

August 20, 1999

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 OBJECTIONS AND RESPONSES
TO THE STATE OF UTAH'S SECOND SET OF
DISCOVERY REQUESTS DIRECTED TO THE NRC STAFF

INTRODUCTION

Pursuant to the Atomic Safety and Licensing Board's August 5, 1999, "Order (Granting Motion for Extension of Time to Respond to Discovery Requests," and 10 C.F.R. § 2.714(c), the staff of the Nuclear Regulatory Commission (Staff) hereby files its objections and responses to the "State of Utah's Second Set of Discovery Requests Directed to the NRC Staff" (State's Second Discovery Request).

GENERAL OBJECTIONS

Objection 1. The Staff objects to each of the State's discovery requests, in that the State has not complied with the Commission's regulations that govern discovery from the Staff. In this regard, it is well established that discovery against the Staff rests on a different footing than discovery in general. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-634, 13 NRC 96, 97-98 (1981). While discovery from parties in an NRC

adjudicatory proceeding is generally governed by the provisions of 10 C.F.R. § 2.740 *et seq.*, interrogatory and document discovery against the Staff is governed by the provisions of 10 C.F.R. §§ 2.720(h)(ii)-(iii), 2.744 and 2.790.¹ These regulations establish certain limits to the Staff's obligation to respond to requests for discovery.

In particular, with regard to interrogatories, the Commission's rules provide:

[A] party may file with the presiding officer written interrogatories to be answered by NRC personnel with knowledge of the facts designated by the Executive Director for Operations. Upon a finding by the presiding officer that answers to the interrogatories are necessary to a proper decision in the proceeding and that answers to the interrogatories are not reasonably obtainable from any other source, the presiding officer may require that the staff answer the interrogatories.

10 C.F.R. § 2.720 (h)(2)(ii). With regard to requests for the production of documents, the Commission's rules similarly provide:

(a) A request for the production of an NRC record or document not available pursuant to 10 C.F.R. § 2.790 shall set forth the records or documents requested, either by individual item or by category, and shall describe each item or category with reasonable particularity and shall state why that record or document is relevant to the proceeding.

(b) If the Executive Director for Operations objects to producing a requested record or document on the ground that (1) it is not relevant or (2) it is exempted from disclosure under § 2.790 and the disclosure is not necessary to a proper decision in the proceeding or the document or the information

¹ See also 10 C.F.R. §§ 2.740(f)(3), 2.740a(j), 2.740b(a), and 2.741(e) (excluding discovery from the Staff from the general provisions of those regulations).

therein is reasonably obtainable from another source, he shall so advise the requesting party.

10 C.F.R. § 2.744(b). The rule further provides for application by the requesting party to the presiding officer to compel production of the documents, where the movant shows that the document is relevant to the issues in the proceeding; and the document is not exempt from disclosure under 10 C.F.R. § 2.790 -- or, if exempt, that the document or information is necessary to a proper decision in the proceeding and is not reasonably obtainable from another source. 10 C.F.R. §§ 2.744(c)-(d).²

Moreover, it is an adequate response to *any* discovery request for a party to state that the information or document requested is available in the public domain and to provide information to locate the material requested. 10 C.F.R. § 2.740(b)(1); *accord, Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 1), CLI-79-8, 10 NRC 141, 147-148 (1979).

Here, the State has not complied with any of the Commission's requirements governing discovery against the Staff. First, the State has not indicated that the requested documents and information are not available in the public domain. In this regard, the Staff notes that much of the requested information and documents are, in fact, readily available to the State through its access to publicly available documents. The State, moreover, is well

² Additionally, 10 C.F.R. § 2.744(e) provides a framework for limited disclosure (under a protective order) of documents exempt from disclosure under 10 C.F.R. § 2.790, upon a finding by the presiding officer that such disclosure is necessary to a proper decision in the proceeding. *Cf.* 10 C.F.R. § 2.740(c).

aware of the fact that many of the requested documents are available in the public domain, having been informed long ago that documents are available in the Public Document Room (PDR) or the Local PDR (LPDR) that was established in Salt Lake City. Second, the State has not indicated, as is required under Commission regulations, that the requested information and documents are exempt from disclosure under 10 C.F.R. § 2.790 and that it can not obtain the documents from public sources. Similarly, to the extent that the documents may be exempt from disclosure, the State has not indicated that each of the exempt items is necessary to a proper decision in the proceeding. Further, as set forth in Objection 2 below, the State has not shown that the requested documents are relevant to the issues in this proceeding. For all of these reasons, the Staff objects to the State's discovery requests.

Objection 2. The Staff objects to each of the State's discovery requests, insofar as they request information that is not relevant to the issues in this proceeding and/or that exceeds the scope of admitted contentions in this proceeding.

Objection 3. The Staff objects to the State's discovery requests insofar as they relate to matters which are outside the jurisdiction of the NRC and/or are beyond the proper scope of this proceeding.

Objection 4. The Staff objects to each of the State's discovery requests, insofar as they request information or documents from the "Nuclear Regulatory Commission" or the "NRC," or other persons or entities who are not members of the NRC Staff or consultants to the Staff in this proceeding. *See, e.g.*, Instruction A, "Scope of Discovery"; and Definition

1 (Request at 1-2, 4). The NRC and persons other than NRC Staff members (*e.g.*, the Commissioners, Commissioners' Assistants, Licensing Board members, ACRS members, etc.) are not parties to this proceeding and are not properly subject to the State's requests for discovery in this proceeding.

Objection 5. The Staff objects to each of the State's discovery requests, insofar as they seek to impose an obligation to respond that is different from or greater than the obligations imposed by Commission regulations, as set forth in 10 C.F.R. Part 2. *See, e.g.*, Instruction B, "Lack of Information" (Request at 2).

Objection 6. The Staff objects to each of the State's discovery requests, insofar as they may request information or documents protected under the attorney-client privilege, the doctrines governing the disclosure of attorney work product and trial preparation materials, and/or any other privilege or exemption that warrants or permits the non-disclosure of documents under the Freedom of Information Act, as set forth in 10 C.F.R. § 2.790(a). Notwithstanding this objection, the Staff is preparing a privilege log to identify documents that are sought to be withheld from discovery as privileged, and will produce that log to the State.

Objection 7. The Staff objects to each of the State's discovery requests, insofar as they seek information or documents at this time pertaining to the potential hazard presented by a military aircraft crash at the PFS ISFSI site, as to which the Staff has not yet taken a position in this proceeding. Notwithstanding this objection, however, the Staff views the State's discovery requests as continuing in nature and will timely supplement its responses

to the State's discovery requests after it has completed its review of this issue and is able to state a position thereon.

RESPONSE TO THE STATE'S DISCOVERY REQUESTS

Notwithstanding the above objections to the State's Second Discovery Request, and without waiving these objections or its right to interpose these or other objections in the future, the Staff hereby voluntarily provides the following responses to the State's discovery requests.

I. GENERAL DISCOVERY

A. GENERAL INTERROGATORIES

The State requests that, pursuant to the Staff's continuing obligation to respond to discovery, the Staff supplement its response to the State's General Interrogatories Nos. 1 through 5 (from "State of Utah's First Set of Discovery Requests Directed to the NRC Staff," dated June 10, 1999, at pp. 9-10) with additional information pertinent to its response to this "State of Utah's Second Set of Discovery Requests Directed to the NRC Staff."

STAFF RESPONSE. The Staff will supplement its responses to the "State of Utah's First Set of Discovery Requests Directed to the NRC Staff" in accordance with applicable NRC requirements governing discovery.

B. GENERAL DOCUMENT REQUESTS

The State requests that, pursuant to the Staff's continuing obligation to respond to discovery, the Staff supplement its response to the State's General Document Requests Nos. 1 through 3 (from "State of Utah's First Set of Discovery Requests Directed to the NRC Staff," dated June 10, 1999, at pp. 10-11) with additional information pertinent to its response to this "State of Utah's Second Set of Discovery Requests Directed to the NRC Staff."

STAFF RESPONSE. The Staff will supplement its responses to the "State of Utah's First Set of Discovery Requests Directed to the NRC Staff" in accordance with applicable NRC requirements governing discovery.

II. SPECIFIC DISCOVERY

A. REQUEST FOR ADMISSIONS – Utah Contention K

REQUEST FOR ADMISSION NO. 1: Admit that the Staff has not evaluated the risk to the proposed ISFSI posed by military training exercises conducted on Dugway Proving Ground.

STAFF RESPONSE.

Denied. The Staff did evaluate the risk to the proposed ISFSI posed by military training exercises conducted on Dugway Proving Ground. The Staff concluded that military training exercises conducted on Dugway Proving Ground would have no adverse impact on the proposed ISFSI. The Staff's evaluation relied upon the material set forth in the PFS application, as well as facts set forth in the Affidavit of George Carruth and the deposition of John Louis Matthews, attached to the Applicant's June 7, 1999, "Motion for Partial Summary Disposition of Utah Contention K and Confederated Tribes' Contention B" (Motion for Summary Disposition). The Staff considered that the firing of weapons at Dugway Proving Ground is governed by safety regulations and all range firing is monitored; guns on the firing ranges are oriented away from the proposed facility; the Cedar Mountains stand between Dugway Proving Ground and the proposed facility; and the size of munitions is relatively small, thus resulting in a negligible increase in air pressure, based on NRC Regulatory Guide 1.91. Furthermore, distances to the proposed PFSF site from the gun firing

positions are generally larger than the nominal ranges of these munitions. (Curruth Aff. at ¶ 7).

REQUEST FOR ADMISSION NO. 2: Admit that, in evaluating the risk to the proposed ISFSI posed by military training exercises conducted on Dugway Proving Ground, Staff did not evaluate the risk posed by the firing of rocket-propelled munitions with ranges of up to 30 kilometers (18.64 miles), fired from positions less than 15 miles away from the ISFSI site.

STAFF RESPONSE. Admitted.

REQUEST FOR ADMISSION NO. 3: Admit that, in evaluating the risk to the proposed ISFSI posed by activities pertaining to Dugway Proving Ground, Staff did not evaluate the risk posed by buried and as-yet undiscovered explosive, chemical, or biological munition from past military testing and training activities associated with Dugway Proving Ground located within its boundaries.

STAFF RESPONSE.

Denied. The Staff did evaluate the risk posed by buried and as-yet undiscovered explosive, chemical, or biological munitions from past military testing and training activities associated with Dugway Proving Ground located within its boundaries. The Staff considered that unexploded and as-yet undiscovered explosive munitions within the Dugway Proving Ground boundaries do not have any credible effect on the proposed PFSF due to the small quantity of explosive, the distance involved between the two facilities, and the location of the Cedar Mountain Range relative to Dugway Proving Ground and the proposed PFSF.

The Staff considered that unexploded and as-yet undiscovered chemical and biological munitions would not present a credible hazard to the proposed facility. The Staff's conclusion is based upon the fact that an offsite accident involving chemical or

biological agents does not have a mechanism for initiating a release from the facility or compromising the integrity of the storage cask confinement barrier. Thus, in that the storage cask systems are passive, their radiological safety functions are unaffected by any chemical or biological agent that may be present at Dugway. The Staff considered that additional information provided in the Applicant's Motion for Summary Disposition further demonstrated that unexploded and as-yet discovered chemical and biological agents at Dugway Proving Ground would not pose a credible threat to the proposed ISFSI. As discussed in the Affidavit of George Carruth, attached to the Applicant's Motion for Summary Disposition, potential areas where as-yet undiscovered chemical munitions might be found are at least 15 miles away from the proposed PFSF site. The hazard zone (one percent lethality region) is about 3 miles downwind of the source of detonation of an 8 in. projectile filled with nerve agent GB (Carruth Aff. at ¶ 36), which is considerably less than the distance from Dugway to the proposed ISFSI site. Prevailing wind directions and the intervening Cedar Mountain Range will also retard the dispersion of the chemical agents toward the proposed PFSF site. Regarding biological agents, the Staff further considered information provided by the Applicant in its Motion for Summary Disposition that only one ordnance with biological stimulant (nontoxic) *Bacillus Subtillis* had been found in the Carr facility (Carruth Aff. at ¶ 37), which is about 17 miles from the proposed PFS site. Biological agents except spores decay rapidly outside a controlled environment (Carruth Aff. at ¶ 37). Additionally, biological munitions generally contain a limited quantity of agents (Carruth Aff. at ¶ 37).

REQUEST FOR ADMISSION NO. 4: Admit that, in evaluating the risk to the proposed ISFSI posed by activities pertaining to Dugway Proving Ground," Staff did not evaluate the risk posed by buried and as-yet undiscovered explosive, chemical, or biological munition from past military testing and training activities associated with Dugway Proving Ground located outside its boundaries.

STAFF RESPONSE.

Denied. The Staff has evaluated the risk posed by buried and as-yet undiscovered explosive, chemical or biological munitions from past military testing and training activities associated with Dugway Proving Ground located outside of its boundaries. First, the Staff finds it unlikely that an explosive, or a chemical or biological munition from past military testing and training activities at Dugway Proving Ground would be found near the proposed PFSF site. This conclusion is based on the distance of the Dugway weapons testing areas from the proposed ISFSI site, and the fact that the intervening Cedar Mountain Range makes it unlikely that these munitions from Dugway Proving Ground would have reached the proposed PFSF site or its vicinity. The Cedar Mountain Range is about 1,000 ft higher than both Dugway Proving Ground and the proposed PFSF site. Second, based on NRC Regulatory Guide 1.91, about 147,942 lb of TNT would have to be detonated simultaneously to create an air overpressure of 1 psi at 2,380 ft. (It should be noted that an air overpressure of 1 psi is conservative for developing structural damage.) Following the same guideline, explosions of 87,800 lb; 10,975 lb; and 170 lb of TNT are necessary for distances of 2,000 ft; 1,000 ft; and 250 ft, respectively, to develop the same air overpressure. Therefore, a munition exploding at 250 ft will not pose a threat to the facility. Regarding the risk posed

by chemical and biological agents, an offsite accident involving chemical or biological agents does not have a mechanism for initiating a release from the facility or compromising the integrity of the storage cask confinement barrier. Thus, in that the storage cask systems are passive, their radiological safety functions are unaffected by the release of any chemical or biological agent.

REQUEST FOR ADMISSION NO. 5: Admit that, in evaluating the risk to the proposed ISFSI posed by activities pertaining to Dugway Proving Ground," Staff did not evaluate the risk posed by detonation of unstable explosive munitions at sites fewer than 2,380 feet from the proposed ISFSI.

STAFF RESPONSE.

Denied. The Staff did consider the detonation of unstable explosive munitions at sites closer than 2,380 ft from the proposed PFSF. The Staff's evaluation was based on NRC Regulatory Guide 1.91. This Regulatory Guide recommends an approach to estimate the amount of explosive necessary to develop an air overpressure of 1 psi from a given distance. Based upon Figure 1.1-2 of the PFS SAR, the distance of the cask storage pads from the controlled area boundary is about 2,000 ft. Based upon the recommended guideline of Reg. Guide 1.91, explosion of about 87,800 lb of TNT is required to develop an air overpressure of 1 psi. Following the same guideline, about 10,975 lb and 170 lb of TNT are necessary at distances of 1,000 ft and 250 ft, respectively, to develop the same air overpressure. It should be noted that an air overpressure of 1 psi is conservative for developing structural damage. Therefore, the Staff did assess the impact of the detonation of explosive munitions at sites fewer than 2,380 feet from the proposed facility.

REQUEST FOR ADMISSION NO. 6: Admit that the probability of aircraft hazard to the proposed ISFSI posed by military flights traveling through Skull Valley to or from the Utah Test and Training Range (UTTR) north and south areas is an aircraft hazard factor³ that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request, in that it pertains to military aircraft hazards, a subject upon which the Staff has not yet taken a position. Notwithstanding this objection, the Staff views the State's discovery requests as continuing in nature and will timely supplement its responses to this request after it has completed its review of this issue and is able to state a position thereon.

REQUEST FOR ADMISSION NO. 7: Admit that Staff has not evaluated the probability of aircraft hazard⁴ to the proposed ISFSI posed by military flights traveling through Skull Valley to or from the UTTR north and south areas.

STAFF RESPONSE.

The Staff objects to this request, in that it pertains to military aircraft hazards, a subject upon which the Staff has not yet taken a position. Notwithstanding this objection, the Staff views the State's discovery requests as continuing in nature and will timely supplement its responses to this request after it has completed its review of this issue and is able to state a position thereon.

³ See State's Second Discovery Request, Definition II.K.

⁴ See State's Second Discovery Request, Definition II.L.

REQUEST FOR ADMISSION NO. 8: Admit that the probability of hazard to the proposed ISFSI posed by military flights flying to and from Michael Army Air Field, Dugway Proving Ground through Skull Valley is an aircraft hazard factor that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request, in that it pertains to military aircraft hazards, a subject upon which the Staff has not yet taken a position. Notwithstanding this objection, the Staff views the State's discovery requests as continuing in nature and will timely supplement its responses to this request after it has completed its review of this issue and is able to state a position thereon.

REQUEST FOR ADMISSION NO. 9: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by military flights flying to and from Michael Army Air Field, Dugway Proving Ground through Skull Valley.

STAFF RESPONSE.

The Staff objects to this request, in that it pertains to military aircraft hazards, a subject upon which the Staff has not yet taken a position. Notwithstanding this objection, the Staff views the State's discovery requests as continuing in nature and will timely supplement its responses to this request after it has completed its review of this issue and is able to state a position thereon.

REQUEST FOR ADMISSION NO. 10: Admit that the probability of hazard to the proposed ISFSI posed by private flights flying in the vicinity of the proposed ISFSI is an aircraft hazard factor that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request on the grounds that the term "private flights" is undefined and vague. If, however, the term "private flights" is understood to mean flights by general aviation aircraft, this request is admitted.

REQUEST FOR ADMISSION NO. 11: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by private flights flying in the vicinity of the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request on the grounds that the term "private flights" is undefined and vague. If, however, the term "private flights" is understood to mean flights by general aviation aircraft, this request is denied. The Staff has evaluated the Applicant's analysis of the aircraft hazard to the proposed ISFSI posed by general aviation aircraft flying in the vicinity of the proposed ISFSI. The Staff considered the aircraft hazard probability to be very low. The proposed PFSF is located in the Sevier B Military Operating Area (MOA), which is adjacent to the airspace of Restricted Areas R6406 and R6402. Both R6406 and R6402 extend up to 58,000 ft. Sevier B MOA airspace extends up to 9,500 ft. Although general aviation aircraft can transit the MOA, it is unlikely that these aircraft will routinely transit the MOA given the proximity of the Sevier B MOA to restricted airspace. Therefore, a crash involving general aviation aircraft is not considered to be a significant hazard for the proposed PFSF site.

REQUEST FOR ADMISSION NO. 12: Admit that the probability of hazard to the proposed ISFSI posed by commercial aircraft flying in the vicinity of the proposed ISFSI is an aircraft hazard factor that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE. Admitted.

REQUEST FOR ADMISSION NO. 13: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by commercial aircraft flying in the vicinity of the proposed ISFSI.

STAFF RESPONSE.

Denied. The Staff has evaluated the applicant's analysis of the aircraft hazard to the proposed ISFSI posed by commercial aircraft flying in the vicinity of the proposed ISFSI. The Staff's evaluation was conducted in accordance with NUREG-0800, Section 3.5.1.6. The Staff concluded that a crash involving commercial aircraft is not a credible hazard for the proposed PFSF site.

REQUEST FOR ADMISSION NO. 14: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by ascending or descending commercial aircraft flying in the vicinity of the proposed ISFSI.

STAFF RESPONSE.

Denied. The Staff has evaluated the applicant's analysis of the probability of aircraft hazard to the proposed ISFSI posed by a commercial aircraft. The total probability of such hazard is extremely low, both for commercial aircraft flying on the J-56 and V-257 routes, and for general aviation aircraft flying from nearby municipal airports, due to the distances involved.

NUREG-0800, Section 3.5.1.6 does not address or set forth criteria for an evaluation based on the ascending or descending status of commercial aircraft when not close to an airport.

REQUEST FOR ADMISSION NO. 15: Admit that the Salt Lake International Airport projects an increase in the number of commercial aircraft flying into and out of the airport. *See*, e.g., Resnikoff July 21, 1999 (sic) Decl. (in opposition to PFS Motion for Summary Disposition on Contention K) at ¶ 11.

STAFF RESPONSE.

The Staff lacks sufficient information to admit or deny this request.

REQUEST FOR ADMISSION NO. 16: Admit that foreseeable increases in the number of commercial aircraft flying in the vicinity of the proposed ISFSI during the term of its initial license must be evaluated in order to determine the aircraft hazard factor posed by such commercial aircraft.

STAFF RESPONSE. Admitted.

REQUEST FOR ADMISSION NO. 17: Admit that Staff has not evaluated any projected increase in aircraft traffic in the vicinity of the proposed ISFSI.

STAFF RESPONSE. Admitted.

REQUEST FOR ADMISSION NO. 18: Admit that the probability of hazard to the proposed ISFSI posed by cruise missiles flying in the vicinity of the proposed ISFSI is an aircraft hazard factor that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE.

Denied. As defined by the State, for the purposes of this discovery request, "aircraft hazard factor" means "one of the individual probabilities that must be summed with all other individual probabilities in order to ascertain the total aircraft hazard probability pursuant to

NUREG-0800." See State's Second Discovery Request at 8. NUREG-0800 does not address or set forth criteria for evaluating hazards posed to a facility by cruise missile test flights, and thus is not applicable to such an analysis.

REQUEST FOR ADMISSION NO. 19: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by cruise missiles flying in the vicinity of the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request on the grounds that (a) it constitutes a compound question, and (b) improperly classifies cruise missiles as an "aircraft" to which NUREG-0800 may apply. Notwithstanding this objection, this request is denied. The Staff has evaluated the test flights of cruise missiles as part of its review of the information provided by the Applicant. This evaluation was conducted without consideration of NUREG-0800, which does not apply to cruise missiles or other weaponry. The Staff's evaluation considered the following factors: the military's extensive test planning and safety procedures, including operational hazard analysis; the use of several chase fighter planes to chase the missile throughout the flight to monitor the missile's performance and flight path; the use of Airborne Range Instrumentation Aircraft (ARIA), precision tracking systems, establishment of no-fly areas, and flight termination systems (FTS). If the FTS does not detect a signal for a preset time period, the FTS activates, causing the missile to crash. The Range Safety Officer at the Mission Control Center and the ARIA can also terminate the missile flight almost instantly by activating the FTS. Additionally, the 49th Test Squadron, responsible for operational test of the Advanced Cruise Missile, maintains a

comprehensive lessons learned program from earlier tests. The Staff, based on the above information, concluded that cruise missiles flying in the vicinity of the proposed ISFSI site do not pose a credible hazard to the facility.

REQUEST FOR ADMISSION NO. 20: Admit that the probability of hazard to the proposed ISFSI posed by aircraft parts or munitions accidentally or intentionally dropping from military aircraft flying in the vicinity of the ISFSI is an aircraft hazard factor that must be evaluated in order to determine the total aircraft hazard to the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request on the grounds that (a) it constitutes a compound question, and (b) improperly classifies cruise missiles as an "aircraft" to which NUREG-0800 may apply. Notwithstanding this objection, the request is denied. As defined by the State, for the purposes of this discovery request, "aircraft hazard factor" means "one of the individual probabilities that must be summed with all other individual probabilities in order to ascertain the total aircraft hazard probability pursuant to NUREG-0800." See State's Second Discovery Request at 8. NUREG-0800 does not require an analysis of these factors as a part of aircraft hazard analysis.

REQUEST FOR ADMISSION NO. 21: Admit that Staff has not evaluated the probability of aircraft hazard to the proposed ISFSI posed by aircraft parts or munitions accidentally or intentionally dropping from military aircraft flying in the vicinity of the ISFSI.

STAFF RESPONSE.

The Staff objects to this request, in that it pertains to military aircraft hazards, a subject upon which the Staff has not yet taken a position. Notwithstanding this objection, the Staff states that it did consider the hazard posed by hanging bombs. The Staff views the State's discovery

requests as continuing in nature and will timely supplement its responses to this request after it has completed its review of this issue and is able to state a position thereon.

REQUEST FOR ADMISSION NO. 22: Admit that the proposed ISFSI site lies beneath the Sevier B Military Operating Area ("MOA") airspace.

STAFF RESPONSE. Admitted.

REQUEST FOR ADMISSION NO. 23: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that cruise missile test flights conducted at the UTTR include flight paths within the Sevier B MOA airspace.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it is vague. Notwithstanding this objection, the request is denied. The Staff evaluated the information submitted by the Applicant to assess whether the potential risk to the proposed PFSF has been analyzed adequately. As part of its evaluation, the Staff considered that cruise missile test flights conducted at the UTTR include flight paths within Sevier B MOA airspace.

REQUEST FOR ADMISSION NO. 24: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that a cruise missile flying in accordance with its test plan may fly within a single nautical mile of the proposed ISFSI.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, is speculative, and is vague and confusing. Notwithstanding this objection, the request is denied. As part of the Staff's evaluation of the Applicant's submittal, the Staff considered that the U.S. Air Force (1998) states a distance of two miles, between the missile flight path and known

occupied sites and no-fly zones, is imposed by safety procedures of the 49th Test Squadron and the 388th Range Squadron. Therefore, the Staff did not consider "that a cruise missile flying in accordance with its test plan may fly within a single nautical mile of the proposed ISFSI."

REQUEST FOR ADMISSION NO. 25: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that a cruise missile test flight in the UTTR airspace (including the Sevier B MOA airspace) may last from two to five hours and cover hundreds of miles.

STAFF RESPONSE.

Denied. The Staff, in its evaluation of the Applicant's analysis, considered that a cruise missile test flight in the UTTR airspace (including the Sevier B MOA airspace) may last from two to five hours and may cover hundreds of miles.

REQUEST FOR ADMISSION NO. 26: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that during a cruise missile test flight in the UTTR airspace (including the Sevier B MOA airspace), the missile typically will change direction and altitude a number of times while traversing the Utah Test and Training Range airspace.

STAFF RESPONSE.

Denied. The Staff, in its evaluation of the Applicant's analysis, considered that during a cruise missile test flight in the UTTR airspace (including the Sevier B MOA airspace), the missile typically will change direction and altitude a number of times while traversing the Utah Test and Training Range airspace.

REQUEST FOR ADMISSION NO. 27: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that since 1983, 19 uncontrolled Air

Launched Cruise Missiles and 2 uncontrolled Conventional Air Launched Cruise Missiles launched in the Utah Test and Training Range air space have crashed.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, and is vague and confusing. No definition has been provided for the term "uncontrolled," nor is it clear which of the cruise missile crashes that have occurred in the past are the subject of this request. Notwithstanding this objection, the request is denied. The Staff, in its evaluation of the Applicant's analysis, did consider the incidents of UTTR cruise missile crashes that have occurred historically. The Staff's evaluation did not include the most recent cruise missile crash, which occurred in June 1999.

REQUEST FOR ADMISSION NO. 28: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that since 1983 two cruise missiles launched in the Utah Test and Training Range airspace crashed, landing outside of Department of Defense land on public or private property.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, is vague and confusing, and is irrelevant and not reasonably calculated to lead to the discovery of admissible evidence in that the ownership of the land does not impact risk. No definition has been provided for the term "uncontrolled," nor is it clear which of the cruise missile crashes that have occurred in the past are the subject of this request. Further, no information has been provided as to the planned flight paths of the cruise missiles that may have crashed outside Department of Defense (DOD) property, or whether those flight paths were located entirely over

DOD land. Notwithstanding this objection, the request is denied. The Staff considered the UTTR cruise missile crashes that have occurred historically, other than the June 1999 crash. The Staff does not have specific information regarding the ownership of the land upon which the cruise missiles crashed and did not consider the ownership in its evaluation.

REQUEST FOR ADMISSION NO. 29: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider the June 1999 cruise missile crash on property directly underneath the Sevier B MOA, the same MOA under which the proposed ISFSI site lies.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, is vague and confusing. Notwithstanding this objection, the Staff admits that it did not consider the June 1999 cruise missile crash in its evaluation.

REQUEST FOR ADMISSION NO. 30: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that the flight termination systems did not prevent two cruise missiles launched in the Utah Test and Training Range airspace that crashed outside of Department of Defense ("DOD") property from leaving airspace over DOD land.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, and is vague and confusing. No information has been presented to support the State's assertion that the flight termination systems were expected or intended to prevent the missiles "from leaving airspace over DOD land," nor does the State indicate which cruise missile crashes are the subject of this request. Notwithstanding this objection, this request is denied. To the extent that

this request may pertain to the December 1997 cruise missile crash, the Accident Investigation Board Report (U.S. Air Force, 1998), submitted as Exhibit 3 to the Declaration of James Cole in support of the Applicant's Motion for Summary Disposition, did not attribute the cause of the 1997 missile crash to the FTS. Thus, this event was considered by the Staff, and was not found to represent a failure of the FTS to function properly.

REQUEST FOR ADMISSION NO. 31: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that the flight termination system for the cruise missile that crashed in December 1997 at Dugway Proving Ground did not prevent it from crashing and destroying civilian property.

STAFF RESPONSE

The Staff objects to this request on the grounds that it constitutes a compound question, and is vague and confusing. No information has been presented to support the State's assertion that the flight termination system was expected or intended to prevent the missile "from crashing and destroying" the "civilian property" that was impacted by this event. Notwithstanding this objection, this request is denied. The Accident Investigation Board Report (U.S. Air Force, 1998) of the cruise missile crash in December 1997, submitted as Exhibit 3 to the Declaration of James Cole in support of the Applicant's Motion for summary disposition, indicates that the FTS was not a factor in the crash. Rather, the test planners were unaware of the astrophysical observation trailers on the Cedar Mountain Range, thus resulting in the crash occurring where it did. The missile followed the programmed backup termination instruction. Therefore, the Staff considered this event in its evaluation of the Applicant's analysis, but did not find it to represent a failure of the FTS.

REQUEST FOR ADMISSION NO. 32: Admit that Staff did not, in its analysis of the risk posed to the proposed ISFSI by cruise missiles, consider that the December 1997 cruise missile crash at Dugway Proving Ground was a result of human error and equipment malfunction.

STAFF RESPONSE.

The Staff objects to this request on the grounds that it constitutes a compound question, and is vague and confusing. No information has been presented to support the State's assertion that there was any cause for this crash beyond the causes discussed in the Accident Investigation Board Report (U.S. Air Force, 1998). The December 1997 crash and its causes were considered by the Staff in its evaluation.

REQUEST FOR ADMISSION NO. 33: Admit that the Holtec HI-STORM cask is not designed to withstand a tornado missile strike of any object greater than 1,800 kilogram, or at speeds of greater than 126 mph.

STAFF RESPONSE.

The Staff objects to this request, pertaining to the design of the HI-STORM cask, as being beyond the proper scope of this contention. Utah Contention K challenges the Applicant's analysis of those hazards external to the site that must be considered in the design of the facility, *i.e.*, events which are required to be within the "design basis" of the facility. Issues pertaining to the adequacy of the HI-STORM casks system are outside the proper scope of this contention.

REQUEST FOR ADMISSION NO. 34: Admit that the Holtec HI-STORM cask is not designed to withstand a strike by an inert 2000 lb concrete bomb with a steel nose cone moving at a speed of 600 mph.

STAFF RESPONSE. See Response to Request for Admission 33, *supra*.

REQUEST FOR ADMISSION NO. 35: Admit that probable consequences of a strike to a Holtec HI-STORM cask by an inert 2000 lb concrete bomb with a steel nose cone moving at a speed of 600 mph include overturning of the cask, shattering of concrete overpack of the cask, and release of at least some of the cask's contents.

STAFF RESPONSE. See Response to Request for Admission 33, *supra*.

REQUEST FOR ADMISSION NO. 36: Admit that the Holtec HI-STORM cask is not designed to withstand a strike by a cruise missile.

STAFF RESPONSE. See Response to Request for Admission 33, *supra*.

REQUEST FOR ADMISSION NO. 37: Admit that probable consequences of a strike to a Holtec HI-STORM cask by a cruise missile include overturning of the cask, shattering of concrete overpack of the cask, and release of at least some of the cask's contents.

STAFF RESPONSE. See Response to Request for Admission 33, *supra*.

REQUEST FOR ADMISSION NO. 38: Admit that, in evaluating risk related to the activities of the Alliant Techsystems Tekoi Rocket Motor Test Facility, the Staff did not evaluate the risk to the proposed PFS ISFSI posed by flying objects from a detonation of a rocket in transit along Skull Valley Road to the Test Facility.

STAFF RESPONSE.

Denied. The Staff did evaluate the risk to the proposed PFS ISFSI posed by flying objects from a detonation of a rocket in transit along Skull Valley Road to the Tekoi facility. The Staff considered that the Bureau of Indian Affairs (BIA), in its 1975 report, *Environmental Impact Analysis, Rocket Motor Test Site, Skull Valley Band of Goshute Indians, Skull Valley Reservation*, (Submitted as Exhibit 5 of Declaration of Bruce Brunson, attached to the Applicant's Motion

for Summary Disposition), stated that 90 percent of all fragments from an explosion in May 1974 at Bacchus, where approximately 12,000 lb of propellant detonated at the test pad, were found within 6,000 ft. The Trident First Stage rocket contains approximately 44,000 lb of the same propellant. Assuming no consumption of propellant before an explosion, BIA stated that 90 percent of all fragments would fall within 7,400 ft and 96 percent of all fragments would fall within 7,920 ft (1.5 miles). BIA calculated the above results using the document, "Chemical Rocket Propellant Hazards, Volume I: General Safety Engineering Design Criteria" (CPIA Publication No. 194, October 1971), which the Staff finds to be acceptable. As the proposed PFSF is at least 1.9 miles from the Skull Valley Road, flying objects from an explosion during transport of Trident Rocket engine containing 40,000 lb of propellants will not pose any undue hazard to the proposed PFSF.

B. INTERROGATORIES – Utah Contention K

INTERROGATORY NO. 1: To the extent the Staff responds to any of the requests for admission in Part II.A., above, with a partial or complete denial, please explain the basis for the denial.

STAFF RESPONSE. See the Staff Responses to the requests for admissions, *supra*.

INTERROGATORY NO. 2: To the extent the Staff responds to Requests for Admission Nos 1, 2, 3, 4, 5, 7, 9, 11, 13, 14, 17, 19, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, or 38 by denying that it failed to consider, analyze, or evaluate the specified risks, please explain how the specified risks were considered, analyzed, or evaluated.

STAFF RESPONSE. See the Staff Responses to the requests for admissions, *supra*.

C. DOCUMENT REQUEST – Utah Contention K

DOCUMENT REQUEST NO. 1: All documents in your possession, custody, or control that are identified, referred to or used in any way in responding to the Requests for Admission in Part IV.A., above or to the Interrogatories in Part IV.B.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 2: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by activities associated with the Alliant Techsystems Tekoi Rocket Motor Test Facility on the proposed PFS ISFSI, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 3: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of the detonation of munitions found in the vicinity of the proposed PFS ISFSI, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 4: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of chemical or biological agent activities (including documents identifying chemical or biological munitions in the vicinity of the proposed PFS ISFSI), including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 5: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of misfired munitions from combat training exercises conducted at Dugway Proving Ground with live munitions, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 6: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of air launched weapons in the Utah Test and Training Range airspace, including the Sevier B military operating area, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 7: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of military aircraft flying over Skull Valley, including flights ingressing to the Utah Test and Training Range ("UTTR") south area, flights egressing from the UTTR north and south area, and flights flying to and from Michael Army Air Field, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 8: All documents generated or relied upon by the Staff or its contractors in preparing its Statement of Position or in its Response to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes Contention B which relate to risk or analysis of risk posed to the proposed ISFSI by impacts of commercial and private aircraft flying in the vicinity of the proposed PFS ISFSI, including documents containing facts, data, source of information, supporting calculations, basis for using various calculations and formulas, assumptions, and conclusions regarding such risk or analysis of risk.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 9: All documents which relate to the Staff's December 10, 1998 request for additional information No. 2, SAR 8-3 and its review of PFS's February 10, 1998 reply.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 10: All documents which relate to the Staff's request and review of information included with PFS's June 30, 1999, Submittal of Commitment Resolution Letter #7 Information.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

DOCUMENT REQUEST NO. 11: All documents, including notes and memorandum, which relate to the July 21, 1999 Staff's teleconference request information referenced in PFS's June 22, 1999, Commitment Resolution Letter #10.

STAFF RESPONSE.

Documents in response to this request will be provided or identified, to the extent that they are not (a) otherwise publicly available or (b) privileged or exempt from disclosure under 10 C.F.R. § 2.790.

Respectfully submitted,

Catherine L. Marco

Catherine L. Marco
Counsel for NRC Staff

Dated at Rockville, Maryland
this 20th day of August 1999

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))

SUPPLEMENTAL AFFIDAVIT OF AMITAVA GHOSH

I, Amitava Ghosh, having first been duly sworn, do hereby state as follows:

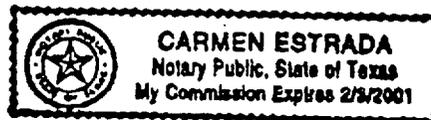
1. I am employed as a Principal Engineer at the Center for Nuclear Waste Regulatory Analyses, which is a division of the Southwest Research Institute in San Antonio, Texas. I am providing this affidavit under a technical assistance contract between the NRC Staff and the Southwest Research Institute.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

2. I have reviewed the foregoing "NRC Staff's Objections and Responses to the State of Utah's Second Set of Discovery Requests Directed to the NRC Staff," as they pertain to Utah Contention K (Credible Offsite Hazards) and verify that they are true and correct to the best of my information and belief.

AGhosh
Amitava Ghosh

Sworn to before me this
20th day of August 1999

Carmen Estrada
Notary Public



My Commission expires: 2-3-2001

AMITAVA GHOSH
Principal Engineer
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute

B.Tech., Mining Engineering, Indian Institute of Technology, Kharagpur, India; 1978
M.S., Mining Engineering, University of Arizona, Tucson, Arizona; 1983
Ph.D., Mining Engineering, University of Arizona, Tucson, Arizona; 1990

Dr. Ghosh has over 20 years of experience in conducting both academic and industrial research, consulting, and teaching in mining, geological, and geotechnical engineering with special emphasis on numerical simulations, field and laboratory experiments, rock mechanics and rock engineering, explosives and blasting, soil mechanics, rock fracture mechanics, and application of probabilistic methods, theory of fractal geometry, geostatistics, and artificial intelligence. Since joining the Center for Nuclear Waste Regulatory Analyses, he provides technical support to the U.S. Nuclear Regulatory Commission on the design and experimental programs for site characterization of the proposed repository, spent fuel project, and reclamation of active mill tailings sites.

He was the principal investigator for modeling rock joint response under cyclic, pseudostatic, and earthquake loads, evaluating rock joint constitutive models and their implementation in UDEC code, selecting computer codes for simulating coupled thermal-mechanical-hydrological processes at the proposed high-level nuclear repository site at Yucca Mountain, and lead a multi-disciplined team for developing the Centralized Interim Storage Facility Assessment Report. He has developed a part of the Standard Review Plan for reclamation of active mill tailings sites under Title II of the Uranium Mill Tailings Radiation Control Act. He is part of the team developing a module for Total-system Performance Assessment (TPA) code to assess the risk associated with waste package disruption from fault slippage at Yucca Mountain.

Dr. Ghosh worked as a postdoctoral research fellow at the University of Nevada, Reno. He quantified the utilization of explosive energy in blasting from the energy required to crush the blasted fragments. Dr. Ghosh was awarded the Rocha Medal in 1992 by the International Society for Rock Mechanics in a worldwide competition for his PhD research on the application of fractal geometry and numerical methods to examine fracture formation and propagation in rock using explosives. A paper based on the application of fractal geometry to quantify the effects of natural fractures on rock blasting won the Society of Mining Engineers Outstanding Student Paper contest in Graduate Division in 1989. He worked as a Technical Services Engineer at IDL Chemicals Ltd with emphasis on ground vibration and air blasts from blasting. Dr. Ghosh has taught several courses at the University of Arizona. He has published about 30 technical papers and 15 research reports. He has reviewed papers for several journals and rock mechanics symposiums and chaired the session of Rock Fragmentation from Blasting at the 35th US Symposium on Rock Mechanics.

PROFESSIONAL CHRONOLOGY: Technical Services Engineer, IDL Chemicals Ltd., 1978-1981; Graduate Assistant/Associate, University of Arizona, 1982-1990; Postdoctoral Fellow, University of Nevada, Reno, 1990-1992; Research Engineer, Southwest Research Institute, 1992-1994; Senior Research Engineer, Southwest Research Institute, 1994-1999; Principal Engineer, 1999-Present.

MEMBERSHIPS: International Society for Rock Mechanics; American Rock Mechanics Association; International Association for Mathematical Geology; American Geophysical Union; Society for Mining, Metallurgy, and Exploration, Inc.

Rev. July 1999

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

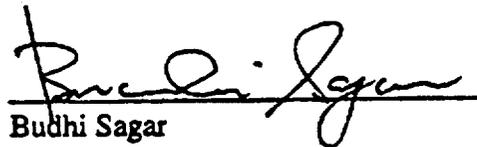
In the Matter of)
)
PRIVATE FUEL STORAGE, L.L.C.) Docket No. 72-22-ISFSI
)
(Independent Spent Fuel)
Storage Installation))

AFFIDAVIT OF BUDHI SAGAR

I, Budhi Sagar, having first been duly sworn, do hereby state as follows:

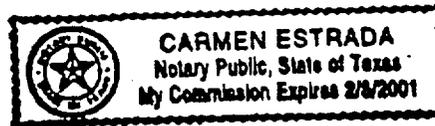
1. I am the Technical Director of the Center for Nuclear Waste Regulatory Analyses, which is a division of the Southwest Research Institute in San Antonio, Texas. I am providing this affidavit under a technical assistance contract between the NRC Staff and the Southwest Research Institute.

2. I have reviewed the foregoing "NRC Staff's Objections and Responses to the State of Utah's Second Set of Discovery Requests Directed to the NRC Staff," as they pertain to Utah Contention K (Credible Offsite Hazards) and verify that they are true and correct to the best of my information and belief.


Budhi Sagar

Sworn to before me this
20th day of August 1999


Notary Public



My Commission expires: 2-3-2001

BUDHI SAGAR

**Technical Director
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute**

**B.S. in Civil Engineering, Punjab University, India 1963
M.S. in Civil Engineering, Punjab University, India, 1966
Ph.D. in Hydrology, University of Arizona, 1973**

Dr. Sagar is a civil engineer and a hydrologist with professional interest in computational methods, stochastic analysis and risk assessment of geologic and engineering systems. At the University of Arizona he developed a numerical method for estimating properties of aquifers from water level observations. He conducted and published original research on stochastic modeling of flow in porous media and risk assessment methods. He is the author of several computer codes dealing with flow, heat transfer, and mass transport in porous media.

In his current position of Technical Director of the Center for Nuclear Waste Regulatory Analyses, (CNWRA) Dr. Sagar's responsibilities are to manage all technical activities and perform as the CNWRA's primary technical representative with the U.S. Nuclear Regulatory Commission. He provides overall direction for conducting technical assistance work and research activities of the CNWRA; assures efficient manpower utilization, controls budgets and schedules, and assures quality of work. He assists the CNWRA President in the conduct of overall administrative and operation activities. Prior to his naming to the Technical Director's position, Dr. Sagar served as the Institute Scientist and Manager of Performance Assessment element. He also participates in technical work related to hydrology, system simulation, and risk assessment.

Dr. Sagar has written or collaborated on over 100 technical papers and reports. He is also a registered Civil Engineer in California. He has taught at Washington State University, University of Ottawa, University of Arizona, and the University of Texas at San Antonio. He routinely reviews papers for Water Resources Research, American Society of Civil Engineering Journal, and Advances in Water Resources. He has represented the United States in a number of international meetings, specifically those organized by the Organization of Economic Cooperation & Development (OECD).

Professional Chronology: Assistant Professor, Punjab Agricultural University, India, 1966-69; Research Associate and graduate student, University of Arizona, 1970-73; Research Fellow, Inland Waters Directorate, Canada, 1976; Associate Professor, Punjab Agricultural University, India, 1973-79; Visiting Assistant Professor, University of Arizona, 1979; Manager/Senior Engineer, Dames & Moore, 1979-81; Westinghouse/Hanford Company, 1984-88; Adjunct Faculty, University of Washington, 1984-90; Staff Scientist/Technical Group Leader, Battelle Pacific Northwest Laboratory (PNL), 1988-89; Element Manager, CNWRA, 1990; Institute Scientist, Southwest Research Institute, 1990-92; Technical Director, CNWRA, 1992-present.

Memberships: American Geophysical Union, American Society of Civil Engineers.