

January 30, 2001

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
 )  
PRIVATE FUEL STORAGE, L.L.C. ) Docket No. 72-22-ISFSI  
 )  
(Independent Spent Fuel )  
Storage Installation) )

NRC STAFF'S RESPONSE TO APPLICANT'S  
MOTION FOR SUMMARY DISPOSITION OF  
UTAH CONTENTION L (GEOTECHNICAL)

INTRODUCTION

Pursuant to 10 C.F.R. §2.749(a), the NRC Staff ("Staff") herewith responds to "Applicant's Motion for Summary Disposition of Utah Contention L" ("Motion"), filed on December 30, 2000 by Private Fuel Storage L.L.C. ("Applicant" or "PFS"). For the reasons set forth below and in the attached Affidavits of John Stamatakos ("Stamatakos Aff.") and Goodluck I. Ofoegbu ("Ofoegbu Aff."), the Staff submits that each of the issues raised by the State of Utah ("State") in Contention Utah L and its supporting basis statements have been resolved, and there no longer exists a genuine dispute of material fact with respect to this contention. Accordingly, inasmuch as these issues have been resolved, the Applicant is entitled to a decision in its favor on these issues as a matter of law. The Staff therefore supports the Applicant's Motion and recommends that it be granted.

BACKGROUND

Utah Contention L (Geotechnical) was filed by the State on November 23, 1997.<sup>1</sup> As revised (by agreement of the State and Applicant) and admitted by the Licensing Board,<sup>2</sup> the contention states as follows:

**Utah H -- Geotechnical**

CONTENTION: The Applicant has not demonstrated the suitability of the proposed ISFSI site because the License Application and SAR do not adequately address site and subsurface investigations necessary to determine geologic conditions, potential seismicity, ground motion, soil stability and foundation loading.

In support of this contention, the State provided four basis statements, concerning the following matters: (1) surface faulting (Utah Contentions at 80-82); (2) ground motion (*Id.* at 82-83); (3) characterization of subsurface soils, including subsurface investigations, sampling and analysis, and physical property testing for engineering analysis (*Id.* at 83-92); and (4) soil stability and foundation loading (*Id.* at 92-95).

Subsequent to the State's filing of this contention, PFS submitted a request for exemption from the seismic requirements of 10 C.F.R. Part 72. The State then filed two requests to modify Contention Utah L to challenge PFS' request for exemption, which the Licensing Board as premature.<sup>3</sup> A further request to modify Basis 2 of Contention Utah L

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<sup>1</sup> "State of Utah's Contentions on the Construction and Operating License Application by Private Fuel Storage, LLC for an Independent Spent Fuel Storage Facility" ("Utah Contentions"), dated November 23, 1997, at 80-95.

<sup>2</sup> *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7 (1998), 47 NRC 142, 191-92, 253 (1998).

<sup>3</sup> See *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-21, 49 NRC 431 (1999); *Id.*, LBP-00-15, 51 NRC 313 (2000).

is pending before the Licensing Board at this time;<sup>4</sup> accordingly, the Applicant's request for exemption is beyond the scope of Contention Utah L in its present form.

In its motion for summary disposition of Utah Contention L, PFS asserts that the bases for the contention have been eliminated, in large part due to the extensive additional geotechnical investigations which it conducted after this contention was filed, and that the State's experts agree that various (but not all) bases for this contention have been resolved. Based on its accompanying "Statement of Material Facts on Which No Genuine Dispute Exists" ("Statement of Material Facts"), Declarations by its experts, citations to the State's experts' depositions, and citations to the Staff's Safety Evaluation Report<sup>5</sup> and Statement of Position concerning Utah Contention L,<sup>6</sup> PFS asserts that this contention is no longer valid. See, e.g., Motion at 2, 3, 4, 9, 10, 29. Accordingly, PFS concludes that summary disposition of Utah Contention L should be entered in its favor.

As set forth below and in the attached affidavits, based on a review of the Applicant's Motion, Statement of Material Facts, and attached documentation, the Staff has concluded that each of the issues raised in Contention Utah L have been resolved, and there no longer exists a genuine dispute of material fact with respect to this contention. Accordingly, the Staff supports the Applicant's Motion and recommends that it be granted.

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<sup>4</sup> See "Request for Admission of Late-Filed Modification to Basis 2 of Contention Utah L," filed on November 9, 2000.

<sup>5</sup> See letter from Mark S. Delligatti (NRC) to John D. Parkyn (PFS), dated September 29, 2000, enclosing "Safety Evaluation Report Concerning the Private Fuel Storage Facility" ("SER").

<sup>6</sup> See "Attachment" to "NRC Staff's Notice Concerning Contention Utah K, and Statement of Position Concerning Contention Utah L" ("Statement of Position"), dated April 28, 2000 ("Statement of Position").

DISCUSSION

A. Legal Standards Governing Motions for Summary Disposition.

Pursuant to 10 C.F.R. §2.749(a), “[a]ny party to a proceeding may move, with or without supporting affidavits, for a decision by the presiding officer in that party’s favor as to all or any part of the matters involved in the proceeding. The moving party shall annex to the motion a separate, short, and concise statement of the material facts as to which the moving party contends that there is no genuine issue to be heard.” In accordance with 10 C.F.R. §2.749(b), when a properly supported motion for summary disposition is made, “a party opposing the motion may not rest upon the mere allegations or denials of his answer; his answer by affidavits or as otherwise provided in this section must set forth specific facts showing that there is a genuine issue of fact.”<sup>7</sup> In addition, an opposing party must annex to its answer a short and concise statement of material facts as to which it contends there exists a genuine issue to be heard. 10 C.F.R. § 2.749(a). All material facts set forth in the moving party’s statement will be deemed to be admitted unless controverted in the opposing party’s statement. *Id.* Pursuant to 10 C.F.R. § 2.749(d), “[t]he presiding officer shall render the decision sought if the filings in the proceeding, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and

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<sup>7</sup> *Accord, Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units I and 2), ALAB-841, 24 NRC 64, 93 (1986). General denials and bare assertions are not sufficient to preclude summary disposition when the proponent of the motion has met its burden. *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993). Although the opposing party does not need to demonstrate that it will succeed on the issues, it must at least demonstrate that a genuine issue of fact exists to be tried. *Id.*; *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-92-8, 35 NRC 145, 154 (1992) (to avoid summary disposition, the opposing party had to present contrary evidence that was so significantly probative as to create a material issue of fact).

the affidavit, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law.”<sup>8</sup>

The Commission’s summary disposition procedures have been analogized to Rule 56 of the Federal Rules of Civil Procedure. *See, e.g., Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), ALAB-443, 6 NRC 741, 753-54 (1977); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation) LBP-99-32, 50 NRC 155, 158 (1999). Indeed, the Commission, when considering motions for summary disposition filed pursuant to 10 C.F.R. § 2.749, generally applies the same standards that the Federal courts use in determining motions for summary judgment under Rule 56 of the Federal Rules. *Advanced Medical Systems*, 38 NRC at 102 (1993). Decisions arising under Rule 56 of the Federal Rules may thus serve as guidelines to the Commission’s adjudicatory boards in applying 10 C.F.R. §2.749. *Perry*, 6 NRC at 754.

Under Rule 56 of the Federal Rules, the party seeking summary judgment has the burden of proving the absence of genuine issues of material fact. *Adickes v. S. H. Kress & Co.*, 398 U.S. 144, 157 (1970); *Advanced Medical Systems*, 38 NRC at 102. In addition, the record is viewed in the light most favorable to the party opposing the motion. *Poller v. CBS, Inc.*, 368 U.S. 464, 473 (1962); *Kerr-McGee Chemical Corp.* (West Chicago Rare Earths Facility), ALAB-944, 33 NRC 81, 144 (1991). However, if the moving party makes a proper showing for summary disposition and the opposing party fails to show that there is a genuine issue of material fact, the District Court (or Licensing Board) may summarily dispose of all of the matters before it on the basis of the filings in the proceeding, the

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<sup>8</sup> Pursuant to 10 C.F.R. § 2.749(c), if a party opposing the motion demonstrates in its affidavits that valid reasons exist why it cannot provide facts essential to oppose the motion, the presiding officer may deny the motion, order a continuance to permit affidavits to be obtained, or take such other action as may be appropriate.

statements of the parties, and affidavits. Rule 56(e), Fed. R. Civ. P. *Accord, Advanced Medical Systems*, 38 NRC at102; 10 C.F.R. § 2.749(d).

The Licensing Board in this proceeding has previously ruled upon various motions for summary disposition filed by PFS, in accordance with these principles. In doing so, the Board succinctly summarized the standards for granting summary disposition, as follows:

Under 10 C.F.R. § 2.749(a), (d), summary disposition may be entered with respect to any matter (or all of the matters) in a proceeding if the motion, along with any appropriate supporting material, shows that there is “no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law.” The movant bears the initial burden of making the requisite showing that there is no genuine issue as to any material fact, which it attempts to do by means of a required statement of material facts not at issue and any supporting materials (including affidavits, discovery responses, and documents) that accompany its dispositive motion. An opposing party must counter each adequately supported material fact with its own statement of material facts in dispute and supporting materials, or the movant’s facts will be deemed admitted. See *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102-03 (1993).

*Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-99-23, 49 NRC 485, 491 (1999) (granting summary disposition of Contention Utah C).<sup>9</sup>

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<sup>9</sup> *Accord, Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation) LBP-99-31, 50 NRC 147, 152 (1999) (granting summary disposition of Contentions Security-A, Security-B and Security-C); *Id.*, LBP-99-32, 50 NRC 155, 158 (1999) (granting summary disposition of Contention Utah G); *Id.*, LBP-99-33, 50 NRC 161, 164-65 (1999) (granting summary disposition of Contention Utah M); *Id.*, LBP-99-34, 50 NRC 168, 173-74 (1999) (granting summary disposition of Contention Utah B); *Id.*, LBP-99-35, 50 NRC 180, 184 (1999) (granting in part, and denying in part, summary disposition of Contention Utah K); *Id.*, LBP-99-36, 50 NRC 202, 207 (1999) (denying partial summary disposition of Contention Utah R); *Id.*, LBP-99-42, 50 NRC 295, 301 (1999) (denying partial summary disposition of Contention Utah H); *Id.*, LBP-00-06, 51 NRC 101, 112 (2000) (granting in part, and denying in part, summary disposition of Contention Utah E).

Finally, it should be noted that the Commission has encouraged parties in its adjudicatory proceedings to utilize its summary disposition procedures “on issues where there is no genuine issue of material fact so that evidentiary hearing time is not unnecessarily devoted to such issues.” Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 NRC 452, 457 (1981).<sup>10</sup> Likewise, the Appeal Board has recognized that summary disposition provides “an efficacious means of avoiding unnecessary and possibly time-consuming hearings on demonstrably insubstantial issues.” *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1263 (1982); *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit1), ALAB-590, 11 NRC 542, 550 (1980).<sup>11</sup>

As more fully set forth below, the Staff submits that summary disposition of Contention Utah L is appropriate, in accordance with these established standards.

B. Adequacy of the Applicant’s Site and Subsurface Investigations.

1. Applicable Regulatory Standards.

As filed by the State of Utah, Contention L asserts that the Applicant fails to comply with 10 C.F.R. § 72.102(b), (c) and (d), and 10 C.F.R. Part 100, Appendix A, § IV(b)(2) (Utah Contentions at 80, 83, 85, and 95).

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<sup>10</sup> The Commission recently endorsed this policy statement, but indicated that “Boards should forego the use of motions for summary disposition except upon a written finding that such a motion will likely substantially reduce the number of issues to be decided, or otherwise expedite the proceeding.” *Statement of Policy on Conduct of Adjudicatory Proceedings*, CLI-98-12, 48 NRC 18, 20-21 (1998). The Staff submits that summary disposition of Utah Contention L will reduce the multiplicity of issues that require hearings in this proceeding, and will serve to expedite the proceeding.

<sup>11</sup> It is well settled that an agency may ordinarily dispense with an evidentiary hearing where no genuine issue of material fact exists. *Veg-Mix, Inc. v. U.S. Dep’t of Agriculture*, 832 F.2d 601, 607-08 (D.C. Cir. 1987).

Pursuant to 10 C.F.R. § 72.102 (“Geological and seismological characteristics”), an applicant for an independent spent fuel storage installation (ISFSI) west of the Rocky Mountain Front is required to meet the following seismic requirements:

(b) West of the Rocky Mountain Front (west of approximately 104 deg. west longitude), and in other areas of known potential seismic activity, seismicity will be evaluated by the techniques of appendix A of part 100 of this chapter. Sites that lie within the range of strong near-field ground motion from historical earthquakes on large capable faults should be avoided.

(c) Sites other than bedrock sites must be evaluated for their liquefaction potential or other soil instability due to vibratory ground motion.

(d) Site-specific investigations and laboratory analyses must show that soil conditions are adequate for the proposed foundation loading.

In addition, Section IV(b)(2) of Appendix A of 10 C.F.R. Part 100, referenced in Contention Utah L, provides requirements for the investigation of surface faulting, as follows:

(b) *Required Investigation for Surface Faulting.* The purpose of the investigations required by this paragraph is to obtain information to determine whether and to what extent the nuclear power plant need be designed for surface faulting. . . . The investigations shall include the following:

(2) Evaluation of tectonic structures underlying the site, whether buried or expressed at the surface, with regard to their potential for causing surface displacement at or near the site. The evaluation shall consider the possible effects caused by man's activities such as withdrawal of fluid from or addition of fluid to the subsurface, extraction of minerals, or the loading effects of dams or reservoirs; . . . .<sup>12</sup>

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<sup>12</sup> Other seismic requirements in 10 C.F.R. Part 100, Appendix A, have not been raised in Contention Utah L and are not in issue in this proceeding.

As set forth below and in the attached affidavits, the Staff's review of the Applicant's geotechnical investigations has led it to conclude that the Applicant has satisfied these regulations and applicable regulatory guidance.

2. The Applicant's Geotechnical Investigations.

As set forth in the attached Affidavits of John Stamatakos and Goodluck I. Ofoegbu, the Staff has reviewed the Applicant's geotechnical investigations and analyses for the PFS facility, including the site and subsurface investigations at issue in this contention. On April 28, 2000, the Staff issued its Statement of Position concerning Contention Utah L (see n.6, *supra*), in which the Staff concluded that "the Applicant has adequately addressed the site and subsurface investigations necessary to determine geologic conditions, potential seismicity, ground motion, soil stability and foundation loading for construction and operation of its facility at the proposed site" (Statement of Position, at 1). The bases for this conclusion were set forth in detail in the Staff's Statement of Position (*Id.* at 2-6). See Stamatakos Affidavit, at ¶ 4; Ofoegbu Affidavit at ¶ 4.

Further, on September 29, 2000, the Staff issued its Safety Evaluation Report concerning the proposed PFS facility (see n.5, *supra*), in which it reviewed the information provided by the Applicant against applicable regulatory criteria and concluded, *inter alia*, that the Applicant's site and subsurface investigations pertaining to geologic conditions, potential seismicity, ground motion, characterization of subsurface soils, soil stability and foundation loading were adequate (see SER at §§ 2.1.6 and 2.2). Stamatakos Affidavit, at ¶ 3; Ofoegbu Affidavit at ¶ 3.

Finally, the Staff has carefully reviewed the Statement of Material Facts submitted in support of the Applicant's Motion. On the basis of its review, the Staff has concluded that the Applicant's Statement of Material Facts is correct, although the Staff believes that

certain proposed corrections and modifications (set forth in the attached affidavits) should be made, none of which affect the Staff's conclusion that summary disposition of this contention is appropriate. See Stamatakos Affidavit, at ¶¶ 5-20; Ofoegbu Affidavit at ¶¶ 5-15.<sup>13</sup>

For these reasons, as more fully set forth in the attached affidavits, the Staff submits that there does not exist any genuine issue of material fact with respect to subparts 1, 2, 3, and 4 of Utah Contention L, and the Applicant is entitled to a decision in its favor on this contention as a matter of law.

#### CONCLUSION

For the reasons set forth above, as more fully set forth in the attached Affidavits of John Stamatakos and Goodluck I. Ofoegbu, the Staff submits that the Applicant is entitled to a decision in its favor as a matter of law, on subparts 1, 2, 3, and 4 of Contention Utah L.

Respectfully submitted,

Sherwin E. Turk  
Counsel for NRC Staff

Dated at Rockville, Maryland  
this 30th day of January 2001

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<sup>13</sup> PFS has indicated that it intends to submit new information concerning certain geotechnical issues in March 2001. See Material Fact No. 17; letter from E. William Brach to John D. Parkyn, dated January 19, 2001; letter from John D. Parkyn to Mark Delligatti, dated December 22, 2000; and letter from John D. Parkyn to Mark Delligatti, dated December 11, 2000. In view of the fact that PFS has not yet submitted that new information, the Staff expresses no position on Material Fact No. 17. See Ofoegbu Affidavit at ¶16. However, based on PFS' description of the additional work it intends to perform, the Staff believes that PFS' additional geotechnical work does not relate to the issues raised in Contention Utah L and does not affect the Staff's conclusions concerning the Applicant's motion for summary disposition of this contention. *Id.*

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PRIVATE FUEL STORAGE, L.L.C. ) Docket No. 72-22-ISFSI  
 )  
(Independent Spent Fuel )  
Storage Installation) )

AFFIDAVIT OF JOHN STAMATAKOS

COUNTY OF BEXAR )  
 ) SS:  
STATE OF TEXAS )

John Stamatakos, having first been duly sworn, does hereby state as follows:

1. I am employed as a Senior Research Scientist at the Center for Nuclear Waste Regulatory Analysis (CNWRA), which is division of the Southwest Research Institute (SwRI), in San Antonio, Texas. I am providing this affidavit under a technical assistance contract between the NRC Staff and SwRI. A statement of my professional qualifications is attached hereto.

2. This Affidavit is prepared in response to the "Applicant's Motion for Summary Disposition of Utah Contention L" ("Motion"), filed on December 30, 2000, by Private Fuel Storage L.L.C. ("Applicant" or "PFS"), and the "Statement of Material Facts on Which No Genuine Dispute Exists" ("Statement of Material Facts") attached thereto.

3. As part of my official responsibilities, I reviewed the adequacy of the Applicant's investigations of site and subsurface conditions pertaining to geologic and seismic matters, as described in the Applicant's Safety Analysis Report ("SAR"), as revised through Rev. 13 (June 28, 2000). I further assisted in preparing the Staff's related safety evaluation of these matters, presented in section 2.1.6 of the NRC Staff's "Safety Evaluation Report Concerning the Private

Fuel Storage Facility” (“SER”), issued on September 29, 2000. Therein, the Staff reviewed the information provided by the Applicant against applicable regulatory criteria and concluded, *inter alia*, that the Applicant’s site and subsurface investigations pertaining to geologic conditions, potential seismicity, and ground motion were adequate (see SER at §§ 2.1.6 and 2.2).

4. In addition, I assisted in preparing the “NRC Staff Position Concerning Utah Contention L” (“Statement of Position”), issued on April 28, 2000. As set forth therein, the Staff’s review of the PFS SAR concluded that the additional geological and geophysical information acquired by PFS in response to the Staff’s RAIs, following the submission of Contention Utah L, were sufficient to adequately address the concerns raised by the State in Contention Utah L.

5. Also as part of my official responsibilities, I have reviewed the Applicant’s Motion, Statement of Material Facts, and the attachments thereto, in which PFS seeks summary disposition of Subparts 1, 2, 3, and 4 of Utah Contention L. On the basis of my review of the Applicant’s SAR and its responses to the Staff’s Requests for Additional Information (“RAIs”), I am satisfied, with respect to Subparts 1 and 2 of the contention, that the Statement of Material Facts attached to the Applicant’s Motion is correct, except that I believe certain statements of fact should be clarified or corrected as set forth below.<sup>14</sup>

#### **Basis 1: Surface Faulting**

6. Material Fact No. 6 should be corrected to read:

6. Seismogenic faults are faults ~~are faults~~ capable of generating earthquakes and in turn vibratory ground motion. Coppersmith Dec. at ¶10.

7. Material Fact No. 8 should be modified to read::

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<sup>14</sup> In the following discussion, proposed changes to the Applicant’s Statement of Material Facts are indicated by underlining (insertions) or underlining and strikeout (deletions).

8. Analysis of proprietary industry gravity and seismic reflection data for Skull Valley, geochronology investigation, and aerial photo survey and geologic mapping investigations were analyzed, all of which suggested that the (primary) structural grain of the valley trends northwest-southeast. runs Northwest. Coppersmith Dec. at ¶56; Clark Dec. at ¶14; SER at 2-30 - 2-32; see Allison Dep. at 319-20.

8. Material Fact No. 10 should be corrected to read:

10. Two initial lines of seismic reflection ~~date~~ data were collected along Lines PFSF-98-A and PFSF-98-B, which were analyzed for the presence of faults. Coppersmith Dec. at ¶43; Clark Dec. at ¶¶7-9.

9. Material Fact No. 11 should be corrected to read:

11. Based on the initial data, ~~to~~ two additional lines, PFSF-98-C and PFSF-98-D, were properly located perpendicular to the structural grain of the area as supported by the geologic setting of the region and oblique to the features noted in the analysis of Line PFSF-98-A. Coppersmith Dec. at ¶¶ 43, 47, 57; Clark at ¶10.

10. Material Fact No. 17 should be clarified to read:

17. Any other characterization of Hickman Knolls than that used by PFS, consistent with available geologic information, would result in a lower vibratory ground motion hazard. Coppersmith Dec. at ¶26; SER at 2-31 - 2-32.

11. Material Fact No. 26 should be corrected, and Material Fact No. 26A should be added, to read as follows:

26. Geomatrix conducted its fault displacement characterization hazard analysis in accordance with well accepted methodologies, consistent with the regulatory guidance provided in Regulatory Guide 1.165 (applicable to seismic source analyses) and the NRC Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, NUREG-0800, § 2.5.3. Coppersmith Dec. ¶35.

26A. Section 2.4.6.3 of NUREG-1567, Standard Review Plan for Spent Fuel Dry Storage Facilities (NRC, 2000) also provides specific criteria for the characterization of surface faulting. The methodology used by Geomatrix Consultants Inc. (1999) to characterize the surface faulting hazard at the PFS site is consistent with the guidance in NUREG 1567. NRC Staff Statement of Position at 2.

12. Material Fact No. 30 should be modified to read:

30. The East and West faults pose no threat to surface fault displacement at the PFSF site, because the surface traces of these faults do not intersect the surface area of the PFS site. they do not lie beneath the site. Coppersmith Dec. at ¶42.
13. Material Fact No. 33 should be modified to read:
33. The slip rate of faults and displacement per event are important factors to be considered in a fault displacement hazard analysis. The slip rate of faults is the most important factor for assessment of fault displacement hazard under the PFDHA methodology. Coppersmith Dec. at ¶44; SER at 2-44 - 2-45.
14. Material Fact No. 37 should be modified to read:
37. PFS's analysis of the fault displacement hazard takes into account the existence of unidentified faults as large as those already located in the site vicinity, such as faults C, D1, and F, in that because surface faulting has been shown not to be a significant hazard at the PFS site, any unidentified faults that are similar to or smaller than the faults which were evaluated would be incapable of generating significant surface faulting displacements. Coppersmith Dec. at ¶¶ 44, 46; SER at 2-44 - 2-45.
15. Material Fact No. 38 should be modified to read:
38. Only the existence of unidentified faults with higher slip rates and greater displacement than those already identified would affect the results of PFS' fault displacement hazard analysis. The Applicant's site characterization studies are adequate to demonstrate that such faults are not present at the PFS site. Coppersmith Dec. at ¶¶44, 47; SER at 2-44 - 2-45; NRC Staff Statement of Position at 2.
16. Material Fact No. 39 should be corrected to read:
39. Geomatrix collected high resolution shear wave seismic reflection data to examine the recency of fault activity along those faults identified in data from an a Geosphere ~~p-wave~~ p-wave seismic reflection study of bedrock faults. Coppersmith Dec. at ¶48; Clark at ¶6.
17. Material Fact No. 46 should be corrected to read:
46. The "earthquake approach" is a well-established technically sound method of evaluating fault displacement hazards and has been employed in the Yucca Mountain Project study. Coppersmith Dec. at ¶55; SER at 2-27.

**Basis 2: Ground Motion**

18. Material Fact No. 2 should be corrected to read:

2. Subsequent to the filing of Contention Utah L, Applicant has incorporated the potential effect of near-surface faults in developing revised design basis ground motions, utilizing ~~the methodology models~~ identified in the paper by Somerville et al. cited by the State in Basis 2 of Utah L. Youngs Dec. at ¶¶4-6.

19. Material Fact No. 3 should be corrected to read:

3. In developing revised design basis ground motions, Applicant appropriately and adequately ~~implemented~~ utilized the Somerville et al. ~~methodology models~~ for incorporating the potential effect of near-surface faults in the estimation of ground motions. Youngs Dec. at ¶¶5-7; Arabasz Dep. at 63-66; Staff Statement of Position at 3; SER at 2-38-2.40.

20. Notwithstanding the modifications and corrections set forth above, I agree with the Applicant's view that the concerns raised by the State of Utah in Bases 1 and 2 of Contention Utah L have been addressed satisfactorily by the Applicant, and no genuine dispute of material fact exists with respect to these matters.

21. I hereby certify that the foregoing is true and correct to the best of my knowledge, information and belief.

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John Stamatakos

Sworn to before me this  
30th day of January 2001

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Notary Public

My commission expires: \_\_\_\_\_

**JOHN STAMATAKOS**  
**Senior Research Scientist**  
**Center for Nuclear Waste Regulatory Analyses**  
**Southwest Research Institute**

**B.S., Geology, Franklin and Marshall College, Lancaster, Pennsylvania, 1981**

**M.S., Geology, Lehigh University, Bethlehem, Pennsylvania, 1988**

**Ph.D., Geology, Lehigh University, Bethlehem, Pennsylvania, 1990**

Dr. Stamatakos is a structural geologist and geophysicist with international research experience in regional and global tectonics. Dr. Stamatakos has conducted research on a range of topics including paleomagnetism, neotectonics, kinematics of fault block rotations in strike-slip, normal, and thrust fault systems, effects of internal strain on the magnetic properties of deformed rocks, evolution of curvature in arcuate mountain belts, and age and sequence of deformation in folded and faulted mountain belts. This research has focused on the northern and central Appalachians in the eastern United States and Canada, the Hercynian mountains in Germany and northern Spain, the Rocky Mountains and Basin and Range in the western United States, and the northern Cordilleran Mountains in Alaska. Other strengths include numerical modeling of deformation, magnetostratigraphy, rock magnetism, and exploration geophysics.

As a Research Scientist in the Center for Nuclear Waste Regulatory Analyses, Dr. Stamatakos is a Principal Investigator for structural deformation and seismicity, including tectonics and neotectonics research. Tectonics research at CNWRA currently includes compiling a tectonics Geographic Information System (GIS) database, field analyses of the structural and tectonic elements of the Basin and Range province in southwestern United States, evaluation of seismic and faulting hazards at nuclear facilities, and the development of tectonic models for the region surrounding the proposed high-level nuclear waste repository at Yucca Mountain, Nevada. These investigations, sponsored by the U.S. Nuclear Regulatory Commission, currently support development of the tectonic framework for evaluation of risk of earthquakes and volcanic activity, and the effects of structures and tectonic processes on groundwater flow in the region surrounding Yucca Mountain.

Prior to coming to CNWRA, Dr. Stamatakos held positions as a visiting faculty at the University of Michigan and as a postdoctoral fellow at the Eidgenössische Technische Hochschule (ETH) in Zurich, Switzerland. At the University of Michigan, Dr. Stamatakos taught courses in field mapping, structural geology, geophysics, and tectonics.

Dr. Stamatakos has written or collaborated on nearly 50 papers and reports on structural geology, tectonics, and geophysics. He has made presentations at international conferences in the U.S., Canada, and Europe and has won an outstanding paper award from the American Geophysical Union. Dr. Stamatakos is associate editor of the Geological Society of America Bulletin, GP Editor for EOS of the American Geophysical Union, and is a regular reviewer of papers for the Journal of Geophysical Research, Earth and Planetary Science Letters, Reviews of Geophysics, Journal of Structural Geology, Physics of the Earth and Planetary Sciences, and Geophysical Research Letters as well as grant proposals for the National Science Foundation.

**Professional Chronology:** Petroleum Geologist, Analex Geosciences, 1981–1983; Research and Teaching Assistant, Lehigh University, 1984–1990; Research Fellow, Eidgenössische Technische Hochschule, Switzerland, 1990–1992, Visiting Assistant Professor, University of Michigan, 1992–1995, Research Scientist, Southwest Research Institute, Center for Nuclear Waste Regulatory Analyses, 1995–Present.

**Memberships:** Geological Society of America, American Geophysical Union, Sigma Xi.

January 30, 2001

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In the Matter of )  
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PRIVATE FUEL STORAGE, L.L.C. ) Docket No. 72-22-ISFSI  
 )  
(Independent Spent Fuel )  
Storage Installation) )

AFFIDAVIT OF GOODLUCK I. OFOEGBU

COUNTY OF BEXAR )  
 ) SS:  
STATE OF TEXAS )

Goodluck I. Ofoegbu, having first been duly sworn, does hereby state as follows:

1. I am employed as a Senior Research Engineer at the Center for Nuclear Waste Regulatory Analysis (CNWRA), which is division of the Southwest Research Institute (SwRI), in San Antonio, Texas. I am providing this affidavit under a technical assistance contract between the NRC Staff and SwRI. A statement of my professional qualifications is attached hereto.

2. This Affidavit is prepared in response to the "Applicant's Motion for Summary Disposition of Utah Contention L" ("Motion"), filed on December 30, 2000, by Private Fuel Storage L.L.C. ("Applicant" or "PFS"), and the "Statement of Material Facts on Which No Genuine Dispute Exists" ("Statement of Material Facts") attached thereto.

3. As part of my official responsibilities, I reviewed the adequacy of the Applicant's investigations of site and subsurface conditions pertaining to soils issues as described in the Applicant's Safety Analysis Report ("SAR"), as revised through Rev. 13 (June 28, 2000). I further assisted in preparing the Staff's related safety evaluation of these matters, presented in section 2.1.6 of the NRC Staff's "Safety Evaluation Report Concerning the Private Fuel Storage

Facility” (“SER”), issued on September 29, 2000. Therein, the Staff reviewed the information provided by the Applicant against applicable regulatory criteria and concluded, *inter alia*, that the Applicant’s site and subsurface investigations pertaining to the characterization of subsurface soils, soil stability and foundation loading were adequate (see SER at §§ 2.1.6.4 and 2.2).

4. In addition, I assisted in preparing the “NRC Staff Position Concerning Utah Contention L” (“Statement of Position”), issued on April 28, 2000. As set forth therein, the Staff’s review of the PFS SAR concluded that the additional geological and geophysical information acquired by PFS in response to the Staff’s RAIs, following the submission of Contention Utah L, including information pertaining to surface and subsurface soils at the site, were sufficient to adequately address the concerns raised by the State in Contention L.

5. Also as part of my official responsibilities, I have reviewed the Applicant’s Motion, its Statement of Material Facts, and the attachments thereto, in which PFS seeks summary disposition of Subparts 1, 2, 3, and 4 of Utah Contention L. On the basis of my review of the Applicant’s SAR and its responses to the Staff’s Requests for Additional Information (“RAIs”), I am satisfied, with respect to Subparts 3 and 4 of the contention, that the Statement of Material Facts attached to the Applicant’s Motion is correct, except that I believe certain statements of fact should be clarified or corrected, as set forth below.<sup>15</sup>

### **Basis 3: Characterization of Subsurface Soils**

#### **Part a: Subsurface investigations**

6. Material Fact No. 13 should be modified to read:

13. A determination was made after the initial tests that the soil properties at the PFSF site are reasonably uniform in the horizontal direction (that is, across the various site locations). Because of this

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<sup>15</sup> In the following discussion, proposed changes to the Applicant’s Statement of Material Facts are indicated by underlining (insertions) or underlining and strikeout (deletions).

apparent uniformity, the Applicant determined it was unnecessary to establish a denser set of borings in the pad emplacement area than the one initially provided. Trudeau Dec. at ¶17.

7. Material Fact No. 23 should be modified to read:

23. The original (pre-Utah L) and supplemental investigations have provided an accurate adequate characterization of the thickness, extent and composition of the subsoil at the site. Trudeau Dec. at ¶24; SER at 2-46; NRC Staff Statement of Position at 4.

8. Material Fact No. 32 should be modified to read:

32. Potential weather-related geochemical effects on the foundations of the structures, if any, will be rendered insignificant will be eliminated by the use of soil cement under the pads and by the installation of a surface rainfall collection system that will divert rainwater away from the structures. Trudeau Dec. at ¶29; NRC Staff Statement of Position at 4.

#### **Part b: Sampling and Analysis**

9. Material Fact No. 44 should be clarified to read:

44. The second layer of soil beneath the ground surface (Layer 1B or PFS Layer 2) is the weakest soil layer at the site Layer 2 of soil is the only layer of concern from the standpoint of soil strength. Trudeau Dec. at ¶25; Bartlett Dep. at 522-23; SER at 2-47; NRC Staff Statement of Position at 5.

10. Material Fact No. 50 should be clarified to read:

50. There are few if any remaining The PFS SAR adequately considers any significant uncertainties associated with the thickness and extent of various materials existing at the site. Trudeau Dec. at ¶40; Bartlett Dep. at 18; SER at 2-48, 2-54; NRC Staff Statement of Position at 4-5.

11. Material Fact No. 60 should be corrected to read:

60. PFS conducted stress-controlled cyclic triaxial tests, and resonant column tests, which are a form of strain-controlled cyclic triaxial tests. PFS also performed seismic cone penetration tests, which measured a number of parameters including seismic shear and pressure wave velocities of the soils within the upper 30 ft of the profile. Trudeau Dec. at ¶33.

12. Material Fact No. 61 should be clarified to read:

61. Because the soil tests performed by PFS provide sufficient information to characterize soils at the site, no soils tests were needed beyond those carried out by PFS. Trudeau Dec. at ¶¶42-46; SER at 2-48, 2-54;NRC Staff Statement of Position at 5.

13. Material Fact No. 63 should be clarified to read:

63. The value of undrained shear strength used as a design parameter was appropriate, since it was based on a sufficient number of samples. Further, contrary to the State of Utah's allegation, the undrained shear strength and it is not affected by any "mobilization" in response to the any free field ground motion, nor by seismic cycling. Trudeau Dec. at ¶43.

#### **Basis 4: Soil Stability and Foundation Loading**

14. Material Fact No. 97 should be added, to read:

97. All issues concerning Basis 4 of contention Utah L have been satisfactorily resolved. See, e.g., Staff Statement of Position dated April 28, 2000, at 5-6; SER at 2-47, 2-55; Solomon Dep. at 32-32; Bartlett Dep. at 16, 514; *Id.* at 469 (Chancellor).

15. Notwithstanding the modifications and corrections set forth above in paragraphs 6-14 above, I agree with the Applicant's view that the concerns raised by the State of Utah in Bases 3 and 4 of Contention Utah L have been addressed satisfactorily by the Applicant, and no genuine dispute of material fact exists with respect to these matters.

16. No opinion is expressed herein with respect to Material Fact No. 17, which describes additional borings to be performed by PFS, and which PFS has indicated will be the subject of further information to be submitted in March 2001. Based on PFS' description of the additional work it intends to perform, I understand that these borings do not relate to the issues raised in Contention Utah L, and I do not expect these additional borings to affect the conclusions reached herein concerning this contention.

17. I hereby certify that the foregoing is true and correct to the best of my knowledge, information and belief.

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Goodluck I. Ofoegbu

Sworn to before me this  
30th day of January 2001

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Notary Public

My commission expires: \_\_\_\_\_

**GOODLUCK I. OFOEGBU**  
**Senior Research Engineer**  
**Center for Nuclear Waste Regulatory Analyses**  
**Southwest Research Institute**

**B.Sc., Geology, University of Nigeria, Nsukka, 1977**  
**M.A.Sc., Geological Engineering, University of Toronto, Canada, 1981**  
**Ph.D., Geological Engineering, University of Toronto, Canada, 1985**

Dr. Ofoegbu is a geological engineer specializing in the mechanical analyses of geological processes, finite element modeling, and the constitutive modeling of geological materials. He has a background in geoscience, geomechanics and computer software development; and about 20 years of experience in teaching, research, and consulting.

As a senior research engineer at the Southwest Research Institute, Dr. Ofoegbu has led several numerical modeling projects to investigate technical issues related to possible licensing of a geologic repository for high level nuclear waste at Yucca Mountain, such as: Evaluation of a finite element code, ABAQUS, for modeling thermal-mechanical-hydrological coupled processes; and investigations of ground motion patterns resulting from numerically simulated normal fault earthquakes, effects of perched water on thermally driven moisture flow, effects of spatial and time-dependent rock-mass property variations on the stability of underground openings and groundwater flow, and effects of regional crustal density variations on patterns of small-volume basaltic volcanism. Other numerical modeling investigations led by Dr. Ofoegbu include finite element analyses of geologic finite strain for fracture distribution predictions and numerical simulation of a deforming salt body. He has also participated in the development of review procedures for an anticipated license application for the proposed Yucca Mountain repository, technical review of uranium recovery site reclamation plans under the Uranium Mill Tailings Radiation Control Act, and a safety evaluation report for an Independent Spent Fuel Storage Installation.

Dr. Ofoegbu was a research engineer at the University of Toronto for five years, during which time he was the Principal Investigator for an industrial contract on the development and numerical implementation of a constitutive model for geological materials. He developed constitutive models for intact rock, non-lithified soils, and regularly jointed rock mass; implemented the models as user-defined code modules in ABAQUS (a commercially available finite element code); and conducted finite element modeling of the Atomic Energy of Canada Limited's mine-by experiment tunnel.

As an Assistant Professor at the Ahmadu Bello University, Nigeria, in the Department of Civil Engineering, Dr. Ofoegbu taught courses and supervised student research projects in the areas of soil mechanics, earthwork, and foundation engineering, and served as Principal Consultant on industrial site-investigation contracts.

Dr. Ofoegbu has published 25 articles in refereed journals and conference proceedings, as well as several technical reports. He is a member of the International Society for Rock Mechanics and the American Rock Mechanics Association. He is a registered professional engineer in Canada.

**PROFESSIONAL CHRONOLOGY:** Senior Research Engineer, Southwest Research Institute, 1993–Present; Consulting Engineer, GI-Johnson Engineering, 1991–93; Research Engineer, University of Toronto, 1987–92; Assistant Professor, Ahmadu-Bello University, 1985–87; Teaching/Research Assistant, University of Toronto, 1980–85; Hydrogeologist, Lower Benue Development Authority, 1978–79; Mathematics/Physics Teacher, Ogun State of Nigeria, 1977–78.

## Goodluck I. Ofoegbu Publications

### Reviewed Scientific Journal Articles

- Newman, A.V., T.H. Dixon, G.I. Ofoegbu, and J.E. Dixon. In press. Geodetic and seismic constraints on recent activity at Long Valley Caldera, California: evidence for viscoelastic rheology. *Journal of Volcanology and Geothermal Research*.
- Ofoegbu, G.I., S. Painter, R. Chen, R.W. Fedors, and D.A. Ferrill. In press. Geomechanical and thermal effects on moisture flow at the proposed Yucca Mountain nuclear waste repository. *Nuclear Technology* 127.
- Connor, C.B., J.A. Stamatakos, D.A. Ferrill, B.E. Hill, G.I. Ofoegbu, and F.M. Conway. 2000. Volcanic hazards at the proposed Yucca Mountain, Nevada, high-level radioactive waste repository I: Geologic factors controlling patterns of small-volume basaltic volcanism. *Journal of Geophysical Research* 105(1): 417–432.
- Ofoegbu, G.I., A.C. Bagtzoglou, R.T. Green, and A. Muller. 1999. Effects of perched water on thermally driven moisture flow at the proposed Yucca Mountain repository for high-level waste. *Nuclear Technology* 125: 235–253.
- Ofoegbu, G.I., and D.A. Ferrill. 1998. Mechanical analyses of listric normal faulting with emphasis on seismicity assessment. *Tectonophysics* 284: 65–77.
- Curran, J.H., and G.I. Ofoegbu. 1993. Modeling discontinuities in numerical analysis. In J.A. Hudson (ed.). *Comprehensive Rock Engineering* (Chapter 18). Pergamon Press, New York, 1:443–468.
- Ofoegbu, G.I., and J.H. Curran. 1992. Deformability of intact rock. *International Journal of Rock Mechanics and Mining Sciences & Geomechanics Abstracts* 29(1):35–48. Also abstracted in *Applied Mechanics Reviews* 45(5), abstract #293.
- Ofoegbu, G.I., and J.H. Curran. 1991. Yielding and damage of intact rock. *Canadian Geotechnical Journal* 28(4): 503–516.
- Curran, J.H., and G.I. Ofoegbu. 1987. A solution procedure for thermal, elastic, plastic, and fluid-induced deformations in granular media. In A.P.S. Selvadurai (ed.). *Developments in Engineering Mechanics: Studies in Applied Mechanics* 16:329–345.
- Ofoegbu, G.I., and J.H. Curran. 1987. Rotation of principal stresses near a heated fracture in a bituminous sand. *Canadian Geotechnical Journal* 24:357–365.
- Kenney, T.C., R. Chahal, E. Chiu, G.I. Ofoegbu, G.N. Omenge, and C.A. Ume. 1985. Controlling constriction sizes of granular filters. *Canadian Geotechnical Journal* 22(1): 32–43. (Discussion in 23: 97–98).
- Kenney, T.C., D. Lau, and G.I. Ofoegbu. 1984. Permeability of compacted granular materials. *Canadian Geotechnical Journal* 21(4): 726–729.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of )  
 )  
PRIVATE FUEL STORAGE L.L.C. ) Docket No. 72-22-ISFSI  
 )  
(Independent Spent )  
Fuel Storage Installation) )

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF UTAH CONTENTION L (GEOTECHNICAL)" in the above captioned proceeding have been served on the following through deposit in the NRC's internal mail system, with copies by electronic mail, as indicated by an asterisk, or by deposit in the U.S. Postal Service, as indicated by double asterisk, with copies by electronic mail this 30<sup>th</sup> day of January, 2001:

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