In the United States Court of Federal Claims

No. 98-488C
Filed: March 31, 2006
TO BE PUBLISHED

**********	Causation;
*	Certainty;
SACRAMENTO MUNICIPAL UTILITY *	Damages;
DISTRICT, *	Foreseeability;
*	Mitigation;
Plaintiff, *	Nuclear Waste Policy Act,
*	42 U.S.C. §§ 10101, *et seq.*;
v. *	RESTATEMENT (FIRST) OF CONTRACTS
*	§ 329;
THE UNITED STATES, *	RESTATEMENT (SECOND) OF CONTRACTS
*	§§ 152, 351(1), (2);
Defendant. *	RESTATEMENT (SECOND) OF JUDGMENTS;
*	§ 26(1)(a), (b);
**********	FED. R. EVID. 702;
	10 C.F.R. § 961.11.

Howard N. Cayne, Arnold & Porter, LLP, Washington, D.C.; **David S. Neslin** and **Timothy R. Macdonald**, Arnold & Porter, LLP, Denver, Colorado, counsel for Plaintiff.

Russell Alan Shultis, **Alan J. Lo Re**, **Scott R. Damelin**, **Joshua E. Garnder**, **Todd J. Cochran**, and **Elizabeth Thomas**, United States Department of Justice, Civil Division, Commercial Litigation Branch, Washington, D.C., counsel for Defendant.

MEMORANDUM OPINION AND ORDER

BRADEN, *Judge*

On January 19, 2005, the court held that the United States ("the Government") is liable for the January 31, 1998 partial breach of a June 14, 1983 Department of Energy Standard Contract ("Standard Contract") with the Sacramento Municipal Unity District ("SMUD" or "the District"). *See Sacramento Mun. Util. Dist.* v. *United States*, 63 Fed. Cl. 49 (Fed. Cl. 2005). On March 21-25, 2005 and March 28, 2005-April 1, 2005, the court convened an evidentiary hearing, wherein SMUD asserted that the partial breach caused SMUD to incur $78,558,212.00 in costs from January 1, 1992 to December 31, 2003. Post-hearing briefing was concluded on November 1, 2005. After evaluating the evidence proffered by the parties in light of *Indiana Michigan Power Co.* v. *United States*, 422 F.3d 1369 (Fed. Cir. 2005), the court has determined that SMUD is entitled to damages, but only for certain costs incurred from May 15, 1997 to December 31, 2003.

An outline of this Memorandum Opinion and Order follows:

I. RELEVANT FACTS.

A. In 1982, Congress Required The Department Of Energy To Provide For The Permanent Disposal Of Spent Nuclear Fuel And/Or High Level Radioactive Waste From All Domestic Utilities.

B. In 1983, The Sacramento Municipal Utility District Entered Into A Standard Contract With The Department Of Energy To Dispose Of Spent Nuclear Fuel And/Or High-Level Radioactive Waste.

C. In 1989, The Sacramento Municipal Utility District Decided To Shut Down The Nuclear Generating Plant.

D. Actions Taken By The Sacramento Municipal Utility District To Decommission The Nuclear Generating Plant.

1. In 1990.

a. Options For Spent Nuclear Fuel Storage Were Evaluated.

b. A "Dual-Purpose" Dry Storage Project Was Authorized.

c. A Decision Was Made To Enter Into A Joint Dry Transfer Demonstration With The Department Of Energy.

2. In 1991.

a. Initial Planning Was Started And Proposals For The "Dual-Purpose" Dry Storage Project Were Solicited.

b. Discussions About The Joint Dry Transfer Demonstration Began.

3. In 1992.

a. Planning For The "Dual-Purpose" Dry Storage Project And Selecting A Vendor Continued.

b. Discussions About The Joint Dry Transfer Demonstration Continued.

c. The Department Of Energy Announced That It May Not Be Able To Construct A Permanent Storage Facility By 1998.

4. In 1993.

a. Vendor Difficulties Delayed Implementation Of The "Dual-Purpose" Dry Storage Project.

b. Concerns Arose About Whether The Department Of Energy Would Accept Spent Nuclear Fuel Stored In Canisters.

c. Discussions About The Joint Dry Transfer Demonstration Continued.

5. In 1994.

a. The Department Of Energy Raised Concerns About The Availability Of A Suitable Storage Facility.

b. The "Dual-Purpose" Dry Storage Project Continued To Be Implemented.

c. A Cooperative Agreement For A Joint Dry Transfer Demonstration Was Reached With The Department Of Energy.

6. In 1995.

a. The Department Of Energy Announced That It Would Not Begin Accepting Spent Nuclear Fuel In 1998.

b. Development Of The "Dual-Purpose" Dry Storage System Continued.

7. In 1996.

a. Development Of The "Dual-Purpose" Dry Storage System Continued.

b. Disposal Of Low-Level Radioactive Waste Around The Wet Pool Began.

c. Received Legal Notice That Performance Would Not Begin Under The Standard Contract On January 31, 1998.

d. The "Dual-Purpose" Dry Storage Project Was Reevaluated.

e. The Sacramento Municipal Utility District Sought To Amend The Cooperative Agreement For A Joint Dry Transfer Demonstration.

8. In 1997.

a. Regulatory Problems And Vendor Bankruptcy Delayed Implementation Of The "Dual-Purpose" Dry Storage Project.

b. The "Dual-Purpose" Dry Storage Project Was Continued.

9. In 1998.

a. The Department Of Energy Did Not Begin Disposal Of Spent Nuclear Fuel And/Or High-Level Radioactive Waste, As Required Under The Standard Contract.

b. A New Vendor Was Retained To Complete The "Dual-Purpose" Dry Storage Project.

c. The Cooperative Agreement For A Joint Dry Transfer Demonstration Was Terminated.

10. In 1999–2001, The Sacramento Municipal Utility District Completed Licensing And Testing The "Dual-Purpose" Dry Storage Project.

11. In 200-2002, Spent Nuclear Fuel Was Loaded Into Twenty-One Canisters And Transferred To An Independent Spent Fuel Storage Installation.

II. PROCEDURAL HISTORY OF THIS CASE.

A. On June 9, 1998, The Sacramento Municipal Utility District Filed Suit For Partial Breach In The United States Court Of Federal Claims.

B. On February 17, 2005, The Sacramento Municipal Utility District Claimed Damages Of $21,553,462.00 For Costs Incurred From 1992 Through 1997 For The Dry Storage Project.

C. On February 17, 2005, The Sacramento Municipal Utility District Claimed Damages Of $55,049,870.00 For Costs Incurred From 1998 Through 2003 For The Dry Storage Project.

III. DISCUSSION.

A. Jurisdiction.

B. Standing.

C. Causation.

1. Governing Precedent.

a. "Reasonable Foreseeability."

b. "Substantial Causal Factor."

c. "Reasonable Certainty."

2. The Court's Determination Of Causation In This Case.

a. "Reasonable Foreseeability" Was Established, In Part.

b. "Substantial Causal Factor" Was Established, In Part.

c. "Reasonable Certainty" Was Established, In Part.

D. Mitigation Costs For Partial Breach.

1. Governing Precedent Of Mitigation In This Case.

2. The Court's Determination.

a. SMUD May Recover Or Retain Certain Costs In This Case.

1. For Dry Storage.

2. For Labor Severance And Recruiting Costs.

3. For Dry Storage Project Delays.

4. For Failed Spent Nuclear Fuel.

* * *

I. RELEVANT FACTS.[1]

[1] The relevant facts recited herein were derived from: SMUD's June 9, 1998 Complaint ("Compl."); SMUD's August 30, 2004 Amended Complaint ("Amend. Compl."); the Government's October 15, 2004 Answer ("Gov't Answer"); SMUD's February 17, 2005 Memorandum of Contentions of Fact and Law ("Pl. Mem."); the Government's February 28, 2005 Memorandum of Contentions of Fact and Law ("Gov't Mem."); SMUD's Exhibits ("PX" 1-1029); the Government's Exhibits ("DX" 1-2004); Transcript of the Evidentiary Hearing held March 21-25, 2005 and March 28, 2005-April 1, 2005 ("TR"); SMUD's August 22, 2005 Post-Trial Brief ("Pl. PT Br.") and the Government's Proposed Findings of Fact ("Pl. PFF"); the Government's September 20, 2005 Post-Trial Brief ("Gov't PT Br.") and Proposed Findings of Fact ("Gov't PFF"); the Government's October 4, 2005 Response to SMUD's Proposed Findings of Fact ("Gov't Resp. to Pl. PFF"); SMUD's October 18, 2005 Post-Trial Reply Brief ("Pl. PT Reply Br."); and SMUD's November 1, 2005 Response to the Government's Proposed Findings of Fact ("Pl. Resp. to Gov't PFF").

In a March 16, 2005 Order, the court granted in-part and denied in-part, SMUD's February 18, 2005 Motion for Leave to File Designated Deposition and Trial Testimony as Substantive Evidence, Pursuant to RCFC 32(a) and FED. R. EVID. 801(d), as to the deposition or trial testimony of the following witnesses (collectively "Designations App."): Mr. Lake Barrett, Deputy Director of the Department of Energy's Office of Civilian Radioactive Waste Management ("OCRWM"); Mr. Ronald Milner, Chief Operating Officer of the OCRWM; Mr. Alan Brownstein, Director of the Regulatory Coordination Division and Senior Policy Advisor to the Director of the OCRWM; Mr. David Huizenga, former Deputy Assistant Secretary for DOE's Office of Integration, within the Office of Environmental Management; Mr. Leroy Stewart, an Engineer at the OCRWM; Mr. Keith Klein, Manager of DOE's Richland, Washington Field Office; Ms. Patrice Bubar, Deputy Assistant Secretary for Safety and Operations Oversight in the Office of Environmental Management; Mr. Robert M. Rosselli, Deputy Manager for Business Services at DOE's Richland, Washington Field Office; Mr. Robert Campbell, Program Manager for the Office of Environmental Management; Mr. Christopher Bajwa, an Engineer at the Nuclear Regulatory Commission's Spent Fuel Project Office; Mr. Stephen O'Connor, a former NRC Senior Project Manager; Ms. Nancy Slater-Thompson, Team Leader of the Regulatory Coordination Division of the OCRWM; Mr. Victor Trebules, Director of the Office of Project Control at the DOE's Yucca Mountain Site Characterization Office in Nevada; Mr. Francis Young, an NRC Senior Transportation Program Manager; Mr. Michael Lawrence, Associate Laboratory Director for Energy Science & Technology at DOE's Pacific Northwest National Laboratory; Ms. Susan Klein, a Senior Policy Advisor at the OCRWM; Mr. Robert Morgan, a former Director of the Nuclear Waste Project Office; Mr. Ben Rusche, former Director of the DOE's Spent Fuel Program; Mr. James Carlson, a former senior official at the OCRWM; Mr. S. David Freeman, former General Manager of SMUD; Ms. Rita Bowser, SMUD's former Fuel Disposition Project Manager; Mr. Ed Benz, a former employee of Jacobs Engineering Group Inc.; Mr. Robert Burgoyne, an Associate with Booz Allen Hamilton Inc.; and Mr. Billy Cole, former Vice President of Johnson Associates, Inc.

The court did not admit deposition testimony or trial testimony of: Mr. Thomas Pollog; Mr.

A. In 1982, Congress Required The Department Of Energy To Provide For The Permanent Disposal Of Spent Nuclear Fuel And/Or High Level Radioactive Waste From All Domestic Utilities.

In 1982, Congress enacted the Nuclear Waste Policy Act ("NWPA"), Pub. L. No. 97-425, 96 Stat. 2201 (codified at 42 U.S.C. §§ 10101, *et seq*.), pursuant to which the federal government assumed the duty to "provide for the permanent disposal" of spent nuclear fuel[2] and/or high-level

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David Zabransky; Mr. William Knoll; Mr. Christopher Kouts; Mr. Jeffrey Williams, because the Government represented that these individuals would testify at the evidentiary hearing. In addition, the court did not admit trial testimony of Mr. Edward Abbott in another proceeding, but invited SMUD to call Mr. Abbott as a witness at the evidentiary hearing.

On March 16, 2005, the court also granted SMUD's March 7, 2005 Motion for Leave to File Designated Deposition Testimony as Substantive Evidence Pursuant to RCFC 32(a), admitting the deposition testimony of: Mr. Salomon Levy ("Levy Dep.") of S. Levy Inc., a consultant hired by SMUD, and Mr. Roger Powers, a former SMUD Supervisory Nuclear Engineer.

In addition, on March 31, 2005, the court granted SMUD's February 25, 2005 Motion for Leave to File Designated Deposition Testimony as Substantive Evidence Pursuant to FED. R. EVID. 801(d), admitting the deposition testimony of Mr. David Langstaff, a General Engineer of DOE's Richland, Washington Field Office ("Langstaff Dep.").

At the March 21-25, 2005 and March 28, 2005-April 1, 2005 evidentiary hearing, the court also admitted the written direct testimony of the following expert witnesses, who testified at the hearing on cross-examination and re-direct: Mr. Brian P. Brinig, J.D., C.P.A., A.S.A., of Brinig & Company, Inc. ("PX 1000"); Mr. Ivan F. Stuart of I. Stuart & Co., a nuclear industry consultant ("PX 1001"); Ms. Eileen M. Supko of Energy Resources International, Inc., a nuclear industry consultant ("PX 1002"); Mr. John R. McGrath, M.B.A., of Contract Solutions, LLC, a nuclear industry consultant ("DX 2000"); Mr. Jerry N. Burford of Watkins Consulting, Inc., a nuclear industry consultant ("DX 2001"); Mr. Stephen J. Kiraly, M.B.A., C.P.A., of Navigant Consulting, Inc. ("DX 2003"); and Mr. Cliff W. Hamal, M.B.A., of LECG, LLC, an economic and business consultant. ("DX 2004").

[2] Congress defined spent nuclear fuel ("SNF") as fuel that "has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." 42 U.S.C. § 10101(23). SNF contains toxic uranium and toxic byproducts, such as plutonium. *See* TR 116; *see also* Amend. Compl. ¶ 15; Gov't Answer ¶ 15. SNF remains radioactive after it is removed from a nuclear reactor and must be isolated in safe disposal facilities for thousands of years. *See* TR 138-39.

radioactive waste[3] from utilities across the country. *See* 42 U.S.C. § 10131(a)(4) ("Congress finds that - - . . . the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment[.]"); *see also* 42 U.S.C. § 10131(b)(2) ("[T]o establish the Federal responsibility, and a definite Federal policy, for the disposal of such waste and spent fuel[.]"). Congress, however, imposed the cost of the Government's acceptance and disposal of SNF and HLW on the "generators" and "owners." *See* 42 U.S.C. § 10131(a)(4) ("Congress finds that - - . . . while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the *costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel*.") (emphasis added).

Congress also required the Department of Energy ("DOE") to enter into contracts with generators and owners of SNF and HLW by June 30, 1983 - - committing DOE to accept, transport, and dispose of SNF and HLW ("the Standard Contract"). *See* 42 U.S.C. § 10222(b)(2) ("No [SNF or HLW] may be disposed of by the Secretary . . . unless the generator or owner of such [SNF or HLW] has entered into a contract with the Secretary under this section by not later than - - June 30, 1983[.]"); *see also* 10 C.F.R. § 961.11 (setting forth "the text of the standard contract for disposal of spent nuclear fuel and/or high-level radioactive waste[.]"). If a utility did not enter into the Standard Contract with DOE, the Nuclear Regulatory Commission ("NRC") was prohibited from renewing or issuing an operator's license.[4] *See* 42 U.S.C. § 10222(b)(1)(A).

In addition, Congress authorized DOE to set the fee amounts to be paid by utilities into the Nuclear Waste Fund to fund the Department's acceptance and disposal of SNF and HLW. *See* 42 U.S.C. § 10222(a)(1) ("[T]he Secretary is authorized to enter into contracts with any person[5] who generates or holds title to high-level radioactive waste, or spent nuclear fuel, of domestic origin for the acceptance of title, subsequent transportation, and disposal of such waste or spent fuel. Such contracts shall provide for payment to the Secretary of fees pursuant to paragraphs (2) and (3)

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[3] Congress defined high-level radioactive waste ("HLW") as "highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing . . . and other highly radioactive material that the [Nuclear Regulatory] Commission, consistent with existing law, determines by rule requires permanent isolation." 42 U.S.C. § 10101(12).

[4] "Utility" or "utilities" refers to an entity or entities that have generated or hold title to high-level radioactive waste, or spent nuclear fuel, of domestic origin, and have entered into a Standard Contract.

[5] When a "person [or entity] who generates or holds title to high-level radioactive waste, or spent nuclear fuel, of domestic origin" enters into the Standard Contract, the Standard Contract provides that the person or entity will be referred to in the Contract as the "Purchaser." 10 C.F.R. § 961.11.

sufficient to offset expenditures described in subsection (d) of this section." (footnote added)). The Standard Contract provided that, in return for the payment of fees from a utility, DOE would start disposing of the SNF and HLW covered by the contracts, no later than January 31, 1998, and continue such services until disposal of all SNF and HLW was completed. *See* 42 U.S.C. § 10222(5)(B) ("[I]n return for payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subchapter."); *see also* 10 C.F.R. § 961.11 at Art. II ("The services to be provided by DOE under this contract shall begin, after commencement of facility operations, not later than January 31, 1998 and shall continue until such time as all SNF and/or HLW from the civilian nuclear power reactors . . . has been disposed of.").

The Standard Contract did not specify a date that DOE would accept a particular utility's SNF and HLW. *See* 10 C.F.R. § 961.11 at Arts. II & VI(B)(1). Rather, the Standard Contract provided that priority of SNF and HLW acceptance was to be determined by the material's age, calculated as of the date of discharge from a nuclear power reactor. *See* 10 C.F.R. § 961.11 at Art. VI(B)(1) ("[A]cceptance priority shall be based upon the age of the SNF and/or HLW as calculated from the date of discharge of such material from the civilian nuclear power reactor."). DOE's acceptance of SNF and HLW was to be prioritized, pursuant to Delivery Commitment Schedules ("DCS's") submitted by each utility, as approved by DOE. *See* 10 C.F.R. § 961.11 at Art. V ("After DOE has issued its proposed acceptance priority ranking . . . the Purchaser shall submit to DOE the delivery commitment schedule(s) which shall identify all SNF and/or HLW the Purchaser wishes to deliver to DOE beginning 63 months thereafter."). The Standard Contract further provided that DOE first would accept the oldest SNF and HLW. *See* 10 C.F.R. § 961.11 at Art. VI(B) ("DOE will first accept from Purchaser the oldest SNF and/or HLW for disposal in the DOE facility, except as otherwise provided for in paragraphs B and D of Article V."). A utility, however, had the right to exchange approved DCSs with other utilities that may hold a priority ranking for pickup of SNF and HLW, subject to DOE's approval. *See* 10 C.F.R. § 961.11 at Art. V(E) ("Purchaser shall have the right to exchange approved delivery commitment schedules with parties to other contracts with DOE for disposal of SNF and/or HLW; provided, however, that DOE shall, in advance, have the right to approve or disapprove, in its sole discretion, any such exchanges.").

An important provision in the Standard Contract gave DOE discretion to grant priority for SNF and HLW removal from nuclear reactors that are no longer operating and to accept emergency deliveries prior to the date of acceptance. *See* 10 C.F.R. § 961.11 at Art. VI(B) ("[P]riority may be accorded any SNF and/or HLW removed from a civilian nuclear power reactor that has reached the end of its useful life or has been shut down permanently for whatever reason."); 10 C.F.R. § 961.11 at Art. V(D) ("Emergency deliveries of SNF and/or HLW may be accepted by DOE before the date provided in the delivery commitment schedule upon prior written approval by DOE.").

B. In 1983, The Sacramento Municipal Utility District Entered Into A Standard Contract With The Department Of Energy To Dispose Of Spent Nuclear Fuel And/Or High-Level Radioactive Waste.

SMUD is a publicly-owned municipal utility district established under the laws of California that operated the Rancho Seco Nuclear Generating Station ("Rancho Seco"), a nuclear-powered plant located in Sacramento County, California. *See* DX 2004 ¶ 29; *see also* TR 114, 129. In 1975, SMUD began commercial operations at Ranch Seco. *See* DX 2004 ¶ 29; DX 248 at SMUD-0029731.

On June 14, 1983, SMUD and DOE entered into the Standard Contract for disposal of SNF and HLW at Rancho Seco. *See* PX 44.[6] Pursuant to the terms of the Standard Contract, by January 31, 1998, SMUD paid approximately $40 million into the Nuclear Waste Fund under the Standard Contract for permanent disposal and other services. *See* DX 481 at SMUD-0033398; *see also* TR 149-50.

C. In 1989, The Sacramento Municipal Utility District Decided To Shut Down The Nuclear Generating Plant.

After the March 28, 1979 accident at Three Mile Island, the NRC initiated a number of regulatory changes that required SMUD to incur substantial expense. *See* TR 121, 1533-34. At this time, SMUD also experienced significant operating problems with Rancho Seco's steam turbine controls and the steam generator tube. *See* TR 120-21. As a result, Rancho Seco incurred numerous outages, including a 27-month outage from December 1985 through early-1988. *See* DX 2004 ¶¶ 29-31; *see also* TR 120-21, 128, 155-56. In fact, over Rancho Seco's fourteen year operating life, the plant operated a full capacity less than half the time. *See* DX 2004 ¶ 29. To service customers during these extended outages, SMUD had to purchase replacement power that significantly increased the electricity rates SMUD charged. *See* TR 127; *see also* TR 891 (Mr. Richard Ferreira, then SMUD Assistant General Manager: "SMUD's operating experience was lower than the national average.").

In the spring of 1998, the District voters placed an initiative on the statewide primary ballot to shutdown Rancho Seco. *See* DX 2004 ¶ 32; *see also* TR 127-29, 876-77. SMUD placed a counter-referendum on the ballot to keep Rancho Seco operational for an additional eighteen month trial period to ascertain the continued viability of the plant and to hold a follow-up referendum the following year. *Id.* This alternative, passed by a slim margin. *See* DX 2004 ¶ 32 (citing SMUD's 1988 Annual Report at 12).

In the June 6, 1989 followup referendum, the District voters decided to close Rancho Seco. *See* DX 2004 ¶ 33; *see also* TR 128-129, 893. On June 7, 1989, SMUD's Board of Directors

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[6] The text of the June 14, 1983 Standard Contract is identical to the text published at 10 C.F.R. § 961.11. *Compare* PX 44, *with* 10 C.F.R. § 961.11.

("SMUD's Board") began implementing plans for closure. *See* TR 129, 894-95. At that time, SMUD had 493 SNF assemblies, measuring approximately 228.37 MTU,[7] stored in a "wet pool."[8] *See* DX 202 at SMUD-0019248; PX 1002 ¶ 109 (Tables 7 & 8); *see also* TR 133, 2046. One of SMUD's principal goals was to decommission the Rancho Seco site, reducing the "nuclear footprint." *See* TR 263-64. SMUD's initial January 31, 1989 Decommissioning Plan indicted that both DECON and SAFSTOR options would be considered.[9] *See* DX 122 at SMUD-0020853-54. At least two other decommissioning studies were undertaken by SMUD in 1989. *See, e.g.,* DX 125 (Sept. 26, 1989 Rancho Seco Decommissioning Plan: Issues & Assumptions, Revision 1); DX 134 (Dec. 12, 1989 Office Memorandum).

D. Actions Taken By The Sacramento Municipal Utility District To Decommission The Nuclear Generating Plant.

1. In 1990.

a. Options For Spent Nuclear Fuel Storage Were Evaluated.

On January 25, 1990, the Rancho Seco Committee of SMUD's Board ("the Rancho Seco Committee") instructed SMUD's General Manager, Mr. David Boggs: "to review the numerous options with varying degrees of risks, certainty, and costs associated with storage of the Rancho Seco

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[7] One metric ton of uranium ("MTU") is equal to one-thousand kilograms. *See* TR 1811.

[8] Spent fuel assemblies may be stored in a "wet pool" of at least 20 feet of water, which provides adequate shielding from the radiation for anyone near the pool. *See* Spent Fuel Pools, U.S. NUCLEAR REGULATORY COMMISSION, *available at* http://www.nrc.gov/ (last visited Mar. 31, 2006). The assemblies are moved into the wet pool from the reactor along the bottom of water canals, so that the spent fuel is always shielded to protect workers. *Id.*

[9] Decommissioning involves three different alternatives: 1) DECON; 2) SAFSTOR; or 3) ENTOMB. *See* Fact Sheet: Decommissioning Nuclear Power Plants, U.S. NUCLEAR REGULATORY COMMISSION, OFFICE OF PUBLIC AFFAIRS, at 1, *available at* http://www.nrc.gov/ (last visited Mar. 31, 2006) ("NRC DECOMMISSIONING FACT SHEET"). DECON is "immediate dismantlement[,] soon after the nuclear facility closes, equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license." NRC DECOMMISSIONING FACT SHEET at 1. SAFSTOR is considered "'delayed DECON,' [*i.e.*,] a nuclear facility is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, it is dismantled." *Id.*; *see also* TR 270 ("SAFSTOR is a term[] that's used for decommissioning and is basically putting the facility in a safe storage or mothball condition."). Under ENTOMB, "radioactive contaminants are encased in a structurally sound material such as concrete and appropriately maintained and monitored until the radioactivity decays to a level permitting release of the property." NRC DECOMMISSIONING FACT SHEET at 1.

nuclear fuel." DX 202 at SMUD-0019248-49. In response, Mr. Boggs commissioned a study from S. Levy Incorporated, a engineering consulting firm. *See* DX 144; *see also* Levy Dep. at 18.

On March 21, 1990, Mr. Solomon Levy of S. Levy Inc. presented an analysis to the Rancho Seco Committee. Mr. Levy evaluated fifteen SNF storage options for Rancho Seco, including both wet and dry storage options.[10] *See* DX 159; DX 160 at SMUD-085618; DX 165; PX 176; *see also* TR 171-72. Although the "most certain approach" was to continue storage in the spent nuclear fuel pool, nevertheless, Mr. Levy recommended that all SNF be placed in dual-purpose canisters[11] and moved from the wet pool to dry storage by 1998, because such storage "offers the earliest date for removal of spent fuel." DX 160 at SMUD-085618-19; *see also* PX 176 at SMUD-0031544 ("It is strongly recommended that the transportable cask option be pursued for the Rancho Seco spent fuel,

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[10] Spent nuclear fuel that has already been cooled in a wet pool for at least one year may be placed in "dry storage." *See* Dry Cask Storage, U.S. NUCLEAR REGULATORY COMMISSION, *available at* http://www.nrc.gov/ (last visited Mar. 31, 2006). In "dry storage," the spent fuel is surrounded by inert gas inside a container, typically a steel cylinders that either is welded or bolted closed. *Id.* The steel cylinder provides a leak-tight containment of the spent fuel, and each cylinder is surrounded by additional steel, concrete, or other material to provide radiation shielding to workers and members of the public. *Id.* There are various "dry storage" system designs. *Id.*

[11] Dual-purpose canisters are designed for dry storage, but also allow SNF to be transported within a cask unit to a disposal site. *See* TR 142; *see also* TR 143-44 ("The canister . . . would be inserted in this cask for either movement onsite or for transportation off site. . . . The cask provides the shielding necessary to handle the device out of the water or the canister out of the water and also provides the support structure for shipping and protecting the fuel during transportation. . . . . It also is designed sturdy enough along with the canister to withstand probable accidents, fire, dropping, et cetera."); TR 2368-70. Storage in dual-purpose canisters is less expensive than storage in dual-purpose casks, because the canisters are much cheaper to produce and such storage only requires that one cask be procured for transport. *See* TR 458-59 ("The cask is a much more beefier construction. It has to have shielding. It has to withstand the loads during a transportation, so you have to deal with accident environments or accident analysis of the cask, whereas the canister is just left onsite, stored onsite, does not have to have that kind of a rigorous analysis and withstand those kind of accidents because it would be contained within the cask.").

Storing SNF in a dual-purpose system, instead of a storage-only system, is advantageous, because it is not necessary for the fuel to be transferred from dry storage to a wet pool or through a dry transfer before transportation. *See* PX 1002 ¶ 113 ("One of the benefits of spent fuel storage in a dual-purpose system is that the fuel does not have to be handled two or more times for the eventual transfer to DOE repository. Minimizing spent fuel handling results in minimizing worker dose associated with spent fuel and cask handling which results in safety benefits as well as cost savings."); PX 1001 ¶¶ 17-21; TR 195-96, 263-64; *see also* TR 336 ("[A] dry transfer system is essentially a mechanism that would allow for handling of spent fuel without having to go back to the fuel pool[.]").

particularly if it can be coupled to a two to three transportable casks demonstration program described in the report and sponsored jointly by DOE/SMUD/cask vendors/and other utilities."). As Mr. Levy explained:

> The schedule for DOE pickup is currently highly uncertain with the earliest conceivable pickup date being in 1998 and a much more likely pickup date well after 2010.
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> * * *
>
> For these reasons it is concluded that there is a need for <u>both</u> (a) an aggressive program to reduce the annual costs for security, cooling and monitoring of spent fuel in the Rancho Seco fuel pool and (b) a programmatic effort to economically close off the number of years of storage in the pool by transfer to a licensed independent fuel storage facility consisting of certified transportable storage casks.

PX 176 at SMUD-0031604 (underlining in original).[12] Mr. Levy also suggested that SMUD pursue a joint demonstration project with DOE, and other interested entities, to construct and demonstrate transportable/storage casks: "This demonstration program would also provide a sound, practical basis for the broader program . . . for DOE acceptance of spent fuel in transportable storage casks by 1998." PX 176 at SMUD-0031580; *see also* DX 160 at SMUD-085618-19; TR 187, 272. Mr. Levy emphasized that SMUD needs "to recognize the unique situation of shut down nuclear power plants and, in particular, of Rancho Seco and the extra costs [SMUD] will incur for spent fuel storage by comparison to operating plant[s]." PX 176 at SMUD-0031545, SMUD-0031548.

b. A "Dual-Purpose" Dry Storage Project Was Authorized.

On March 30, 1990, SMUD adopted the recommendation to utilize dry storage for Rancho Seco's SNF. *See* DX 164 at SMUD-0029491-92 ("As a result of the [Levy] [S]tudy, it was decided that [SMUD] pursue dual purpose (storage and transportation) casks or storage only casks that could be effectively interfaced with early receipt by the DOE of Rancho Seco's spent fuel and subsequent use of the casks by DOE. . . . For that reason, we would like to meet with you and your staff to

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[12] In 1987 and 1988, DOE announced that the date for SNF acceptance at a permanent repository would be delayed from 1998 to 2003, but that DOE would accept SNF and HLW in 1998 at a Monitored Retrievable Storage Facility ("MRS") site. *See* PX 109 at HQR-0255148-49 (Jan. 1987: announcing the date for waste acceptance at the first repository is delayed from 1998 to 2003, "DOE could nonetheless start accepting waste in 1998 at an MRS facility"); PX 118 at HQ0005810 (June 1987: same); PX 143 at HQ0004887 (June 1988: "The repository will be developed in two phases and will start receiving spent fuel in the year 2003. The DOE expects to complete phase 1 for waste acceptance in 2003 and to complete phase 2 . . . in the year 2006.").

An MRS is an interim storage facility that is neither a disposal nor a repository facility. *See* TR 441-42. Congress, however, prohibited DOE from developing MRS's, until after the NRC authorized construction of a permanent repository. *See* 42 U.S.C. § 10168(d)(1); *see also* PX 169 at DB0001469). DOE understood this statutory impediment and expressed its intent to work with Congress to amend the law to permit an "MRS to begin receiving SNF significantly earlier than the repository[.]" PX 188 at HQ0003376-77 ("The current restrictions . . . linking the repository and MRS make it impossible for DOE to accept waste at an MRS facility on a schedule that is independent from that of the repository.").

In November 1989, DOE announced that a permanent repository would not begin to accept SNF until 2010, DOE subsequently reiterated that it planned to begin collection of SNF in 1998 with an MRS. *See* PX 169 at BD0001448 (Nov. 1989: announcing a "significant slip" for the start of SNF acceptance at a permanent repository from 2003 to "approximately 2010"); PX 189 at 3, 9-10, A-1 (Dec. 1990: announcing that DOE planned to commence performance of the Standard Contract in 1998 through use of an MRS); PX 231 at HQ0003592 (Dec. 1991: "[A] site for a Monitored Retrievable Storage (MRS) facility will be obtained and the facility will initiate operations in 1998[.]").

discuss the Rancho Seco spent fuel option study and our selected alternative."); *see also* TR 163-64, 172, 193, 275, 401 ("What dry storage offered was a cheaper way of dealing with storage of the fuel, so less impact from a cost standpoint. . . . [I]n looking at what Mr. Levy was pulling together, based on potential options, a possibility that it would also be in a form that could facilitate transport to the DOE in the long term and perhaps even sooner than the repository. . . . As a result of our review of the Saul Levy report and his recommendation, our recommendation to our board was that we pursue that option and go look at dual purpose transportable system."); DX 202 at SMUD-0019255 ("The District plans to have all of Rancho Seco's fuel in DOE-compatible dry storage by 1998. This will allow abandonment of the spent fuel pool which could lead to earlier decommissioning of the facility or facilitate repowering.").

c. A Decision Was Made To Enter Into A Joint Dry Transfer Demonstration With The Department Of Energy.

On March 30, 1990, SMUD also began the process of obtaining a cooperative arrangement with DOE for the development and demonstration of dual-purpose cask technology. *See* DX 164 ("[SMUD] recognize[s] that transportable storage casks and compatible shipping storage casks have not yet been licensed by the Nuclear Regulatory Commission (NRC) and that monitoring and inspection program must still be developed to assure their subsequent periodic recertification by the NRC. [SMUD] believe[s] that these issues can best be resolved by a demonstration effort sponsored jointly by the DOE, the District, cask vendors, and other utilities."); *see also* TR 184.

On April 25, 1990, SMUD's Chief Nuclear Officer advised the Rancho Seco Committee of the following:

> [S]et up a demonstration program and construct three dual purpose casks by 1993. At that time, 72 fuel assemblies would be loaded into the three casks and monitored *until the DOE takes possession of them in 1998*. The remaining 493 assemblies will be maintained in wet storage until 1993. *At that time, we should have a commitment from DOE regarding fuel acceptance in 1998. Our decision point regarding concrete casks or dual purpose casks is in 1993. If the DOE will not take our fuel in 1998, or if the dual purpose casks do not prove feasible, we will award a contract to build concrete casks and load the fuel in them by 1995*.
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> * * *
>
> *If a commitment can be obtained from DOE to take possession of the spent fuel by 1998, whether onsite or offsite, then dual purpose casks should be pursued*. If a commitment cannot be obtained, onsite concrete cask/canister storage by 1995 should be pursued. This is the earliest that we can put our spent fuel in concrete casks, since it must decay for approximately five years before it is put in cask storage.

DX 174 at SMUD-0018522 (emphasis added).[13] SMUD wanted to place the SNF in "dual-purpose" dry storage, but recognized that the technical feasibility of such a system was not yet known. *Id.*

Regarding SMUD's decision to select dry storage, Mr. Shetler, formerly SMUD's Deputy Assistant Manager and currently Assistant General Manager for Energy Supply, testified that, in 1990 and 1991, SMUD viewed the probability of an MRS being available to be "50/50." TR 395, 400, 440-41.

By mid-1990, SMUD was engaged in planning the construction and licencing of an Independent Spent Fuel Storage Installation ("ISFSI"), a passive system of storage that requires less system support and fewer personnel for oversight, monitoring, and security. *See* DX 188; DX 202 ("Generic siting, design and licencing activities for the Rancho Seco Independent Spent Fuel Storage Installation (ISFIS) have begun. These include regulatory reviews, review of vendor topical reports, and procurement of 10 CFR [Part] 72 applications submitted by other utilities. The ISFSI should be licensed and constructed by 1993. Sometime after licensing and construction of the ISFSI, the District will transfer all remaining fuel to casks where they will remain prepared for storage and transportation until DOE acceptance."); *see also* TR 146-47, 523. An internal SMUD memorandum, dated June 7, 1990, evidences SMUD's understanding that an ISFSI "will be required for dry cask storage regardless of whether a commitment for a DOE demonstration program is received[.]" DX 188 at SMUD-0019292.

SMUD was convinced that: "Storage in transportable casks offers the *best opportunity* explored to *keep open the possibility of early off-site shipment*, possibly as early as 1998 should DOE develop a Monitored Retrievable Storage facility (MRS). Under such circumstances, transportable storage casks would involve the lowest overall cost and become the preferred option." DX 202 at SMUD-0019251 (emphasis added).

Accordingly, SMUD embarked on a "first-of-a-kind effort" to develop a dual-purpose dry storage system. *See* TR 172-73, 190, 265, 345-46.

2. In 1991.

a. Initial Planning Was Started And Proposals For The "Dual-Purpose" Dry Storage Project Were Solicited.

On May 20, 1991, SMUD submitted an Application for Termination of License and Proposed Decommissioning Plan for Rancho Seco ("Decommissioning Plan") to the NRC. *See* DX 247; DX 248. The Decommissioning Plan emphasized SMUD's plan to move the SNF from the wet storage to dry storage, construct and license an ISFSI by the end of 1993, and complete the transfer of the

[13] Although this statement suggests that SMUD has 565 spent fuel assemblies, the record establishes that SMUD has 493 assemblies. *See* DX 202 at SMUD-0019248; PX 1002 ¶ 109 (Tables 7 & 8); *see also* TR 133, 2046.

SNF to the ISFSI by 1998. *See* DX 248 at SMUD-0029733. The Decommissioning Cost Study acknowledged that SMUD "presumes the availability of a Monitored Retrievable Storage (MRS) facility such that DOE can meet its obligation to begin receiving fuel[.]" DX 248 at SMUD-0030074; *but see* TR 474 (Mr. Shetler: "It was a planning assumption for funding purposes. It allowed us to come in with a decommissioning estimate that met our targets from a rate standpoint. We also recognized that we would be reviewing and adjusting this on an annual basis, once we had better information, not only for decommissioning but also for fuel disposition.").

On October 3, 1991, SMUD's Board convened a Public Hearing concerning the "Proposed Decommissioning Plan and Construction of a Spent Fuel Storage Facility." *See* DX 274. During the presentation, Mr. Ken Miller, SMUD's Decommissioning Project Manager, explained the concept of dry storage and SMUD's plan to develop an ISFSI:

> For our high level waste, we're going to put fuel assemblies in casks for a number of years, and wait for the Federal Mine Geological Repository to open. And currently, that's targeted somewhere in the neighborhood of the year 2010. However, there is currently a process going on to site and build something called a "monitored retrievable storage facility" whereby we could take our canisters or fuel storage packs and have them temporarily reside until the Mine Geological Repository is opened, and then they would be transferred.
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> Now, once we take the fuel out of the spent fuel pool and put it into the dry storage casks, then we reduce staff, we reduce maintenance, and the cost on an annualized basis is $2.6 million. *And that is why we're casking the fuel, because we can prudently save the District a great deal of money over the storage period.*

Id. at SMUD-0027418-19 (emphasis added). Ms. Rita Bowser, SMUD's former Fuel Disposition Project Manager, however, estimated that dry storage would save SMUD approximately $8 million per year and the potential for more significant savings long term:

> If you look at the fact that a repository isn't projected until 1998, or an MRS until 1998, with a repository in 2010, and it will take DOE approximately 10 years to accept all of SMUD's fuel, the cost savings can range somewhere between $60 to $156 million over the lifetime of decommissioning.

Id. at SMUD-0027436. The range reflected the difference between DOE assumptions of acceptance at an MRS in 1998 and acceptance at a federal repository in 2010. *See* TR 327. At the time, SMUD calculated that the transfer from wet to dry storage would pay for itself within two and a half years, by mid-1994. *Compare* DX 274 at SMUD-0027426 (explaining that transfer from wet to dry storage would cost between $16 and $20 million), *with* DX 274 at SMUD-0027436 (explaining that transfer from wet to dry storage would result in a savings of $8 million per year).

At the October 3, 1991 Public Hearing, in response to a question from SMUD's President, SMUD's Fuel Disposition Project Manager, at the time, stated that "it is likely that an MRS could be sited by 1998 . . . [, however,] there needs to be some congressional action that would delink the final repository [at Yucca Mountain] from the MRS" before the MRS could actually start to operate. DX 274 at SMUD-0027466. The Fuel Disposition Manager explained "[w]ith the situation at Yucca Mountain, that seems like it will be tied up in litigation for a while[,] . . . there is actually legislation in Congress to delink the facilities which would make an MRS likely in 1998." *Id.* The Fuel Disposition Project Manager also suggested that: "[B]y the District procuring dual purpose casks, there would perhaps be an implied incentive that would enable DOE to take our assemblies perhaps earlier than they otherwise could if they had to do a lot of additional planning." *Id.* at SMUD-0027473.

On October 4, 1991, SMUD submitted an application to the NRC to construct and operate an ISFSI, pursuant to 10 C.F.R. Part 72. *See* DX 276; PX 222.

On October 17, 1991, SMUD's Deputy Assistant General Manager made another presentation to SMUD's Board, estimating that $8 million in annual savings could be realized from moving SNF from wet to dry storage. *See* DX 280 at SMUD-0029434.[14] It was assumed, however, that either an MRS would be operational in 1998 or a federal repository be operational in 2010.[15] *Id.* at SMUD-0029434 ("Assumes no MRS until 1998 with final acceptance of [SMUD] fuel by 2008 or no Repository until 2010 with final acceptance of SMUD fuel by 2020[.]" (underline in original)). On that same day, SMUD's Board issued a Resolution approving "the proposal to construct a Spent Fuel Storage Facility." *See* DX 282.

On December 5, 1991, SMUD issued a Solicitation for Dual-Purpose Casks, which stated that the procurement "shall initially consist of two such [dual-purpose (storage/transport)] casks for the District/U.S. Department of Energy Cask Demonstration Project with additional cask procurement dependent on successful demonstration of cask design, testing and licensing effort." PX 233 at SMUD-0005508; *see also* DX 293 at SMUD-0005908. Shortly thereafter, SMUD issued "Request for Proposal [No.] 3449 for the Acquisition of Dual-Purpose Spent Nuclear Fuel Casks and Cask System[,]" with a proposal due date of January 15, 1992. *See* PX 239 (Request for Proposal No. 3449); *see also* TR 200 (Mr. Shetler: "We recognized we were looking at some new technology here. We recognized that vendors were probably going to come back with some potentially unique

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[14] At trial, Mr. Shetler explained that, based on the estimates provided to SMUD's Board, the cost of the dry storage project would be offset by operating savings within two-and-a-half years. *See* TR 329.

[15] In 1994, DOE published a Notice of Inquiry stating that it planned to accept SNF sometime after January 31, 1998. *See* 59 FED. REG. 27,007 (May 25, 1994). On September 21, 1994, SMUD submitted a comment in response indicating that, when SMUD decided to fund its Decommissioning Trust in 1991, SMUD "assumed that DOE would accept all of Rancho Seco's fuel starting in 1998, including the queue, by 2010." DX 462 at SMUD-0019624.

options or offerings. And we wanted to have the ability, through a request for proposals, to be able to negotiate with the individual vendors when they brought back their offerings."). The Request solicited proposals for one dual-purpose cask to be delivered by July 1, 1993 as a demonstration project, but stated that "[t]he District intends to procure an additional cask by or upon successful completion and delivery of the first demonstration cask." PX 239 at SMUD-0005507. Subsequently, SMUD extended the initial deadline for proposals to February 12, 1992. *See* PX 236 at HQR0161575; *see also* PX 242 at SMUD-0006152.

At that time, SMUD was focused on transferring SNF from the wet pool to dry storage in order further advance the decommissioning of Rancho Seco:

> The District is committed to store spent nuclear fuel assemblies in dry, shippable casks from the time that their decay heat generation rate allows until the Department of Energy is ready to accept them for permanent disposal. This will permit the lay up of the Spent Fuel Pool, Spent Fuel Cooling System, the Component Cooling Water System, the Plant Cooling Water System and the Radioactive Waste System. *All fuel will be in dry casks by 1998.*

DX 234 at SMUD-0031033 (emphasis added); *see also* TR 1178.

b. Discussions About The Joint Dry Transfer Demonstration Began.

During 1991, SMUD and DOE also began to discuss the possibility of a joint demonstration of a dry transfer system and dual-purpose dry storage. *See, e.g.,* PX 220 (Sept. 19, 1991 meeting); PX 229 at SMUD-0006753 (Nov. 15, 1991 meeting); PX 246 (Nov. 15, 1991 meeting); *see also* TR 188-89 (Mr. Shetler: We had a "series of meetings to determine what the demonstration program would consist of. We had certain views of what we thought might be of benefit to DOE and the industry. I think DOE had their views of what might be a benefit. And we spent quite a bit of time going through trying to figure out what were those joint or overlapping benefits."). SMUD believed that DOE and SMUD had a mutual interest in the development of dual-purpose cask technology. *See* TR 188-90 (Mr. Shetler: "From [SMUD's] perspective, we felt that this was a technology that had promise, that the concept of joint storage and transportation cask might have an advantage to the industry in general and DOE. And we felt that demonstrating that, the licensing of that, the demonstration of the loading of the fuel, inspection of the fuel, those different aspects would have benefit to DOE. DOE, I think, felt they had some benefit from that, but also was interested in demonstrating a dry transfer capability, the ability to dry transfer fuel assemblies from one container or canister to another."). During these discussions, SMUD provided DOE with a draft of the technical specifications developed for a dual-purpose cask and solicited comments from DOE. *See* PX 224; PX 229.

SMUD also lobbied Congress, including then-Congressman Fazio of California's Third Congressional District, to facilitate DOE's participation in a cooperative arrangement. *See* DX 175 at SMUD-0018539; DX 254. On August 17, 1991, Congress enacted the Energy and Water

Development Appropriations Act of 1992, providing the necessary appropriations that would enable DOE to enter into a cooperative agreement with SMUD beginning in fiscal-year 1992. *See* Pub. L. No. 102-104, 105 Stat. 510 (Aug. 17, 1991).

On December 2, 1991, Mr. Shetler made a presentation to the California Senate Committee on Energy and Public Utilities, identical to the October 17, 1991 presentation to SMUD's Board. *See* DX 291 at SMUD-0029418; *see also* TR 358-59. That presentation included a slide representing that SMUD could realize an $8 million annual savings from moving the SNF from wet to dry storage. *Id.* at SMUD-0029418. The slide, however, noted SMUD's assumption that either an MRS would be operational in 1998 or a federal repository be operational in 2010. *Id.* at SMUD-0029418 ("Assumes no MRS until 1998 with final acceptance of [SMUD] fuel by 2008 or no Repository until 2010 with final acceptance of SMUD fuel [by] 2020[.]" (underline in original)).

3. In 1992.

a. Planning For The "Dual-Purpose" Dry Storage Project And Selecting A Vendor Continued.

SMUD received bids from the following companies: Pacific Nuclear Systems Inc. ($11,754,00.00); Sierra Nuclear Corp. ($12,670,000.00); Transnuclear Inc. ($19,812,00.00); Nuclear Assurance Corp. ($37,950,000.00); and The Babcock and Wilcox Co. ($72,543,000.00). *See* DX 35; PX 259; *see also* TR 198-99, 459, 981-82. The $11.7 million and $12.6 million bids were for a canister-based system. *See* TR 811-13, 983-990. Bids in the $19.8-$72.5 million range were for a cask-based system. *See* TR 983-990; *see also supra* note 11 (explaining the difference between canister-based and cask-based storage). In April 1992, SMUD's Board approved a process for evaluating these proposals. *See* DX 348; *see also* PX 259 at SMUD-0027247-48. SMUD initially estimated that approximately $6 million in annual savings could be realized by the use of dry storage. *See* PX 272 at SMUD-0029013; DX 251 at SMUD-0018595.

By June 11, 1992, the Rancho Seco staff evaluated the potential suppliers' bids for a dry storage system and selected Pacific Nuclear. *See* PX 272; DX 251; *see also* TR 362-63. On July 7, 1992, Mr. Shetler advised SMUD's Board that SMUD could save approximately $33 million over a twelve-year period with dry storage. *See* PX 991 at SMP0330404, SMP0330410. On July 9, 1992, SMUD's Board selected Pacific Nuclear's proposal and authorized SMUD's General Manager to negotiate a contract. *See* PX 259 at SMUD-0027247, PX 242, PX 269A, PX 991; *see also* DX 315, DX 344; TR 201. In October 1992, SMUD and Pacific Nuclear entered into Contract E-776 for the development and construction a "dual-purpose" dry storage system, including twenty-one dry-sealed canisters, twenty-two horizontal-storage modules, and two transportable casks. *See* PX 267; PX 269A; *see also* TR 959.

Pacific Nuclear's original cost and schedule estimates assumed that most of the design work was completed. *See* TR 201-02, 537-38, 985-87. Pacific Nuclear had a licensed storage-only dry canister system, *i.e.* the NUHOMS system, and a licensed transport-only cask, *i.e.* the 125-B cask.

Id. Pacific Nuclear assumed with that any modest technical changes, these two licenses could be converted into a dual-purpose system. *Id.* Although nuclear industry vendors were working to secure NRC licensing for a dual-purpose system, the NRC had not issued a full license to any company. *See* TR 190, 1382-83; *see also* TR 2249 ("[A]t the time, there was no transportable storage casks that were licensed. But there was storage, dry storage casks.").

For the remainder of 1992, SMUD and Pacific Nuclear worked to design, license, and fabricate dual-purpose system. *See* TR 212 (Mr. Shetler: "[W]e then started the process of working with Pacific Nuclear. [Pacific Nuclear] provided the design information. We started generating the licensing documents for both the storage and transportation systems. And started the discussions with the NRC on the licensing process that would be necessary in order to go forward with this arrangement.").

b. Discussions About The Joint Dry Transfer Demonstration Continued.

In 1992, SMUD and DOE continued to discuss the specifics of a joint demonstration of dual-purpose storage and dry transfer system. *See, e.g.,* PX 253 (Jan. 14, 1992 and Mar. 4, 1992 meetings); PX 258 (Apr. 16, 1992 meeting). SMUD anticipated that if an agreement could be reached with DOE for a demonstration project, up to $3 million of the proposed cost of Pacific Nuclear's contract could be shared. *See* PX 259 at SMUD-0027248.

c. The Department Of Energy Announced That It May Not Be Able To Construct A Permanent Storage Facility By 1998.

In December 1992, DOE acknowledged that it may not be able to build and operate an MRS by 1998, but explained that the Department was investigating alternatives, *e.g.*, "storing the waste at existing federal facilities on an interim basis." PX 973.

4. In 1993.

a. Vendor Difficulties Delayed Implementation Of The "Dual-Purpose" Dry Storage Project.

In 1993, Pacific Nuclear experienced a number of set-backs in the development of the dual-purpose casks. *See* TR 375, 597. In early 1993, the NRC advised Pacific Nuclear that additional testing, *e.g.*, impact limited testing, would be required for the design of the casks and canisters to ensure that the system could safely transport SNF. *See* TR 225, 537-38. Although Pacific Nuclear and SMUD anticipated two to three rounds of questioning from the NRC, seven rounds followed. *See* PX 845. As a result, Pacific Nuclear[16] was required to execute ten change orders between 1993

[16] In 1993, Pacific Nuclear changed its name to Vectra Technologies, Inc. ("Vectra") after acquiring ABB Impell Corp. *See* DX 442.

and 1997 to modify the original 1992 Contract. *See* PX 267; *see also* TR 225. These change orders increased the cost of the dry storage project. *Id.*; *see also* TR 230-31.

b. Concerns Arose About Whether The Department Of Energy Would Accept Spent Nuclear Fuel Stored In Canisters.

On June 22, 1993, SMUD sent a letter to DOE, asking for assurances "regarding the acceptability of the canister-based storage system SMUD recently purchased[.]" PX 311 at SMUD-0031661. On September 2, 1993, DOE responded: "Once the Nuclear Regulatory Commission has certified Sacramento Municipal Utility District's transport-storage system, the Department would be willing to initiate the appropriate actions to include such a system as an acceptable waste form under the terms of the Standard Contract[.]" PX 320 at HQR-0361098. On September 28, 1993, SMUD sent another letter that explained SMUD's understanding of DOE's position:

> [I]t is now my understanding that your letter of September 2, 1993, takes the position that once the Nuclear Regulatory Commission (NRC) certifies the Rancho Seco transportation/storage system, the DOE would them be ready to take the necessary actions to include the system as an acceptable waste form under the terms of our spent fuel contract. . . . This clarification greatly helps the District. We now understand that as long as we have an NRC certified system, the fuel will eventually be accepted by DOE, which makes our long range planning much easier.

PX 325 at SMUD-0019636. On October 4, 1993, DOE sent a letter, reiterating the assurances provided in its September 2, 1993 letter. *See* PX 327 (Mr. Lake Barrett, then Acting Director of OCRWM: "In a letter dated September 2, 1983, . . . I provided the assurances you requested concerning the acceptability of the Rancho Seco spent nuclear fuel in a canistered system certified for storage and transportation offsite to a Federal facility.").

Despite this assurance, in 1993, SMUD decided to conduct an evaluation of its dry storage project, because of concerns about whether DOE would delay acceptance of the Rancho Seco SNF if it were placed in canisters:

> The uncertainty rests with the acceptance of the spent fuel by DOE for ultimate disposal. The issue does not appear to be one of will the DOE accept our canistered spent fuel but, rather, one of when will they accept it. Under our current contract with DOE for spent fuel disposal, they will only accept "standard" fuel in accordance with their planned receipt schedule. Presently the definition of "standard" fuel is bare fuel assemblies. Thus, even though DOE is moving toward a canistered fuel concept similar to ours, fuel in canisters is not currently considered "standard" fuel. We are continuing to interface with DOE on this issue in order to get our system declared a "standard" fuel form. This effort involves ourselves, other interested utilities, and support from Congressman Fazio's office.

> However, we cannot predict the final outcome, though the obvious worst case is that we are declared a "non-standard" fuel form. This is not as bad as it may at first appear since DOE acknowledges that they will still have to take the fuel some day, just not necessarily in accordance with the current planned receipt schedule. *Therefore, the issue with DOE and the use of our planned dry storage system comes down to one of financial risk.*

DX 425 at SMUD-0027390-91 (footnote omitted & emphasis added); *see also* TR 367-70. SMUD's objective was to quantify the risk of different scenarios. *See* DX 425 at SMUD-0027391-92; *see also* TR 370, 374. The evaluation also included a "base case" - - the current dry storage project - - which assumed that "DOE Accepts Fuel on Current Schedule." *Id.*; DX 425 at SMUD-0027393. Again, SMUD concluded that "continuing with the licensing and construction of the Dry Fuel Storage System is the right direction for the District." *Id.*

c. Discussions About The Joint Dry Transfer Demonstration Continued.

Throughout 1993, SMUD and DOE also continued to discuss a joint demonstration arrangement. *See, e.g.,* PX 286 at SMUD-0009322 (Apr. 30, 2003 meeting), SMUD-0009348 (referencing an Aug. 24, 2003 planned conference call between SMUD and DOE); PX 325 (referencing a Sept. 22, 1993 meeting between SMUD and DOE).

5. In 1994.

a. The Department Of Energy Raised Concerns About The Availability Of A Suitable Storage Facility.

On May 24, 1994, DOE published a Notice in the FEDERAL REGISTER acknowledging that "[t]hus far, neither efforts of the Department [of Energy] nor any other organization . . . have achieved the level of success needed to realize significant success in developing a [repository or MRS] site by 1998." 59 FED. REG. 27,007, 27,008 (May 25, 1994). The Notice solicited comments on the issue of whether DOE has "a legal obligation under the Act or the Standard Contract to accept waste in 1998 in the absence of a repository or other facility under the Act?" *Id.* at 27,009. Interestingly, DOE explained that:

> [T]he Department is evaluating a design for multi-purpose canisters (MPC) to support spent nuclear fuel transportation, storage, and disposal. The MPC offers the potential for considerable standardization, simplification and, consequently, cost savings for both utilities and the Federal waste management system. Given the potential benefits of the MPC, the Secretary [of Energy] has directed that the options

> to be explored by the Department should include, to the maximum extent possible, the provision and use of MPCs to address both schedule and cost concerns arising from the potential unavailability of a repository or an MRS in 1998.

Id.

b. The "Dual-Purpose" Dry Storage Project Continued To Be Implemented.

During 1994, SMUD met with the NRC to discuss the preliminary designs for SMUD's dry storage. *See* TR 543-44. Based on these discussions, on December 6 and 8, 1994, SMUD stated, at a public workshop on the various alternative strategies for decommissioning Rancho Seco, that DOE may begin accepting SNF as early as 1998. *See* DX 481 ("DOE May Start Accepting Spent Fuel Between 1998 and 2013[.]").

c. A Cooperative Agreement For A Joint Dry Transfer Demonstration Was Reached With The Department Of Energy.

In late-1994, after three years of negotiations, SMUD and DOE executed a Cooperative Agreement for the "demonstration of a spent fuel dry transfer system using transportable storage systems." PX 371; *see also* DX 1328; PX 220; PX 229 at SMUD-0006753; PX 246; PX 253; PX 258; PX 286 at SMUD-0009322, SMUD-0009348; PX 325; PX 376; PX 381; TR 188-89. The demonstration project was to proceed in two phases: Phase I consisted of the development and procurement of two dual-purpose canisters; Phase II consisted of the procurement of a dry-transfer system and the demonstration of a transfer of spent fuel from one canister to another. *See* PX 371 at SMUD-0036436; DX 1328 at HQR3100004. The Cooperative Agreement specified that SMUD would pay for one of the dual-purpose canister and DOE would pay for the other. *See* PX 371 at SMUD-0036437-40, SMUD-0036507; DX 1328 at HQR3100005-08, HQR3100083.

6. In 1995.

a. The Department Of Energy Announced That It Would Not Begin Accepting Spent Nuclear Fuel In 1998.

On May 3, 1995, DOE issued another Notice stating that was not able to begin providing disposal services in 1998. *See* 60 FED. REG. 21,793, 21,793-94 (May 3, 1995). The Notice also explained that the Department "does not have an unconditional statutory or contractual obligation to accept high level waste and spent nuclear fuel beginning January 31, 1998 in the absence of a repository or interim storage facility." *Id.* DOE also stated that "the earliest possible date for acceptance of waste for disposal at a repository is 2010" and acknowledged that utilities with SNF might have to plan for alternate storage until DOE could begin acceptance. *Id.* at 21,794 & 21,797.

b. Development Of The "Dual-Purpose" Dry Storage System Continued.

Throughout 1995, SMUD's dry storage project continued to progress. *See* TR 670 (Rancho Seco Plant Manager: "1995 was very heavy into engineering, redesign, reengineering. We also started fabricating the cask at [Precision Custom Components ("PCC")]. We started purchasing materials for the canisters. The project was really starting to roll."). Construction of the ISFSI site,[17] *e.g.*, the concrete structure, fencing, and security, also continued. *See* DX 524; *see also* TR 959. On June 27, 1995, SMUD submitted a Plan to the NRC for the Rancho Seco ISFSI. *See* DX 521.

7. In 1996.

a. Development Of The "Dual-Purpose" Dry Storage System Continued.

In July 1996, in order to determine the condition of each fuel assembly prior to transfer, as required by the Standard Contract, SMUD performed a visual on-site inspection of the SNF in the pool, videotaping the fuel with underwater radiation hardened cameras. *See* TR 1041; *see also* PX 44 at Art. VI(A)(1)(b).

b. Disposal Of Low-Level Radioactive Waste Around The Wet Pool Began.

By late-1996, SMUD began to dispose of low-level radioactive waste around the area of the wet pool. *See* TR 697; *see also* TR 218 (Mr. Shetler: "At the time we started we weren't looking at going to that fuel pool, working our way around that, looking at some of the lower level contaminated areas."). At present, SMUD is still in the process of disposing of the wet pool. *See* TR 1031.

c. Received Legal Notice That Performance Would Not Begin Under The Standard Contract On January 31, 1998.

On December 17, 1996, DOE advised SMUD that "DOE anticipates that it will be unable to begin acceptance of spent nuclear fuel for disposal in a repository or interim storage facility by

[17] SMUD contracted with BRCO for the construction of the on-site ISFSI facility. *See* TR 959 (Mr. Field: testifying that "the ISFSI facility on-site [was built] to receive the material that was provided by the Pacific Nuclear/Vectra/TN[W] contract, so that facility, the concrete slab that the concrete module sat on and the apron around it and fencing and lighting was done by BRCO.").

January 31, 1998" and invited SMUD to submit views on "how the delay can best be accommodated." *See* PX 500 at SMUD-0019348.[18]

d. The "Dual-Purpose" Dry Storage Project Was Reevaluated.

Beginning in December 1996, SMUD conducted a comprehensive reevaluation of SNF storage options. *See* PX 502 (Dec. 31, 1996 SMUD Office Memorandum); PX 538 at SMUD-061112 (listing nine options considered); *see also* PX 503 (draft version of the Dec. 31, 1996 Memorandum). These efforts continued through May 1997. *See* PX 512 (Jan. 21, 1997: indicating that reevaluation is ongoing); PX 519 (Feb. 20, 1997: describing the results of the reevaluation); PX 524 (Mar. 3, 1997: explaining that the reevaluation "has recently concluded"); PX 538 (May 15, 1997 presentation to SMUD's Board about the reevaluation). SMUD's evaluation was prompted by the delays that arose from Vectra's performance and the cost overruns. *See* Pl. Resp. to Gov't PFF ¶ 85; *see also* PX 502 at SMUD-0028999 ("The [nine different] options described below are a variation of the base case [(the TLG 1995 Decommissioning Evaluation and Cost Estimate)] and reflect action that SMUD could take to mitigate the financial impact posed by the current spent fuel program (Vectra) delays."); PX 519 at SMUD-061378; TR 535 (Rancho Seco Plant Manager: "We were doing re-evaluations because the project started getting in trouble. There started being cost

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[18] SMUD did not respond until March 14, 1997:

> SMUD believes that if DOE cannot disposed of the Rancho Seco spent fuel on the schedule set forth in the DOE-SMUD Standard Contract, DOE should . . . reimburs[e] SMUD for the on-going costs of on-site spent fuel storage at Rancho Seco from January 31, 1998, until such time as DOE can fulfill its contractual obligation to off-loan and transport the spent fuel to an interim or permanent DOE storage facility.
>
> * * *
>
> SMUD has fulfilled its financial obligation to the [Nuclear] Waste Fund and has complied with the law and all of its contractual obligations. SMUD has also done everything possible to reduce the interim costs of storage by proceeding with its plan for dry storage.
>
> * * *
>
> SMUD believes that the delay in spent fuel acceptance has been and is completely avoidable. It is now time for DOE to honor its contractual obligation by accepting fuel as soon as possible and to reimburse utilities such as SMUD for their interim storage costs in the meantime.

PX 528.

overruns and started being issues and we said if there are problems with this, with this project, *why don't we stop and leave the fuel in the spent fuel pool*." (emphasis added)); TR 597 (Rancho Seco Plant Manager: "We knew Vectra was having trouble. We had been working with them to try to fix it. So in anticipation that things might not go well, we had kicked off a study to look at a myriad of options of what should we do with the project now? Should we cancel it? *Should we leave it in the pool?* Should we switch to a different vendor?" (emphasis added)). SMUD also was concerned about safety issues arising from DOE's anticipated delay in performance under the Standard Contract. *See* PX 512 ("Our objective in the study is to assure that we pursue the most cost effective yet safe fuel storage strategy and at the same time acknowledging that the longer our fuel remains in the spent fuel pool, the higher our overall costs will be."); *see also* TR 723-26.

During this evaluation, SMUD examined nine different options for storing Rancho Seco's SNF: "1) Continue with Current Concept, Expedited Schedule; 2) Continue with Current Concept, Unexpedited Schedule; 3) Accept One [C]ask Without Transportation License; 4) License the Design of the Cask, But Do Not Fabricate; 5) Use Storage Only Canister and Reload When DOE Accepts Spent Fuel; 6) Wait Until NUHOMS II is Available; 7) Purchase Cask and Canister From Another Vendor; 8) Purchase Existing Licensed Storage and Transportation System; and 9) *Keep Spent Fuel In Spent Fuel Pool*." PX 519 at SMUD-061378 (emphasis added). SMUD's analysis reflected an understanding that DOE's performance of the Standard Contract would be delayed. *See* PX 502 at SMUD-0029005 (anticipating that costs could be incurred as late as 2028).

e. The Sacramento Municipal Utility District Sought To Amend The Cooperative Agreement For A Joint Dry Transfer Demonstration.

On September 25, 1996, SMUD advised DOE, as a consequence of regulatory delays and unforseen vendor problems, that the Cooperative Agreement should be amended to provide a larger DOE financial contribution. *See* DX 647. SMUD explained that the cost of Phase I of the cooperative efforts - - *i.e.*, development and procurement of a dual-purpose dry storage system - - would exceed the amounts specified in the Cooperative Agreement. *Id.*; *see also* TR 963.

8. In 1997.

a. Regulatory Problems And Vendor Bankruptcy Delayed Implementation Of The "Dual-Purpose" Dry Storage Project.

On January 13, 1997, the NRC issued a Demand for Information regarding concerns about the adequacy of Vectra's Quality Assurance ("QA Program"). *See* PX 509; PX 511; *see also* DX 707 ("Based on these and earlier inspection findings as well as our discussions at the management meeting, your lack of understanding of the breadth of problems with your QA [P]rogram is of significant regulatory concern."). The NRC threatened enforcement action and required Vectra to provide "information as to why the NRC should not suspend further VECTRA fabrication activities, until [Vectra] identif[ies] and effectively correct[s] the significant problems associated with the QA

Program." PX 509 at SMUD-0024537; DX 707 at SMUD-0024537. On January 27, 1997 Vectra informed SMUD that, as of January 24, 1997, Vectra has "placed a quality assurance stop work on fabrication activities for its Fuel Services operations." DX 712. In a January 21, 1997 letter to SMUD's Board, SMUD's General Manager reported:

> Although the full effect of the NRC's action will not be known for several months, [SMUD] staff anticipates that considerable VECTRA resources will be required to address the issues, resulting in delays in the design and licensing of our system. A fabrication halt would prevent resumption of work on our cask and delay start of fabrication of our canisters. As you may recall, there is already a one year project delay due to licensing and design issues . . . and an additional delay related to cask design which suspended cask fabrication[.] Given the potential impact of the current NRC Demand of VECTRA, [SMUD] staff estimates that the total project delay could be two years beyond the March 1997 target for placing all fuel in dry storage.

PX 512 at RS006000. On April 10, 1997, Vectra submitted a Response to the NRC Demand for Information. *See* DX 740.

On October 2, 1997, Vectra filed for bankruptcy in the United States Bankruptcy Court for the Western District of Washington - - *Vectra Technologies Inc.*, Bankruptcy Petition No. 97-13001. *See* TR 237, 997. In November 1997, Transnuclear West, Inc. ("TNW") purchased Vectra's assets and intellectual property. *See* TR 238. The United States Bankruptcy Court issued an order to confirm that TNW agreed to complete the SMUD project, without profit. *See* PX 585; *see also* TR 634. TNW insisted, however, that SMUD provide adequate assurances that all actual out-of-pocket costs that TNW would incur to complete the project would be reimbursed. *See* TR 921 (Mr. Ferreira: "Transnuclear was not willing to continue the program unless they were assured that they would have their costs reimbursed. One of the problems that Vectra had was that they agreed to fixed prices, and then with cost overruns, they were assuming that risk, and that was one reason why it eventually went into bankruptcy."); *see also* TR 238-39.

b. The "Dual-Purpose" Dry Storage Project Was Continued.

At this time, SMUD was aware that DOE likely could not dispose of or assume title to the Rancho Seco SNF on January 31, 1998. Therefore, SMUD management was confronted with having to select a storage method that could meet NRC concerns, perhaps for an indefinite period. *See* TR 620. SMUD's management concluded that continuing with the dry storage project was the most cost-effective option and switching to another vendor was not a viable option. *See* PX 538 (May 15, 1997 Presentation to SMUD's Board); *see also* PX 519 (Feb. 20, 1997 SMUD Office Memorandum to Mr. Redeker, Rancho Seco Plant Manager, from Mr. Ken Miller, Decommissioning Project Manager); PX 524 (Mar. 3, 1997 SMUD Office Memorandum to Mr. Steve Redeker from Mr. Ken Miller); DX 721 (same); TR 612-19. The reality that DOE likely would not perform was relevant in SMUD's decision making, as the Rancho Seco Plant Manager testified at trial:

SMUD'S COUNSEL: How did your knowledge that the Department of Energy would not begin performing in 1998 affect your [1997] recommendation [to the Board of Directors]?

MR. REDEKER: That was definitely a consideration relative to the option to store the fuel in the spent fuel pool. A key issue of storing in the pool is how long is it going to be in the pool? How big is that delta cost going to be over time? And at this point in 1997, it was a fact that they weren't showing up in '98. The 2010 date was in my mind very optimistic because I hadn't seen the kinds of progress that would need to be made. DOE had some specific milestones they had to reach, weren't being made. And that the 2010 date was in jeopardy as well. And that some date out in the late 2020s was my best estimate of when the fuel would be gone. So that played an important part in this. Had they been performing and saying, yes, we're coming in 1998 and that fuel will be gone by 2006, that would have changed the outcome of this entirely. It would have made the spent fuel pool an absolute certainty. They are coming, they are going to take it out of our pool, the risk will be gone. And I wouldn't have to worry about that, licensing of a transportation system, I wouldn't have to worry about whether they could manufacture the thing, if they had said I'm coming, we're going to perform.

THE COURT: Do you consider yourself to be the person that was responsible for continuing on with dry storage? Did the buck stop with you on that?

MR. REDEKER: The buck stopped with me relative to making the recommendation [to the Board of Directors]. I was the one that Dick Ferreira was looking to, Jim Shetler was looking to, the board was [looking to] . . . [t]o say Steve [Redeker], we see you are the expert on this, that's why we put you in his job is for you to make Rancho Seco go away safely and cost effectively. What are you going to do with the fuel[?] Your job is to get this done. What do you recommend?

TR 619-20; *see also* TR 912-14 (Mr. Ferreira: testifying that the decision to continue with the dry storage project in 1997, "was part of our continued evaluation of the cost and risks of continuing to maintain fuel in wet storage versus dry storage, and *if you're going to be holding fuel in wet storage for an indefinite period of time, then the estimated cost to complete the dry storage program, recognizing there are many challenges and risks and complexities involved, it still made sense to continue to make that investment to move fuel to dry storage because it would reduce the cost over the long term*." (emphasis added)). On May 15, 1997, SMUD's Board concurred that the current dry storage project should be continued. *See* TR 612, 619; *see also* PX 538.

9. In 1998.

a. The Department Of Energy Did Not Begin Disposal Of Spent Nuclear Fuel And/Or High-Level Radioactive Waste, As Required Under The Standard Contract.

Although the Standard Contract required DOE to commence performance by January 31, 1998, that did not occur. *See* PX 500.

b. A New Vendor Was Retained To Complete The "Dual-Purpose" Dry Storage Project.

On January 20, 1998, the NRC sent a letter and report to TNW explaining the results of an NRC inspection and the status of the April 10, 1997 Demand for Information. *See* DX 822 at SMUD-0032461-509. The NRC commended TNW on corrective actions, but identified four concerns that must be fixed prior to resumption of any fabrication activities: 1) "lack of a short-term continuous process to assess, nurture[,] and reinforce VECTRA's new safety culture[;]" 2) "failure to assess the effectiveness of training on safety culture improvement and human error reduction[;]" 3) potential licensing issues with the canisters; and 4) "uncertainty regarding the independence of the Quality Assurance organization from VECTRA line management." *Id.* at SMUD-0032461-62. TNW continued to address these issues and, on September 10, 1998, the NRC issued TNW a transportation license for the NUHOMS®-MP187 Multi-Purpose Cask, evidencing that the design for the cask and canisters was sufficient for offsite transportation of SNF. *See* PX 596; DX 873.

On September 28, 1998, after extensive negotiations, SMUD and TNW entered into a new contract, Contract E-776A, for the completion of the design, licensing, and fabrication of the dry storage system, converting the "fixed-price" contract, Contract E-776, to a "cost-without-profit" contract. *See* DX 879; PX 598; *see also* TR 237-39, 633-34, 919-21.

Sometime in 1998, SMUD also contracted with Hartford Steam Boilers Inspection & Insurance Co. for third-party inspection services to supplement's SMUD's internal oversight of the dry storage project. *See* TR 960.

c. The Cooperative Agreement For A Joint Dry Transfer Demonstration Was Terminated.

On September 30, 1998, after concluding that DOE could not provide additional funds to meet the unexpected costs associated with the joint project, SMUD and DOE decided to negotiate a mutual termination of the Cooperative Agreement. *See* PX 655; *see also* PX 648; TR 2286. As a consequence, SMUD and DOE never entered Phase II of the Cooperative Agreement, *i.e.*, joint demonstration of a dry transfer system. *Id.*; *see also* TR 963, 2279-80. Nevertheless, sometime in 1998 or 1999, after the mutual termination of the Cooperative Agreement, DOE conducted a

demonstration of a dry transfer system using dummy fuel assemblies at a DOE facility in Idaho. *See* TR 963, 2284-85, 2291-92.

10. In 1999–2001, The Sacramento Municipal Utility District Completed Licensing And Testing The "Dual-Purpose" Dry Storage Project.

During 1999, SMUD did not receive a transfer cask or any storage canister, because the project continued to face vendor delays. *See* PX 640 at SMUD-0010030, SMUD-0010033, SMUD-0010035. SMUD once again decided to reevaluate the vitality of the dry storage project. *See* TR 930-31 (Mr. Ferreira: "[T]he alternatives were to suspend or stop the project and just maintain the fuel in wet storage, looking at possibly switching to another vendor, but the risk of moving in that direction, I think, as the Judge indicated earlier, didn't have too many options, Transnuclear was probably in a strong negotiating position. So we attempted to maintain the relationship with Transnuclear, tried, intended to try to move to fixing certain prices of the services or products they would provide, doing everything we could to try to manage and control the costs."); *see also* TR 652. Therefore, in December 1999 and continuing through February 2000, SMUD conducted another evaluation and analysis, comparing future cost projections of wet storage and dry storage. *See* PX 642. Again, SMUD concluded that the dry storage project would cost less than wet storage. *Id.*; *see also* TR 242-43.

In June 30, 2000, the NRC issued a twenty-year storage license authorizing SMUD to store SNF in the Rancho Seco ISFSI, using licensed canisters. *See* PX 962. In July 2000, SMUD received the MP187 cask from TNW. *See* DX 1069 at SMUD-053621. In September 2000, SMUD received the first completed canister from TNW. *See* PX 640 at SMUD-010102.

On November 13, 2000, the NRC issued an Assessment Report, indicating that the concept of a dry transfer system "has merit[,]" but would require submission site-specific information and further analysis before the NRC could issue a license. *See* DX 1095 at PNL1800080.

On January 22, 2001, SMUD sent a letter informing DOE that SMUD would be placing the SNF into dual-purpose dry storage in spring of 2001:

> In accordance with Article IV, Paragraph A.2(a) of [the Standard Contract], we are notifying the Department of Energy (DOE) of our intent to load Rancho Seco spent nuclear fuel into the NUHOMS MP187 transportable storage system.
>
> * * *
>
> We expect to begin loading fuel in spring-2001, and we invite DOE to observe our fuel loading activities and review our fuel inspection records. This will be the last opportunity to see the spent fuel assemblies before we package the fuel for shipment.
>
> * * *

> Based on previous correspondence . . . and our timely request herein, we understand that DOE will initiate actions to include the NUHOMS MP187 canisters as an acceptable waste form under the terms of the Standard Contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR [§] 961).

PX 670 at SMUD-061119-20.

> On April 6, 2001, DOE responded:
>
> As you indicated the Department [of Energy] has previously stated its willingness to initiate the appropriate actions to include such dual-purpose storage/transport systems as acceptable waste forms under the terms of the disposal contract.
>
> * * *
>
> [T]he Department will initiate actions to include storage systems certified by the [Nuclear Regulatory] Commission for both transportation and storage (dual-purpose systems) as acceptable waste forms under the disposal contract with SMUD. We are in the process of identifying the extent of and methods for effecting such contract modifications, including the development of specifications that may be placed on "Standard" dual-purpose systems, where "Standard" refers to canistered spent nuclear fuel that could be accepted as if it were standard spent nuclear fuel under the contract.
>
> While the Department continues to believe in the overall benefits that may accrue to a multi-purpose storage/transport/disposal system, *we are unable at this time to complete final design and acceptance criteria for the disposability aspects of such a system for commercial spent nuclear fuel*.

PX 678 at 1 (emphasis added). In April 2001, SMUD loaded the first canister with SNF and transported this canister to the Rancho Seco ISFSI.[19] *See* DX 2000 ¶ 34; TR 665.

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[19] In order to have the amount of staff required to package the SNF into canisters and transfer the canisters to dry storage, SMUD contracted with Bigge Crane & Rigging Co. and Numanco, L.L.C. *See* TR 957-59 ("The primary role of Bigge was staff augmentation. The remaining staff at Rancho Seco was not large enough to actually do the loading of the fuel into the canisters, and so we let a contract with Bigge to provide additional staff to do the loading . . . . Numanco's contract was also a staff augmentation contract. Because of the radiation hazard with handling the spent nuclear fuel, there's a lot of involvement with radiation protection technicians who oversee the work and set the work standards and practices to assure radiation protection, and we had reduced our radiation protection staff, in-house staff, to the point where they couldn't support the project, and so they provided staff augmentation for radiation protection.").

In June 2001, after continued fabrication delays and delivery issues, SMUD undertook another analysis of alternatives to dry storage. *See* PX 689; *see also* TR 667-68 (Mr. Redeker: "And even though we did have one canister in storage at that time, one of our directors said I still want to make sure that we're going down the right path here. So we committed to go back and update the eight or nine option study we had done before, based on the most current information that we had."). Again, SMUD concluded that the current dry storage project would yield the highest degree of savings, but recognized that:

> There are viable alternatives to the current TNW dry nuclear fuel storage system which have a [net present value] savings compared to wet fuel storage. These alternate systems have some risks, which are significantly greater than the current system. Their risks include required NRC approval for design changes and Rancho Seco Site use and the fact that one system has not even been placed in service.

PX 688-89 at SMUD-061940 (calculating that the current dry storage project had the highest "net present value . . . of savings compared to leaving the fuel in wet storage").

In 2001, SMUD entered into an arrangement with PCC, the subcontractor responsible for the majority of the cask and canister fabrication work under the Vectra and TNW contracts, for SMUD to make payments directly to PCC to expedite the fabrication work. *See* TR 960-61 (Rancho Seco's Chief Engineer: testifying that SMUD "began making payments to [PCC] directly to expedite the work and assure the work got completed, so the 5.5 million dollars would represent what we paid directly, as opposed to what we paid through Transnuclear.").

11. In 200-2002, Spent Nuclear Fuel Was Loaded Into Twenty-One Canisters And Transferred To An Independent Spent Fuel Storage Installation.

Beginning in April 2001, SMUD loaded a total of twenty-one dual-purpose canisters each with twenty-four separate fuel assemblies,[20] except one canister that held thirteen assemblies. *See* TR 144-46, 496-522, 655; *see also* DX 2000 ¶ 34. SMUD transported each canister to the ISFSI site[21] and then placed each in a storage module.[22] *See* TR 518-20, 665-68. Because of the significant

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[20] Nuclear fuel is made of solid ceramic pellets of enriched uranium that are sealed in strong metal tubes. *See* Nuclear Waste Explained: Spent Nuclear Fuel, U.S. DEP'T OF ENERGY, OFFICE OF CIVILIAN RADIOACTIVE WASTE MGMT., *available at* http://www.ocrwm.doe.gov/ (last visited Mar. 31, 2006). The tubes are bundled together to form a nuclear fuel "assembly." *Id.*

[21] The ISFSI constructed at the Rancho Seco site contains twenty-two storage modules, divided into two sides, with eleven horizontal storage modules on each side. *See* TR 144-45. The ISFSI has concrete bunkers that shield the canisters and vents for cooling purposes. *Id.* Although SMUD filled 493 spent fuel assemblies into twenty-one canisters, the ISFSI was designed and constructed to house twenty-two storage modules. *See* TR 145. SMUD plans to use the twenty-

public health and safety issues associated with the transfer of spent nuclear fuel, SMUD was involved with extensive advanced training and preparation prior to this transfer. *See* TR 1027-28. In August 2002, SMUD completed loading all canisters and transported them to the ISFSI. *See* DX 2000 ¶ 34; *see also* TR 668.

II. PROCEDURAL HISTORY OF THIS CASE.

A. On June 9, 1998, The Sacramento Municipal Utility District Filed Suit For Partial Breach In The United States Court Of Federal Claims.

On June 9, 1998, SMUD filed a Complaint in the United States Court of Federal Claims alleging: breach of contract (Counts I and II), illegal exaction (Count III), and violation of the Just Compensation Clause of the Fifth Amendment of the United States Constitution (Counts IV and V). The case was assigned to the Honorable Robert J. Yock.

On January 23, 2001, the Government filed a Motion to Reassign the SNF-Related Cases to a Single Judge. On May 21, 2001, then-Chief Judge Baskir designated the Honorable John P. Wiese, Senior Judge, as Managing Judge, to meet with the parties of all pending spent nuclear fuel cases to consider whether consolidation, joint handling of discovery, or other pre-trial dispositive motions was required. On June 14, 2001, Senior Judge Wiese convened a hearing, at which the parties were directed to file a Joint Order with the initial judge assigned to adjudicate the merits of proposed consolidation and/or joint handling of discovery, in light of recent United States Court of Appeals for the Federal Circuit decisions in: *Maine Yankee Atomic Co.* v. *United States*, 225 F.3d 1336, 1342 (Fed. Cir. 2000) (holding that DOE's "breach involved all the utilities that had signed the contract - - the entire nuclear electric industry."); *Northern States Power Co.* v. *United States*, 224 F.3d 1361, 1367 (Fed. Cir. 2000) (holding that "the unavoidable delays provision deals with delays arising after performance of the contract has begun, and does not bar a suit seeking damages for the government's failure to begin performance at all by the statutory and contractual deadline of January 31, 1998.").

On July 10, 2001, the Government filed a Joint Motion for an Order Coordinating Discovery in each pending spent nuclear fuel case. On July 18, 2001, SMUD filed a Motion for Leave to File

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second module to store any high level, Greater Than Class C ("GTCC") waste that may result from final decommissioning. *Id.*; *see also* TR 693, 800; DX 1365.

[22] SMUD has at least ten SNF assemblies that are "damaged," *i.e.*, these assemblies have "known or suspected cladding defects greater than [a] harline crack[] or [a] pinhole leak[.]" *Compare* DX 1108 at 1; TR 683-85, 799 (Rancho Seco Plant Manager: noting that SMUD has ten "damaged" assemblies), *with* DX 2001 ¶ 63 (The Government's Nuclear Engineering Expert estimated: "SMUD is in possession of at least 12 failed fuel assemblies[.]"). SMUD has filled ten "damaged" assemblies into the twenty-first module in a canister that was specially designed to accommodate such fuel. *See* TR 685-86; *but see* DX 2001 ¶ 63 (assuming that SMUD has twelve failed assemblies, two of these assemblies improperly are contained in non-failed fuel casks).

a Proposed Liability Order with Judge Yock. On August 1, 2001, Judge Yock granted SMUD's motion and ordered the Government to show cause why a liability order should not be entered on August 17, 2001. Judge Yock also issued an Order lifting any pending stay and designated the Honorable Diane Gilbert Sypolt nee Weinstein to preside over the discovery phase of the proceeding. On August 17, 2001, the Government filed a Response. On August 24, 2001, SMUD filed a Reply.

On September 26, 2001, Judge Sypolt issued an Order granting the Government's Joint Motion for an Order Coordinating Discovery in all spent nuclear fuel cases. On November 27, 2001, the Government moved to dismiss Count IV (Taking Without Just Compensation: Vested Contract Rights) and Count V (Taking Without Just Compensation: Real Property) for failure to state a claim. On December 13, 2001, the Government moved to dismiss Count III (Illegal Exaction). On December 16, 2002, SMUD filed Response stating that SMUD did not oppose the Government's Motion to Dismiss Count III, but argued that the claims asserted in Counts IV and V under the Fifth Amendment of the United States Constitution were viable. On January 31, 2003, the Government filed a Reply. On April 17, 2003, the case was reassigned to the Honorable Emily C. Hewitt.

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On August 15, 2003, the case was reassigned to the undersigned judge. On December 15, 2003 and February 25, 2004, the court convened status conferences with the parties. On March 23, 2004, the court entered a Scheduling Order. On July 15, 2004, the court convened another status conference and on July 28, 2004, entered an Amended Scheduling Order. On July 30, 2004, the court issued a Memorandum Opinion and Order denying the Government's November 27, 2001 Motion to Dismiss Counts IV and V, granting the Government's Motion to Dismiss Count III, and granting SMUD thirty days to Amend the June 9, 1998 Complaint to conform with the court's rulings. *See Sacramento Mun. Util. Dist.* v. *United States*, 61 Fed. Cl. 438, 443 (Fed. Cl. 2004). On August 30, 2004, SMUD filed an Amended Complaint. On September 23, 2004, the court granted the Government's request to file a supplemental brief on the issue of liability.

On September 27, 2004, the parties entered into a Stipulation to afford SMUD the opportunity to obtain an adjudication of costs incurred from January 1, 1992 through December 31, 2003 claimed to be caused by the January 31, 1998 partial breach, but preserving SMUD's ability to seek any additional costs incurred after December 31, 2003, consistent with applicable statutes of limitation. *See Indiana Michigan*, 422 F.3d at 1376-77 ("Because [plaintiff's] claim is premised upon the [G]overnment's partial breach, [plaintiff's] damages were limited to those costs incurred prior to the date of its suit. [The plaintiff] can, however, obtain recovery for post-breach damages as they are incurred."); RESTATEMENT (SECOND) OF JUDGMENTS § 26(1)(a), (b). On October 15, 2004, the Government filed a Supplemental Response to SMUD's Motion for Leave to File a Proposed Liability Order, under seal. On October 29, 2004, SMUD filed a Reply.

On January 19, 2005, the court issued a Memorandum Opinion and Order determining that the Government's failure to commence performance on January 31, 1998, as required by the June 14, 1983 Standard Contract, was a partial breach of contract. *See Sacramento Mun. Util.*

Dist. v. *United States*, 63 Fed. Cl. 49 (Fed. Cl. 2005). The court did not reach the issue of what damages, if any, were caused by that breach.

On March 21-25, 2005 and March 28, 2005-April 1, 2005, the court held an evidentiary hearing to determine whether plaintiff was entitled to damages as a result of that breach.[23]

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[23] On April 21, 2005, the court issued a Memorandum Opinion and Order to Show Cause why the Standard Contract was not void, under the doctrine of mutual mistake, as set forth in RESTATEMENT (SECOND) OF CONTRACTS § 152 (1981), and why restitution should not be awarded from the Nuclear Waste Fund, 42 U.S.C. § 10222(c)(1)-(3). *See Sacramento Mun. Util. Dist.* v. *United States*, 65 Fed. Cl. 180 (Fed. Cl. 2005). The court ordered the parties to file briefs and invited any interested entities to file *amicus curiae* briefs. On July 7, 2005, the Government filed a Response to the Show Cause Order, arguing that the doctrine of mutual mistake was not applicable, restitution was not an appropriate remedy, and the court did not have authority to order restitution from the Nuclear Waste Fund. Likewise, on July 7, 2005, SMUD filed a Response, in effect, supporting the Government's position.

On June 20, 2005, the Consumers Energy Company filed an *amicus curiae* brief in support of SMUD's position. On July 7, 2005, thirteen plaintiffs in similar breach of contract actions in the United States Court of Federal Claims filed a joint *amicus curiae* brief also supporting SMUD. On July 7, 2005, twenty-four utility plaintiffs in similar breach of contract actions in the United States Court of Federal Claims also filed a joint *amicus curiae* brief also supporting SMUD. In addition, on July 7, 2005, the National Association of Regulatory Utility Commissioners, joined by the Alabama Public Service Commission, the Public Service Commission of the State of New York, the North Dakota Public Service Commission, the North Carolina Utilities Commission, and the Minnesota Public Utilities Commission filed an *amicus curiae* brief in support of SMUD.

Since SMUD has declined to amend the Complaint to seek restitution, based on the doctrine of mutual mistake, the court will not impose an equitable remedy on a party that insists on a remedy at law. The court, however, is of the opinion that this case presents a classic example of mutual mistake and that restitution would be a much more efficient, fair, and final resolution of the Government's breach. The State of Nevada submitted an important *amicus* brief on July 7, 2005 that catalogued many of the scientific, regulatory, and legal issues that have and will continue to impede the implementation of the Nuclear Waste Policy Act of 1982 for at least the next quarter century. Since the United States Court of Appeals for the Federal Circuit has recognized that private utilities may attempt to fund the costs of interim storage of spent nuclear fuel via mitigation damage claims, the court is obliged to proceed in that manner, given the status of the Complaint. *See Indiana Michigan*, 422 F.3d at 1377 (quoting RESTATEMENT (SECOND) OF JUDGMENTS § 26 cmt. g (1982)) ("[A]lthough [a] breach is material, the plaintiff may elect to treat it as being merely a partial breach. If [the plaintiff] so elects, [plaintiff] is entitled to maintain an action for damages sustained from breaches up to the time of the institution of the action, and the judgment does not preclude a further action . . . for a breach occurring after that date."). The prospect of continuing to issue rolling damage awards *ad infinitum* for interim storage costs, however, falls far short of resolving the

B. On February 17, 2005, The Sacramento Municipal Utility District Claimed Damages Of $21,553,462.00 For Costs Incurred From 1992 Through 1997 For The Dry Storage Project.

Initially, SMUD claimed $22,308,342.00 for costs incurred from January 1, 1992 through December 31, 1997 on the dry storage project. *See* PX 1000; *see also* Pl. PFF ¶ 199. These costs include: $12,112,865.00 for outside services and vendor contracts; $3,737,099.00 for internal labor; $3,399,284.00 for materials. *See* Pl. PFF ¶¶ 202, 205-06. Prior to the evidentiary hearing, SMUD discovered a double-counting error of approximately $2 million. *Id.* ¶ 280. On November 5, 2004, SMUD notified the Government of that error. *See* Gov't Resp. to Pl. PFF ¶ 281. SMUD corrected the error and deducted approximately $2 million, prior to filing the February 17, 2005 Pre-Trial Memorandum of Contentions of Fact and Law. *See* Pl. Mem. at 5; 59-60; *see also id.* ¶ 282; TR 1049-50. Wherein SMUD conceded that an additional $754,880.00, incurred for gantry crane refurbishment[24] and spent fuel inspection, also should be offset. *See* Pl. Mem. at 59-60; *see also* Pl. PFF ¶ 200. Accordingly, SMUD now seeks $21,553,462.00 for costs incurred on the dry storage project from January 1, 1992 through December 31, 1997. *See* Pl. PFF ¶¶ 5, 200; PX 1000. The following chart summarizes these costs:

"national problem" that Congress identified in 1982 as being "created by the accumulation of (A) spent nuclear fuel from nuclear reactors; and (B) radioactive waste from . . . reprocessing spent nuclear fuel[.]" 42 U.S.C. § 10131(a)(2). Both Congress and Department of Energy bear joint responsibility for failure to resolve this problem. A re-examination of the 1982 Act and a global resolution, based on sound science and commercial certainty required both by the domestic nuclear power industry and the public, are needed to resolve this "national problem," instead of continuing the *status quo* of litigating *ad hoc* damage claims and appeals.

[24] A gantry crane is "similar to an overhead crane except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway." 29 C.F.R. § 1910.179(a)(6). SMUD's gantry crane, was purchased to service the turbine generator, but subsequently was used for handing cask transfers in and out of the spent fuel building. *See* TR 1043. SMUD's gantry crane had a hook weight capacity of approximately 100 tons. *See* TR 2594; *see also* DX 381. SMUD refurbished the crane to strengthen the capacity to 130 tons. *See* DX 389 at SMUD-0019613; *see also* TR 1043-44, 2594.

Category	Amount
Expenses	
Outside Services	$12.1 million
Labor	$3.7 million
Materials	$3.4 million
Indirect Labor / Other	$3.1 million
Offsets	($750,000.00)
TOTAL	$21.5 million

Pl. PT Br. at 42.

C. On February 17, 2005, The Sacramento Municipal Utility District Claimed Damages Of $55,049,870.00 For Costs Incurred From 1998 Through 2003 For The Dry Storage Project.

SMUD also initially claimed $56,249,870.00 for costs incurred from January 1, 1998 through December 31, 2003 on the dry storage project. *See* PX 1000; *see also* Pl. PFF ¶ 212. These costs include: $42,260,138.00 for outside services and vendor contracts; $10,074,941.00 for internal labor; $1,123,960.00 for materials. *See* Pl. PFF ¶¶ 215, 231-32. In the February 17, 2005 Pre-Trial Memorandum of Contentions of Fact and Law, SMUD conceded that $1,200,000.00, attributed to: an upgrade to the spent fuel building; on-site drop mitigation; and a loan workout credit, should be offset. *See* Pl. Mem. at 59-60; *see also id.* ¶ 248. Accordingly, SMUD now seeks $55,049,870.00 for costs incurred from 1998 through 2003 on the dry storage project. *See* Pl. PFF ¶ 5; *see also* PX 1000. The following chart summarizes these costs:

Category	Amount
Expenses	
Outside Services	$42.3 million
Labor	$10.1 million
Materials	$1.1 million
Indirect Labor / Other	$2.75 million
Offsets	($1.2 million)
TOTAL	$55.05 million

Pl. PT Br. at 43.

On August 22, 2005, SMUD filed a Post-Trial Brief and Proposed Findings of Fact. On September 20, 2005, the Government filed a Post-Trial Brief and Proposed Findings of Fact. On October 4, 2005, the Government filed a Response to SMUD's Proposed Findings of Fact. On October 18, 2005, SMUD filed a Response to the Government's Post-Trial Brief. On November 1, 2005, SMUD filed a Response to the Government's Proposed Findings of Fact.

III. DISCUSSION.

A. Jurisdiction.

The United States Court of Federal Claims has "jurisdiction to render judgment upon any claim against the United States founded either upon the Constitution, or any Act of Congress or any regulation of an executive department, or upon any express or implied contract with the United States, or for liquidated or unliquidated damages in cases not sounding in tort." 28 U.S.C. § 1491(a)(1). The Tucker Act, however, is only a "jurisdictional statute; it does not create any substantive right enforceable against the United States for money damages." *United States* v. *Testan*, 424 U.S. 392, 398 (1976). Therefore, in order to pursue a substantive right, a plaintiff must identify and plead an independent contractual relationship, constitutional provision, federal statute, and/or executive agency regulation that provides a substantive right to money damages for the court to have jurisdiction. *See Todd* v. *United States*, 386 F.3d 1091, 1094 (Fed. Cir. 2004) ("[J]urisdiction under the Tucker Act requires the litigant to identify a substantive right for money damages against the United States separate from the Tucker Act."); *see also Roth* v. *United States*, 378 F.3d 1371, 1384 (Fed. Cir. 2004) ("Because the Tucker Act itself does not provide a substantive cause of action, . . . a plaintiff must find elsewhere a money-mandating source upon which to base a suit."); *Kahn* v. *United States,* 201 F.3d 1375, 1377 (Fed. Cir. 2000) (quoting *James* v. *Caldera*, 159 F.3d 573, 580 (Fed. Cir. 1998) ("[T]he plaintiff 'must assert a claim under a separate money-mandating constitutional provision, statute, or regulation, the violation of which supports a claim for damages against the United States.'").

The court has jurisdiction over SMUD's damage claims, because a contractual relationship between SMUD and the Government properly was pled. *See Sacramento Mun. Util. Dist.*, 63 Fed. Cl. at 500; *see also Trauma Serv. Group* v. *United States*, 104 F.3d 1321, 1325 (Fed. Cir. 1997) ("To show jurisdiction . . . [Plaintiff] must show that either an express or implied-in-fact contract underlies its claim.").

B. Standing.

Federal trial courts should "decide standing questions at the outset of a case. That order of decision (first jurisdiction, then the merits) helps better to restrict the use of the federal courts to those adversarial disputes that Article III defines as the federal judiciary's business." *Steel Co.* v. *Citizens for a Better Env't*, 523 U.S. 83, 111 (1998) (Breyer, J. concurring). The party invoking federal jurisdiction, however, has the burden of proof and persuasion to satisfy the constitutional requirements of Article III standing. *See FEW/PBS, Inc.* v. *Dallas*, 493 U.S. 215, 231

(1990) (holding that the burden is on the party seeking to exercise jurisdiction clearly to allege facts sufficient to establish jurisdiction).

In this case, the court previously has determined that SMUD satisfied standing required to assert contract claims and claims under the Just Compensation Clause of the Fifth Amendment of the United States Constitution. *See Sacramento Mun. Util. Dist.*, 63 Fed. Cl. at 500-01 ("As a signator and intended beneficiary of the June 14, 1983 Standard Contract, SMUD has established privity . . . . The court [also] has determined that SMUD has standing to bring this action to pursue a claim based on the takings clause."). The constitutional claims were stayed until a final adjudication of SMUD's contract claims is made.

C. Causation.

1. Governing Precedent.

The United States Court of Appeals for the Federal Circuit recently held, in a similar case premised on a partial breach of the Standard Contract, that the appropriate remedy is "damages sufficient to place the injured party in as good a position as it would have been had the breaching party fully performed." *Indiana Michigan*, 422 F.3d at 1373 (citing *San Carlos Irrigation & Drainage Dist.* v. *United States*, 111 F.3d 1557, 1562 (Fed. Cir. 1997)). An injured party, however, only may recover damages where the breach was: "(1) *reasonably foreseeable* by the breaching party at the time of contracting; (2) the breach is a *substantial causal factor* in the damages; and (3) the damages are shown with *reasonable certainty*." *See Indiana Michigan*, 422 F.3d at 1373 (citing *Energy Capital Corp.* v. *United States*, 302 F.3d 1314, 1320 (Fed. Cir. 2002) (emphasis added)). Although damages "need not be ascertainable with absolute exactness or mathematical precision[,] recovery for speculative damages is precluded." *Id.* (citing *San Carlos Irrigation*, 111 F.3d at 1563) (internal quotations omitted, alteration in original).

Where a claim arises from a partial breach, the non-breaching party's damages are limited only to costs up to the time of trial. *Id.* at 1376-77 ("If the breach is partial only, the injured party may recover damages for nonperformance only to the time of trial and may not recover damages for anticipated future nonperformance." (emphasis, quotations, and citations omitted)). The non-breaching party, however, may recover post-breach damages as they are incurred. *Id.* at 1377 ("When a party sues for partial breach, it retains its right to sue for damages for its remaining rights to performance.").

a. "Reasonable Foreseeability."

The plaintiff in an action for breach of contract damages must establish that any losses incurred as a result of a partial breach of contract reasonably were foreseeable by the defendant when the contract was executed. *See Indiana Michigan*, 422 F.3d at 1373; *see also* RESTATEMENT (SECOND) OF CONTRACTS § 351(1) ("Damages are not recoverable for loss that the party in breach did not have reason to foresee as a probable result of the breach *when the contract was made*.")

(emphasis added). The RESTATEMENT (SECOND) OF CONTRACTS explains that a "[l]oss may be foreseeable as a probable result of a breach because it follows from the breach (a) in the ordinary course of events, or (b) as a result of special circumstances, beyond the ordinary course of events, that the party in breach had reason to know." *Id.* § 351(2).

b. "Substantial Causal Factor."

The United States Court of Appeals for the Federal Circuit has held that the plaintiff has the burden to establish a "substantial causal factor," connecting a partial breach to any costs incurred. *See Indiana Michigan*, 422 F.3d at 1373 (citing *Energy Capital*, 302 F.3d at 1320). In other words, there must be a direct causal relationship between the breach and any claimed losses. *See Bluebonnet Savings Bank, F.S.B.* v. *United States*, 266 F.3d 1348, 1356 (Fed. Cir. 2001) ("the breach . . . was a *substantial factor* in [the] . . . costs [claimed]" (emphasis added)).

In *Indiana Michigan Power Co.* v. *United States*, 60 Fed. Cl. 639 (Fed. Cl. 2004), the plaintiff entered into a Standard Contract with DOE. *Id.* at 640-41. Thereafter, the plaintiff sued the Government for partial breach, claiming the costs incurred to mitigate the partial breach as damages, including those for: re-racking;[25] an advanced purchase agreement for dual-purpose storage containers; investment in a consortium to build a private SNF storage facility; and associated engineering and staffing. *Id.* at 648, 655-59. After trial, the United States Court of Federal Claims held that the plaintiff's decision to re-rack SNF was not caused by the Government's partial breach. *Id.* at 664. Instead, the trial court found that decision "was made for sound business reasons." *Id*. Likewise, the trial court found that the plaintiff failed to establish that the decision to enter into an advanced purchase agreement was caused by the Government's breach, because the plaintiff "had an equity interest in the System, and may have made the investment anyway." *Id.* at 658. In addition, the trial court found that the plaintiff failed to prove that the engineering and staffing costs associated with dry storage were linked to the breach. *Id.* at 659. Recovery of expenses incurred in connection with the private fuel storage facility consortium also was denied, because the trial court found that the Government could not have foreseen such an expense. *Id.*

The United States Court of Federal Claims' decision that pre-breach costs claimed as damages "were not caused by any anticipated DOE delay in performance[,]" was affirmed on appeal, because the costs claimed were authorized six years prior to the Government's partial breach of the Standard Contract, "in the normal course of business." *See Indiana Michigan*, 422 F.3d at 1376; *see also Indiana Michigan*, 60 Fed. Cl. at 664 (explaining that Government "statements in the late 1980's expressing doubt that DOE would meet the 1998 deadline did not rise to the level of repudiation.").

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[25] "Re-racking" is a process whereby the existing SNF racks in a wet pool are removed and replaced with racks that allow for higher storage capacity. *See* Designations App. at 14 (Apr. 22, 2002 Barrett Dep.); *see also Tennessee Valley Auth.* v. *United States*, 69 Fed. Cl. 515, 521 n.7 (Fed. Cl. 2006).

c. "Reasonable Certainty."

In addition, the United States Court of Appeals for the Federal Circuit has held that the injured party bears the burden of establishing that any costs incurred because of an alleged breach of contract were made with "reasonable certainty." *See Indiana Michigan*, 422 F.3d at 1373 (citing *Energy Capital*, 302 F.3d at 1320); *see also* RESTATEMENT (SECOND) OF CONTRACTS § 352 ("Damages are not recoverable for loss beyond an amount that the evidence permits to be established with reasonable certainty.").

2. The Court's Determination Of Causation In This Case.

a. "Reasonable Foreseeability" Was Established, In Part.

On June 14, 1983, when DOE executed the Standard Contract with SMUD, it was a matter of public record that nuclear utilities in the United States had growing SNF inventory.[26] In addition,

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[26] *See* CONGRESSIONAL BUDGET OFFICE, U.S. CONGRESS, FINANCING RADIOACTIVE WASTE DISPOSAL, at 1 (Sept. 1982) ("[N]uclear electric utilities have been accumulating spent fuel which is stored in on-site interim facilities. . . . Many of these nuclear-powered utilities are now running out of interim storage space[.]"); COMMITTEE ON ENERGY AND COMMERCE, NUCLEAR WASTE POLICY ACT OF 1982, H.R. REP. NO. 97-785, pt. 1, at 47 (1982) ("The pools to store the fuel at those reactors were designed with sufficient capacity to accommodate only several years of spent fuel discharge. . . . [T]he spent fuel is accumulating in the storage pools at the site of reactors. The storage pools at many reactors are approaching the limits of their original design. Without a place in which a utility can store spent fuel bundles, which must be done an average of once a year during refueling, operation of the reactor must terminate."); OFFICE OF TECH. ASSESSMENT, U.S. CONGRESS, MANAGING COMMERCIAL HIGH-LEVEL RADIOACTIVE WASTE, at 9 & 25 (Apr. 1982) ("[E]xisting reactors are running out of spent fuel storage space, and by 1986 some may face a risk of shutting down for some period if there are delays in efforts to provide additional storage capacity."); 128 CONG. REC. 32,947 (1982) (Rep. Udall: discussing the accumulation of spent fuel rods and the need for a national disposal solution); SEN. HART, NATIONAL NUCLEAR WASTE REGULATION AND CONTROL ACT OF 1980, S. REP. NO. 96-871, at 1 (1980) ("[C]ivilian nuclear powerplants have generated nearly 8000 metric tons of spent fuel, stored primarily in pools at the powerplant site. . . . This bill recognizes that the development of a safe and timely solution to the problem of nuclear waste disposal is essential."); SEN. JOHNSON, THE NUCLEAR WASTE POLICY ACT, S. REP. NO. 96-548, at 10-11 (1980) (noting the buildup of spent nuclear fuel at commercial reactor sites and the absence of a coordinated solution to deal with this growing problem); *see also* Designations App. at 1130-31 (May 22, 2002 Klein Dep.) (Manager of DOE's Richland, Washington Field Office and former Director of DOE's Storage Division: testifying that the rate at which utilities were discharging spent fuel, *at the time the NWPA* [in 1982] was enacted, was a national problem, "you'd want the system to be able to at least curtail buildup . . . to receive as - - as much as was being discharged. To reduce the buildup, the legacy, you'd have to receive at a rate faster than what is being generated."); *see also id.* at 1120 (Klein Dep.) (testifying that *prior to the passage of the*

by that time, dry storage was considered a viable alternative to wet storage.[27] There is no evidence in the record, however, that the Government anticipated or was aware on June 14, 1983 that any breach of the Standard Contact might require the Government to be responsible for the cost of "dual-

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NWPA, "[i]t was recognized that . . . there were considerable uncertainties in terms of when they would be able to open a geologic repository, and there were near-term needs for storage at reactor sites that - - the pools were filling up." (emphasis added)).

[27] *See* OFFICE OF TECH. ASSESSMENT, U.S. CONGRESS, MANAGING COMMERCIAL HIGH-LEVEL RADIOACTIVE WASTE, at 22 (Apr. 1982) (explaining that dry storage technologies are "potentially much more flexible, quicker to implement, and less expensive for at-reactor use than water basins, and may even be less expensive than large-scale centralized storage[.]"); REP. STAGGERS, NUCLEAR WASTE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1980, H.R. REP. NO. 96-1156, pt. 3, at 27 (1980) ("Although wet storage is a proven and accepted technology, there is growing evidence that dry storage may have significant cost advantages."); 128 CONG. REC. 28,040 (1982) (Rep. Kemp: "Fuel rod consolidation, and even more dry storage techniques, now offer onsite storage alternatives that are much cheaper than constructing an interim storage facility[.]"); 128 CONG. REC. 27,780 (1982) (Rep. Ottinger: "The NRC testified before our committee that dry storage technologies could be approved within 1 year[.]"); SEN. HART, NATIONAL NUCLEAR WASTE REGULATION AND CONTROL ACT OF 1980, S. REP. NO. 96-871, at 11 (1980) (noting that the Office of Technology Assessment advised Senator Hart that dry storage technologies "possess 'significant potential advantages . . . in terms of low front-end costs, relatively short lead times for implementation, and ability to expand incrementally as needed.'"); SEN. UDALL, NUCLEAR WASTE POLICY ACT OF 1982, H.R. REP. NO. 97-491, pt. 1, at 38-40 (1982) (Letter to Rep. Butler Derrick, from Mr. Franklin E. Coffman, Deputy Assistant Secretary for Nuclear Waste Manager and Fuel Cycle Programs, Office of Nuclear Energy: "The Department of Energy's (DOE) spent fuel storage program activities concentrate on the support of utility license applications for rod consolidation and dry storage in casks, drywells, and silos. We believe these alternative storage technologies have the potential to safely and efficiently meet the interim spent fuel storage needs of commercial domestic reactors."); *see also* Designations App. at 1118-20 (Klein Dep.) (testifying that, prior to the passage of NWPA in 1982, DOE was "establishing a program to demonstrate the viability and licensing basis for dry cask storage at reactor sites[.]"); PX 50 at PNL1731284 (Sept. 15, 1983 DOE Memorandum re: "Mission Plan Strategy:" "If by 1994, it is known that the first repository will be delayed . . . DOE will take title to the spent fuel, have it placed in dry storage casks and pay a rental fee to the utility to store the casks on-site at the reactor.") Designations App. at 1977-83 (Mar. 21-22, 2002 Morgan Dep.) (Former Director of the Nuclear Waste Project Office: testifying about a December 12-15, 1983 meeting where it was assumed that a utility could use dry storage for SNF until DOE's acceptance); PX 70 at PNL1173152 (Apr. 26, 1984 Battelle (DOE consultant) Memorandum: "In the event of a one to three year lag in the 1998 deadline for a geologic repository, the Department of Energy is considering taking title to spent fuel at commercial reactor sites and storing it in casks at the sites . . . . [The] Acting Director of Management for the [N]uclear [W]aste [P]rogram revealed this strategy to an Atomic Industrial Forum Conference in Atlanta.").

purpose" dry storage. At the time, the NRC was more than a decade away from issuing the requisite licence for a utility to implement a "dual-purpose" system. *Compare* DX 164, *with* TR 190; *see also supra* note 27.

For these reasons, the court has determined that SMUD established that it was "reasonably foreseeable" to DOE, on June 14, 1993, that if performance could not be commenced by January 31, 1998, SMUD would be required to make interim arrangements to store the SNF. The record establishes that DOE could have foreseen that such interim arrangements might involve dry storage, but not "dual-purpose" dry storage.

b. "Substantial Causal Factor" Was Established, In Part.

From January 1, 1992 through December 31, 2003, SMUD claims to have incurred costs in the amount of $78,558,212.00 for the "dual-purpose" dry storage project implemented to mitigate the Government's January 31, 1998 breach. *See* Amend. Compl. ¶¶ 37, 62; *see also* Sept. 27, 2004 Joint Stipulation ¶ 6(a).

The Government counters that SMUD cannot establish that DOE's alleged breach of the Standard Contract imposed any costs on SMUD, because SMUD decided to place the SNF in storage prior to, and independent of, the Government's January 31, 1998 breach. *See* Gov't PT Br. at 8 (asserting that SMUD's June 7, 1989 decision to cease production of energy using nuclear fuel and March 30, 1990 authorization to utilize "dual-purpose" dry storage was made for reasons "wholly unrelated" to the Government's subsequent nonperformance); *see also id.* at 7-42. At the evidentiary hearing, the Government's expert, Mr. Cliff Hamal,[28] testified that SMUD is not entitled to recover costs associated with "dual-purpose" dry storage, because SMUD's Board's March 30, 1990 authorization was made without knowledge of the Government's subsequent breach, eight years later on January 31, 1998. *See* DX 2004 ¶¶ 71, 80. Mr. Hamal's analysis was based on a "but for" causation standard. *Id.* ¶¶ 80-81 ("SMUD's claim of damages associated with the costs of dry storage is not appropriate because SMUD would have pursued dry storage absent the breach. . . . [T]his conclusion results in reducing the damages due to the breach to zero[.]"). The United States Court of Appeals for the Federal Circuit, however, requires that a plaintiff need only demonstrate a "substantial causal factor," a lesser standard than the "but for" standard. *Compare Indiana Michigan*, 422 F.3d at 1373 (citing *Energy Capital*, 302 F.3d at 1320), *with California Fed. Bank*, 395 F.3d at 1268 (holding that the more rigorous "but for" causation standard, rather than the "substantial factor" standard, is applied to a claim for lost profits).

[28] The Government proffered Mr. Cliff Hamal as an expert in "business decision-making [in the electric industry] and economic analysis, as well as the analysis of damages claim in the electricity industry." TR 2825. Although SMUD objected, the court deems Mr. Hamal an expert, as proffered. *See* FED. R. EVID. 702.

In this case, the record evidences that SMUD's had three objectives in decommissioning the Rancho Seco site, *i.e.*, "to try to get the fuel in the safest mode,"[29] to do so at the "lowest cost,"[30] and to transfer the SNF into "DOE's hands as soon as possible."[31] TR 150-52 (footnotes added).

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[29] Regarding safety, on a "relative basis," dry storage was considered to be safer than wet storage, although SMUD's Assistant General Manager testified that both were "considered safe storage modes by the NRC." TR 265.

[30] As for costs, on January 18, 1990, S. Levy, Inc. issued a Phase I Study concluding:

> The most certain approach is continued storage in the spent fuel pool until disposal in the permanent DOE repository (now scheduled at the earliest for 2010); this option complicates station decommissioning and repowering options. Storage in the spent fuel pool . . . [is] the lowest capital cost option[] and ha[s] predictable annual operating costs; but th[is] option necessitate[s] making a 1-2 year backend loading-to-shipping-cask and facility dismantling campaign in the indefinite future. Storage in transportable casks offers the best opportunity explored to keep open the possibility of early off-site shipment, possibly as early as 1998 should DOE develop a[n] . . . MRS. Under such circumstances, transportable storage casks would involve the lowest overall cost and become the preferred option.

DX 202 at SMUD-0019260; *see also* TR 172 (SMUD's Assistant General Manager for Energy Supply: "What dry storage offered was a cheaper way of dealing with storage of the fuel[.]"); TR 264 (confirming abandoning the wet pool would decrease the amount of SMUD staff); TR 619 (recognizing that dry storage was "the least cost.").

By placing SNF into dry storage, SMUD decided that it could decommission the wet pool and significantly decrease staff and reduce associated costs. *See* TR 264, 567, 833. In fact, at an October 3, 1991 Public Hearing, SMUD's Spent Fuel Disposition Manager advised SMUD's Board:

> If you look at the fact that a[n] . . . [MRS] isn't projected until 1998, with a repository until 2010, and it will take DOE approximately ten years to accept all of SMUD's fuel, the cost savings can range somewhere between $60 to $156 million over the lifetime of decommissioning. . . . [T]hese are the major cost savings - - utility staff reductions, ISFSI support - - which are your certified fuel handler type people instead of licensed operators - - the insurance, and also your water processing costs. These are your major areas of savings.

DX 274 at SMUD-0027436.

[31] *See* DX 164 ("Transfer of Rancho Seco's spent fuel into . . . casks would allow for shipment of the fuel by 1998 if a storage site is identified by DOE by that date. If no site is available

Accordingly, after deciding to close the nuclear generating plant, SMUD commissioned a study on January 25, 1990 to evaluate the costs and benefits of utilizing "dual-purpose" dry storage to store SMUD's SNF. *See* DX 202 at SMUD-0019248-49-51 (July 18, 1990 S. Levy, Inc. Assessment and Development of Rancho Seco's Dry Fuel Storage Policy, advising that on January 25, 1990, SMUD's management commission a two-month study regarding the disposition of SNF from shut down, to an on-site wet or dry storage). On March 30, 1990, SMUD's Board confirmed that utilizing "dual-purpose" dry storage would provide the best chance of persuading DOE to accept SMUD's SNF by 1998, when a storage site was identified by DOE. *See* DX 164 at SMUD-0029491-92; DX 202 at SMUD-0019251; DX 274 at SMUD-0027473 (Oct. 3, 1991); *see also* TR 150-52, 172-73, 345-46, 617, 1070-71. In other words, SMUD decided that the sooner DOE arrived at the Rancho Seco site to dispose of the SNF, the sooner SMUD would be able to complete decommissioning the plant.

In 1995, however, DOE announced that it would not begin acceptance of SNF in 1998 as planned. *See* 60 FED. REG. 21,793 (May 3, 1995). Nevertheless, SMUD proceeded with the "dual-purpose" dry storage project. *See* TR 225, 566-68 (progress during 1994-95), 669-70 (progress during 1994-95), 2937; *see also* TR 152, 168-69, 172, 265-66, 325-26.

In December 1996, SMUD undertook an internal reevaluation of the "dual-purpose" dry storage project. *See* PX 500; PX 502; PX 503; PX 512; PX 513; PX 538 at SMUD-061112. At that time, it was not clear whether, or when, DOE would commence performance under the Standard Contract. *See* PX 500; *see also* PX 519 at SMUD-061380. SMUD considered nine different options, including abandoning the dry storage project and leaving SNF in the pool. *See* PX 519 at

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by 1998, it would still be possible for DOE to meet its original 1998 contractual obligation through interim acceptance of the spent fuel in the storage/transportation casks at the Rancho Seco site."). SMUD anticipated that DOE would dispose SNF under the Standard Contract, either at a federal repository or an MRS. *See, e.g.,* DX 248 at SMUD-0030074 (May 20, 1991 Rancho Seco Decommissioning Plan: "[T]his study presumes the availability of a Monitored Retrievable Storage (MRS) facility such that DOE can meet its obligation to begin receiving fuel by 1998."); DX 274 at SMUD-0027418-19 (Oct. 3, 1991 Public Hearing where SMUD's Decommissioning Project Manager advised SMUD's Board that: "For our high level waste, we're going to put the fuel assemblies in casks for a number of years, and wait for the Federal Mine Geological Repository [("FMGR")] to open. And currently, that's targeted somewhere in the neighborhood of the year 2010. However, there is currently a process going on to site and build something called a 'monitored retrievable storage facility' whereby we could take our canisters or fuel storage packs and have them temporarily reside until the [FMGR] is opened, and then they could be transferred."); DX 274 at SMUD-0027466 (SMUD's former Fuel Disposition Project Manager: "At this time, it is likely that an MRS could be sited by 1998[.]"); DX 481 at SMUD-0033398 (SMUD Public Workshop On Alternative Decommissioning Strategy Dec. 6 and 8, 1994: "DOE May Start Accepting Spent Fuel Between 1998 and 2013 - - Fourteen Year Queue for Rancho Seco, Once DOE Starts to Accept Spent Fuel - - SMUD Prepared to Store Spent Fuel Until 2027/Beyond"); *see also* TR 327, 440-41, 710, 1377.

SMUD-061378; *see also* PX 502. SMUD calculated a cost differential for each option as compared to the ongoing "dual-purpose" dry storage project. *See* PX 519 at SMUD-061379; *see also* PX 524 (March 3, 1997 SMUD Summary Review of Evaluation of Spent Nuclear Fuel Project Study). Based on that reevaluation, the Rancho Seco Plant Manager recommended to SMUD's Board that the "dual-purpose" dry storage project be continued:

> SMUD'S COUNSEL: How did your knowledge that the Department of Energy would not begin performing in 1998 affect your recommendation?
>
> MR. REDEKER: That was definitely a consideration relative to the option to store the fuel in the spent fuel pool. A key issue of storing in the pool is how long is it going to be in the pool? How big is that delta cost going to be over time? And at this point in 1997, it was a fact that they weren't showing up in '98. The 2010 date was in my mind very optimistic because I hadn't seen the kinds of progress that would need to be made. DOE had some specific milestones they had to reach, weren't being made. And that the 2010 date was in jeopardy as well. And that some date out in the late 2020s was my best estimate of when the fuel would be gone. So that played an important part in this. Had they been performing and saying, yes, we're coming in 1998 and that fuel will be gone by 2006, that would have changed the outcome of this entirely. It would have made the spent fuel pool an absolute certainty. They are coming, they are going to take it out of our pool, the risk will be gone. And I wouldn't have to worry about that, licensing of a transportation system, I wouldn't have to worry about whether they could manufacture the thing, if they had said I'm coming, we're going to perform.
>
> THE COURT: Do you consider yourself to be the person that was responsible for continuing on with dry storage? Did the buck stop with you on that?
>
> MR. REDEKER: The buck stopped with me relative to making the recommendation.

TR 619-21.

On May 15, 1997, SMUD's Board concluded that, despite expected delays in DOE's performance under the Standard Contract and persistent problems with outside contractors, continuing with the "dual-purpose" dry storage project was the most cost-effective option and switching to another vendor at this juncture was not in SMUD's best interest. *See* PX 519 at SMUD-061379; *see also* PX 502 at SMUD-0028999; PX 538.

The record evidences that, until May 14, 1997, SMUD's decision to authorize expenditures for "dual-purpose" dry storage was made for business reasons, and that the Government's subsequent January 31, 1998 breach of the Standard Contract was not a substantial causal factor in that decision. In 1989-1990, faced with the high cost of storing SNF a wet pool at a dormant nuclear plant for at least a decade, *i.e.*, until the Standard Contract obligated DOE to accept SNF, SMUD decided to

continue the "dual-purpose" dry storage project. *See* TR 152 (SMUD's Assistant General Manager for Energy Supply: "SMUD's primary objective at that time was to get the fuel off site as soon as we could in[to] to the DOE's hands."); *see also* TR 167-69 (explaining how closure of the wet pool saved SMUD $2.3 million per year), TR 265-66 (estimating that "dual-purpose" dry storage yielded $8-$12 million savings per year), TR 325-27 (confirming that "dual-purpose" dry storage would save $8 million per year, reducing expenditures from $10.6 million per year to $2.6 million per year, resulting in a savings of $60-$150 million over the course or lifetime of the decommissioning of Rancho Seco).

On May 15, 1997, the date SMUD's Board was presented with Mr. Redeker's recommendation, despite delays, cost overruns, and the bankruptcy of a major contractor, SMUD's Board decided to continue with "dual-purpose" dry storage, because it was the best option in light of DOE's performance under the Standard Contract likely would be delayed until 2010. *See* PX 519 at SMUD-061379; *see also* PX 502 at SMUD-0028999; TR 535, 597, 620. That decision was made in anticipation of the Government's subsequent January 31, 1998 breach of the Standard Contract, and, therefore, was a substantial causal factor in this decision. *Id.*

Accordingly, SMUD has not established by a preponderance of the evidence that the costs incurred by SMUD from January 1, 1992 to May 14, 1997 for the "dual-purpose" dry storage project were "substantially caused" by DOE's subsequent January 31, 1998 breach.[32] *See Indiana Michigan*, 422 F.3d at 1373. Therefore, the court has determined that the Government's January 31, 1998 breach was not a substantial factor in SMUD's decision to authorize the expenditure of costs for "dual-purpose" dry storage from March 1, 1990 to May 14, 1997. *Id.* The court, however, has determined that DOE's January 31, 1998 breach was a substantial causal factor in SMUD's May 15, 1997 decision to continue to authorize expenses for the "dual-purpose" dry storage project. *Id.*

c. "Reasonable Certainty" Was Established, In Part.

SMUD established that the $78,558,212.00 for costs incurred for "dual-purpose" dry storage from January 1, 1992 through December 31, 2003 were recorded in an automated accounting system that itemized costs by work order. *See* PX 1000 ¶¶ 3, 7-9, 20; *see also* TR 681, 1046. SMUD also established that a new work order was created for each project - - ultimately, creating nineteen specific work orders for the "dual-purpose" dry storage project. *See* PX 1000 ¶¶ 8, 9; *see also* TR 1050, 1233-34. For internal labor charges, SMUD employees recorded their hours to the corresponding work order. *See* PX 943; *see also* TR 1234. SMUD's accounting system had a variety of internal control policies and procedures designed to ensure that transactions were timely

[32] Since the court has determined that SMUD did not establish causation as to costs incurred during 1993-1995, the court does not need to reach the import of an August 27, 1993 Memorandum that suggests SMUD "backload[ed]" expenditures from 1993 to 1994 and 1995. *See* DX 425.

recorded and accurately reported. *See* PX 291, PX 1000 ¶ 9;[33] *see also* TR 674-77, 1046-48, 1234-35. In addition, SMUD assigned particular cost categories (*e.g.*, outside services, internal labor, materials), so that these costs could be summarized by category. *See* PX 1000 ¶ 8; *see also* TR 1233.

SMUD established with reasonable certainty that costs were incurred for "dual-purpose" dry storage from January 1, 1992 through October 31, 1999, *i.e.*, $32,393,262.00, and from November 1, 1999 through December 31, 2003, *i.e.*, $46,164,950.00. *See* PX 1000 ¶ 20.

The court, however, cannot ascertain with reasonable certainty the costs incurred from the period May 15, 1997 through November 1, 1999, since that data is not broken out. *Id.* The court also cannot ascertain with reasonable certainty costs that SMUD incurred for storage-only components of the dry storage system, *i.e.*, excluding "dual-purpose" transportable feature, for the period May 15, 1997 through December 31, 2003. Therefore, this information will need to be provided as set forth in the Order Requesting Supplemental Expert Testimony, issued herewith.[34]

D. Mitigation Costs For Partial Breach.

1. Governing Precedent Of Mitigation In This Case.

The law imposes a duty on an injured party to mitigate, *i.e.*, an injured party "cannot recover damages for loss that he could have avoided by *reasonable efforts*." *Robinson* v. *United States*, 305

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[33] At the evidentiary hearing, SMUD proffered expert testimony from Mr. Brian Brinig, a Certified Public Accountant and an expert on the costs that SMUD claims to have incurred from 1992 to 2003. *See* PX 1000; *see also* TR 1277 ("[W]e would proffer Mr. Brinig an expert in connection with the confirmation of SMUD's costs that were incurred in connection with this project and also in connection with certain cost issues raised by the government's, one of the government's expert witnesses."). The Government did not object to SMUD's proffer. The court deems Mr. Brinig an expert in the proffered areas. *See* FED. R. EVID. 702.

[34] The Government proffered Mr. Burford as an expert in "the management of nuclear capital projects, NRC regulatory compliance, fuel that exhibits radioactive leakage . . . , and claims preparation." TR 2548. Although SMUD objected to this proffer, *id.*, the court deems Mr. Burford an expert in the proffered areas. *See* FED. R. EVID. 702.

Mr. Burford, testified that, based on an analysis of the documents related to "dual-purpose" dry storage and his expertise, a "reasonable cost estimate for the major components of a dry storage-only system is $9,263,000 and SMUD should have incurred at least this amount if it had purchased a dry storage-only system in 1992." DX 2001 ¶ 123. Mr. Burford estimated the cost of the storage-only system was approximately $13.6 million, including $3.6 million for the ISFSI and related security costs and $.75 million for NUHOMS auxiliary equipment and other miscellaneous equipment." *Id.* ¶ 123 n.58. Mr. Burford's analysis, however, is not sufficient for the court to make a determination of the costs that SMUD would have incurred to purchase a storage-only system.

F.3d 1330, 1333 (Fed. Cir. 2002) (citing RESTATEMENT (SECOND) OF CONTRACTS § 350 cmt. b) (emphasis in original); *see also Tennessee Valley Auth.* v. *United States*, 69 Fed. Cl. 515, 522-23 (Fed. Cl. 2006) ("Where a party to a contract is put on notice by the other contracting party that it does not intend to perform under the contract, the non-breaching party has an obligation to take steps to avoid damage."). Therefore, if an injured party's efforts to mitigate damages from a breach are reasonable, they are recoverable. *See Indiana Michigan*, 422 F.3d at 1375 ("[W]e see no reason why efforts to avoid damages in contemplation of a partial breach should not also be recoverable."); *see also First Heights Bank, FSB* v. *United States*, 422 F.3d 1311, 1316-17 (Fed. Cir. 2005) (holding that alleged mitigation efforts were reasonable).

When mitigating damages, however, an injured party "must only make those efforts that are fair and reasonable under the circumstances." *Home Savings of Am.* v. *United States*, 399 F.3d 1341, 1353 (Fed. Cir. 2005) (citation omitted); *see also Robinson*, 305 F.3d at 1334 (holding that "reasonable efforts in the form of affirmative steps are required to mitigate damages and that relative costs in time and money are primary factors to consider in assessing reasonableness."). The RESTATEMENT (SECOND) OF CONTRACTS further explains that "[t]he injured party is not precluded from recovery . . . to the extent that he has made reasonable but unsuccessful efforts to avoid loss." *Id.* § 350(2). In actions before the United States Court of Federal Claims, the Government bears the burden of proving that actions to mitigate were unreasonable. *See Tenn. Valley Auth.*, 69 Fed. Cl. at 528.

Where a choice is required between two reasonable courses of action, the party that caused the injury may not complain that one course, rather than the other, was chosen. *See Koby* v. *United States*, 53 Fed. Cl. 493, 497 (Fed. Cl. 2002) (citing *In re Kellett Aircraft*, 186 F.2d at 197, 198-99 (3d Cir. 1950) ("The rule of mitigation of damages may not be invoked by a contract breaker as a basis for hypercritical examination of the conduct of the injured party, or merely for the purpose of showing that the injured person might have taken steps which seemed wiser or would have been more advantageous to the defaulter.") (selected citations omitted)); *accord Cuyahoga Metropolitan Housing Auth.* v. *United States*, 65 Fed. Cl. 534, 546-47 (Fed. Cl. 2005) (same).

The United States Court of Appeals for the Federal Circuit also has held that "the non-breaching party is not entitled, through the award of damages, to achieve a position superior to the one it would reasonably have occupied had the breach not occurred." *LaSalle Talman Bank, F.S.B.* v. *Unites States*, 317 F.3d 1363, 1371 (Fed. Cir. 2003) (quoting FARNSWORTH ON CONTRACTS § 12.8, at 193 (2d ed. 1998) ("No matter how reprehensible the breach, damages are generally limited to those required to compensate the injured party for lost expectation, for it is a fundamental tenet of the law of contract remedies that an injured party should not be put in a better position than had the contract been performed.")); *accord* FARNSWORTH ON CONTRACTS § 12.8 at 194 (3d ed. 2004) (same). Therefore, in addition to "reasonableness," the court also must determine whether alleged mitigation damages require an offset, so as not to put the injured party in a better position than if the breach had not occurred. *See, e.g., Tennessee Valley Auth.*, 69 Fed. Cl. at 533-543 (evaluating each of the Government's requested offsets to TVA's damage claim).

2. The Court's Determination.

a. SMUD May Recover Or Retain Certain Costs In This Case.

1. For Dry Storage.

The Government asserts that SMUD's decision to store SNF in dry storage was unreasonable, because it could, and should, have left SNF in the wet pool and "avoided the substantial capital costs . . . incurred in pursuing dual-purpose dry storage[.]" Gov't PT Br. at 66. According to the Government, SMUD would not have incurred any damages attributable to the Government's breach "until, at the earliest, 2007," had the SNF been left in the pool. *Id.*

The Government is correct that SMUD could have left SNF in the wet pool and sought to recover all resulting costs attributable to the Government's breach. The Government, however, is not correct in asserting that this option *ipso facto* renders SMUD's decision to utilize dry storage unreasonable. To the contrary, the record establishes that SMUD's mitigation efforts in this regard were reasonable.

On May 15, 1997, SMUD's Board decided to continue to authorize expenditures for the dry storage project, as it was ascertained to be the most cost-effective strategy in light of DOE's announced delay in performing under the Standard Contract. *See* PX 502; PX 519. SMUD's Board made that decision after considering nine other alternatives, including abandoning the dry storage project. *See* PX 519 at SMUD-061378. As the Rancho Seco Plant Manager testified, under the circumstances, continuation of the dry storage project in 1997 was the most certain and efficient course of action:

> SMUD'S COUNSEL: Mr. Redeker, you mentioned the risks of licensing, the risks of costs associated with going to dry storage. Were there any other risks associated with going to dry storage or continuing with dry storage in 1997?
>
> MR. REDEKER: Well, certainly that was the risk of when would DOE take our fuel, if it was in dry storage. We had conversations with DOE and we had looked at the contract, and there was not certainty whether they would - - you know, in what order they would take the fuel if it was in canisters. And we had correspondence with them and we had received a letter from them about that, but there was some uncertainty and some risk about when would the fuel be gone if we put it in canisters.
>
> SMUD'S COUNSEL: Why go forward with canisters if that was a risk?
>
> MR. REDEKER: Because the fuel was going to be there so long anyway, that there was going to be a large cost associated with that long-term storage. And we felt we could work through that, that there would be some way that we could get the fuel off in a timely manner. There were technical ways we felt that could be done. *We felt*

> *that even though the risk was substantial, the risk of not going into dry storage was also quite substantial from a cost perspective, because of the long-term that I expected the fuel to be there.*

TR 621-22 (emphasis added); *see also* TR 627-29.

SMUD's Assistant General Manager also explained that in 1997 SMUD believed that continuing the dry storage project would cost much less than long-term storage in the pool:

> SMUD'S COUNSEL: Describe for me at the time why your decision at the time was not to maintain the fuel in wet storage through 2027?
>
> MR. FERREIRA: Well, again, the cost to maintain fuel in wet storage was orders of magnitude above what the expected cost would be if we could move it into dry storage. And if we were going to have to maintain the wet storage for the next 20, 30, who knows how long, then it still made sense for us to pursue the dry storage option.

TR 917-18.

Thereafter, SMUD conducted other evaluations in 1999, 2000, and 2001 to consider whether to abandon the dry storage project and leave SNF in the pool. *See, e.g.,* PX 642; PX 689. At each juncture, the court found that SMUD's Board acted reasonably in evaluating the costs and risks associated with the decision to continue the dry storage aspect of the project. *See, e.g.,* DX 978A at SMUD-062789; DX 986 at SMP0471069; DX 1013 at SMUD-0028426; *see also* PX 585 at SM0470332. For these reasons, the court has determined that SMUD's authorization to continue the dry storage was reasonable.[35]

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[35] The Government also argues that SMUD not only has an affirmative obligation to mitigate claimed damages, but SMUD also must do so "at the least cost to the defendant." Gov't PT Br. at 67 n.41 (quoting *LaSalle Talman Bank, F.S.B.* v. *United States*, 45 Fed. Cl. 64, 111 (Fed. Cl. 1999), *rev'd on other grounds*, 317 F.3d 1363 (Fed. Cir. 2003)). The Government concedes that the "least cost" rule, discussed in *Northern Helex Co.* v. *United States*, 524 F.2d 707 (Ct. Cl. 1975), is the governing precedent:

> The basic rule for awarding common law damages for a breach of contract is stated as follows in the RESTATEMENT OF LAW, CONTRACTS [(FIRST)] § 329, comment a at 504:
>
> In awarding compensatory damages, the effort is made to put the injured party in as good a position as that in which he would have been put by full performance of the contract, *at the least cost to the defendant* and without charging him with harms that he had no sufficient reason to foresee when he made the contract.

2. For Labor Severance And Recruiting Costs.

The Government argues that labor severance and recruiting costs should be subtracted from SMUD's damage claim, because these costs were otherwise unavoidable. *See* Gov't PT Br. at 109. The Government's economic expert, Mr. Kiraly, testified that SMUD's damage claim was overstated because SMUD failed to consider labor severance obligations as a credit, as many of SMUD's employees were hired prior to the alleged damage period and specifically for the purpose of working on the "dual-purpose" dry storage project. *See* DX 2003 ¶ 96. Because the severance obligations for these employees were created prior to 1992, SMUD would have been liable for the severance costs. *Id.* Moreover, Mr. Kiraly testified that severance payments for employees working on the "dual-purpose" dry storage project who would not have been assigned to other work were also unavoidable costs. *Id.* Mr. Kiraly concluded that "SMUD should have assessed credits against their claimed amounts because the spent nuclear fuel project saved [SMUD] potential severance and recruiting costs." *Id.* ¶ 97.

In order to offset labor severance and recruiting costs, the Government would have to establish employee by employee whether SMUD would have offered severance payments or recruiting costs would have been paid, but for the breach. This evidence was not developed. For this reason, the court has declined to speculate about SMUD's labor severance and recruiting costs, and determined not to offset these alleged costs. *See Tennessee Valley Auth.*, 69 Fed. Cl. at 543.

3. For Dry Storage Project Delays.

The Government also argues that SMUD may not recover $13,527,736.00 in costs associated with delays to complete the "dual-purpose" dry storage project. *See* Gov't PT Br. at 92, 96-97. The Government asserts that the dry storage project was delayed by a total of eighty-eight months, primarily because of the inability of SMUD's vendors to obtain proper licensing for the construction of SMUD's "first-of-a-kind" dry storage facility. *Id.* at 92-93. The Government also claims that the project was plagued with shortcomings caused by SMUD's management. *Id.* at 93-97.

Northern Helex Co., 524 F.2d at 713 (emphasis added). The Government, however, misconstrues the "least cost" reference in RESTATEMENT (FIRST) OF CONTRACTS § 329 cmt. a. The United States Court of Federal Claims correctly restated the principle: "If the defendant's breach of contract saves expense to the plaintiff by discharging his duty of rendering a performance in return or by executing [sic] him from the performance of a condition precedent, the amount of this saving is deducted from the damages that would otherwise be recoverable." *Northern Helex*, 524 F.2d at 713 (quoting RESTATEMENT (FIRST) OF CONTRACTS § 335). Therefore, *Northern Helex* does not require SMUD to mitigate damages at the "least cost" to the Government. Rather, only if savings are achieved, those savings must be credited against SMUD's mitigation damages. The United States Court of Appeals for the Federal Circuit recently re-affirmed this rule in *Home Savings of Am.*, 399 F.3d at 1352-53 (affirming the trial court's decision that the plaintiffs' mitigation was reasonable, despite the Government's assertion that "the court erred by not requiring the mitigation of damages at least cost").

At the evidentiary hearing, the Government presented expert testimony from Mr. John R. McGrath of Contract Solutions LLC,[36] regarding eighty-eight months of delay that occurred during the period October 9, 1992 to August 21, 2002 to complete SMUD's "dual-purpose" dry storage project. *See* DX 2000; *see also* TR 2425-26. Since the court has determined that SMUD is not entitled to costs incurred prior to May 15, 1997, because such costs were not caused by the January 31, 1998 partial breach, only three delays discussed by Mr. Grath require examination: 1) January 25, 1997 through November 17, 1998 - - 22-month delay, because of a hold on fabrication work pending approval of NRC; 2) November 18, 1998 through September 11, 2000 - - 12-month delay, because of TNW's assumption of the NUHOMS assets; and 3) September 12, 2000 through August 21, 2002 - - 16.5-month delay, because of the re-evaluation, re-inspection, re-certification, and "productivity inefficiencies regarding production delay and loading the canisters." *See* DX 2000 ¶¶ 27-35. Mr. McGrath, however, failed to render an opinion as to the reasonableness of the three relevant post-May 15, 1997 delays or the specific costs incurred as a result. *Id.*, *see also* TR 2435-36, 2451, 2453-54.

The United States Court of Appeals for the Federal Circuit has held that an injured party may not recover those damages that "could have avoided by *reasonable efforts*." *Robinson*, 305 F.3d at 1333(citing RESTATEMENT (SECOND) OF CONTRACTS § 350 cmt. b) (emphasis in original); *see also* WILLISTON ON CONTRACTS § 64:27, at 191-92 (4th ed. 1990) ("Although it had been said that a plaintiff is ordinarily under a duty to mitigate damages, this is not strictly true, since there are no damages for breach of the duty; rather, the plaintiff simply cannot recover those damages that it could have avoided."). Therefore, a claim for damages incurred to mitigate a breach is dependent on whether such efforts were reasonable. *See Home Savings of Am.*, 399 F.3d at 1353 (reiterating the principle that an injured party must only make those mitigation efforts that are fair and reasonable and finding "no clear error in the trial court's factual conclusion that [the injured party] reasonably mitigated"); *see also Tennessee Valley Auth.*, 69 Fed. Cl. at 528 (finding the three requisite elements - - *i.e.*, foreseeability, causation, and certainty - - and explaining "TVA's expenses of its mitigation are accordingly recoverable to the extent they are reasonable."). The breaching party has the burden to prove that mitigation efforts were unreasonable. *Id.* In this case, however, the Government asks the court to impose on SMUD an elevated duty to mitigate. *See* Gov't PT Br. at 93 ("SMUD took on a substantial risk with its decision to abandon its wet pool and pursue a first-of-its-kind dry storage technology and, consequently, *SMUD bore the risk associated with the delays* in the pursuit of this technology." (emphasis added)).

The Government failed to establish that SMUD acted unreasonably with respect to these three delays, which were in large part caused by NRC licencing and inspection procedures. Accordingly, the court had determined not to offset any amount for these delays.

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[36] The Government proffered Mr. McGrath an expert in schedule and delay analysis. *See* TR 2423-24. Although SMUD objected, the court deems Mr. McGrath an expert in the proffered areas. *See* FED. R. EVID. 702.

4. For Failed Spent Nuclear Fuel.

Appendix E of the Standard Contract lists three SNF classifications: Standard [Spent] Fuel; Non-Standard Fuel; and Failed Fuel. *See* PX 44 at App. E ¶ A. Under the Standard Contract, DOE has an obligation to accept Non-Standard and Failed Fuel, but where DOE is concerned with "the technical feasibility of disposing of such fuel[,]" DOE may adjust the schedule for acceptance of such fuel:

> DOE's obligation for disposing of SNF under this contract also extends to other than standard fuel; however, for any SNF which has been designated by the Purchaser as other than standard fuel, as that term is defined in Appendix E, the Purchaser shall obtain delivery and procedure confirmation from DOE prior to delivery. DOE shall advise Purchaser within sixty (60) days after receipt of such confirmation request as to the *technical feasibility* of disposing of such fuel on the currently agreed to schedule and any schedule adjustment for such services.

PX 44 at Art. VI(A)(2)(b) (emphasis added).

The parties agree that SMUD placed ten "Failed Fuel" assemblies in the twenty-first module of the ISFSI, in a canister specially designed for damaged assemblies. *See* DX 2001 ¶ 63; *see also* TR 799. The Government argues, however, under the terms of the Standard Contract, DOE may chose to accept "Failed Fuel" on a separate, later schedule than Standard [Spent] Fuel. *See* Gov't PT Br. 89 ("If DOE determines that failed fuel requires special handling or raises other issues of technical feasibility, its acceptance by DOE may be delayed, as permitted by the Standard Contract."). Even if DOE performed in a timely manner under the Standard Contract, "SMUD may still have been required to store failed fuel for an indefinite period of time and, therefore, cannot demonstrated [sic] that, but for the Government's breach, it would not have incurred the costs associated with the storage of SNF." *Id.* at 85 ("In other words, SMUD would have incurred many of the ISFSI design and construction costs for the storage of its failed fuel, even if DOE had accepted SMUD's standard fuel beginning in 2001."). Therefore, the Government asserts that $4,720,658.00 for designing and fabricating the failed fuel canister should be deducted from SMUD's damages claim, because it is a cost SMUD that would have incurred irrespective of the Government's breach. *Id.* at 78. Moreover, even if DOE performed in a timely manner, DOE may have questioned the technical feasibility of accepting the Rancho Seco "Failed Fuel" and may have delayed acceptance of these assemblies. *Id.*

Although the Standard Contract permits delayed acceptance of "Failed Fuel," if DOE is concerned about the "technical feasability" of acceptance, the Standard Contract does not give DOE discretion to defer acceptance of failed fuel. *See* PX 44 at Art. VI(A)(2)(b). Therefore, the court has determined that the Government's argument is too speculative to disallow the $4,720,658.00

claimed.[37] *See Tennessee Valley Auth.*, 69 Fed. Cl. at 543 ("Correlatively, the 'benefits' the government seeks to setoff are too speculative to meet the standards set forth by the [United States Court of Appeals for the] Federal Circuit in *Indiana Michigan*, and thus a setoff is denied." (citing *Indiana Michigan*, 422 F.3d at 1373)).

5. For Operation And Maintenance Costs For The Independent Spent Fuel Storage Installation.

In addition, the Government asserts that SMUD should recover $695,715.00 for ISFSI operation and maintenance costs for 2003, because SMUD is responsible for operation and maintenance costs associated with the storage of SNF until DOE accepts the last of SMUD's SNF. *See* Gov't PT Br. at 91; *see also* TR 1056 (estimating that ISFSI operating and maintenance costs in 2003 were approximately $600,000.00).

SMUD counters that the Government is seeking a double deduction, in light of the $4,196,360.00 offset for 2003 wet storage costs that SMUD concedes is appropriate. *See* Pl. PT Reply Br. at 113-14 ("The [G]overnment now also argues for an additional offset that would force SMUD to pay for storing its fuel in *both* wet storage and dry storage during the same period." (emphasis in original)).

The record evidences that the ISFSI was constructed to mitigate damages caused by the Government's failure to perform under the Standard Contract. Under the circumstances, the Government, not SMUD, is responsible for operation and maintenance costs associated with storage of SNF, until DOE accepts the last of SMUD's SNF. Accordingly, the court has determined not to offset SMUD's damage award by the costs incurred to operate and maintain the ISFSI in 2003.

6. For Gantry Crane Refurbishment.

SMUD contends that $667,880.00 was spent to refurbish the gantry crane. *See* Pl. PT Br. at 41 & 44. SMUD acknowledges that the gantry crane's age likely would have required refurbishment, even if DOE performed. *Id.* Therefore, SMUD concedes that this cost should be offset. *Id.* at 44.

The Government asserts, however, that SMUD's proposed offset is understated. *See* Gov't PT Br. at 105-06 (explaining that the proper offset for the crane refurbishment is $825,871.00). At the evidentiary hearing, Mr. Burford testified that, although SMUD proposes an offset for work on the gantry crane through 1997, SMUD also incurred $158,043.00 for additional costs associated with refurbishment work after 1997. *See* DX 2001 ¶¶ 97, 102; *see also* DX 1307 at EXS0060075-77; DX 2003 at EXS0050026.

[37] When SMUD transported the failed fuel canister to the ISFSI, it did not need to take any extraordinary "precautions" or use "any special handing" or "precautions." TR 687-88.

On cross-examination, however, Mr. Burford conceded that he did not know what actual work was performed by SMUD for refurbishment of the gantry crane:

> SMUD'S COUNSEL: Do you know what work that encompasses, sir?
>
> MR. BURFORD: No, I do not.
>
> * * *
>
> SMUD'S COUNSEL: But you don't know what work was done related to that $158,000?
>
> MR. BURFORD: No.

TR 2593-94.

Mr. Burford also acknowledged that he did not quantify the cost of the refurbishment, but relied on the information produced by the Government's accounting expert, Mr. Kiraly of Navigant Consulting, Inc.:

> THE COURT: What is the basis for your conclusions in paragraph 102 [that SMUD understated the gantry crane offset by $158,043.00]?
>
> MR. BURFORD: As I indicated earlier in my direct testimony, I reviewed a significant amount of the produced documentation. In that documentation there are numerous design change procedures that are processed by SMUD, and they are discussed in there. *The costs are not tracked from there but the costs are tracked by [Navigant Consulting, Inc.], but I gained my insight on the crane upgrades from reading the design change processes and the safety evaluations that were conducted on them.* And during that reading there were - - there was one very large crane upgrade for the gantry crane that had to do with basically making it new brakes, new control systems, drop pendants so it could be used in the fuel building and/or outside the fuel building. It was a significant upgrade to the crane. It had nothing to do with structural upgrade at that point. There was one upgrade that was done on the crane that I could find that had to do with working on the cross-web, some welded angle iron, a cross-web for the cantilever that came out over the pool. That didn't look like a very - - a big change to me. But that's the only thing I could find with regards to upgrading the crane from 100 to 125 tons in that location. And I also reviewed other documentation that came after '97 indicating RL frequency problems with regards to certain crane equipment, and having to change out some of the equipment that was on the crane. Is that, in fact, all work, all the work that was done on the crane? I cannot say, but that is what I was able to find during the documentation.

SMUD'S COUNSEL: *And, again, you made no effort to determine the total costs of those upgrades on your own; is that right?*

MR. BURFORD: *No, I did not.*

TR 2597-99 (emphasis added).

Therefore, the Government did not establish that SMUD understated the proposed gantry crane offset. Accordingly, the court has determined not to offset SMUD's damage award by $158,043.00, as the Government requests.

7. For Costs Associated With The Preparation, Packaging, Inspection, And Loading Of Spent Nuclear Fuel.

The Standard Contract requires SMUD to "arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of SNF and/or HLW to the DOE facility." PX 44 at Art. IV(A)(2). Therefore, the Government argues that SMUD improperly included $4,274,856.00 for costs associated with the preparation, packaging, inspection, and loading of SNF into the ISFSI that SMUD would have incurred irregardless of the partial breach. *See* Gov't PT Br. at 107-08 (citing PX 44 at Art. IV(A)(2)).

SMUD counters that, only when DOE commences performance under the Standard Contract, SMUD becomes responsible to "arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of SNF and/or HLW to the DOE facility." *See* PX 44 at Art. IV(A)(2)(a); *see also* Pl. PT Reply Br. at 90 ("When DOE finally performs its obligations under the Contract, SMUD still will be required to arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of SNF and/or HLW to the DOE facility." (internal quotations omitted)). Since DOE and SMUD both contemplate that DOE will still perform under the Standard Contract at some future date, any benefit to SMUD, because of delayed loading costs, would be entirely speculative.

The Government also argues that SMUD improperly included all labor and equipment rental costs associated with the loading of SNF into dry storage that were incurred prior to November 1, 2000. *See* Gov't PT Br. at 109-10. The Government claims that SMUD prematurely mobilized labor and equipment in July 1999, before the MP187 cask was delivered in July 2000 and the first canister delivered in September 2000. *Id.* The Government's expert, Mr. Burford, testified that, "[b]ased on my project management experience, a three month mobilization time frame for this project would have been sufficient to support training, readiness reviews, and other onsite preparation activities related to loading and transferring the fuel." DX 2001 ¶ 86. Therefore, Mr. Burford concluded that February 1, 2001 was the correct date for mobilization, because that was the date that SMUD conducted the first fuel loading "dry run." *Id.* ¶ 87. Accordingly, Mr. Burford recommended that labor and equipment rentals costs incurred for the mobilization prior to November 1, 2000 should be offset in SMUD's damages claim. *Id.* ¶ 88.

During cross-examination, however, Mr. Burford admitted that he: never "supervised a canister/cask loading project of the magnitude carried out at SMUD;" has not "been responsible for transferring fuel from a wet pool to an ISFSI;" has not "prepared written procedures for a fuel move from a wet pool to an ISFSI;" and has not "conducted training for a fuel move from a wet pool to an ISFSI." TR 2587. Mr. Burford also declined to estimate what costs should have been incurred during the mobilization efforts or what staff size would have been required. *See* TR 2590. Moreover, Mr. Burford conceded that he did not investigate the mobilization period experienced by other utilities. *Id.*

The record evidences that the July 1999 mobilization prior to loading SNF was reasonable under the circumstances - - to facilitate employee training and test runs. *See* TR 640-41. As the Rancho Seco Plant Manager, testified:

> The most positive indicator to me that we didn't start too early [with the mobilization] is that the fuel off-load went extremely well. The crews were very proficient. And it paid off. If there had been an issue, a significant issue, during the fuel off-load such as a hydrogen explosion at one of the other plants, this project would have taken a lot longer time. So did we start too early? We trained very hard for very long and it paid off in spades as the actual project went very smoothly.

Id.

The court has determined that the Government did not establish that SMUD prematurely mobilized labor and equipment in July 1999. Accordingly, the court declines to offset $4,274,856.00 in costs incurred prior to November 1, 2000 for the preparation, packaging, inspection, and loading of SNF into the ISFSI.

b. SMUD May Not Recover Or Retain Certain Costs In This Case.

1. For "Dual-Purpose" Dry Storage.

The Government also argues that SMUD's decision to utilize "dual-purpose" transportable casks, the NUHOMS dual-purpose system, and canisters not authorized under the Standard Contract were unreasonable. *See* Gov't PT Br. at 68-77. All of these arguments concern the expenses SMUD incurred for dual-purpose storage. *Id.*

Although the Government challenged "dual-purpose" dry storage as unreasonable mitigation, the court believes the proper substantive analysis is that SMUD did not establish that the partial breach caused SMUD to incur the extra costs of "dual-purpose" dry storage. There is no evidence in the record that the costs of "dual-purpose" dry storage were foreseeable to the Government on June 14, 1983, the date the Standard Contract was executed. Moreover, SMUD did not establish any direct causal link between the partial breach and SMUD's December 5, 1991 Solicitation for "dual-purpose" dry storage. *See* PX 233 at SMUD-0005908. What is evidenced in the record is that at the

time the Standard Contract was executed "dual-purpose" dry storage was a new technology that had not been licensed by the NRC. *Id.*; *see also* TR 200. On January 31, 1998, when the partial breach occurred, SMUD was obligated by the NRC only to store SNF in a manner that was safe until the Government was in a position to assume title, move, and place SNF into a permanent storage facility. The NRC did not impose any obligation on SMUD to store SNF in a manner that would make it transportable or more easily transportable. Under the Standard Contract, the Government has an obligation to provide appropriate transportable casks if and when the SNF is moved off site. There is no evidence in the record that the Government will not live up to that obligation at the appropriate time.

For these reasons, the court has determined that SMUD's decision to utilize "dual-purpose" dry storage was not reasonably foreseeable by the Government on June 14, 1983 and without a substantial causal connection to the January 31, 1998 breach. Therefore, SMUD's decision to utilize "dual-purpose" dry storage was unreasonable.

2. For Contract, Lease, Or Other Legal Obligations.

The Government argues that any contract, lease, or other legal obligation that SMUD incurred prior to mitigation of DOE's breach should be deducted from SMUD's damage claim, because these costs were otherwise unavoidable. *See* Gov't PT Br. at 109. By May 15, 1997, SMUD had entered into multiple contracts for the dry storage project. *See, e.g.,* PX 267; PX 269A. The court previously determined that SMUD did not establish causation for the costs that were obligated prior to May 15, 1997, but incurred thereafter.

Accordingly, SMUD may not recover any cost attributable to a contract, lease, or other legal obligation executed prior to May 15, 1997 . Since the court cannot readily ascertain the appropriate offset amount, the court orders SMUD to submit this information, as set forth in the Order Requesting Supplemental Expert Testimony, issued herewith.

3. For Certain ISFSI Construction Costs.

The Government also argues that SMUD's damage claim includes costs that SMUD has incurred, or will have to incur, to store the Greater Than Class C ("GTCC") waste. *See* Gov't PT Br. at 80-85. The Government maintains that neither the Standard Contract nor the NWPA cover the disposal of GTCC waste. *See* Gov't PT Br. at 80-81. Instead, the Government asserts that the disposal of GTCC waste is covered by the Low-Level Radioactive Waste Policy Amendments Act of 1985 ("LLRWPA"), Pub. L. No. 99-240, 99 Stat. 1842 (codified at 42 U.S.C. §§ 2021b, *et seq.*). *See* Gov't PT Br. at 80-81. Although the LLRWPA makes the disposal of GTCC a federal responsibility, that Act does not identify any specific deadlines by which DOE must dispose of GTCC waste or enter into agreements regarding disposal. *See* 42 U.S.C. § 2021c(b). In fact, it appears that DOE has not established a mechanism for recovering the costs of disposing of GTCC waste or made any determinations regarding long-term disposal. *See* Gov't PT Br. at 81.

SMUD responds that the "issue of whether DOE has an obligation to dispose of GTCC under the Standard Contract is not ripe and has no bearing on this case given that SMUD is not pursuing its GTCC-related costs." *See* Pl. PT Br. at 69. The Government counters that, because SMUD plans to store GTCC in the twenty-second ISFSI module, the entire claimed cost of the ISFSI should be disallowed. *See* Gov't PT Br. at 84-85 ("SMUD is in fact claiming a portion of its costs associated with the storage of GTCC.").

The court has determined that by including the entire cost of the ISFSI in the damage claim, SMUD seeks to recover GTCC-related costs. The record evidences that SMUD constructed the ISFSI with the intention of placing GTCC waste in the twenty-second module. *See* DX 1365; *see also* TR 144-45, 693, 800. Since the ISFSI was constructed to store both SNF and GTCC waste, one-twenty-second of the cost of the ISFSI construction incurred since May 15, 1997 should be offset. Work Order 604025 indicated that $3,146,520 was spent to construct the ISFSI from 1992 to 2001. *See* DX 2003 at EXS0050032, EXS0050055. The court, however, cannot readily ascertain how much of that amount was incurred prior to May 15, 1997. Therefore, the court orders SMUD to provide this information, as set forth in the Order Requesting Supplemental Expert Testimony, issued herewith.

4. For Wet Pool Cost Savings.

In August 2002, when SMUD completed loading SNF into the ISFSI, certain systems associated with the wet pool were shut down[38] and the staff was reduced by 30 employees. *See* TR 668, 1170-71. Therefore, the Government argues that $4,146,360.00 should offset for the amount that SMUD saved by placing SNF into dry storage and decommissioning the pool. *See* Gov't PT Br. at 110-13; *see also* TR 170-71, 972-76. The Government further asserts that, absent the breach, SMUD would have had to maintain SNF in the wet pool until, at least 2003. *Id.*

SMUD counters that, if DOE had accepted SNF on January 31, 1998, as required by the Standard Contract, all of the SNF would have been removed by 2006, at the latest. *See* Pl. PT Br. at 61; *see also* Pl. PFF ¶ 555 ("If DOE had begun acceptance of spent nuclear fuel by January 31, 1998, at an overall spent fuel acceptance rate of 3,000 MTU per year, all of the spent nuclear fuel from the Rancho Seco nuclear power plant would have been accepted by DOE for disposal and transported off-site by 2006, *at the latest*, assuming an oldest-fuel-first acceptance priority and that SMUD does not utilize either the 'exchange' provision in the Standard Contract or the shutdown priority provision."). SMUD states that it might have been able to convince another utility in the queue to switch places to enable SMUD's SNF to be removed in 2003.[39] SMUD concedes, however,

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[38] Several different systems were necessary to support the operation of the wet pool, *e.g.*, cooling equipment, filters, pumps, valves, piping, demineralizers, and heat exchangers. *See* TR 139-40, 524.

[39] Under the Standard Contract, the priority of SNF and HLW acceptance is to be determined by the material's age. *See* PX 44 at Art. VI(B)(1). The Standard Contract, however, permits utilities

that "[i]f this Court concludes that SMUD would not have had all of its fuel removed prior to 2003, a deduction of $4,196,360 for 2003 would be appropriate." Pl. PT Br. at 61.

To accept SMUD's position, the court would need to speculate about whether SMUD would have been successful in trading SMUD's acceptance priority with another utility or convincing DOE to accept SMUD's SNF early. The law does not permit the court to do so.[40] Therefore, the court has determined that the $4,196,360.00 SMUD saved by placing SNF into dry storage and decommissioning the wet pool should be offset. As the United States Court of Appeals for the Federal Circuit has held: "To derive the proper amount for the damages award, the costs resulting from the breach must be reduced by the costs, if any, that the plaintiffs would have experienced absent a breach." *Bluebonnett Savings Bank*, 339 F.3d at 1345.

5. For Certain Internal Labor Costs.

SMUD workers performed various engineering tasks associated with the "dual-purpose" dry storage project and managed outside services and vendor contracts for which SMUD seeks damages of $13,812,040.00. *See* Pl. PT Br. at 63; *see also* TR 659, 1054-55. The Government argues that these internal labor costs should not be recovered as damages, because SMUD failed to establish that these were incremental costs that SMUD otherwise would not have incurred. *See* Gov't PT Br. at 99-104. Moreover, SMUD has not presented any evidence concerning what SMUD would have done with these employees, but for the partial breach, *e.g.*, assignment to other positions or termination. *Id.* at 100.

SMUD responds that if DOE performed under the Standard Contract, SMUD would have been able to make a more significant reduction to the Rancho Seco staff or to engage them in other projects, because labor for the "dual-purpose" dry storage project would not have been necessary. *See* Pl. PT Reply Br. at 85-88. SMUD proffered evidence that management continuously worked to reduce the number of Rancho Seco personnel since the shutdown of the plant in 1989. *See, e.g.,* DX 1172; PX 505 at SMP0881600; PX 838; *see also* TR 668, 678, 680-81, 953. SMUD's Rancho Seco Plant Manager testified that SMUD is an efficient company that makes a concerted effort to "combine work forces" and that "[t]he dry storage project resulted in us not being able to decrease staff as fast." TR 678-80.

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to exchange their acceptance positions. *Id.* at Art. V(E).

[40] Under the Standard Contract, DOE was supposed to issue a proposed priority acceptance, pursuant to DCS's submitted by each utility, as approved by DOE. *See* PX 44 at Art. V, VI(B)(1)(b). The Standard Contract also provided that DOE may give acceptance priority to "a civilian nuclear power reactor that has reached the end of its useful life or has been shut down permanently for whatever reason." *Id*. at Art. VI(B)(1)(b). The court finds that the evidence presented on the acceptance rate under the terms of the Standard Contract to be highly speculative, therefore, the court declines to make any determination of the acceptance rate based on this record.

An injured party's mitigation expenses are only recoverable where the injured party establishes that the expenses were caused by the breach. *See Indiana Michigan*, 422 F.3d at 1373 (citing *Energy Capital*, 302 F.3d at 1320). The fact that an injured party has used internal resources to mitigate a breach does not foreclose the injured party from recovering such costs. *See Tennessee Valley Auth.*, 69 Fed. Cl. at 539 ("[T]hat TVA used its own internal resources to support its mitigation is not fatal to its claim for damages in mitigating a breach of contract."). The evidence in this case, however, fails to establish that SMUD would have reduced the Rancho Seco personnel or reassigned these employees to other responsibilities, but for the labor requirements of the"dual-purpose" dry storage project - - particularly since SMUD also was engaged during this time in executing the incremental decommissioning of the Rancho Seco site. *See* DX 122; DX 247; DX 274; DX 248; DX 481; DX 521; *see also* TR 218, 697. Of the 256 employees that charged time to the "dual-purpose" dry storage project, only 16 employees spent the majority of their time to that project.[41] *See* TR 2737; *see also* DX 2003 at EXS0050082-86 (detailing the percentage of hours that each SMUD employee charged to "dual-purpose" dry storage project relative to the total hours that each employee worked for SMUD).

Accordingly, the court has determined that SMUD may not recover any internal labor costs claimed, except for the costs incurred for the 16 employees to the extent they worked on any portion of the dry storage project. Since the court cannot readily ascertain the appropriate offset amount, the court orders SMUD to submit this information, as set forth in the Order Requesting Supplemental Expert Testimony, issued herewith.

6. For Other Overhead Costs.

The Government also asserts that SMUD should offset $2,497,724.00 for other overhead costs, *e.g.*, human resources, office space, vehicles, computers, accounting software, telephones. *See* Gov't PT Br. at 104-05. The Government argues that SMUD has failed to show with any specificity that these costs would not otherwise have been incurred, but for the Government's breach. *Id.*

SMUD counters that the claimed overhead expenses are incremental, as the Rancho Seco Plant Manager testified:

> SMUD'S COUNSEL: When you reduced your labor force, what happens to your overhead?
>
> MR. REDEKER: The overhead associated with that is included in the labor costs, so that decreases as well. You know, we have got a guy sitting at a desk with a

[41] The 16 employees that charged the majority of their time to the "dual-purpose" dry storage project are: Employee No. 2149; Employee No. 2281; Employee No. 2799; Employee No. 3155; Employee No. 3505; Employee No. 3663; Employee No. 4318; Employee No. 5512; Employee No. 5801; Employee No. 6073; Employee No. 6730; Employee No. 7911; Employee No. 8790; Employee No. 9436; Employee No. 9647; Employee No. 9850. *See* DX 2003 at EXS0050083-86.

computer. When he leaves, that computer leaves. They have got an accounting system when we put an SAP, if you are familiar with that system, that we get charged for every telephone, every computer monitor, every beeper that we have and comes out of my budget. So when somebody goes, we find his beeper, his telephone, everything and get rid of it because we don't want to pay for it.

SMUD'S COUNSEL: What is the effect on departmental administration?

MR. REDEKER: The actual burden for that decreases. There are fewer people or fewer personnel issues to deal with.

TR 681.

Although SMUD properly may have incurred $2,497,724.00 for other overhead costs, SMUD failed to meet the burden of demonstrating that such costs, in fact, were incremental. Accordingly, the court has determined that $2,497,724.00 should be offset for other overhead costs claimed.

7. For On-Site Drop Testing Costs.

Rancho Seco initially was designed to accommodate a 100-ton cask and the initial specifications about the plant's ability to withstand an on-site drop were developed three decades earlier. *See* Pl. PT Br. at 44. As a consequence, SMUD had to conduct new tests and added certain drop mitigation limiters prior to SNF transfer in 2001 and 2002. *Id.* SMUD acknowledges that it likely would have undertaken similar testing and changes even if DOE would have performed, including: 1) an impact limiter, or foam cushion, where the cask would impact, and 2) a raised platform to limit the distance that it would fall. *Id.* Therefore, SMUD concedes that $250,000.00 claimed for on-site drop testing should be offset. *Id.*

The Government argues, however, that SMUD's proposed $250,000.00 offset for the on-site drop mitigation testing is understated. *See* Gov't PT Br. at 105-07 (explaining that the proper offset for the testing should be approximately $2.14 million). At the evidentiary hearing, the Government presented testimony from Mr. Burford, a nuclear industry consultant, about the costs that SMUD incurred for on-site drop mitigation testing. *See* DX 2001 ¶¶ 97, 103; *see also* DX 1307 at EXS0060075-77. Mr. Burford explained that from late-1996 to mid-1999, SMUD's outside contractor, Packaging Technology,[42] charged SMUD $924,571.00 for an analysis of cask drops and design, fabrication, and delivery of cask drop impact limiters. *See* DX 2001 ¶ 103. In addition, "[w]hile the Packaging Technology charges are easily documented, records for charges of onsite support contractors and SMUD's own staff to install these impact limiters can not [sic] be located." *Id.* Relying on an internal document reflecting that SMUD estimated that $419,000.00 was required

[42] SMUD contracted with Packaging Technology to assist with the on-site drop testing. *See* TR 959. Packaging Technology performed work for SMUD from 1996 to 1999. *Id.*; *see also* DX 2001 ¶ 103.

to install the impact limiters, Mr. Burford concluded: "Assuming that SMUD's estimate for installing impact limiters is correct, and has been included in the damages claims, the summation of these two amounts total $1,343,571 [sic]"[43] for the impact limiter work. *Id.* (citing DX 1359). Mr. Burford also testified that Vectra charged $799,888.00 to a work order for impact limiter related service. *Id.*

Therefore, Mr. Burford concluded that "as much as $2.14 million in costs should be excluded from the damages claims, not $250,000." *Id.* On cross-examination, however, Mr. Burford conceded that he did not have an opinion regarding whether these costs would have been incurred, if DOE timely performed:

> SMUD'S COUNSEL: Mr. Burford, do you have an opinion as to whether the [$]2.14 million in costs outlined in paragraph 103 of your testimony would have been required had DOE brought a 100-ton rail cask to SMUD's site?
>
> MR. BURFORD: No, I don't have an opinion on that.

TR 2606.

SMUD counters that there is no basis for disputing the proposed offset, because the Government's expert stated "that he did not 'have an opinion' regarding whether the costs would have been incurred in a non-breach world scenario wherein DOE brought a cask suitable for SMUD's facilities, as the Contract requires." *See* Pl. PT Reply Br. at 93 (citing TR 2606).

SMUD conceded that on-site drop testing would be needed, even if the Government had performed under the Standard Contract. In addition, the court has determined that the $799,888.00 Vectra charge and the $924,571.00 Packaging Technology charge, or $1,724,459.00, should be offset, minus the amount excluded by the court's prior determination that SMUD may not recover any costs incurred or obligated prior to May 15, 1997. Therefore, the court orders SMUD to provide this information, as set forth in the Order Requesting Supplemental Expert Testimony, issued herewith.

IV. CONCLUSION.

For the aforementioned reasons, the court has determined that the Government's January 31, 1998 partial breach of the June 14, 1983 Standard Contract entitles SMUD to mitigation damages, but only for certain costs incurred from May 15, 1997 to December 31, 2003. Because of the manner in which both parties submitted cost data at the evidentiary hearing, the court cannot ascertain the specific amount damages with reasonable certainty at this juncture.

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[43] Mr. Burford misstated SMUD's cost estimate. *Compare* DX 2001 ¶ 103 ($419,000.00), *with* DX 1359 ($418,980.00). If the correct figure were used, Mr. Burford's estimate for the installation of the impact lines would be $1,343,551.00.

Therefore, the court has entered a separate Order Requesting Supplemental Expert Testimony to be issued together with this Memorandum Opinion and Order. After receiving the information requested and any objections thereto, the court will issue a Final Order awarding mitigation damages to SMUD for certain costs incurred from May 15, 1997 to December 31, 2003.

IT IS SO ORDERED.

s/**SUSAN G. BRADEN**
Judge