

July 19, 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 RESPONSE TO
APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF
UTAH CONTENTION M - PROBABLE MAXIMUM FLOOD

INTRODUCTION

Pursuant to 10 C.F.R. §2.749(a), the NRC Staff ("Staff") herewith responds to "Applicant's Motion for Summary Disposition of Utah Contention M - Probable Maximum Flood" ("Motion"), filed on June 28, 1999, by Private Fuel Storage L.L.C. ("Applicant" or "PFS"). For the reasons set forth below and in the attached Affidavit of Dr. Steven R. Abt ("Abt Aff."), the Staff submits that all issues pertaining to the Applicant's analysis of the probable maximum flood ("PMF") for its proposed ISFSI site have been resolved, and there no longer exists a genuine dispute of material fact with respect to Utah Contention M. Inasmuch as these issues have been resolved, the Applicant is entitled to a decision in its favor on this issue as a matter of law. The Staff therefore supports the Applicant's Motion and recommends that it be granted.

BACKGROUND

Contention Utah M ("Probable Maximum Flood") was filed by the State of Utah on November 23, 1997.¹ As admitted by the Licensing Board on April 22, 1998, the contention states as follows:

CONTENTION: The application fails to accurately estimate the Probable Maximum Flood (PMF) as required by 10 C.F.R. § 72.98, and subsequently, design structures important to safety are inadequate to address the PMF; thus, the application fails to satisfy 10 C.F.R. § 72.24(d)(2).

1. The Applicant's determination of the PMF drainage area to be 26 sq. miles is inaccurate because the Applicant has failed to account for all drainage sources that may impact the ISFSI site during extraordinary storm events.
2. In addition to design structures important to safety being inadequate to address the PMF, the consequence of an inaccurate PMF drainage area may negate the Applicant's assertion that the facility area is "flood dry."²

In support of this contention, the State asserted that the Applicant's PMF analysis incorrectly determined a drainage area in the site vicinity of 26 square miles; that the actual drainage area exceeds 240 square miles; that the Applicant failed to account for potential drainage sources during extraordinary storm events; and, as a result, "the Applicant's figures for the 100-year flood and the PMF are undervalued by at least a half" (Utah Contentions at 96). Further, the State asserted that this failure to properly calculate the PMF results in the proposed diversion berm

¹ "State of Utah's Contentions on the Construction and Operating License Application by Private Fuel Storage, LLC for an Independent Spent Fuel Storage Facility" ("Utah Contentions"), dated November 23, 1997, at 96-97.

² *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 191-92, 253-54 (1998).

being under-designed and renders suspect the Applicant's assertion that the facility is "flood-dry" (*Id.* at 96-97). Further, the State asserts that this deficiency may adversely affect the operation, maintenance and safety of the proposed facility; may result in flood water "curling" around the proposed berm; may result in flooding or wash-out of the access road (which would preclude operations or emergency personnel from getting access to the site, thus affecting the Applicant's ability to cope with emergencies); may lead to "translation motion" of the storage pad and building foundations, resulting in possible structural damage or failure; and may result in the transportation of onsite contaminants to offsite soils and surface waters (*Id.* at 97).

In sum, the State asserted that the Applicant's failure to properly calculate the PMF results in a failure to satisfy 10 C.F.R. § 72.24(d)(2) (adequacy of structures, systems and components important to safety to withstand the "consequences of accidents, including natural and manmade phenomena and events"), and 10 C.F.R. § 72.98 (identification of regions around an ISFSI site);³ and that PFS' failure to properly estimate the PMF could lead to a violation of 10 C.F.R. § 72.24(k) (emergency plans) and § 72.24(l) (effluent releases).

In its motion for summary disposition of Utah Contention M, PFS asserts that the issues raised by the contention have been resolved, and that there is no longer any basis for litigation of the contention. Specifically, PFS states that it has revised its PMF analysis, in response to the

³ While Contention Utah M cites 10 C.F.R. § 72.98 (a siting regulation), it omits reference to 10 C.F.R. § 72.122(b), which establishes design criteria for the protection of structures important to safety against environmental conditions and natural phenomena, including floods. See "NRC Staff's Response to Contentions Filed by (1) the State of Utah, (2) the Skull Valley Band of Goshute Indians, (3) Ohngo Gaudadeh Devia, (4), Castle Rock Land and Livestock, et al., and (5) the Confederated Tribes of the Goshute Reservation and David Pete," dated December 24, 1997, at 34 n.35.

State's concerns and the Staff's Requests for Additional Information ("RAIs") dated December 10, 1998, and that it has addressed each of the concerns identified in this contention. Specifically, PFS states that it has revised its PMF analysis to calculate a drainage area of 270 square miles instead of the 26 mile area it had used previously, and that it has included other conservative assumptions suggested by the Staff, resulting in a revised PMF that is more conservative than the PMF estimated by the State; in this regard, PFS asserts that the State calculated a PMF of 64,500 cfs, whereas PFS calculated a PMF of 85,000 cfs and that it designed its flood protection structures accordingly (Motion at 3-5). Further, PFS asserts that the State's responses to PFS' discovery requests show that the State concurs that PFS' revised PMF analysis uses an appropriate drainage area and is acceptable -- except as to one issue (time of concentration), which PFS states does not materially affect the PMF calculation since its effect is bounded by PFS' use of an overly conservative infiltration rate in its analysis (*Id.* at 5 and n.7).

In sum, PFS asserts that under its revised calculation, "[t]he site will remain flood-dry, as flood protection structures will be designed to address this conservatively estimated PMF, and therefore the PMF will not impinge or threaten 'design structures important to safety'" -- which it identifies as the fuel casks, fuel canisters, storage pads and canister transfer building (including components located inside the building) (*Id.* at 3, 9). PFS states that flood waters during a PMF will not reach the site, and that the flood level will remain 5.3 to 6.2 feet below the site elevation (*Id.* at 6). PFS further states that its access road is designed to withstand the 100-year flood and may be over-topped by the PMF -- which is acceptable since the road is not a structure that is important to safety (*Id.* at 6, 8-9). Finally, PFS describes its proposed construction of a north-south flood diversion berm to the east of the site, which is intended to protect the site from flood

water diverted by its access road; PFS states that this berm will be at least one foot above the elevation of the accumulated waters, based on a PMF of 85,000 cfs, and that it will not be breached by the access road, which will pass up and over the berm (*Id.* at 6, 7). Accordingly, PFS concludes that its revised PMF analysis renders the State's concerns moot, and that it is entitled to summary disposition of this contention as a matter of law (*Id.* at 3, 4-5).

For the reasons set forth below and in the attached Affidavit of Steven R. Abt, the Staff supports the Applicant's Motion and recommends that it be granted.

DISCUSSION

A. Legal Standards Governing Motions for Summary Disposition.

Pursuant to 10 C.F.R. §2.749(a), "[a]ny party to a proceeding may move, with or without supporting affidavits, for a decision by the presiding officer in that party's favor as to all or any part of the matters involved in the proceeding. The moving party shall annex to the motion a separate, short, and concise statement of the material facts as to which the moving party contends that there is no genuine issue to be heard." In accordance with 10 C.F.R. §2.749(b), when a properly supported motion for summary disposition is made, "a party opposing the motion may not rest upon the mere allegations or denials of his answer; his answer by affidavits or as otherwise provided in this section must set forth specific facts showing that there is a genuine issue of fact."⁴ In addition, an opposing party must annex to its answer a short and concise

⁴ *Accord, Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units I and 2), ALAB-841, 24 NRC 64, 93 (1986). General denials and bare assertions are not sufficient to preclude summary disposition when the proponent of the motion has met its burden. *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993). Although the opposing party does not need to demonstrate that it will succeed on the issues, it must
(continued...)

statement of material facts as to which it contends there exists a genuine issue to be heard. 10 C.F.R. § 2.749(a). All material facts set forth in the moving party's statement will be deemed to be admitted unless controverted in the opposing party's statement. *Id.* Pursuant to 10 C.F.R. § 2.749(d), "[t]he presiding officer shall render the decision sought if the filings in the proceeding, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and the affidavit, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law."⁵

The Commission has encouraged parties in its adjudicatory proceedings to seek summary disposition "on issues where there is no genuine issue of material fact so that evidentiary hearing time is not unnecessarily devoted to such issues." Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 NRC 452, 457 (1981).⁶ Summary disposition has been recognized to provide "an efficacious means of avoiding unnecessary and possibly time-consuming hearings on

⁴(...continued)

at least demonstrate that a genuine issue of fact exists to be tried. *Id.*; *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-92-8, 35 NRC 145, 154 (1992) (to avoid summary disposition, the opposing party had to present contrary evidence that was so significantly probative as to create a material issue of fact).

⁵ Pursuant to 10 C.F.R. § 2.749(c), if a party opposing the motion demonstrates in its affidavits that valid reasons exist why it cannot provide facts essential to oppose the motion, the presiding officer may deny the motion, order a continuance to permit affidavits to be obtained, or take such other action as may be appropriate.

⁶ The Commission recently endorsed its earlier policy statement, but indicated that "Boards should forego the use of motions for summary disposition except upon a written finding that such a motion will likely substantially reduce the number of issues to be decided, or otherwise expedite the proceeding." Statement of Policy on Conduct of Adjudicatory Proceedings, CLI-98-12, 48 NRC 18, 20-21 (1998). The Staff submits that partial summary disposition of this contention will reduce the multiplicity of issues that require hearings in this proceeding, and will otherwise serve to expedite the proceeding.

demonstrably insubstantial issues." *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1263 (1982); *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 550 (1980).⁷

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

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

⁷ It is well settled that an agency may ordinarily dispense with an evidentiary hearing where no genuine issue of material fact exists. *Veg-Mix, Inc. v. U.S. Dep't of Agriculture*, 832 F.2d 601, 607-08 (D.C. Cir. 1987).

basis of the filings in the proceeding, the statements of the parties, and affidavits. Rule 56(e), Fed. R. Civ. P. *Accord, Advanced Medical Systems*. 38 NRC at 102; 10 C.F.R. § 2.749(d).

The Licensing Board in this proceeding has recently had occasion to rule upon a motion for summary disposition filed by PFS. See "Memorandum and Order (Granting Motion for Summary Disposition Regarding Contention Utah C), LBP-99-23, 49 NRC ____ (June 17, 1999). Therein, the Licensing Board succinctly summarized the standards governing the granting of summary disposition, as follows:

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

LBP-99-23, slip op. at 10.

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

B. No Factual Issues Remain to Be Resolved Concerning Contention Utah M.

The Staff submits that the factual assertions submitted by the State of Utah in support of this contention have been rendered moot by the Applicant's revised PMF analysis. While PFS

initially identified a PMF drainage area of 26 square miles, it has revised that estimate to 270 square miles -- which exceeds the 240 square mile drainage area estimated by the State. Further, while the State estimates a PMF of 64,500 cfs, PFS now estimates a PMF of 85,000 cfs and has designed its flood protection structures accordingly.

Further, as set forth in the attached Affidavit of Dr. Steven R. Abt, the Staff has reviewed the Applicant's revised PMF analysis,⁸ which it submitted in response to the Staff's Requests for Additional Information ("RAIs") dated December 10, 1998,⁹ and which it has now incorporated in section 2.4 of its Safety Analysis Report ("SAR"), as revised on May 19, 1999. Based on its review of the Applicant's revised analysis, and its review of the Applicant's Motion and the attachments thereto, the Staff has determined that the Statement of Material Facts attached to the Applicant's Motion is correct (Abt Aff. at 2).¹⁰ Accordingly, the Staff submits that there no longer exists any genuine issue of material fact with respect to Contention Utah M, and the Applicant is entitled to a decision in its favor on this contention.

⁸ See (1) letter from John D. Parkyn (PFS) to Director, Office of Nuclear Material Safety and Safeguards (NRC), dated February 10, 1999; (2) letter from John L. Donnell (PFS) to Mark Delligatti (NRC), dated March 25, 1999; (3) letter from John L. Donnell (PFS) to Mark Delligatti (NRC), dated May 18, 1999; and (4), letter from John L. Donnell (PFS) to Mark Delligatti (NRC), dated June 22, 1999.

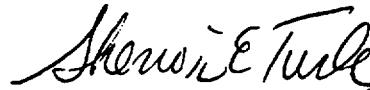
⁹ See Letter from Mark S. Delligatti (NRC) to John D. Parkyn (PFS), dated December 10, 1998 (Attachment, Section 4 "License Application - Intermodal Transfer Point").

¹⁰ Based on its review of the Applicant's revised PMF analysis, the Staff has also concluded that the revised analysis is acceptable (Abt Aff. at 2; see "NRC Staff's Statement of Its Position Concerning Group I Contentions," dated June 15, 1999, at 17-18).

CONCLUSION

For the reasons set forth above and in the attached Affidavit, the Staff supports the Applicant's motion for summary disposition of Utah Contention M, and recommends that it be granted.

Respectfully submitted,

A handwritten signature in cursive script, reading "Sherwin E. Turk".

Sherwin E. Turk
Counsel for NRC Staff

Dated at Rockville, Maryland
this 19th day of July 1999

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July 19, 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 DR. STEVEN R. ABT
CONCERNING CONTENTION UTAH M**

I, Steven R. Abt, having first been duly sworn, do hereby state as follows:

1. I am currently employed as Professor of Civil Engineering and Interim Associate Dean for Research and Graduate Studies at the College of Engineering, Colorado State University, in Fort Collins, CO. I also serve as a consultant to the Southwest Research Institute ("SWRI") (and the Center for Nuclear Waste Regulatory Analyses ("CNWRA")), pursuant to a subcontract between Colorado State University and the SWRI, in conjunction with a contract between SWRI and the NRC Staff ("Staff"). A statement of my professional qualifications is attached hereto.

2. This Affidavit is prepared in response to the "Applicant's Motion for Summary Disposition of Utah Contention M" ("Motion"), filed on June 28, 1999, by Private Fuel Storage L.L.C. ("Applicant" or "PFS"), and the "Statement of Material Facts on Which No Genuine Dispute Exists" ("Statement of Material Facts") attached thereto.

3. As part of my official responsibilities on behalf of the Staff, I reviewed the Applicant's analysis of surface hydrology, including the Probable Maximum Flood ("PMF") for its proposed Independent Spent Fuel Storage Installation ("ISFSI"), to be located on the

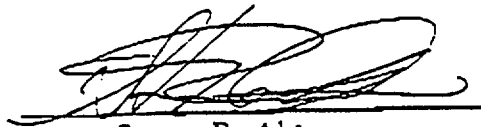
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reservation of the Skull Valley Band of Goshute Indians in Skull Valley, Utah, as set forth (a) in section 2.4 of the Safety Analysis Report ("SAR") submitted with PFS' license application of June 1997, as revised on May 19, 1999, and (b) in PFS' responses to the Staff's requests for additional information and related submittals, dated February 10, March 25, May 18, and June 22, 1999.


4. As part of my official responsibilities on behalf of the Staff, I also participated in preparing the "NRC Staff Position With Respect to Utah Contention M: Probable Maximum Flood" ("Staff Position") set forth in the "NRC Staff's Statement of Its Position Concerning Group I Contentions," dated June 15, 1999 (at pp. 17-18). The Staff Position on Contention Utah M accurately represents my views concerning this contention.

5. Also as part of my official responsibilities on behalf of the Staff, I have reviewed the Applicant's Motion and the attachments thereto, in which PFS seeks summary disposition of Contention Utah M. On the basis of my review of the Applicant's description of its revised PMF analysis, and the documents attached to the Applicant's Motion, I am satisfied that the Statement of Material Facts attached to the Applicant's Motion is correct.

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


Steven R. Abt

Sworn to before me this
19th day of July 1999


Notary Public
My commission expires: 10/11/02

**STEVEN R. ABT
VITA**

07/14/99

EDUCATION:

Colorado State University: Fort Collins, Colorado			
Civil Engineering	Hydraulics	Ph.D.	1980
Civil Engineering	Water Resources	M.S.	1976
Civil Engineering		B.C.E.	1973

REGISTRATION:

Professional Engineer, State of Colorado	- No. 15474
Professional Engineer, State of Wyoming	- No. 5400

PROFESSIONAL ORGANIZATIONS:

American Society of Civil Engineers
American Society for Testing and Materials
American Water Resource Association
Colorado Association of Stormwater and Flood Plain Managers
International Erosion Control Association
Transportation Research Board
Chi Epsilon Honorary
Sigma Xi
Army Engineer Association
Reserve Officer's Association

EXPERIENCE:

September 1997- Present	Interim Associate Dean for Research and Graduate Studies College of Engineering Colorado State University, Fort Collins, Colorado
July 1988 - Present	Professor of Civil Engineering Department of Civil Engineering Colorado State University, Fort Collins, Colorado
July 1989 - June 1999	Director, Hydraulics Laboratory Engineering Research Center Colorado State University, Fort Collins, Colorado

September 1989 - August 1992	Associate Department Head for Research Department of Civil Engineering Colorado State University, Fort Collins, Colorado
July 1983 - June 1988	Associate Professor of Civil Engineering Department of Civil Engineering Colorado State University, Fort Collins, Colorado
September 1984 - August 1985	Associate Department Head/Academic Coordinator Department of Civil Engineering Colorado State University, Fort Collins, Colorado
September 1979 - February 1984	Assistant Department Head Department of Civil Engineering Colorado State University, Fort Collins, Colorado
May 1980 - June 1983	Assistant Professor of Civil Engineering Department of Civil Engineering Colorado State University, Fort Collins, Colorado
January 1976 - May 1980	Instructor of Civil Engineering Department of Civil Engineering Colorado State University, Fort Collins, Colorado

Duties have included instruction, research, administration, service, and outreach.

Administration

- Supervise the Engineering Research Center, allocate space, perform short-term and long-term planning activities, monitor College research activities, promote research for five departments, coordinate graduate recruiting, serve as primary contact for graduate information.
- Performed administrative duties as required in assigning faculty teaching loads, monitoring budgets, training of administrative personnel, equipment purchases, budget recommendations, evaluating equipment needs, student orientation, and student advising.
- Served as the Graduate Admissions Officer for the Civil Engineering Department. Reviewed and evaluated applications for the Graduate Program. Served as the Undergraduate Admissions Officer and scholarship officer for the Civil Engineering Department.
- Coordinate College Agricultural Experiment Station activities.

- Research** - Serve as principal investigator, co-principal investigator, and investigator on numerous research and testing projects valued at over \$12 million in the areas of water resources and hydraulics.
- Conduct hydraulic studies to include pump intake, spillway, harbor, river, culvert, boat chute, energy dissipation, and hydraulic structures physical model and computer model studies.
 - Conduct research on flow meters, Parshall flumes, cutthroat flumes, channel stabilization, riprap, gabions, soil covers, rock durability, erosion mats, articulated concrete blocks, sediment transport, localized scour, gully erosion, bridge and culvert scour, and tailings deposition. Also perform laboratory tests on flow meters, valves, pitots, flumes, and other hydraulic control and measurement devices.

Instruction

Responsible for content and teaching of the following classes and laboratories:

EG/CE 101	Freshman Engineering - Orientation and Programming
EG/CE 102	Freshman Engineering - Graphics and Problem Solving
EG 350	Computer Assisted Design and Graphics
CE 172	Construction Surveying
CE 173	Topographic Surveying
CE 256	Statics for Non-engineers
CE 260	Engineering Mechanics - Statics
CE 273	Engineering Surveying I
CE 301	Hydraulics
CE 358	Mechanics of Materials for Non-engineers
CE 360	Mechanics of Materials
CE 362	Properties of Materials for Engineers
CE 364	Properties of Materials for Non-engineers
CE 408	Civil Engineering Design I
CE 409	Civil Engineering Design II
CE 413	Environmental River Mechanics
CE 469	Senior Design Practice I
CE 470	Senior Design Practice II
CE 474	Engineering Planning and Management
CE 574	Engineering Planning and Management

Graduate Committees

Served on over 150 graduate committees at the M.S. and Ph.D. level.
Advised 79 M.S. and 16 Ph.D. graduates.

Continuing Education

Served as either a member of organization committee, coordinator, instructor, or speaker at numerous short courses, symposia, seminars, or workshops held at, sponsored by, or in conjunction with Colorado State University including:

- ASCE National Conference on Water Resources Engineering (1995, 1998)
- The International Riprap Workshop (1993)
- ASCE National Conference on Hydraulic Engineering (1985-1990)
- Mill Tailings Management Short Course (1978-1983, 1985-87, 1990)
- Uranium Mill Tailings Symposium (1978-1987)
- Planning and Preliminary Design for Flood Hazard Mitigation (1986)
- Hydraulics Conference for the Highway Community, DOT (1985)
- Problems of Sediment Transport in Gravel-Bed Rivers (1985)
- Materials Sampling and Testing Short Course (1981, 1983, 1984)
- Hazardous Waste Management Seminar (1981)
- Contaminant Transport Short Course (1981)
- Pump Design Short Course (1979, 1980)

May 1974 -
January 1976

Hydraulic and Staff Engineer
Leonard Rice Consulting Water Engineers, Inc., Denver Colorado

- Performed hydraulic, economic, hydrologic, water quality, and water rights analysis for numerous engineering projects.
- Served as project engineer for projects requiring drainage, surveying, stream gaging, inspection, groundwater monitoring, and other field oriented expertise.
- Performed administrative duties involving supervision of technical staff and small project estimation. Responsible for financial and operational accountability of computer systems and computer program library.

October 1973 -
May 1974

Graduate Research Assistant and Graduate Teaching Assistant
Colorado State University, Fort Collins, Colorado

May 1973 -
October 1973

U. S. Army Corps of Engineers, Active Duty, Fort Belvoir, Virginia

MISCELLANEOUS EXPERIENCE:**June 1973 - Present****U.S. Army Reserve**

Currently serve in the rank of Colonel in the position of Director, Facilities Engineering TDA, 416th Engineer Command, Darien, IL. Previously served in the U.S. Army Corps of Engineers as a platoon leader and company commander, specializing in heavy equipment and facilities construction. Also served as a Civil Engineer, Mechanical Engineer, and Team Leader for the Denver and/or Cheyenne Facility Engineering Teams; and Operations Officer, Deputy Director, and Director of Engineer Support Group-SW, 416th Engineer Command, San Antonio, Texas. Other assignments have included the U.S. Army Health Services Command Individual Mobilization Augmentee and U.S. Military Academy Liaison. Completed the Engineer Officer Basic Course, Engineer Officer Advanced Course, Facilities Management Course, Senior Officer Legal Orientation Course, U.S. Army Command and General Staff College, and U.S. Army War College.

June 1981 - September 1994 U.S. Forest Service

Served as Contract Station Engineer for the U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experiment Station. Duties entailed the conductance of needs assessment and feasibility studies of numerous construction projects; construction cost estimates; contract liaison and coordination; review of construction plans and specifications; maintenance surveys; value analysis, and construction inspections. Also, conducted an extensive energy conservation program for the station 10 state region. Performed site studies of underground storage tanks, radon emission, asbestos removal, and facility master planning. Implemented a facility inventory and database program. Provided assistance in uranium mine cleanup and rehabilitation. Supervised construction projects of: the erection of pre-engineered buildings, parking lot rehabilitation, roof replacements, UST removal and restoration, and building restorations. Assisted the Lakeview Ranger District, Fremont National Forest in the reclamation planning of the White King and Lucky Lass Uranium Mines.

June 1979 - June 1990**U.S. Nuclear Regulatory Commission**

Performed reviews of mining and milling applications and amendments for the U.S. Nuclear Regulatory Commission. Reviews addressed the construction, modification, and reclamation of uranium tailing impoundments. Also reviewed rock sizing and rock quality procedures for reclamation of uranium and low-level waste disposal sites. Served as an inspector of uranium tailings dams during various stages of construction.

AWARDS AND HONORS:

Associate Editor for Civil and Environmental Engineering, Journal of the American Water Resources Association, June 99 - Present.

Service Award, American Society of Civil Engineers, Water Resources Engineering Division, 1998

Graduate, U.S. Army War College, Carlisle, PA., 1997

Most Distinguished Technical Paper Award, International Erosion Control Association, 1997

Fellow, American Society of Civil Engineers, 1994

Executive Committee, American Society of Civil Engineers, Hydraulics Division, 1990-94;
Chairman 1992-93

Certificate of Appreciation, Formation of the Colorado Transportation Institute, Colorado Department of Transportation, 1992

Certificate of Recognition for Service, American Society of Civil Engineers, Hydraulic Division, 1991

Oliver P. Pennock University Distinguished Service Award, Colorado State University, 1990-91

Halliburton Faculty Teaching Award, College of Engineering, Colorado State University, 1990

U. S. Forest Service, Certificate of Merit for Engineering Services, Rocky Mountain Forest and Range Experiment Station, 1987

Jack E. Cermak Undergraduate Advising Award, College of Engineering, Colorado State University, 1985

Stone and Webster Engineering Corporation Faculty Fellowship Program Award, 1984

Alumni Faculty Award, College of Engineering, Colorado State University Alumni Association, 1983

Dow Chemical Outstanding Young Faculty Award, American Society for Engineering Education, Rocky Mountain Section, 1983

U. S. Forest Service, Performance Award for Energy Conservation, Rocky Mountain Forest and Range Experiment Station, 1983

Halliburton Engineering Young Faculty Teaching Award, College of Engineering, Colorado State University, 1982

Ralph R. Teetor Awardee, Society of Automotive Engineers Conference and Exposition, 1981

U.S. Air Force ROTC Service Recognition Award, Detachment 90, Colorado State University, 1981

REFEREED JOURNALS:

1. Abt, S. R. and Grigg, N. S. "An Approximate Method for Sizing Detention Reservoirs." *AWRA Water Resources Bulletin*, Vol. 14, No. 4, pp. 956-965, August 1978.
2. Ruff, J. F. and Abt, S. R. "Evaluating Scour at Culvert Outlets." *Transportation Research Record No. 785*, Hydraulics and Hydrology Division, pp. 37-40, 1981.
3. Abt, S. R., and Ruff, J. F. "Estimating Culvert Scour in Cohesive Material." *Journal of Hydraulic Engineering*, ASCE, Vol. 108, No. HY1, Proc. Paper 16784, pp. 25-34, January 1982.
4. Mendoza, C., Abt, S. R., and Ruff, J. F. "Headwall Influence on Scour at Culvert Outlets." *Journal of Hydraulic Engineering*, ASCE, Vol. 109, No. HY7, Paper 18076, July 1983.
5. Abt, S. R., Ruff, J. F., and Mendoza, C. "Mound Formation at Culvert Outlets." *AWRA Water Resources Bulletin*, Vol. 19, No. 4, pp. 571-576, August 1983.
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO APPLICANT'S MOTION FOR SUMMARY DISPOSITION OF UTAH CONTENTION M - PROBABLE MAXIMUM FLOOD" in the above captioned proceeding have been served on the following through deposit in the Nuclear Regulatory Commission's internal mail system, or by deposit in the United States mail, first class, as indicated by an asterisk, with copies by electronic mail as indicated, this 19th day of July, 1999:

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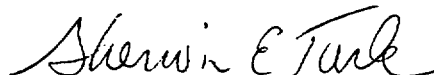
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