RAS 3327

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	August 16, 2001

STATE OF UTAH'S RESPONSE TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF UTAH CONTENTION W

Pursuant to 10 CFR § 2.749(a), the State files this Response to the Applicant's July 27, 2001, Motion for Summary Disposition of Utah Contention W – NEPA Flooding at Rowley Junction ("Motion").[1] For the reasons stated below, the State opposes PFS's motion. This Response is supported by a Statement of Disputed and Relevant Material Facts ("Utah Facts"), and by the attached Declarations of Dr. Marvin Resnikoff and Michael V. Lowe attached hereto as Exhibits 1 and 2, respectively.

LEGAL STANDARDS

A party is entitled to summary disposition if "there is no genuine issue as to any material fact" and the party "is entitled to a decision as a matter of law." 10 CFR § 2.749(d). The burden of proving entitlement to summary disposition is on the movant and "the evidence submitted must be construed in favor of the party in opposition thereto, who receives the benefit of any favorable inferences that can be drawn."[2] Furthermore, if there is any possibility that a litigable issue of fact exists or any doubt as to whether the parties should be permitted or required to proceed further, the motion must be denied.[3]

[1] As admitted, Utah W states: "The Environmental Report does not adequately consider the adverse impacts of the proposed ISFSI and thus does not comply with NEPA or 10 CFR § 51.45(b) in that the Applicant has not considered the impacts of flooding on the intermodal transfer point." LBP-98-7, 47 NRC 142, 201-202 (1998).

[2] Sequoyah Fuels Corp. and General Atomics Corp. (Gore, Oklahoma Site Decontamination and Decommissioning Funding), LBP-94-17, 39 NRC 359, 361, *aff'd* CLI-94-11, 40 NRC 55 (1994).

[3] General Electric Co. (GE Morris Operation Spent Fuel Storage Facility), LBP-82-14, 15 NRC 530,

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Expert testimony and opinion contained in affidavits in support of summary disposition must meet two legal requirements. First, the affidavit must contain a demonstration that the affiant is an expert, qualified to express expert opinions on matters contained in his or her affidavit.[4] Second, the affidavit must contain supporting analysis, facts and reasons supporting the expert's opinion.[5]

Since the passage of the National Environmental Policy Act ("NEPA"), part of NRC's primary mission is to "protect the environment." 49 Fed. Reg. 9,352, 9,353 (1984). NRC regulations require that the Applicant and the Staff consider and weigh the effects of the proposed action on the environment. 10 CFR §§ 51.45, 51.71. The test for determining whether an Environmental Impact Statement (EIS) sufficiently analyzes the environmental effects of the proposed action is the "hard look" or "rule of reason."[6] Under NEPA regulations, 40 CFR § 1502.22(a), if the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement. The Commission stated it will follow the procedural standard in 40 CFR § 1502.22(a). 49 Fed Reg. 9,352, 9,353. Agencies under the rule of reason must, therefore, supply or obtain adequate information upon which they can make a meaningful decision.

Under Part 72 "the proposed ISFSI ... must be evaluated with respect to the potential impact on the environment of the transportation of spent fuel .. within the region."

532 (1982).

[4] Public Serv. Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-88-31, 28 NRC 652, 1988 WL 236205, 4 (1988), *aff'd*, ALAB-909, 29 NRC 1 (1989).

[5] Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant, Units 1 and 2), LBP-84-7, 19 NRC 432, 447 (1984); Mid-State Fertilizer Co. v. Exchange Nat'l Bank, 877 F.2d 1333, 1339 (7th Cir. 1989).

[6] Yankee Atomic Electric Co. (Yankee Nuclear Power Station), LBP-96-2, 43 NRC 61, 89 (1996); Limerick Ecology Action v. NRC, 869 F.2d 719, 737, 739 (3d Cir.1989) (agency need not consider remote and speculative risks). *See also* Utah Response to Summary Disposition of Utah O (July 19, 2001) at 3-4 and cases cited therein.

10 CFR § 72.108. As part of the proposed action under PFS's license application, PFS will be constructing a facility at which incoming fuel shipment will be transferred by rail to truck for transport in and through Rowley Junction to the ISFSI located 25 miles to the south.

ARGUMENT

PFS intends to construct an Intermodal Transfer Facility ("ITF") on a slight rise in the mud flats within a couple of miles of the shoreline of the Great Salt Lake. At the ITF, transportation casks containing spent nuclear fuel will be transferred from a rail car to a truck. The Environmental Report ("ER") and Draft Environmental Impact Statement ("DEIS") do not adequately describe the effects of flooding that may occur at the ITF.

I. Table S-4 and Generic Cask Testing Do Not Bound the Adverse Environmental Impacts that May Occur at the ITF.

Table S-4 does not evaluate flooding or track washout. Resnikoff Dec. ¶¶ 6-8. Also Table S-4 is not applicable in the PFS case because the casks exceed the weight threshold under the rules. Id. ¶ 9. Nonetheless, PFS asserts that Table S-4, which is primarily based on data from 1972 (*see* WASH 1238), and which applies only to light-water-cooled nuclear power plant construction permits and not off-site ISFSIs, precludes any consideration under NEPA of the site-specific environmental impacts from flooding of PFS's ITF located on the mud flats of the Great Salt Lake. Motion at 4. PFS is trying to raise the same tired old argument that it presented to the Board in Applicant's Position on Dismissal of ITP-Related Contentions at 9-10 (September 7, 1999).[7] The Board rejected PFS's argument that Table S-

[7] When the Board issued LBP-99-34, a merits ruling on Contention Utah B which alleged that the Applicant needed a Part 72 license for the ITF, it invited the parties to file their position on the impact of that ruling on other contentions. LBP-99-34, 50 NRC 168, 179. PFS argued that Utah W was a challenge to 10 CFR § 51.52, which permits the use of Table S-4. Applicant's Position on Dismissal of ITP-Related Contentions at 10 (September 7, 1999). The State took the position that under 10 CFR § 72.108 the proposed ISFSI must be evaluated with respect to the potential impact on the environment of the transportation of spent fuel within the region; that the ITF, approximately 25 miles from the ISFSI, was within the region; that the activities at the ITF were part of the proposed action under PFS's license application; and that NEPA requires an analysis of all adverse environmental effects from the proposed action. State of Utah's Response to the Impact of the Board's Ruling in LBP-99-34 (Utah Contention B) as the Ruling May Relate to Other Admitted Contentions, at 2 (September 7, 1999).

4 controls and found that the issues raised in Utah W "go to the NEPA responsibilities that are part of the agency licensing process relative to the PFS ISFSI" and that while the ITF is not subject to the Part 72 licensing process, "it is proposed to be constructed as part of the PFS application for that license and, as such, is subject to consideration under NEPA." LBP 99-39, 50 NRC 232, 236 (1999). Accordingly, the Board took no action on Utah W and chose not to dismiss the contention as part of its merits determination on Utah B. Id.

Contrary to PFS's assertion, the preamble to Part 72 does not say that Table S-4 exculpates an ISFSI applicant – or the Staff – from conducting an analysis under NEPA of flooding at Rowley Junction. Motion at n. 14. In the preamble, the Commission noted that a Part 72 ER may incorporate generic EISs but the Commission also said that the ER "required for an ISFSI is an evaluation of the environmental impact of the ISFSI on the region in which it is located, including the transportation that is involved." Id.[8]

Not only are the conditions and environmental impacts at the ITF outside the bounds of Table S-4, but they are also outside the bounds of cask testing performed under 10 CFR § 71.73(c)(1). Utah Facts ¶¶ 15-18. Potential accident events at the ITF are not encompassed within the test that a cask with an impact limiter can withstand a thirty foot vertical drop on its end onto "a flat, essentially unyielding, horizontal surface." Id. During transfer operations at the ITF, the cask, impact limiters plus its shipping cradle will be transferred in a horizontal position from a rail car to a heavy haul truck. Contrary to PFS's assertion, the thirty-foot drop test does not encompass the conditions at the ITF because first, the cask would be expected to drop horizontally not vertically. Second, the combined

[8] PFS's reliance on Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), ALAB-825, 222 NRC 785, 793 (1985), Motion at n.14, offers no support for PFS's exclusive reliance on Table S-4 for site-specific impacts at the ITF. The issue in Catawba was whether environmental impacts associated with potential shipments of spent fuel generated from other nuclear power plants to Catawaba were covered by Table S-4. First, the Catawba proposal did not qualify as an ISFSI but should be licensed under Part 50. Second, the Commission amended its regulations to provide that Table S-4 encompassed the transshipment of spent fuel between reactors, and the basis of intervenor's contention was thus mooted. Catawba, 22 NRC at 792-94.

weight of the cask, impact limiters and shipping cradle is considerably heavier than without the shipping cradle. Resnikoff Dec. ¶ 9. This additional weight and force are not considered in cask testing. Utah Facts ¶ 16.

Cask testing is also conducted to simulate a 40 inch horizontal drop of a cask onto a steel cylindrical bar. Again, the additional weight and force of the cradle are not encompassed in this test. In addition, the height that a cask will be lifted at the ITF could vary from 48 inches to beyond 70 inches. Id. ¶¶ 17-18. Taking PFS's unsupported assumption that the drop height will be 48 inches, the 40 inch horizontal drop test does not bound the conditions at the ITF. If the cask and cradle combination are dropped during lifting operations from a height exceeding 40 inches – at a potential height of 70 inches – onto an object, such as a rail line, it could be sufficient to penetrate the shipping cask and damage the fuel cladding and cause a radioactive release during a flood at the intermodal transfer facility. Resnikoff Dec. ¶¶ 15-19. An earthquake at the ITF could cause such an accident. *See* Motion at 9. The ER and the DEIS are devoid of any analysis of such environmental impacts at the intermodal transfer facility.

There are unconsidered adverse environmental impacts that neither the ER nor the DEIS evaluate. At Rowley Junction, PFS will construct a rail spur from the Union Pacific mainline. The flooding potential at Rowley Junction could cause track instability and lead to derailment of cask shipments. Resnikoff Dec. ¶¶ 7-8. The PFS facility will be more than an all-weather enclosure for the gantry crane; it will also have restrooms and shower amenities, wastewater from which will be disposed of in a septic tank and leachfield. Utah Facts ¶ 32; Exhibit 6. Even though PFS intends to use a septic tank and leach field system, to date it has conducted no percolation or groundwater tests to determine whether the mud flats will be suitable for such a wastewater disposal system. Lewis Tr. at 49, excerpts attached hereto

as Exhibit 3. If the leachfield is unable to accept the quantity of discharged wastewater, the wastewater may pool near the surface and contaminants could come in contact with humans. *See* Utah Response to Summary Disposition of Utah O, Ostler Dec. ¶ 20. Flooding, even if it does not inundate the facility, will cause a rise in the water table and will further exacerbate the ineffectiveness of the leachfield. Finally, the site at Rowley Junction is high in dissolved minerals. Flooding, combined with the weight of the casks, rail car, and heavy haul truck could lead to instability of the foundations and roadbed at the facility. Solomon Tr. at 54-55. PFS's intent to conduct testing at some future unspecified date does not satisfy NEPA to supply or obtain adequate information upon which an agency can make a meaningful decision. *See e.g.*, Lewis Dec. ¶ 9.

Without meaningful information, the EIS cannot weigh the effects of the proposed action on the environment. Thus, the DEIS fails to satisfy NEPA, as does this Motion.

II. Utah W Is Not Mooted Because Neither the ER nor the DEIS Adequately Evaluated the Impacts of Flooding at the ITF.

PFS contends that Utah W is moot because flooding at Rowley Junction has been "considered" in the ER and DEIS. PFS motion at 4-5. PFS conveniently omits the adverb "adequately" preceding "considered" in Utah W. Moreover, Utah W does not suffer the perceived impediment that the Board found in Utah Z because Utah W is not an "omission" contention. *See* LBP-01-23 at 10. The basis of Utah W incorporates Utah N, which states in part that PFS has failed to "identify, document and <u>evaluate</u> the significance of potential flooding events to the design of the intermodal transfer site and rail route paralleling the Great Salt Lake...." State of Utah Contentions (November 23, 1997), at 98 (*emphasis added*).

The DEIS has a scant paragraph about flooding at the ITF. DEIS at 5-7, lines 9-18. There is no support for the ITF site elevation levels referenced in the DEIS. Both the ER and DEIS rely on a draft planning document prepared by the State of Utah after the recent

historic rise of the Great Salt Lake. ER at 4.3-9; DEIS at 5-7. That document, the Great Salt Lake Planning Project Draft Analysis of Proposed Management Alternatives, focuses on recreational activities and the extractive industries that occur around the edge of the Great Salt Lake. It is not a land use planning document for siting nuclear waste facilities. The State has laws specific to the siting of high hazard industries. Utah Facts ¶¶4-5. In particular, Utah Code Ann. § 19-3-307 contains siting criteria specific to nuclear waste transfer facilities.[9] The ITF is located within three miles of the Great Salt Lake. Utah siting criteria prohibits facilities like the ITF to be located within five miles of lakes. Utah Code Ann. §19-3-307(2)(a)(x). The DEIS and ER conveniently take a draft State of Utah planning document that is inapplicable to the ITF yet they ignore laws enacted specifically on point for siting the ITF.

As drafted, the DEIS does not provide adequate information upon which the agency can make a meaningful decision. PFS cannot support its Motion by reliance on the DEIS.

III. PFS Has Failed to Support Key Elements of its Motion.

PFS's Motion lacks adequate support. First, PFS presents no reliable evidence of the final grade elevation of the structure to be built at the ITF. Second, PFS summarily dismisses credible scientific literature that an earthquake generated a twelve foot seiche in the Great Salt Lake. Third, PFS selectively relies on documents that are not relevant or scenarios over which PFS has no control.

The final grade elevation of the structure at the ITF is an important and disputed material fact because PFS frequently relies on the structure being constructed at an elevation of 4221 feet to assume that there will be no environmental effects from flooding at Rowley Junction. *See* PFS Facts ¶¶ 7, 33, 37, 48; Utah Fact ¶ 26. The declarants PFS relies upon, Lewis and Liang, offer only hearsay evidence to establish a contested material fact.

[9] PFS is well aware of this statutory requirement because it is one of the statutes that is at issue in PFS's federal lawsuit against the State. *See* Exhibit 1 to Applicant's Response to State of Utah's Request for Admission of Late-filed Contention Utah Security J - Law Enforcement (April 27, 2001).

Expert testimony is "typically a mixture of scientific principles (known to the expert through his or her training or experience), data derived from analysis or by perception, and the expert's opinions based on these principles and data." Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 720 (1985). Thus, when an expert affiant submits an affidavit, the affidavit must contain an explanation of facts and reasons supporting the affiant's expert opinion. Mid-State Fertilizer Co. v. Exchange Nat'l Bank, 877 F.2d 1333, 1339 (7th Cir. 1989). In both administrative and judicial proceedings, an expert affiant is given leeway to base his or her testimony on hearsay. Commonwealth Edison Co. (Braidwood Nuclear Power Station, Units 1 and 2), LBP-86-12, 23 NRC 414, 419 (1986). Further, 10 CFR § 2.749(b), does not expressly require that affidavits be "made on personal knowledge." For this reason, 10 CFR § 2.749(b) differs from Rule 56(a) of the Federal Rules of Civil Procedure "in order to reflect the difference between administrative practice and court practice." Id.

However, regarding statements of contested material fact, the presiding officer's leeway in accepting hearsay is somewhat restricted. The witness-affiant "must be competent as a fact witness" which means the witness must have "personal knowledge." Id. Even considering the latitude an expert witness has to base his testimony on hearsay, the expert's opinion "cannot substitute for, or establish, the material facts about which the expert witness may lack competence as a fact witness, i.e., have personal knowledge." Id.[10] If material facts "appear legitimately in dispute and a witness with personal knowledge is readily available, that witness should be offered. Similarly, when a document is relied upon that is readily available, that too should be presented." Id. PFS relies on Lewis's declaration in an attempt to establish the fact that the ITF will be built at 4,221 ft. PFS Facts ¶ 7. However, Lewis's

[10] *See also* U.S. v. Sparks, 2001 WL 460007 (10th Cir. 2001) (defendant's expert testimony properly excluded when expert was basing his testimony on unauthenticated document provided by defendant).

asserted elevation of the ITF comes from an unauthenticated document that has not been introduced into this proceeding. Lewis Dec. ¶ 7. Moreover, Lewis has never visited the ITF site. Lewis Tr. at 10. Under previous NRC rulings, Lewis' testimony on the elevation of the ITF constitutes impermissible hearsay, and cannot be used as evidence of a material fact.

PFS also relies on George Liang's declaration in an attempt to establish that in the event the lake reaches its historical high, it would still be nine feet below the ITF. PFS Fact ¶ 23. However, Liang's Declaration provides no supporting facts to indicate how he established the elevation of the ITF. Liang Dec. ¶ 6. In his deposition Liang testified that he did not know the exact elevation of the proposed ITF; in fact, Liang could not even locate the site's elevation on the topographical maps cited in the ER and DEIS. Liang Tr. at 15-17, excerpts attached hereto as Exhibit 4. Although he visited the proposed site, Liang did not conduct any field tests, and therefore, lacks personal knowledge of the ITF's elevation and his declaration suffers the same impediment as Lewis's Declaration. Id. at 13.

PFS summarily dismisses that a seismically induced twelve foot seiche could occur at the ITF. Motion at 8; Liang Dec. ¶ 17. Liang postulates that the 1909 reports of a twelve foot seiche overtopping a Great Salt Lake railroad trestle are unreliable because they are based on unconfirmed reports. Id. ¶ 16. Liang's naked assertion does not withstand scrutiny. The scientific report the State relies upon for the twelve foot seiche was authored by Michael V. Lowe. Lowe Dec. ¶ 5. Mr. Lowe relied upon Southern Pacific Transportation Company records from 1909, reported to him by a long time employee, to show that at the time of the Hansel Valley earthquake the elevation of the Lucin cutoff was 4,214.85 feet. Id. ¶ 8. Taking elevation for the height of the trestle from the lake elevation obtained from USGS records, the resulting twelve foot of seiche height is very credible. Utah Facts ¶¶ 28-30. During this time the lake elevation was similar to today's elevation. Thus, a twelve foot

seiche at the ITF is not remote or speculative and the DEIS is deficient, as is this Motion, because it fails to evaluate the environmental impacts from this credible event.

PFS's Motion is replete with unsupported assertions.[11] For example, PFS refers to re-routing shipment to or from the ITF yet it has no authority to prioritize Union Pacific shipments or to assume that PFS's shipments could be moved to another location. Utah Facts ¶¶ 11-12. Nor is there any evidence that dikes could be built – either by PFS or a governmental entity – or the pumps at the Great Salt Lake re-started. Id. ¶¶ 20-21. Furthermore, PFS references a Diking Feasibility Study to claim a maximum flooding elevation of 4,216 feet but ignores other evidence of higher lake levels. Id. ¶ 24.

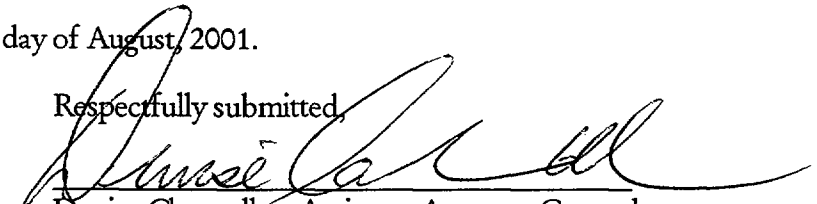
The Board is quick to find procedural defects in the State's filings. *See e.g.*, LBP-01-23 at 10-11. Fairness dictates that the Board also scrutinize PFS's Motion for adherence to procedural form as well as substantive content. PFS's Motion cannot withstand scrutiny and should denied.

CONCLUSION

If the State is to be accorded any procedural or substantive due process in this proceeding, the Board should require that PFS support its motion with greater clarity and documentation than it has done. There are numerous material facts in dispute and PFS is not entitled to judgment as a matter of law.

DATED this 16th day of August, 2001.

Respectfully submitted,



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[11]As described in Section I and II, in its Motion PFS does not support the elevation at which it asserts the ITF will be constructed; PFS relies on conditions that do not bound cask testing; PFS relies on studies it will do in the future, such as whether the foundations of the proposed ITF building will be able to withstand sulfates, chlorides and other dissolved minerals; and, although PFS intends to use a septic tank leach field system, to date it has conducted no tests to determine whether the mud flats will be suitable for that system.

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CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S RESPONSE TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF CONTENTION UTAH W was served on the persons listed below by electronic mail (unless otherwise noted) with conforming copies by United States mail first class, this August 16, 2001:

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	August 16, 2001

STATE OF UTAH'S STATEMENT OF DISPUTED AND RELEVANT MATERIAL FACTS WITH RESPECT TO CONTENTION UTAH W

In support of its Response to Applicant's Motion for Summary Disposition of Contention Utah W, the State submits this Statement of Disputed and Relevant Material Facts ("Utah Facts").

1. PFS Fact ¶ 4, quoting from the PFS Environmental Report, states "Great Salt Lake Planning Project Draft Analysis of Proposed Management Alternatives issued by the State of Utah Department of Natural Resources in January 1999 has designated the flood plain of the lake at 4,213 ft. for planning purposes and 4,217 ft. as the extent of the lake's flood plain." *See also* PFS Fact ¶ 6.

2. The Great Salt Lake Planning Project Draft Analysis of Proposed Management Alternatives was a draft array of Great Salt Lake management alternatives put out for public review and comment in January of 1999. Record of Decision No. 00-0301-GSL CMP at 1, *in* "Great Salt Lake Comprehensive Management Plan and Decision Document," prepared by the Great Salt Lake Planning Team, Utah Department of Natural Resources (March 1, 2000), excerpts attached hereto as Exhibit 5. Five public meetings on the management alternatives were held in a number of counties surrounding the Great Salt Lake, and the comment period ran through January 7, 2000.

3. Utah Code Ann. § 65A-10-8(1) established the duty of the Utah Division of Forestry, Fire and State Lands "to prepare and maintain a comprehensive plan for the lake which recognizes the following policies":

(a) develop strategies to deal with a fluctuating lake level;
(b) encourage development of the lake in a manner which will preserve the

lake, encourage availability of brines to lake extraction industries, protect wildlife, and protect recreational facilities;
(c) maintain the lake's flood plain as a hazard zone;
(d) promote water quality management for the lake and its tributary streams;
(e) promote the development of lake brines, minerals, chemicals, and petro-chemicals to aid the state's economy;
(f) encourage the use of appropriate areas for extraction of brine, minerals, chemicals, and petro-chemicals;
(g) maintain the lake and the marshes as important to the waterfowl flyway system;
(h) encourage the development of an integrated industrial complex;
(i) promote and maintain recreation areas on and surrounding the lake;
(j) encourage safe boating use of the lake;
(k) maintain and protect state, federal, and private marshlands, rookeries, and wildlife refuges;
(l) provide public access to the lake for recreation, hunting, and fishing.

4. The Great Salt Lake Planning Project draft analysis is not a land use siting plan for high hazard industries, such as nuclear facilities. *See* Solomon Tr. at 39.

5. Utah has enacted siting criteria for nuclear waste transfer facilities, codified at Utah Code Ann. § 19-3-307, which prohibits locating a nuclear waste transfer facility, *inter alia* "within five miles of surface waters." Id. § 19-3-307(2)(a)(x). Similar laws and rules are in effect for siting hazard waste facilities and low level radioactive waste treatment, storage or decay in storage facilities. *See* Utah Code Ann. §§ 19-3-105(3) and 19-3-104(8) and implementing rules.

6. The ITF is approximately three miles from the shoreline of the Great Salt Lake. Solomon Tr. at 6; PFS Fact ¶ 3.

7. The State disputes PFS Material Fact ¶ 7 that the Intermodal Transfer Facility ("ITF") will be built at an elevation of 4,221 feet.

8. The State disputes Lewis Declaration ¶ 7. Mr. Lewis has not visited the ITF site. Lewis Tr. at 10. In addition, the PFSF Project Survey Data by Aero-metric, Inc. cited by Mr. Lewis in ¶ 7 of his declaration for a mean elevation of 4,221 ft for the ITF was not attached to his declaration and has not otherwise been introduced into evidence in this proceeding.

9. The State disputes PFS Material Fact ¶ 8. Documents produced by PFS to the State suggest that the ITP facility will not be a "simply a weather enclosure for the crane" but the ITF will have restroom and bathroom facilities. *See* Exh. 6.

10. The State disputes Lewis Dec. ¶ 9. To date, PFS has not conducted a geotechnical soil investigation of the site and what needs to be done is irrelevant to whether the foundations of the building at the ITF can withstand the high sulfates and chlorides or other soluble minerals present in soils near the Great Salt Lake. Solomon Tr. at 54-55.

11. The State disputes PFS Material Fact ¶ 11. There is no evidence of how PFS will contact an inbound train nor is there any evidence about whether PFS would have any control over diversion of fuel-loaded trains on the Union Pacific mainline track.

12. The State disputes PFS Material Fact ¶ 12. PFS, a private entity not affiliated with Union Pacific, has no authority to prioritize Union Pacific mainline shipments out of Rowley Junction.

13. The State disputes PFS Material Fact ¶¶ 15 and 16. There is no evidence to support PFS's asserted fact that the deck height of the rail car will be 28" to 48." While 28" to 48" may be the height of a standard railcar, PFS may use a steerable trolley type of railcar. Resnikoff Dec. ¶ 16. The deck height of a steerable trolley railcar may be higher than a standard railcar. Id. To the State's knowledge, such rail cars are yet to be designed and the deck height at this time is unknown. Id.

14. The State disputes PFS Material Fact ¶ 17 and 18. The statement that the "tie-down straps and attachment pins will be designed to exceed the dynamic loads that are imposed on the vehicle during transport" is unsupported by the Lewis Declaration ¶ 19.

15. The State disputes PFS Material Facts ¶¶ 19 and 20. Potential accident events at the ITF are not encompassed within the regulatory test requirements that a cask be designed to withstand a vertical thirty-foot drop onto a flat horizontal surface or a forty-inch horizontal drop onto a cylindrical bar. 10 CFR § 71.72(c)(1) and (3) do not bound the conditions at the ITF. Resnikoff Dec. ¶¶ 9, 11-19.

16. A cask must be designed to withstand a thirty foot vertical drop on its end with an intact impact limiter on "a flat, essentially unyielding, horizontal surface." 10 CFR § 71.72(c)(1). During an earthquake, a shipping cask could be dropped at the ITF directly from a stationary or moving railcar or during transfer of the cask from the railcar to a heavy haul truck. Resnikoff Dec. ¶ 13. A cask dropped directly from a railcar would essentially be dropped horizontally, not vertically as in the thirty-foot test. Id. ¶ 14. The combined shipping cask plus its shipping cradle are lifted as a package by crane from the rail car to the heavy haul truck. The additional weight and force of the shipping cradle is not considered in the thirty-foot vertical drop test. Id. ¶¶ 9, 13, 15. This drop test does not bound a dropped cask on an object at the ITF. Id. ¶ 14.

17. Testing is also done by simulating the horizontal dropping of a cask forty-inches onto a steel cylindrical bar. 10 CFR § 71.72(c)(3). The additional weight and force of

the combined cask and cradle are not considered in the forty-inch drop test. Resnikoff Dec. ¶ 9, 15. At the ITF, a shipping cask may be dropped greater than forty inches. Id. *See also*, PFS Material Fact ¶ 19.

18. The maximum drop distance from the railcar deck to the ground of four feet or forty-eight inches claimed by PFS is not bounded by the forty-inch drop test. Resnikoff Dec. ¶ 17. In addition, the shipping cask is transported on a cradle which lifts the cask an additional twenty-two inches above the deck of the railcar. Id. The maximum drop distance of a cask will be increased by at least twenty-two inches. Id. PFS may use a steerable trolley railcar to transport casks. Id. A steerable trolley railcar may increase the deck height of the railcar to the ground greater than four feet. Id. ¶ 16. A crane tip-over from an earthquake during a cask transfer may drop the cask and cradle horizontally distances greater than a drop directly from the railcar. Id. ¶ 13.

19. The State disputes PFS Material Fact ¶ 23 because it is premised on the unsupported fact that the ITF will be constructed at an elevation of 4,221 feet. *See* Utah Fact ¶¶ 6 and 7.

20. The State disputes PFS Material Fact ¶ 25 and Liang Dec. ¶ 7. There are several impediments to re-starting the Great Salt Lake pumping station. First, the pumping station has been moth-balled. Second, funds would need to be appropriated by the Legislature to fund the operation of the pumps. Third, there is no authority for the State to pump water onto land surrounding the pumping station. The State had an informal, temporary arrangement with the U.S. Air Force to use part of UTTR-North to pump flood waters from the Lake in 1986. Cole Tr. 14-17.

21. The State disputes PFS Material Fact ¶ 26 as an unsupported fact. PFS provides no evidence of the feasibility of any governmental entity building a dike to protect PFS's ITF facility, nor has PFS provided evidence showing that it has considered building its own dike to protect the ITF. PFS has provided no information regarding its choice for the location of a dike, performed a soil evaluation for the diking area to determine whether the foundation soils could support a dike, or provided information regarding governmental regulation[1] of diking activity.

22. The majority of currently existing dikes around the Great Salt Lake are

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[1] *See* Deseret Livestock Co. v. State, 110 Utah 239, 171 P.2d 401 (1946) ("Because the Great Salt Lake is a navigable body of water, its bed belongs to the state subject to the control of Congress for navigation in commerce," *citing* United States of America v. Utah, 283 U.S. 64 (1931); Utah Code Ann. § 65A-1-1(5) ("'Sovereign lands' means those lands lying below the ordinary high water mark of navigable bodies of water at the date of statehood and owned by the state by virtue of its sovereignty.").

experiencing stability problems due to low foundation strengths of native lake bed soils, and erosion problems due to wind and wave action resulting in very high maintenance costs. Diking Feasibility Study, UT-37880. The dike closest to the shore adjacent to the ITF location, 1-2 reach, was washed out in the 1980s during the Lake's historic high. Cole Tr. 45-46; Atwood and Mabey, 1995; Montgomery, 1984; State's 5/21/99 4th supplemental response to 1st set discovery, at 4. Also dikes could fail due to ground shaking and liquifaction of the lake bed caused by large earthquakes. Atwood and Mabey, 1995.

23. The State disputes PFS Material Fact ¶ 27 as a conclusory statement.

24. The State disputes PFS Material Fact ¶ 31 and Liang Dec. ¶ 12. Dr. Liang cites to the Diking Feasibility Study, UT-37890 for his statement "the maximum elevation at which flooding would be expected to occur would be 4216 ft." The Diking Feasibility Study also postulates that, with the lake level at 4,217 feet, unprotected areas below 4,223 feet could be considered threatened. Utah Diking Study at 3-9 (UT-37890).

25. The Diking Feasibility study is not the only source for information regarding lake elevations and storm seiche. Shoreline features for the 1980s on Antelope Island, an island in the Lake about 26 miles E-NE of Rowley Junction, indicate that storms resulted in flooding above the gauged highstand, with a debris line that ranged in elevation from 4,212.4 to 4,218 feet. Archaeological studies indicate high lake levels of 4,217 occurring about 400 years ago. Atwood and Mabey, 1995. Lake elevation levels of approximately 4,221 feet occurred about 2,000 years ago. Murchison, 1989; State's 5/21/99 4th supplemental response to 1st set discovery, at 4; Solomon Tr. at 39.

26. The State disputes PFS Material Fact ¶¶ 33, 37 and 48 relative to the predicted maximum water level at the ITF because it is premised on the unsupported fact that the ITF will be constructed at an elevation of 4,221 feet. *See* Utah Facts ¶¶ 6 and 7.

27. PFS Fact ¶ 32 admits the possibility, using conservative assumptions of wave height and assuming an historic high lake level, that lake water could reach an elevation of 4,221 feet, the same elevation at which PFS admits will be the construction level of the ITF.

28. The State disputes PFS Material Fact ¶ 34 and Liang Dec. ¶ 16 that the reports of the height of the seiche induced by the 1909 Hansel Valley earthquake are unconfirmed. The seiche height of 12 feet was computed based on a lake level of 4,202.0 ft, known on the date of the earthquake from USGS lake elevation records and the height of the Lucin cutoff railroad trestle overtopped by the seiche, known to be 4,214.85 feet from Southern Pacific Transportation Company records. *See* Exh. 2, Declaration of Michael V. Lowe; Black & Solomon, 1995, referencing Williams & Tapper, 1953; Lowe, 1993; State's 5/21/99 4th supplemental response to 1st set discovery, at 5. *See also* Solomon Tr. 14-15, 20-24.

29. The State disputes PFS Material Fact ¶ 35 and Liang Dec. ¶ 17. A 12 foot seiche was already documented from the Hansel Valley earthquake, and in 1909 when it occurred, the lake level was close to the same level it is now, 4,201.6 ft. Cole Tr. at 9. The Hansel Valley earthquake was a conservatively estimated magnitude earthquake, and there could be a larger magnitude earthquake at the site. Solomon Tr. at 24.

30. The State disputes PFS Material Facts ¶¶ 36, 37 and 38, and Liang Dec. ¶¶ 18 and 19. At the lake's historic high of almost 4,212 ft, structures at 4,220 feet in elevation may be flooded by an earthquake induced seiche of 12 feet like that generated by the Hansel Valley earthquake. *See* Utah Fact ¶¶ 28, 29.

31. Flooding potential at Rowley could cause track instability and lead to derailment of cask shipments. Resnikoff Dec. ¶¶ 6-8.

32. The PFS facility at the ITF will have restrooms and showers and a spectic tank and leachfield wastewater disposal system. *See* PFS discovery document, PFS bates no. 67381, from calculation no. 05996.01-P-002, Rev. 5, *Miscellaneous Design Data Required for PFSF Licensing Documents*, Stone & Webster (March 21, 2001), attached hereto as Exhibit 6.; *see also* Motion at 10.

33. PFS has not conducted any percolation or depth to groundwater tests to determine whether the soils at the ITF will absorb wastewater. Lewis Tr. at 49.

34. Wastewater may pool at or near the surface and contaminants could come in contact with humans if the leachfield is unable to accept the quantity of wastewater discharged. *See* Utah Response to Summary Disposition of Utah O, Ostler Dec. ¶ 20.

35. Effects of flooding at the ITF site may include foundation instability due to dissolution of soluble minerals in foundation soils, low bearing capacity of saturated foundation soils, and chemical reaction between saline water and foundation concrete; temporary loss of access to the ITF during and after flooding due to floodwaters and saturated, unstable soils; and loss of access due to a permanent shift in the lake shore resulting from tectonic subsidence. Solomon Tr. at 54-55.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	August 16, 2001

DECLARATION OF DR. MARVIN RESNIKOFF REGARDING MATERIAL FACTS IN DISPUTE WITH RESPECT TO CONTENTION UTAH W

I, Dr. Marvin Resnikoff, hereby declare under penalty of perjury and pursuant to 28 USC § 1746, as follows:

1. I am a physicist with a Ph.D. in high-energy theoretical physics from the University of Michigan and also the Senior Associate of Radioactive Waste Management Associates (RWMA), a private technical consulting firm based in New York City. I have researched radioactive waste issues for the past 27 years and have extensive experience and training in the field of nuclear waste management, storage, and disposal. Our work at RWMA includes, but is not limited to, issues concerning: (i) transportation and storage of irradiated fuel, (ii) the calculation of radiation exposures, and (iii) the evaluation of environmental impacts. A copy of my resume has already been filed in this proceeding. *See*, Exhibit A attached to my declaration in support of the "State of Utah's Responses to Applicant's Motion for Summary Disposition of Utah Contention K/Confederated Tribes Contention B," dated January 30, 2001.

2. I have considerable expertise and experience in the field of nuclear waste storage and transportation, including reviewing and analyzing cask designs, and evaluating transportation risks. Since 1975 I have worked on spent fuel transportation issues, including cask safety, for the States of Utah, Nevada (including Clark and White Pine Counties), Idaho, New Mexico and Alaska. This work began with work for the New York Attorney General's office on the safety of transporting plutonium by plane out of John F. Kennedy International Airport. My role in the case was to determine whether the plutonium shipping container could be punctured and the amount of plutonium that could be released. I was an invited speaker at the 1976 Canadian meeting of the American Nuclear Society to discuss the risk of transporting plutonium by air. On behalf of the State of New York, I also reviewed and provided comments on NUREG-170, "Final Environmental Statement on the Transportation

of Radioactive Material by Air and Other Modes." On behalf of the State of Nevada and Clark County, Nevada, I provided comments on the transportation cask safety studies and transportation risk assessments, such as the Modal Study and references, and more recently NUREG/CR-6672. I have conducted transportation risk assessments for the State of Nevada and have employed various computer codes and formulas to estimate the amount of radioactivity released in and the health and economic consequences of a severe accident, including the computer models RADTRAN, RISKIND, RESRAD, and HOTSPOT. In addition, in hearings before state commissions and in federal court, I investigated proposed dry storage facilities at the Point Beach (WI), Prairie Island (MN) and Palisades (MI) reactors. These are matters that are also addressed in this declaration. For the Council on Economic Priorities, I have written a book on the transportation and storage of irradiated fuel. In June 2000, I was appointed to a Blue Ribbon Panel on Alternatives to Incineration by former U.S. Department of Energy Secretary Bill Richardson.

3. I have considerable training and experience in the field of risk assessment involving nuclear and hazardous facilities, serving as an expert witness in numerous personal injury cases in which I estimated radiation doses and the likelihood these exposures caused cancer. These cases involved uranium mining and milling, oil pipe cleaning, X-rays, thorium contamination and other issues. This work involved the use of computer codes, such as MILDOS, to estimate radiation doses and spreadsheets employing dose conversion factors.

4. I am familiar with Private Fuel Storage, L.L.C.'s ("PFS's") license application ("LA"), Environmental Report ("ER") and Safety Analysis Report ("SAR") in this proceeding, as well as the applications for the storage (HI-STORM) and transportation casks (HI-STAR) PFS plans to use. I am also familiar with NRC regulations, guidance documents, and environmental studies relating to the storage and transportation of spent nuclear power plant fuel, including NUREG-0800, 10 CFR Part 100, EPA's Protective Action Guide, and Federal Register Notice December 4, 1996 (61 Fed. Reg. 64257). I am also familiar with PFS responses to NRC's Requests for Additional Information ("RAIs") that may be applicable to Contention Utah W.

5. I have carefully reviewed the Applicant's July 27, 2001 Motion for Summary Disposition of Utah Contention W ("Motion"), as well the Statement of Material Facts on Which No Genuine Dispute Exists ("PFS Facts"); other relevant PFS documents; the NRC Staff's *Safety Evaluation Report* ("SER") dated September 29, 2000; and the *Draft Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah*, NUREG-1714 ("DEIS") dated June 2000. I have visited the proposed intermodal transfer

facility site. Thus, I am familiar with the surrounding topography and existing rail lines.

6. This declaration is written in support of the State's Statement of Disputed and Relevant Material Facts with Respect to Contention Utah W. I will discuss my view that the ER and the DEIS do not adequately address the impacts of flooding at the intermodal transfer facility.

7. PFS incorrectly claims that Table S-4 in 10 CFR § 51.52 "accounts for all environmental impacts of transporting spent fuel through the [intermodal transfer facility.]" Motion at 4. Table S-4 did not consider numerous transportation events, including the environmental impact of flooding and earthquakes at an intermodal transfer facility. 10 CFR § 51.52. In my opinion, neither PFS nor the Staff can rely on Table S-4. PFS has not evaluated the scope of flooding impacts, including whether flooding or a high water table would weaken the track foundation causing a train to derail.

8. For example, Table S-4 does not consider the impact of track washout, a frequent cause of derailments. I am personally familiar that the natural over saturation of soil supporting a rail line may cause train derailment. Following snow accumulations in Vermont this past winter, the ground softened near the Connecticut River in Westminister, Vermont, on a rail line that I frequent.[1] A freight train fell into the river as a result of the weakened or softened foundation. Flooding or a high water table at the intermodal transfer facility may similarly cause the track foundation to weaken resulting in a railcar derailment.

9. PFS also incorrectly purports that Table S-4 "accounts" for all environmental impacts at the intermodal transfer facility. Motion at 4. PFS plans to transport spent nuclear fuel in 142 ton HI-STAR 100 shipping casks. *See*, emailed memo from John Donnell to Stan Gurule dated March 30, 1999, attached hereto as Exhibit A (PFS bates no. 32858-9). The 142 ton HI-STAR 100 shipping cask exceeds the threshold weight limit for Table S-4. *See* 10 CFR § 51.52. The cask plus cradle plus rail carriage would exceed 211 tons. Thus, Table S-4 is not applicable, and therefore, does not bound PFS intermodal transfer facility events.

10. The ER and the DEIS both fail to adequately discuss the impacts of flooding on a damaged shipping cask at the intermodal transfer facility. PFS concludes there would be "no material damage" to a shipping cask "[i]f a cask was dropped by earthquake forces off the railcar, it would drop four feet to the ground." Motion at 9.

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[1] I am particularly familiar with this incident because I was scheduled to ride an Amtrack train along the same rail line a few hours following the derailment.

11. Dr. Singh asserts that PFS's shipping cask is designed to withstand a thirty foot drop; thus, the cask would not receive any "material damage" from a drop of four feet. *See* Singh Dec. ¶ 10. NRC regulations require that a cask be designed to withstand a thirty foot vertical drop onto a "flat, essentially unyielding, horizontal surface" at an orientation designed to cause maximum damage. 10 CFR § 71.73(c)(1) (*emphasis added*). *See* schematic of thirty foot drop test, attached hereto as Exhibit B.

12. PFS has not demonstrated that the maximum height that a cask could drop is four feet or that a dropped cask at the intermodal transfer facility will not be damaged. Thus, the requirement for a shipping cask to withstand a thirty foot vertical drop on a flat surface will not bound the potential "dropped shipping cask" scenarios at the intermodal transfer facility.

13. A shipping cask at the intermodal transfer facility could be dropped during an earthquake. This cask could be dropped directly from a stationary or moving railcar or while the cask is transferred from the railcar to a heavy haul truck. *See also* Motion at 9 and Singh Dec. at ¶ 10. The drop distance of cask from a crane during transfer operations may be greater than if the cask was dropped directly from a railcar. At the intermodal transfer facility both the cask and the cradle will be lifted together from the railcar by a crane. PFS cannot ensure that a dropped cask will not be damaged because of the thirty foot "cask only" drop test due to the substantially increased weight of the combined cask/cradle. PFS has not evaluated the impacts from the increased force of dropping the combined cask/cradle.

14. Based on my experience, transferring a horizontally positioned shipping cask from railcars to heavy haul trucks such as at the intermodal transfer facility, it is unlikely that the shipping cask will be vertically dropped. *See* schematic of horizontally dropped cask attached hereto as Exhibit C. Thus, the thirty foot vertical drop test design requirement does not eliminate potential impacts of a horizontally dropped cask. In addition, PFS relies on the design requirements for a flat, unyielding, horizontal surface and has not evaluated the impacts of a horizontally dropped cask onto an object at the intermodal transfer facility.

15. NRC regulations require shipping casks to withstand a forty-inch drop onto a cylindrical steel bar. 10 CFR § 71.73(c)(3). The forty-inch drop test also does not consider the combined weight and force of the cask and cradle. *See* ¶ 13 *supra*. PFS itself states that the deck height of "the vehicles is typically 28" to 48"." PFS Material Fact ¶ 15. Thus, PFS asserts its shipping casks would drop a maximum of four feet from a railcar. Id. at ¶ 19. The 40 inch drop test onto a steel bar does not bound a cask dropped 48 inches, or four feet.

16. PFS has not provided any documentation that shows the height of its railcar flatbed will in fact be less than four feet. If PFS uses a steerable trolley for the railcar,[2] then the deck height of a railcar with a steerable trolley may be higher than the height of a standard flat bed railcar. No design materials have been given to the State during discovery. Thus, the deck height is currently unknown.

17. Even assuming that PFS' railcars will have a four foot or less deck height, the actual drop distance will exceed the forty-inch test. Additionally, the cask and cradle lay on the railcar deck. The height of the cask is raised twenty-two inches above the cradle due to the impact limiters.[3] Thus, a cask/cradle dropped directly from a railcar could be dropped at least 70 inches. Use of a steerable trolley may increase the drop distance further. *See* ¶ 16 *supra.*

18. If the crane tips over, for example during an earthquake, while lifting the combined cask/cradle, the cask/cradle could be dropped horizontally from a height greater than the 70 inches. Under this scenario, the employment of a steerable trolley may increase the drop distance further. *See* ¶ 16 *supra.*

19. PFS has not analyzed the impacts of flooding at the intermodal transfer facility if a cask is dropped during an earthquake. Thus, a cask/cradle combination from a height exceeding 40 inches onto an object could be sufficient to penetrate the shipping cask and damage the fuel cladding and cause a radioactive release during a flood at the intermodal transfer facility.

Executed this 16th day of August 2001,

By _____
Marvin Resnikoff, PhD

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[2] *See* Applicant's Response to State of Utah's Request for Admission of Late-Filed Contentions LL-OO (August 30, 2000) at 11.

[3] Holtec, HI-STAR TSAR, HI-951251, Rev. 8 (June 25, 1999), Docket No. 71-9261, Section 1.4, Drawing 1765, No 4 of 7.

16. PFS has not provided any documentation that shows the height of its railcar flatbed will in fact be less than four feet. If PFS uses a steerable trolley for the railcar,[2] then the deck height of a railcar with a steerable trolley may be higher than the height of a standard flat bed railcar. No design materials have been given to the State during discovery. Thus, the deck height is currently unknown.

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18. If the crane tips over, for example during an earthquake, while lifting the combined cask/cradle, the cask/cradle could be dropped horizontally from a height greater than the 70 inches. Under this scenario, the employment of a steerable trolley may increase the drop distance further. *See* ¶ 16 *supra*.

19. PFS has not analyzed the impacts of flooding at the intermodal transfer facility if a cask is dropped during an earthquake. Thus, a cask/cradle combination from a height exceeding 40 inches onto an object could be sufficient to penetrate the shipping cask and damage the fuel cladding and cause a radioactive release during a flood at the intermodal transfer facility.

Executed this 16th day of August 2001,

By Marvin Resnikoff, PhD

[2] *See* Applicant's Response to State of Utah's Request for Admission of Late-Filed Contentions LL-OO (August 30, 2000) at 11.
[3] Holtec, HI-STAR TSAR, HI-951251, Rev. 8 (June 25, 1999), Docket No. 71-9261, Section 1.4, Drawing 1765, No 4 of 7.

John Donnell
03/30/99 03:54 PM

To: Stan_Gurule@aar.com
cc:
Subject: Re: Request for Info

Attached is some info which I believe answers your question.

J Donnell

railc

SPENT FUEL SHIPMENT WEIGHT

A shipment consists of either a HI-STAR or TranStor shipping cask loaded with a spent fuel canister, two impact limiters, shipping cradle, personnel barrier, and shipment tie downs.

HI-STAR shipping cask

Max. weight of loaded canister	=	88,857 lb.	(Reference 1, Table 2.2.1)
Weight of HI-STAR shipping cask	=	153,080 lb.	(Reference 1, Table 2.2.1)
Weight of impact limiters	=	33,309 lb.	(Reference 1, Table 2.2.1)
Weight of shipping cradle	=	6700 lb.	(Reference 1, Table 7.1.1)
Weight of tie downs	=	1100 lb.	(Reference 1, Table 7.1.1)
Weight of personnel barrier	=	710 lb.	(Reference 1, Table 7.1.1)

Total weight of HI-STAR shipment = 283,756 lb. = 141.9 ≈ 142 tons

TranStor shipping cask

Max. weight of loaded canister	=	83,200 lb.	(Reference 2, Table 2.2-1)
Weight of shipping cask	=	160,900 lb.	(Reference 2, Table 2.2-1)
Weight of impact limiters	=	20,900 lb.	(Reference 2, Table 2.2-1)
Weight of shipping cradle	=	15,600 lb.	(Reference 3, Sheet 1)
Weight of tie downs (incl w/ cradle)			
Weight of personnel barrier	=	1300 lb.	(Reference 4)

Total weight of HI-STAR shipment = 281,900 lb. = 141 tons

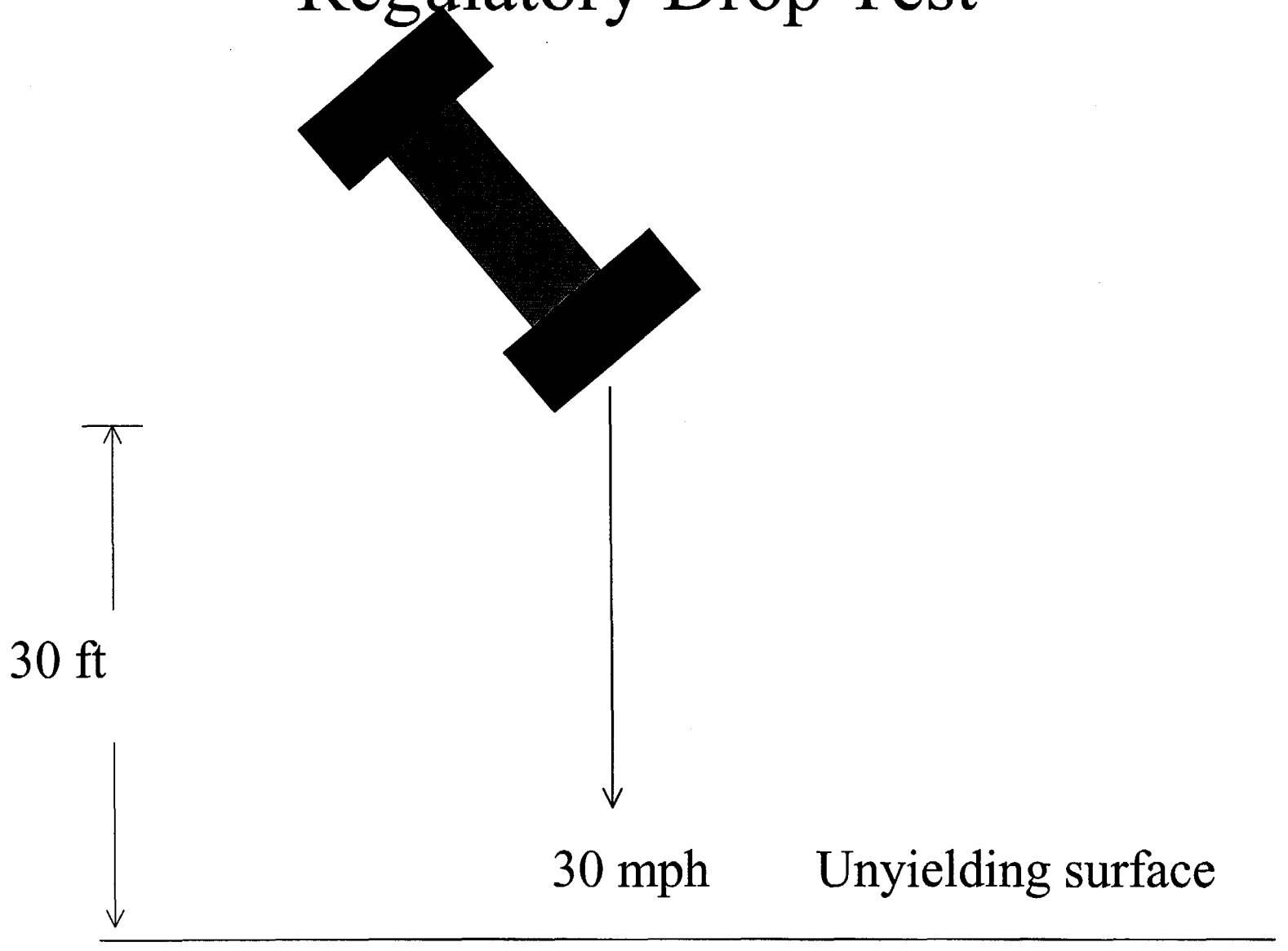
Since the heaviest shipment weight = 142 tons, select a Heavy Duty Flat Car or Heavy Duty Depressed Deck Car with a minimum load capacity of 145 tons (290,000 lb.).

Current designs for heavy duty rail cars consist of either two 3-axle trucks supporting the bed or two sets of 2-axle trucks attached to span bolsters, which support the bed.

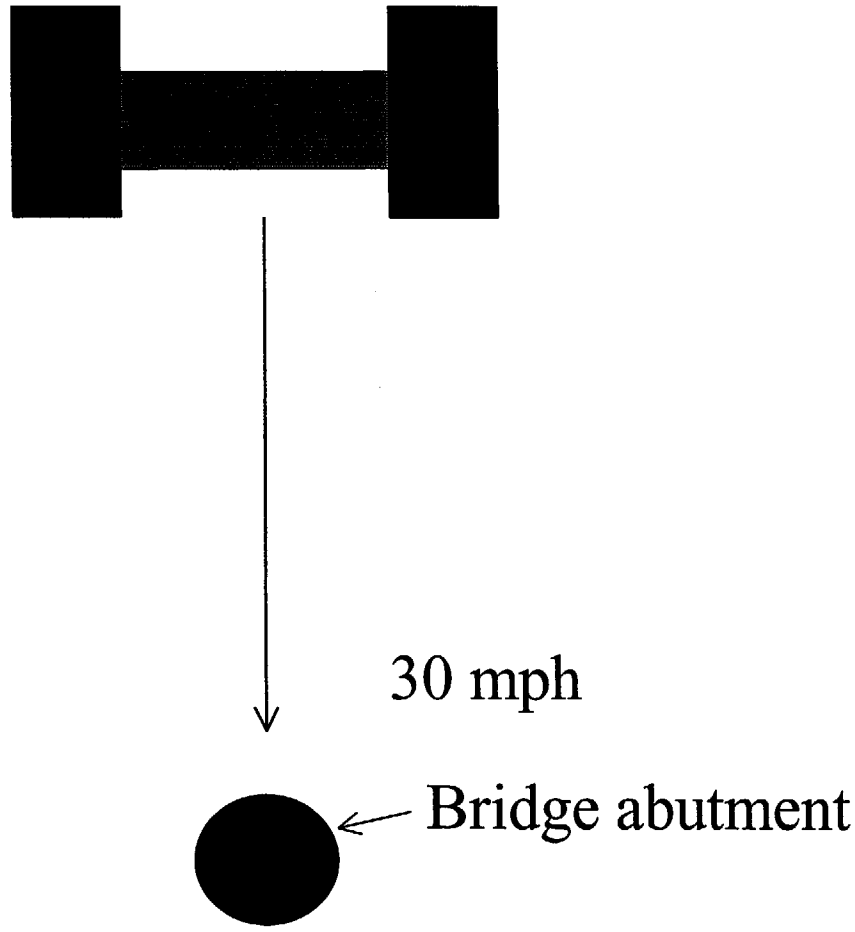
The light weight (weight of car) for a two 3-axle heavy duty flat car is 98,300 lb. (Ref. 5)
The light weight for a four 2-axle heavy duty depressed center car is 132,500 lb. (Ref. 6)

Since the heaviest is 132,500 lb, then the maximum rail load is 132,500 + 290,000 = 422,500 lb.

Regulatory Drop Test



Potential Accident



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	August 14, 2001

DECLARATION OF MICHAEL V. LOWE

I, Michael V. Lowe, hereby declare under penalty of perjury and pursuant to 28 USC § 1746, as follows:

1. I am currently employed as a Geologic Program Manager at the Utah Geological Survey ("UGS"), a division of the Department of Natural Resources, and have been employed at UGS since 1989.

2. Some of my responsibilities include managing of the UGS Environmental Sciences Program, and supervising twelve program employees; reviewing technical and nontechnical reports; conducting hydrogeologic investigations; marketing ground-water projects to obtain outside funding; performing water-quality, surficial-geologic, geologic-hazard, and waste-disposal-suitability mapping; and conducting debris-flow and liquefaction hazard research.

3. I earned my M.S. degree in geology from Utah State University in 1987. I earned my B.S. degree in geology from Weber State University in 1981.

4. Prior to my employment with the Utah Geological Survey, I worked as the Davis County Geologist for the Davis County Planning Department, Farmington, Utah, from 1988 to 1989. In this position my responsibilities included production of translated geologic-hazard maps and reports; conducting neotectonic and debris-flow hazard research; performing a hydrogeologic study of Ogden Valley; emergency response during geologic-hazard events; and site evaluations for public facilities. My attached resume provides additional information about my qualifications and experience as well as a list of publications.

5. I am the author of *Hazards from Earthquake-Induced Ground Failure in Sensitive Clays, Vibratory Settlement, and Flooding due to Seiches, Surface-Drainage Disruptions, and Increased Ground-Water Discharge, Davis County, Utah*, published in Applications of Research from the U.S. Geological Survey Program, Assessment of Regional Earthquake Hazards and Risk Along the Wasatch Front, Utah, U.S. Geological Survey Professional Paper 1519, in 1993.

6. As part of my discussion of earthquake-induced seiche hazards, I made the following statement (at page 165):

> No systematic or theoretical studies of landslide or earthquake-induced seiching in Great Salt Lake have been completed. Seiches were reported along the southern shoreline of Great Salt Lake at Saltair and at the trestle at Lucin during the magnitude 6 Hansel Valley earthquake of October 5, 1909 (Williams and Tapper, 1953). The elevation of Great Salt Lake was 4,202.0 ft (1280.77 m) on October 1, 1909 (U.S. Geological Survey lake elevation records). The seiche generated by the 1909 Hansel Valley earthquake overtopped the Lucin cutoff railroad trestle, which had an elevation of 4,214.85 ft (1284.69 m) (Southern Pacific Transportation Company records). Assuming the reports that the seiche overtopped the trestle are true and that lake and trestle elevation records were accurately reported, the seiche wave was more than 12 ft (3.7 m) high.

7. The Lucin cutoff railroad trestle is located in the middle of the Great Salt Lake, where the Southern Pacific Causeway railroad tracks run from Ogden, Utah on the east, to Lakeside, Utah on the west.

8. In my research in preparation of the above-quoted statement in my article, I spoke to a Southern Pacific Transportation Company employee who indicated to me that he had been working for the company for many years. At my request, he researched his company's records and located the elevation figures for the Lucin cutoff railroad trestle. He told me the records show that at the time of the Hansel Valley earthquake in October 1909, the elevation of the Lucin cutoff was 4,214.85 feet.

9. In addition, as part of my research, I reviewed existing relevant geological studies, and found that Williams and Tapper, 1953 (at page 205; full reference provided below), reported that the Lucin cutoff railroad trestle had been overtopped by the Hansel Valley earthquake-induced seiche in October 1909. In my opinion, this

publication is well-researched considering that seismic information from earlier in the 20th century and before is sparse and not easily retrievable.

10. I feel confident that the Southern Pacific Transportation Company employee reported the elevation figure of the Lucin cutoff to me accurately because he told me he was directly quoting from his company's records.

11. I feel confident in my conclusion that the Hansel Valley earthquake-induced seiche reached a height of over 12 feet at the Lucin cutoff railroad trestle.

Dated this 14th day of August 2001,

By Michael V. Lowe

Michael V. Lowe

Reference: Williams, J.S., and Tapper, M.L., 1953, *Earthquake history of Utah, 1850-1948*: Bulletin of the Seismological Society of America, v. 43, no. 3, p. 191-218.

RESUME

MICHAEL V. LOWE, Utah Geological Survey, 1594 W. North Temple, Salt Lake City, Utah

EDUCATION: M.S. Geology, 1987, Utah State University, Logan, UT 84322-0705.
G.P.A. 3.96. Major Advisor: James McCalpin.
B.S. Geology, 1981, Weber State College, Ogden, UT 84408.
G.P.A. 3.45.
Post-graduate courses: "Introduction to solute transport and ground-water contamination", and "Advanced topics in hydrogeology" (University of Utah).

EXPERIENCE: September 1989-Present, **Geologic Program Manager (Environmental Sciences Program)**, Utah Geological Survey (UGS), 1594 W. North Temple, Salt Lake City, UT. Responsibilities: management of UGS Environmental Sciences Program, which includes three Sections (Ground Water, Paleontology, and Paleoecology/Archaeology), and supervision of fifteen program employees; review of technical and nontechnical reports; conducting hydrogeologic investigations; marketing ground-water projects to obtain outside funding; performing water-quality, surficial-geologic, geologic-hazard, and waste-disposal-suitability mapping; conducting debris-flow and liquefaction hazard research; representing UGS on committees, including Wellhead Protection Advisory, Kennecott Natural Resources Damage Claim, Pesticides State Management Plan, Pineview Water Quality, and Sevier River Basin Water Quality and Ground Water Technical Advisory Committees.

June-August 1992 - 1995, **Instructor**, Geology Department, Weber State University, Ogden, UT. Responsibilities: teaching environmental geology course.

June 1988-Sept. 1989, **Davis County Geologist**, Davis County Planning Department, Farmington, Utah. Responsibilities: production of translated geologic-hazard maps and reports; conducting neotectonic and debris-flow hazard research; performing hydrogeologic study of Ogden Valley; emergency response during geologic-hazard events; site evaluations for public facilities. High-profile position (newspaper and television interviews).

June 1985-June 1988, **Weber/Davis Counties Geologist**, Weber Co. Planning Dept., Ogden, UT. Responsibilities: performing geologic hazards mapping; landslide mitigation; conducting neotectonic research; conducting hydrogeologic study of Ogden Valley; writing environmental sections for Master Plans; emergency response during geologic-hazard events; review of consultant's reports. High profile position (public speaking and newspaper, radio, and television interviews).

June 1981-July 1982, **Well-Site Geologist**, Petro Graph Inc., Giddings, TX. Duties: monitor/record lithology, formation tops, drilling rate, gas types/levels, fractures, and oil fluorescence; warn driller of blowout danger.

AWARDS: Second place, 1969 Regional Science Fair, Weber State College.

Claude E. Zobell Award, 1983/1984, for most outstanding student in School of Natural Sciences, Utah State University.

Certificate of Appreciation, 1989, from U.S. Geological Survey, Federal Emergency Management Agency, Utah Geological Survey, and Utah Division of Comprehensive Emergency

Management for accomplishments in fostering the implementation of measures to reduce losses due to earthquakes in the Utah.

Certificate of Appreciation, 1989, from Utah North Mission 2000 Board of Trustees in recognition of outstanding voluntary service in futuristic planning.

John C. Frye Environmental Geology Award, 1995, from the Geological Society of America (GSA) and Association of State Geologists for the best paper on environmental geology published either by GSA or a state geological survey.

PROFESSIONAL ORGANIZATION MEMBERSHIPS:

Utah Geological Association, Active Member, 1990-2001. President Elect-1998, President-1999, Pas-President, 2000.

Association of Engineering Geologists, Full Member, 1990-2001. Utah Section AEG Membership Chairperson, 1991; Vice Chairperson/Program Director, 1992-93; Newsletter Editor 1992-95; Utah Section Chairperson, 1994-95.

National Ground Water Association, Member, 1992-2001.

Utah Ground Water Association, Member, 1997-2001; Board of Directors (Technical) 1998-2001.

Utah Friends of Paleontology, Member, 1997-99.

CIVIC ACTIVITIES: 1985-1986, **Pineview Clean Lakes Committee**, geologist on panel of professionals advising Weber County Planning Commission on measures which could be taken to maintain high water quality in Pineview Reservoir.

1987-1989, **Utah North Mission 2000, Physical Resources Council, Natural Resources Task Force,** citizens group planning for the growth expected to occur in Box Elder, Morgan, and Weber Counties by the year 2000.

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Lowe, Mike, Black, B.D., Harty, K.M., Keaton, J.R., Mulvey, W.E., Pashley, E.F., Jr., and Williams, S.R., 1992, Geologic hazards of the Ogden area, Utah, *in* Wilson, J.R., editor, Field guide to geologic excursions in Utah and adjacent areas of Nevada, Idaho, and Wyoming: Utah Geological Survey Miscellaneous Publication 92-3, p. 231-285. **Winner of GSA's 1995 John C. Frye Environmental Geology Award.**

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Lowe Mike, and Wallace, Janae, 1997, The hydrogeology of Ogden Valley, Weber County, Utah, and potential implications of increased septic-tank soil-absorption system density: Geological Society of America Abstracts with Programs, v. 29, no. 6, p.

Lowe, Mike, and Wallace, Janae, 1999, A mass-balance approach for recommending septic-tank system density/lot size based on nitrate loading--three Utah examples: Geological Society of America Abstracts with Programs, v. 31, no. 4, p. A-22.

Lowe, Mike, and Wallace, Janae, 1999, Protecting ground-water quality through aquifer classification--examples from Cache, Ogden, and Tooele Valleys, Utah, *in* Spangler, L.E., and Allen, C.J., editors, Geology of northern Utah and vicinity: Utah Geological Association Publication 27, p. 275-313.

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Association of Engineering Geologists 42nd Annual Meeting Program with Abstracts, Salt Lake City, Utah, p. 75.

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McCalpin, J.P., Forman, S.L., and Lowe, Mike, 1994, Reevaluation of Holocene faulting at the Kaysville site, Weber segment of the Wasatch fault zone, Utah: Tectonics, v. 13, no. 1, p. 1-16.

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COPY OF TRANSCRIPT

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	) Docket No. 72-22
	) ASLPB No. 97-732-02-ISFSI
PRIVATE FUEL STORAGE L.L.C.	)
	) DEPOSITION OF:
(Private Fuel Storage Facility)	) **DONALD WAYNE LEWIS**
	) **(Utah Contention W)**

Thursday, April 19, 2001 - 1:15 p.m.

Location: Parsons, Behle & Latimer

201 S. Main, #1800

Salt Lake City, Utah

Reporter: Vicky McDaniel

Notary Public in and for the State of Utah

1 can try to understand the scope?
2 A. In terms of what kind of -- gee. I can't
3 remember the term I'm thinking of. Emissions that --
4 let's see. Where permits or things like that would be
5 required for equipment that I might be installing. I
6 would have looked at it to see what types of regulations
7 are required for that particular equipment.
8 Q. Okay. Can you think of any other examples?
9 A. For example, if I were to install a diesel
10 generator, I would look at emissions from a diesel
11 generator to see what levels would require certain
12 things.
13 Q. "Things" being?
14 A. Controls, engineer controls that I might
15 have to install.
16 Q. Are you familiar with another contention
17 that the State of Utah filed, Contention N, which deals
18 with the intermodal transfer point?
19 A. Vaguely, but not directly.
20 Q. Okay. Have you visited the intermodal
21 transfer site personally?
22 A. I've been down I-80. I have not stopped at
23 the intermodal transport -- or intermodal transfer
24 point.
25 Q. Could you describe the location where it's

1 A. Yeah, sometime later this year. And I do
2 not know what studies the geological or civil people
3 have for that area this year.
4 Q. Do you know whether any soil profiles will
5 be conducted in time for hearings that may occur in
6 November?
7 A. I don't know that without looking into it.
8 Q. And what would you do to look into it?
9 A. Talk to the geotechnical engineers to see
10 what they have planned for that particular area.
11 MS. CHANCELLOR: I'd request that if they
12 plan any studies out there, if you could supplement
13 discovery so that we can know.
14 Q. (BY MS. CHANCELLOR) Do you anticipate doing
15 any depth to groundwater studies between now and
16 November?
17 A. It would be the same answer. I would have
18 to talk to the geotechnical. They would be the ones
19 that would determine that information, the height of the
20 groundwater.
21 Q. Do you anticipate doing any perc tests
22 between now and November?
23 A. We would not need to do a perc test until it
24 came time to design for the septic system, and we
25 wouldn't do that until -- that's one of the last items

COPY OF TRANSCRIPT

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	) Docket No. 72-22
	) ASLPB No. 97-732-02-ISFSI
PRIVATE FUEL STORAGE	)
L.L.C.	) DEPOSITION OF:
	)
(Private Fuel Storage	) **GEORGE H. C. LIANG**
Facility)	)
	) **(Utah Contention W)**

Wednesday, April 18, 2001 - 9:06 a.m.

Location: Heber Wells Building

160 East 300 South

Salt Lake City, Utah

Reporter: Vicky McDaniel

Notary Public in and for the State of Utah

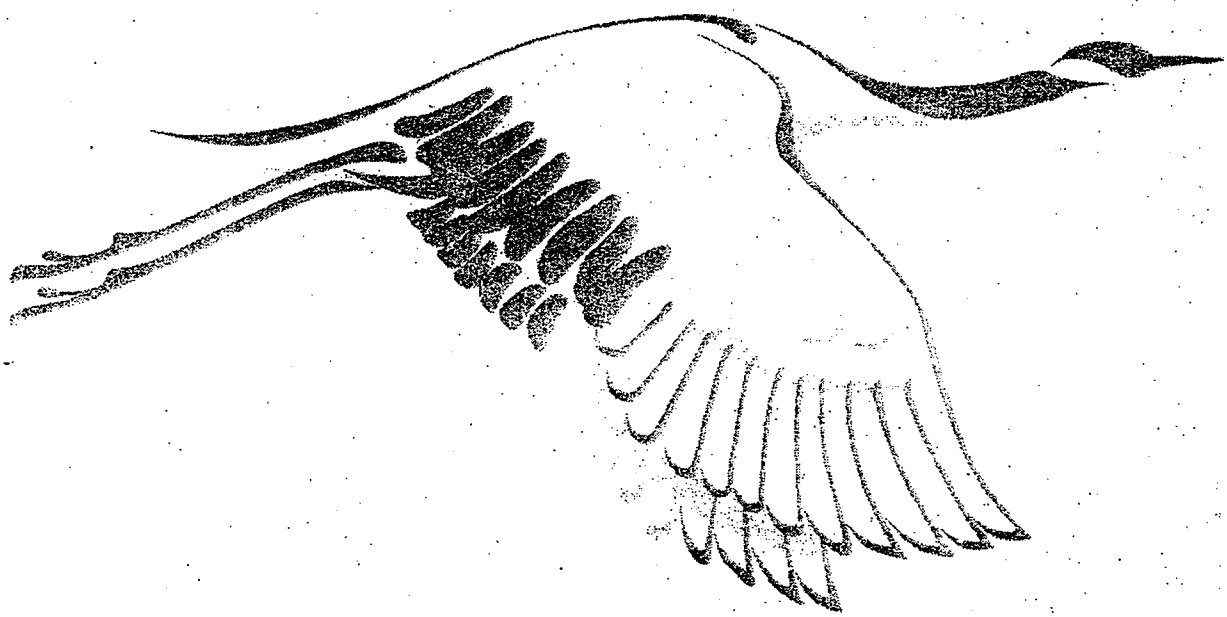
1 A. Oh, yeah. That I understand, yes.
2 Q. Okay. And what's the purpose?
3 A. The purpose, they -- when the casks are
4 shipped by rail and then they will transfer to another
5 truck. Let's see, I think it's in -- they'd be in
6 another rail line all the way to the site from that
7 point on. It's some kind of cask transfer from one
8 motor vehicle to another moving vehicle. That's my
9 understanding.
10 Q. And do you know how many casks will come
11 into that site?
12 A. No, I don't know.
13 Q. Do you know how many employees will be at
14 the site?
15 A. The only exact number I don't know. I only
16 know a few employee will be there.
17 Q. And do you know the hours of operation at
18 the site?
19 A. Very in general. They will have a crane
20 lifted from one motor vehicle to the other, loading to
21 the other one, and all the way to the site. That's the
22 only operation I understand.
23 Q. Okay. Have you conducted any field studies
24 at the site?
25 A. No.

1 Q. Okay.
2 A. These first two line is from other
3 discipline within our company.
4 Q. Okay. So let's go over it word by word.
5 "The ITP is not expected to be affected by flooding."
6 Was that your conclusion? We're in paragraph 3.
7 A. Paragraph 3 -- one, two, three. Oh, okay.
8 Q. "The ITP is not expected to be affected by
9 flooding."
10 A. Yes.
11 Q. That's your conclusion?
12 A. That's my input, yes.
13 Q. Okay. "The existing elevation of the ITP
14 area is from 4220 feet to 4225 feet as determined from
15 the Poverty Point, Utah and Timpie, Utah 7 1/2 minute
16 USGS quadrangle topographical map 5 ft. contours."
17 A. Yes.
18 Q. Okay. And that's your input?
19 A. Yes.
20 Q. All right. We have here the two quadrangles
21 referred to, the Poverty Point and the Timpie
22 quadrangles. And could you explain how you arrived at
23 the elevations of 4220 and 4225 from these two
24 quadrangle maps?
25 A. I believe I -- when I look at it, it is not

1 this one. And I have that number. Because I recall
2 that the USGS quad map I look at was the lake, the Great
3 Salt Lake. But here I didn't see the Great Salt Lake in
4 there. So must be somehow referring to wrong USGS map.
5 Q. Is that map entitled Poverty Point, Utah?
6 A. Oh, yeah.
7 Q. And is the other one entitled Timpie?
8 A. Yes, yes.
9 Q. Is the location of the ITP evident -- can
10 you tell where the location of the IT -- intermodal
11 transfer site is on those two maps?
12 A. I would like to refer this question to
13 Mr. Wayne Lewis, because when I look at the lake, I was
14 provided number. I did not specifically refer to this
15 USGS map. When they using that conclusions from
16 so-called elevation, the existing elevation of ITP from
17 2025, they using my -- referring to the map and then put
18 into our drawing, which show in the ER 4.3 feet. And
19 you will see that, which is actually copy from USGS map.
20 There's a number in it. The figure.
21 Q. Figure what?
22 A. 4.3 something ER. I can locate it for you.
23 I have an ER here.
24 Q. I've got a Figure 3.2-1, which is the --
25 MS. CHANCELLOR: Are we still on the record?

1 Let's go off the record for a moment.
2 (Discussion off the record.)
3 Q. (BY MS. CHANCELLOR) All right, back on the
4 record.
5 So Mr. Liang, you cannot find on the
6 quadrangle map, the two quadrangle maps that are
7 referred to on the ER, you can't find the elevations
8 referred to in the ER of 4220 to 4225. Is that correct?
9 A. The first part of your question is correct.
10 The second part is not true. I did find it in the USGS
11 map, but not the one --
12 Q. Not the one referred to --
13 A. -- referenced here.
14 Q. Okay. And do you recall what map it was
15 that you used from the -- was it a map from USGS?
16 A. Yes.
17 Q. Was it a five-foot contour interval?
18 A. Yes.
19 Q. Do you recall the name of the map?
20 A. No.
21 Q. Could I request that you provide the map or
22 at least a reference to the map that you used to obtain
23 this 4220- to 4225-foot elevation based on a USGS map
24 with five-foot contours?
25 MR. GAUKLER: We'll take it under

Great Salt Lake Comprehensive Management Plan and Decision Document



Prepared by the Great Salt Lake Planning Team
Utah Department of Natural Resources

March 1, 2000

RECORD OF DECISION

Record of Decision Number 00-0301-GSL CMP

PROPOSED ACTION

Approval of the final Comprehensive Management Plan (CMP) for Great Salt Lake (GSL). This action includes all state lands below or adjacent to the surveyed meander line of GSL. This action involves satisfying statutory requirements and administrative purposes for the CMP.

RELEVANT FACTUAL BACKGROUND:

In 1997 the Great Salt Lake Planning Project was initiated to develop a CMP. A planning team (team) consisting of representatives of Department of Natural Resources (DNR) divisions was assembled. The purposes of the project were: (1) To establish unifying DNR management objectives and policies for GSL trust resources; (2) To coordinate the management, planning and research activities of DNR divisions on GSL; (3) To improve coordination among DNR divisions, establish a decision-making review and appeal process, develop a sovereign land management plan for the lake that balances multiple-use and sustainability, resolves issues and improves management of the lake and its resources; (4) To develop a sovereign lands and resources management plan, and; (5) To establish a process for plan implementation, monitoring, evaluation and amendment.

Formal notice that the project was proceeding was sent to the Resource Development Coordinating Committee (RDCC) in February 1998 (State Identifier Number UT980203-010). Public Notices regarding public meetings for the project were published in The Salt Lake Tribune (2/8/98-2/15/98), Deseret News (2/8/98-2/15/98), Box Elder News Journal (2/11/98-2/18/98), Davis County Clipper (2/6/98-2/10/98), Tooele Transcript-Bulletin (1/29/98-2/5/98), and Ogden Standard Examiner(2/6/98-2/8/98). Notice of the meetings was also sent to persons on a mailing list that included permittees and lessees. Five public scoping meetings were held in Box Elder, Davis, Salt Lake, Tooele and Weber counties in February and March 1998. Representatives of the team met with federal agencies, local government officials, citizen and industry groups, and interested individuals for a variety of purposes from November 1997 through November 1999. A draft Statement of Current Conditions and Trends was distributed for public review and comment in October 1998. A draft array of GSL management alternatives was distributed for public review and comment in January 1999. Five public meetings on the management alternatives were held in Box Elder, Davis, Salt Lake, Tooele and Weber Counties in January and February 1999. A draft CMP was distributed for public review and comment in November 1999. The comment period ran through January 7, 2000. RDCC review concluded with a letter from RDCC on January 7, 2000 (State Identifier Number UT991116-010). The team reviewed the public comments and prepared responses. Based on this review the GSL Board of Directors approved the selected alternatives for inclusion in the final CMP.

CRITERIA FOR EVALUATION

Article XX, Section 1 of the Constitution of Utah affirms the public trust over state lands: "All lands of the State that have been, or may hereafter be granted to the State by Congress, and all lands acquired by gift, grant or devise, from any person or corporation, or that may otherwise be acquired, are hereby accepted, and . . . are declared to be the public lands of the State; and shall

STONE & WEBSTER ENGINEERING CORPORATION

CALCULATION TITLE PAGE

CLIENT & PROJECT	PAGE 1 OF ~~28~~ 30 31 1A ~~X~~ ~~4~~
Private Fuel Storage L. L. C./Private Fuel Storage Facility	
CALCULATION TITLE **Miscellaneous Design Data Required for PFSF Licensing Documents**	QA CATEGORY III

CALCULATION IDENTIFICATION NUMBER				
J.O. OR W.O. NO.	DIVISION & GROUP	CURRENT CALC. NO.	OPTIONAL TASK CODE	OPTIONAL WORK PACKAGE NO.
05996.01	**Mechanical**	**P-002**	**NA**	**NA**

APPROVALS - SIGNATURE & DATE			REV. NO. OR NEW CALC. NO	SUPERSEDES CALC. NO. OR REV. NO.	CONFIRMATION REQUIRED (X)	
PREPARER(S)/DATE(S)	REVIEWER(S)/DATE(S)	INDEPENDENT REVIEWER(S)/DATE(S)			YES	NO
D. W. Lewis 7-16-97 7-16-97	J.L. Cooper 7-17-97	NA	0	NA		X
S.M. MACIE 10-23-97 ISSUED FOR USE ON	10-24-97 J.L. COOPER	NA J.O. No. 0599602	1	0		X
D.W. LEWIS 9-9-98	J.L. COOPER 9-11-98	NA	2	1	✓	
D.W. LEWIS 5-13-99	S.M. MACIE 5-13-99	NA	3	2	✓	

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9. Determine Water Requirements for PFSF Operation

At the PFSF

The client estimates a work staff of 42 persons (Reference 27)

Use 50 persons at one 8 hour shift per day

Factory type work w/ showers
= 35 gallons/capita/8-hour shift (Reference 28, Table I-3)

Water usage = 50 x 35 gal/capita/8-hour shift = 1750≈ 1800 gal/day

For the Low Corridor Rail Line Operation

Water required during operation of the rail line will be exclusively to provide drinking water for personnel, and it will be supplied in drinking water bottles/containers from the PFSF.

For the Intermodal Transfer Point (ITP) Operation

Water requirements at the ITP during operation will be to provide drinking water and water for the restroom. These requirements will be minimal since the ITP is staffed only intermittently.

Assume 3 operators + 1 hp worker during 4 hours to transfer the a shipping cask from the rail car to the heavy haul trailer (Reference 44)

Assume 1 transfer per day

4 persons during half of one 8 hour shift per day

Factory type work w/ showers
= 35 gallons/capita/8-hour shift (Reference 28, Table I-3)

Water usage = 4 x 35 gal/capita/8-hour shift / 2 = 70≈ 100 gal/day