conservative because it assumes the maximum number of possible paleoearthquakes given the age constraints derived from the ^{14}C age data. Talwani and Schaeffer (2001) used 1σ error ranges to develop their list of age-distinct paleoearthquakes. Overlap of the ^{14}C ages using 2σ error ranges would results in a smaller number of age-distinct paleoearthquakes during this same 6000 year interval and thereby increase the recurrence interval.

24. I concur in Dr. Stepp's view (Stepp Affidavit ¶¶ 59-63) that GANE, through Dr. Long, has failed to identify for evaluation any new information regarding the magnitude of historical earthquakes on the South Carolina Coastal Plain (SCCP).[23] In my opinion, the larger magnitudes based on the two Hu et. al., (2002) papers referred to in the Stepp Affidavit [24] would not significantly change the current probabilistic or deterministic estimates of the earthquake hazard at the site of

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[22] Draft Safety Evaluation Report, revision 1, at 1.3-9.

[23] I have no opinion with regard to Dr. Stepp's assessment (Stepp Affidavit ¶¶ 59-63) of recent soil data analyses used to reassess the magnitudes of prehistoric earthquakes on the South Carolina Coastal Plain. I am not an expert on the geotechnical properties of soils, and have no opinions pertaining to how that data is used to estimate earthquake magnitude.

[24] Papers by K. Hu et al., *Magnitudes of prehistoric earthquakes in the South Carolina Coastal Plain from geotechnical data* and *In-situ properties of soils at paleoliquefaction sites in the South Carolina Coastal Plain*, Seismological Research Letters, Vol. 73, pp. 964–978, and 979–991 (November/December 2002).

the proposed MOX Facility. The increase in magnitudes suggested by Dr. Long[25] for these earthquakes are accounted for by the uncertainties in magnitude the experts used in developing the inputs to the LLNL and EPRI PSHA studies.

25. Additionally, as stated by Dr. Stepp (Stepp Affidavit ¶¶ 29-30), the modeled "historic check" performed by DCS for a repeat of the Charleston earthquake used a moment magnitude of 7.3 at a distance of 120 kilometers southeast of the SRS (which is the closest point to the site of the proposed MOX Facility which is still within the Modified Mercali Intensity X mesoseismal zone). Using a large moment magnitude of up to 7.8 as suggested by Hu et al., (2002), would increase the ground motion spectrum at the proposed MOX Facility site by up to 20%. Yet, as demonstrated in Attachment F to the DCS Motion, the design spectra for the MOX Facility is sufficiently conservative to envelope a repeat of the Charleston 1886 earthquake, even assuming an increase of the resulting ground motions by 50% (*see supra* ¶ 14).

26. I concur in Dr. Stepp's opinion (Stepp Affidavit ¶¶ 64-71) that DCS considered an appropriate range of viable ground motion attenuation models in its seismic design of the proposed MOX Facility, and that these models adequately captured the uncertainty in ground motion estimates, including the potential for a "Moho Bounce." The recent attenuation model of Campbell[26] (2002) discussed in the Stepp Affidavit adequately accounts for the Moho Bounce, in my opinion. Using that model and a Charleston-type earthquake with a moment magnitude of 7.3 and source-to-site distance of 120 kilometers, I estimate ground motions for spectral frequencies between 2 and 10 Hz. that are equal to or lower than those provided by DCS in its "historic check"

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[25]Long Tr. at 282-298.

[26] K.W. Campbell, *Prediction of strong ground motion using the hybrid empirical method and its use in the development of ground-motion (attenuation) relations in eastern North America*, Bulletin of the Seismological Society of America, Vol 93, pp. 1012–1033 (June 2002).

calculation.[27] This calculation supports Dr. Stepp's conclusion that consideration of attenuation models that incorporate the possible effects of Moho Bounce would not materially affect the seismic design of the proposed MOX facility.

27. Although I generally concur in Dr. Stepp's view (Stepp Affidavit ¶¶ 72-80) that the underlying models and data used to construct the USGS Seismic Hazard Maps need to be known before a valid comparison can be made between their ground motion estimates and those produced by DCS, I disagree with Dr. Stepp's position that these hazard maps are not appropriate for evaluating seismic hazards at nuclear facilities. Although not used directly for the licensing of NRC-regulated nuclear facilities, these USGS hazard maps represent an additional and useful estimate of seismic hazards, in my opinion. Unlike the LLNL and EPRI studies which are based on multiple expert elicitation, even though the USGS hazard maps may only essentially reflect the views of a single expert. Nevertheless, results from the USGS Seismic Hazard Maps have provided valid comparisons for other seismic hazard studies at nuclear facilities across the country (e.g., Private Fuel Storage Facility in Utah and the U.S. Department of Energy facilities at Portsmouth, Ohio; Oak Ridge, Tennessee, and Paducah, Kentucky).

28. Additionally, I note that DOE STD 1020-2002 (regarding the return period for the PC-3 design basis ground motions applicable to nuclear storage facilities) was recently revised to explicitly take into account the USGS Seismic Hazard Map results. DOE states as follows in the forward to DOE-1020-2002:

> "Thus it is not the intent of this revision to alter the methodology for evaluating PC-3 facilities nor to increase the performance goal of PC-3 facilities by increasing the return period for the PC-3 DBE from 2,000-year earthquake to a 2,500- year earthquake.

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[27] Spectral accelerations based on Campbell's (2002) attenuation model with soil amplification factors from R.C. Lee et al, *SRS Seismic Response Analysis and Design Basis Guidelines*, Westinghouse Savannah River Company, WSRC-TR-97-0085, Rev. 0 (March 1997).

> Rather, the intention is more for convenience to provide a linkage from the NEHRP[28] maps and DOE Standards."

In DOE-1020-2002, PC-3 SSCs are now to be designed to a using 2,500-year return period ground motions.

29. As pointed out by Dr. Long, the impact of using the USGS Seismic Hazard Maps would be to effectively increase -- to approximately 2,500 years -- the MAPE for the peak ground acceleration at the site of the proposed MOX Facility.[29] However, in my opinion, Dr. Long has failed to show how the higher hazard predicted by the USGS Seismic Hazard Maps would materially affect the seismic safety of the proposed MOX Facility. It is my further opinion that Dr. Long has similarly failed to show that the higher hazard predicted by the USGS Seismic Hazard Maps prevents DCS from complying with the regulatory requirements of 10 CFR §§ 70.61(b) and 70.64(a)(2). As stated above in ¶¶ 11-12, it is my opinion that the MOX Facility seismic design fully meets these regulatory requirements.

30. In conclusion, I believe that the seismic design spectrum DCS has selected for the proposed MOX Facility is properly conservative. The seismic design spectrum clearly envelopes both the PC-3 PSHA spectrum and the historical check of a repeat of the Charleston 1886 earthquake. In my opinion, incorporating the USGS Seismic Map results into the evaluation would not increase either of these spectra beyond the design ground motions for spectral frequencies of interest (~2 to 10 Hz).

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[28] NEHRP stands for the National Earthquake Hazard Reduction Program, which is the name of the USGS Seismic Hazard mapping program.

[29] Long Tr. at 414.

31. The statements expressed above are true and correct to the best of my knowledge, information and belief.

John Stamatakos

Sworn and subscribed to before me
this 16th day of September, 2003

Notary Public
My commission expires: 6-26-05

GLENNA KAY BURKE
MY COMMISSION EXPIRES
June 28, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DUKE COGEMA STONE & WEBSTER	)	Docket No. 70-3098
	)	
Mixed Oxide (MOX) Fuel Fabrication Facility (Construction Authorization Request)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing "NRC STAFF'S RESPONSE TO MOTION FOR SUMMARY DISPOSITION SUBMITTED BY DUKE COGEMA STONE & WEBSTER," and NRC Staff Exhibit 1 in support of said response, have been served upon the following persons this 16th day of September, 2003, by electronic mail, and by U.S. mail, first class (or as indicated by an asterisk (*) through the Nuclear Regulatory Commission's internal distribution system).

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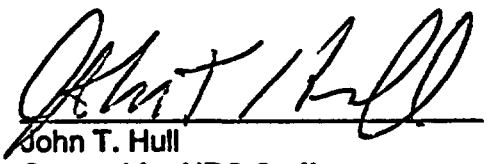

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