

In the United States Court of Federal Claims

No. 98-126C

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*****			Damages for breach of Standard Contract for
YANKEE ATOMIC	*		disposal of spent nuclear fuel and high-level
ELECTRIC COMPANY,	*		radioactive waste; mitigation; incurred costs
Plaintiff,	*		for partial breach of contract; foreseeability;
	*		substantial causal factor; commercial
v.	*		reasonableness; reasonable certainty;
	*		amended and supplemental pleadings;
THE UNITED STATES,	*		takings; election of remedies; administrative
Defendant.	*		dispute remedy; future offsets; use of expert
*****			demonstrative evidence.

Jerry Stouck, Washington, D.C., for plaintiffs. *Robert L. Shapiro*, Washington, D.C., of counsel.

Harold D. Lester, Jr., Assistant Director, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, D.C., for defendant, with whom were *Peter D. Keisler*, Assistant Attorney General, *David M. Cohen*, Director and *Kevin B. Crawford*, *John C. Ekman*, *Heide L. Herrmann*, *Russell A. Shultis* and *Marian E. Sullivan*, Trial Attorneys. *Jane K. Taylor*, Office of General Counsel, United States Department of Energy, Washington, D.C., of counsel.

OPINION and ORDER^{1/}

Merow, *Senior Judge*

Three nuclear utilities seek damages for the Department of Energy’s (“DOE”)’s breach of contract to accept, transport, and dispose of their spent nuclear fuel (“SNF”).^{2/} Substantial storage costs for SNF are borne by utility ratepayers whose rates also reflect the \$440.5± million paid or to be paid to DOE under the contracts involved. Breach of contract by the United States has been established. *Maine Yankee Atomic Power Co. v. United States*, 225 F.3d 1336, 1342 (Fed. Cir. 2000). Plaintiffs seek to recover their incurred SNF storage costs from the United States as mitigation expenses – commercially reasonable and foreseeable responses to DOE’s admitted

^{1/} This shall also be deemed applicable in *Connecticut Yankee Atomic Power Co. v. United States*, No. 98-154C and *Maine Yankee Atomic Power Co. v. United States*, No. 98-474C.

^{2/}Spent nuclear fuel “has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.” 42 U.S.C. § 10101(23).

decade-long delay in commencing performance. Defendant counters that many, if not most, of the costs would have been incurred regardless of DOE's delay. Trial in this matter consumed seven weeks.

INTRODUCTION

In 1983, pursuant to the Nuclear Waste Policy Act of 1982 ("NWPA"), Pub. L. No. 97-425, 96 Stat. 2201 (codified at 42 U.S.C. §§ 10101-10270 (2000)) plaintiffs, along with all domestic nuclear utilities, entered into Standard Contracts with DOE wherein, in return for payment of substantial fees, DOE would accept title to, transport and dispose of the utilities' SNF, commencing performance no later than January 31, 1998. Due in part to the highly regulated nature of the industry, entry into Standard Contracts was mandatory. "Nuclear plant operators and utilities were mandated by Congress to enter into Standard Contracts, the terms of which are presented at 10 C.F.R. § 961.11, as a prerequisite to obtaining renewal of their operating licenses." *Indiana Michigan Power Co. (hereinafter "Ind. Mich.") v. United States*, 422 F.3d 1369, 1372 (Fed. Cir. 2005) (citing 42 U.S.C. § 10222(a)(1)); *Maine Yankee*, 225 F.3d at 1337 ("The NWPA effectively made entry into such contracts mandatory for the utilities.")). DOE did not commence performance by 1998 as required by the NWPA and the Standard Contract. While insisting there will be performance, the date continues to recede from 2010 to 2017, the latest prognosis.

Plaintiffs assert that the delay in DOE's performance has resulted in substantial damages. All three plaintiffs' nuclear reactors have been shut down. They contend that if DOE had timely commenced performance, all their SNF would no longer be on-site (or at least they would not be responsible for it); and accordingly, their sites would have been "decommissioned" and available for other use.

At trial, damages were presented on actual and future costs for time periods preceding January 31, 1998 (pre-breach) through 2012 (2011 for Maine Yankee). *See Yankee Atomic Elec. Co. v. United States*, 2004 WL 1535688, at *1-3 (June 28, 2004). Future costs were based in substantial part on cost projections approved by regulators for rate base purposes. As such, these costs were subject to public notice and opportunity for input, analysis and criticism. After trial was completed, the Circuit Court issued its decision in *Indiana Michigan* and held that, in any suit for breach of an SNF contract, recoverable costs were limited to those actually incurred up to the date the litigation was initiated. Trial, as well as post-trial briefing and proposed findings in the instant cases included future damages based on the then assumption that DOE planned to commence performance in 2010. Following the ruling in *Indiana Michigan*, the court requested supplemental briefing. Thereafter, plaintiffs' Motion to Amend their Complaints was granted in part, and record evidence was limited to damages actually incurred through 2001 for Yankee Atomic and Connecticut Yankee, and through 2002 for Maine Yankee. These damages involved costs actually incurred as of trial and contained in plaintiffs' pre-trial and trial evidence. Costs asserted for periods beyond these time periods were dismissed without prejudice to their reassertion in future litigation.

Upon careful consideration of testimony, argument, documents and exhibits, the court concludes that the plaintiffs reasonably incurred substantial and foreseeable costs in mitigating

DOE's acknowledged impending and substantial delay in commencement of performance of the contracts involved, and that the delay was a substantial causal factor in their respective expenditure decisions. Accordingly, plaintiffs are entitled to recover certain, but not all, mitigation costs claimed as damages for DOE's partial breach in not commencing contract performance by January 31, 1998.

Technical summary

The nuclear waste problems involved in this litigation commence with the content of the fuel rods. Uranium oxide pellets (little finger-sized) are placed into 12-14 foot metal rods of about the same diameter and bundled together with metallic bands into "assemblies." Each fuel assembly contains about one metric ton of uranium ("MTU"). A fuel assembly is approximately nine inches square and fourteen feet long. (PX 1926.001; Yankee Atomic's Proposed Findings of Fact ("YA PFF") 9; Maine Yankee's Proposed Findings of Fact ("MY PFF") 8; Connecticut Yankee's Proposed Findings of Fact ("CY PFF") 8 and Def.'s Resps.) Assemblies are placed in the reactor core where fission produces heat which is converted to steam to drive turbines and generate electricity.

Within twelve to eighteen months, the uranium in the rods becomes relatively inefficient. The reactor is shut down, the assemblies removed and placed on-site in adjacent "wet" pools of treated water where the SNF is cooled for at least five years.^{3/} Wet pools involved in this litigation are about 80 by 40 feet, are made of concrete, lined with stainless steel and filled with treated water that shields radioactivity. Boric acid, which absorbs neutrons, and spacing in the racks help prevent "criticality" – self-sustaining fission reaction resulting from the interchange of neutrons. The assemblies are placed in basket-like racks lowered into the pools. When SNF is removed from the reactor core, it is still capable of attaining criticality. Transporting rods in or out of the reactor core, or in and out of the wet pool, is a complex, expensive and highly regulated process. (YA PFF 11-15 and Def.'s Resp.) *See Twp. of Lower Alloways Creek v. Pub. Serv. Elec. & Gas Co.*, 687 F.2d 732, 737 (3rd Cir. 1982). Storage, and most activities in and around the plant, are regulated by the Nuclear Regulatory Commission ("NRC"). *See generally* 10 C.F.R. pts. 72-73 (2004).

The size and configuration of the spent fuel pool and the racks constrain the number of spent fuel rods that can be stored there. The reactor core can hold only a limited number of rods. Storage need is triggered by the removal of either "spent" fuel or damaged assemblies from the reactor core. Also, repair or inspection of the reactor core requires removal of all the fuel. Irradiated tools are also stored along the walls of the pool.

"Pool capacity" refers to the maximum number of rods that can be stored in a pool. "Full core reserve capability" is the maintenance of sufficient unused space in the pool for all the rods in the reactor core. Maintaining full core reserve ("FCR") is a common safety-enhancing practice. (Tr. 2591-92 (Mellor); Tr. 2672, 2676 (Heider); Tr. 2850 (Whittier); Tr. 5430-31 (Abbott).) Certain NRC inspections require a FCR. (Tr. 2857 (Whittier).) While the NRC did not require FCR, such

^{3/}The Standard Contract requires the SNF to be cooled for five years before disposal by DOE. 10 C.F.R. § 961.11 at App. E(B)(3).

a contingency was preferred. (Tr. 2856 (Whittier).) Maine Yankee had discharged all of its fuel rods into the spent fuel pool for repair of the core's thermal shield and for inspections of the reactor vessel. (Tr. 2857 (Whittier).)

Reracking is the use of higher density racks, resulting in a tighter configuration, allowing more fuel assemblies to be stored in the pool. (Tr. 2849 (Whittier); Tr. 2590 (Mellor); Tr. 1552; Tr. 2306 (Bennet); MY PFF 104 and Def.'s Resp.)

From 1992 to 1997, Maine Yankee expanded its on-site storage capacity by reracking its spent fuel pool for the third time. (MY PFF 103 and Def.'s Resp.) From 1995 to 1997, Connecticut Yankee expanded its on-site storage capacity by reracking its spent fuel pool for the second time. (CY PFF 109 and Def.'s Resp.) Yankee Atomic reracked in 1979-80, adding a second tier of fuel storage racks. These costs, incurred prior to the signing of the contracts involved here, are not included in Yankee Atomic's requested damages.

Yankee Atomic's nuclear reactor core held 76 fuel assemblies. (YA PFF 10 and Def.'s Resp.) Connecticut Yankee's reactor core held 157 and Maine Yankee's held 217. (CY PFF 9; MY PFF 13 and Def.'s Resps.) A full-size demonstration fuel assembly was in the courtroom during trial and a photograph is in the record. (Tr. 1571; PX 1926.001-PX 1926.004.) They, together with other photographs and a miniature display of the components and process of transfer of SNF were helpful in comprehending the magnitude, complexity and costs of the mitigation and storage efforts taken here.

Spent fuel remains highly radioactive and hazardous for an extraordinary length of time. (MY PFF 8-10 and Def.'s Resp.) A risk standard of 10,000 years appears to be the current (albeit rejected) design standard for Yucca Mountain, Nevada, the site where DOE plans to store SNF it obtains under the contracts involved in this litigation. *See Nuclear Energy Inst., Inc. v. EPA*, 373 F.3d 1251, 1266-73 (D.C. Cir. 2004) (rejecting 10,000 year radiation standard as inconsistent with the National Academy of Science recommendations incorporated into Section 801(a) of the Energy Policy Act); 70 Fed. Reg. 49,014-01 (Aug. 22, 2005) (proposed revision to add peak damage standards for a period beyond 10,000 years); 70 Fed. Reg. 53,313-02 (Sept. 8, 2005) (proposed amendment to NRC regulations to implement EPA's proposed additional changes).

History

The following summary, which is probative with respect to the context in which the parties contracted for the removal and disposal of the SNF is derived in substantial part from *Florida Power & Light Co. v. Westinghouse Electric Corp.*, 826 F.2d 239 (4th Cir. 1987).

After the government's Manhattan Project during World War II for the military use of atomic power (at a cost of over \$2 billion and an employment force of over 600,000 in 37 installations in the United States and Canada), interest shifted to commercial use of atomic energy. That interest, tempered by public health and safety concerns, culminated in the Atomic Energy Act of 1954 as amended, 42 U.S.C. §§2011 *et seq.* Therein, Congress declared that the "[s]ource and special

nuclear material, production facilities, and utilization facilities” for the use of nuclear energy were to be treated as “affected with the public interest” and strictly regulated “in the national interest to assure the common defense and security and to protect the health and safety of the public.” § 2012(e). The Atomic Energy Commission (“AEC”) was created to effectuate this program which included the development of a commercial nuclear electric industry. 42 U.S.C. §§ 2031 *et seq.*

Disposal of SNF posed a “severe potential health hazard” with “complex technical problems.” *Natural Res. Def. Council v. NRC*, 547 F.2d 633, 638 n.10 (D. C. Cir.1976), *rev’d in part and remanded in part sub nom., Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519 (1978). Congress accepted federal responsibility for spent fuel disposal. “The stated policy of the Federal Government **has always been** that the safe disposal of high-level waste is to be accomplished under **Federal management.**” 1980 U.S.Code Cong. & Admin. News at 6934 (emphases added).

The AEC assumed responsibility for the spent fuel if reprocessing was not available, announcing that “a [governmental] policy of assuring the nuclear power industry that the Government would, in the event that commercial reprocessing services were not available at reasonable times and conditions when irradiated power reactor fuels were discharged from their reactors, make financial settlement for the materials contained in those elements, and reprocess them.”^{4/} *Fla. Power & Light Co.*, 826 F.2d at 246 (citing a February 27, 1957 Federal Register AEC announcement). The government demonstrated its firm resolution to carry out this 1957 commitment. Although the government's reprocessing facilities required some minimal adaptation in order to process SNF from commercial reactors, Congress, at the instance of the AEC, made funds available for such adaptation in 1959. The government punctually complied with its 1957 commitment.

According to the House Report on the NWPAA, Congress relied on reprocessing rather than permanent storage. 40 Fed. Reg. 42801-02 (Sept. 16, 1975); 1982 U. S. Code Cong. & Admin. News at 3793. However, plutonium, a key component of nuclear weapons, is a by-product of reprocessing. There was concern that reprocessing would promote nuclear proliferation. *Westinghouse Elec. Corp. v. NRC*, 598 F.2d 759, 762 n.4 (3rd Cir.1979).

Reprocessing suffered other setbacks. *Nat. Res. Defense Council v. NRC*, 539 F.2d 824 (1976), held that the AEC could not grant licenses for reprocessing facilities or for the transportation of plutonium and uranium mixed oxide fuel pending further regulatory review, although the review

^{4/}The phrase “financial settlement for the materials” in this announcement referred to the reusable uranium and plutonium in the spent fuel, which could be reclaimed in reprocessing, valued by some estimates to be greater than the cost of recovery and disposal of the fuel. 826 F.2d at 246 n.12. Under the Standard Contract, upon acceptance, the utilities relinquish title, and presumably any value in the SNF, to DOE.

procedure was affirmed. *Certiorari* was sought. 430 U.S. 944 (1977).^{5/} Two months later, in October 1976, then-President Carter issued a policy statement urging temporary deferral of reprocessing. 1982 U. S. Code Cong. & Admin. News, 3794.

Utilities then sought regulatory approval to rerack their wet pools to increase storage as there was no other way to deal with their spent fuel. “No one disputes that solutions to the commercial waste dilemma are not currently available.” *Minn. v. NRC*, 602 F.2d 412, 416 (D.C. Cir.1979). Reracking was authorized. *See* 1982 U. S. Code Cong. & Admin. News, 3803.

President Carter then banned reprocessing, announcing that “spent fuel reprocessing and the development of advanced plutonium non-based reactors would be indefinitely deferred in this country,” but “the Federal government would provide interim storage for utilities’ spent fuel.” 1982 U.S.Code Cong. & Admin.News, 3794. However, no Congressional authority for interim storage was obtained and no storage facility was then planned or constructed.

In October 1977, DOE announced its “New Spent Fuel Policy” implementing President Carter's indefinite suspension of reprocessing. DOE described this new policy as “a logical extension . . . of the long-established **Federal responsibility for permanent disposal of high-level wastes.**” *Fla. Power & Light Co.*, 826 F.2d at 251 (emphasis added.) Permanent storage was planned, backed up by interim storage. Upon payment of an unspecified storage fee, the government would take title to the spent fuel; however, “questions surrounding the permanent disposition of nuclear wastes have not yet been resolved.” “If, at some time in the future, the U.S. should decide that commercial reprocessing or other energy recovery methods for spent fuel can be accomplished economically and without serious proliferation risks, the spent fuel [can] either be returned with an appropriate storage charge refund, or compensation could be provided for the net fuel value.” *Id.* at 252.

Recently, interest in reprocessing or “recycling” has resurfaced. In the Energy Policy Act of 2005, Congress appropriated \$50 million to DOE to explore a “new kind” of reprocessing – “advanced fuel recycling technology” or “transmutation techniques.” 42 U.S.C. § 16271, 16273 (2005); *see also* Matthew Wald, *Scientists Try to Resolve Nuclear Problem With an Old Technology Made New Again*, N.Y. TIMES, December 27, 2005, at D3.

In October 1981, President Reagan lifted “the indefinite ban which previous administrations placed on commercial reprocessing facilities in the United States.” “We will pursue consistent, long-term policies concerning reprocessing of spent fuel from nuclear power reactors and eliminate regulatory impediments to commercial interest in this technology, while insuring adequate safeguards.” That the government failed in meeting “its responsibilities” in this regard was accepted. 17 Weekly Comp. of Pres.Doc., 1101-02 (October 12, 1981). Congress admitted that “[f]ailures in the Federal repository development program, the collapse of the domestic spent fuel

^{5/}The Supreme Court granted *certiorari* but remanded the case for consideration of mootness after the several presidential actions noted. 434 U.S. 1030 (1978).

reprocessing industry and quickly deteriorating public confidence in our ability to deal safely with nuclear waste, together with other critical safety and economic issues, were seriously undermining the strength of the domestic nuclear industry” and that “[n]uclear waste management was on its way to becoming a top Federal energy priority.” 1982 U.S. Code Cong. & Admin. News, 3794-95.

The Nuclear Waste Policy Act

The Nuclear Waste Policy Act of 1982 (“NWPAct”), Pub. L. 97-425, 96 Stat. 2201 (codified as amended at 42 U.S.C. § 10101-10270), enacted on January 7, 1983, reaffirmed federal 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.” 42 U.S.C. § 10131(a); *Ind. Mich.*, 422 F.3d at 1372. Congress recognized that SNF was a national health and safety concern, that the disposal of nuclear waste was a federal responsibility, that 30 years of government attempts to meet this responsibility were inadequate, and that utilities should bear the financial responsibility for storage until the government “accepted” the waste under mandated contracts. “From the beginning of the Atomic Age, it has been a given that the Federal Government has the responsibility for eventual disposal of high level radioactive wastes and spent fuel. However, the absence of specific arrangements for disposal of this material has been a substantial impediment to public acceptance of the use of nuclear energy.” (PX 353 at MOL.19980527.0086.0004 (May 17, 1984 Confirmation Statement of Bernard Rusche, President Reagan’s nominee for Director of the Office of Civilian Radioactive Waste Management).)

The NWPAct directed the Secretary of Energy to find an appropriate repository site, 42 U.S.C. §§ 10132-33, and following Presidential and Congressional approval of that selection, proceed with construction authorization through the NRC. *Id.* §§ 10134-35. A 1987 amendment directed the Secretary to select Yucca Mountain in Nevada. Pub. L. No. 100-23 § 5011, 1001 Stat. 1330 at 227-31 (1987) (codified at 42 U.S.C. § 10172). In the event Yucca Mountain proved unsuitable, DOE was directed to terminate site-specific activities and report to Congress. *See* 42 U.S.C. § 10133(c)(3).

Congress directed DOE to “enter into Standard Contracts with all entities that generate or hold 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.” *Ind. Mich.*, 422 F.3d at 1372 (citing 42 U.S.C. § 10222 (2000)). Utilities would pay fees to the Secretary of Energy for deposit into the Nuclear Waste Fund (“NWF”).^{6/} 48 Fed. Reg. 5,458-01, 5,464 (Feb. 4, 1983).

^{6/}The Nuclear Waste Fund was established to cover the government’s costs. 42 U.S.C. § 10131(b)(4) (1982). The Fund is “composed of payments made by the generators and owners of such waste and spent fuel, that will ensure that the costs of carrying out activities relating to the disposal of such waste and spent fuel will be borne by the persons responsible for generating such waste and spent fuel.” Utility breach of contract claims cannot be settled by offsets to future payment obligations. *Ala. Power Co. v. DOE*, 307 F.3d 1300, 1313-14 (11th Cir. 2002). The Waste Fund cannot be used to finance the participation by the State of Nevada in NRC licensing hearings. (continued...)

Yankee Atomic has paid \$22.5 million into the NWF. (YA PFF 1 and Def.'s Resp.^{7/}) Connecticut Yankee has paid approximately \$41 million into the NWF, with about \$153 million remaining to be paid. (CY PFF 1 and Def.'s Resp.) Maine Yankee has paid approximately \$65 million, with about \$159 million remaining. (MY PFF 1 and Def.'s Resp.) Plaintiffs have paid a total of \$128.5 million into the NWF, with \$312 million remaining to be paid for a total of \$440.5 million. In the aggregate, nuclear utilities have paid over \$20 billion into the NWF.^{8/} In the end, "DOE was exclusively responsible for SNF collection and disposal in the United States, thereby prohibiting Indiana Michigan or any other nuclear utility from seeking alternative disposal means." *Ind. Mich.*, 422 F.3d at 1374 (citing 42 U.S.C. §10131(a)(4), (b)(2); *Roedler v. DOE*, 255 F.3d 1347, 1350 (Fed. Cir. 2001)).

Nevertheless, the repository at Yucca Mountain remains unbuilt and commencement of contract performance is further on the horizon. Recently, DOE announced that if "requested legislative changes are enacted, the [Yucca Mountain] repository will be able to accept spent nuclear fuel and high-level waste starting in early 2017." www.energy.gov/news/3845.htm (last visited July 27, 2006); *see also Nuclear Energy Inst., Inc. v. EPA*, 373 F.3d 1251, 1273 (D.C. Cir.2004) (agency's interpretation of environmental risk standards did not comport with statutory dictate to comply with standards of the National Academy of Science); Matthew Wald, *Big Question Marks on Nuclear Waste Facility*, N.Y. TIMES, Feb. 14, 2006 at C-4.

Development of the Standard Contract

Because DOE employed a rule making "notice and comment" procedure, the industry had only a thirty day period to comment on a proposed contract valued in the billions that would last for decades. The nuclear industry, however, had substantial input into the formulation of the Standard Contract. DOE met with industry representatives on January 19, 1983. (Tr. 344-45, 472-74 (Mills); Def.'s PFF 21-23.)

^{6/}(...continued)

Nev. v. DOE, 400 F.3d 9 (D.C. Cir. 2005). *See N. States Power Co. v. DOE*, No. 97-1064, 1998 WL 276581 (D.C. Cir. May 5, 1998) (declining to opine on use of fund to pay breach of contract damages).

^{7/}Reference to individual plaintiff's proposed facts (as well as defendant's response) will be so noted.

^{8/}Defendant does not dispute that, in the aggregate, utilities have paid DOE over \$20 billion dollars under the Standard Contract, less than half of which has been appropriated to DOE's repository program. (Def.'s Resp. to Pls.' PFF 2.) Defendant objected to plaintiffs' citation to a Michigan Public Service website to support proposed findings concerning the aggregate level of payments by utilities, asserting the public website cited is not part of the record in this case and cannot be relied upon for this proposed finding. The court may take judicial notice of matters of public record. Fed. R. Evid 201 (b)(2).

The proposed Standard Contract was published on February 4, 1983 with a 30 day comment period. Comments were received from 85 entities. Utilities noted the lack of a minimum rate at which DOE would “accept” the spent fuel, commenting that “a commitment to do no more than start accepting delivery by 1998 is empty and meaningless without setting forth some reasonable minimum rate of acceptance which corresponds to the purposes of the Act.”^{9/} (DX 2.063 at ACR0010537.)

Yankee Atomic’s comments contrasted its obligation to its ratepayers who would bear the cost of the substantial up-front fee investment payable in mid-1983 (under the chosen payment option), while DOE’s obligations would not begin until almost fifteen years later on January 31, 1998.^{10/}

^{9/} Recommended changes submitted by Florida Power and Light included a provision that if DOE failed to meet a pick-up schedule in the approved 1984 DOE Mission Plan, DOE would, to the extent permitted by the NWP, pay for the reasonable and necessary incremental costs of storage, or alternative disposal, incurred by the utilities. Edison Electric Institute (“EEI”), an association of investor-owned utilities, collectively providing approximately 78 percent of the nation’s electricity, serving over 67 million customers and the Utility Nuclear Waste Management Group (“UNWGM”), a consortium of 43 utilities, conceded that it may not be appropriate, at least at that time, to have a specific acceptance rate in the Standard Contract. There was simply not enough information then available and the transfer mechanism was not developed sufficiently for the DOE to commit to a specific acceptance rate. Nevertheless, EEI advocated that the Contract provide “that DOE would design the facility with the capacity to receive SNF [and high-level-waste (“HLW”)] at a rate commensurate with the amount of SNF/HLW then being generated together with the accumulated backlog of SNF/HLW.” (DX 2.034 at ARC0010334.) Tennessee Valley Authority (“TVA”) also advocated a rate at least equal to the annual rate of production with consideration for decommissioning plans of the particular utility. (DX 2.063 at ACR0010537.)

^{10/} We are being required to make substantial advance payments for nuclear waste disposal long before the DOE has an operating disposal facility or even an approved plan or site for such a facility. Yankee’s advance payments will be included in the cost of power from its plant and will ultimately be paid by electric customers throughout New England. We have a duty to these customers to assure that DOE is fulfilling its end of our bargain. Although Yankee would be contractually required to begin making payments to DOE in mid-1983, DOE will not be required to begin fulfilling its obligations until 1998. (DX 2.023 at ADM002.00195.)

Exchanges

The majority of commenting utilities wanted to be able to exchange their delivery commitments, but the published proposal did not contain that option. TVA suggested: “Purchaser shall have the right to . . . sell or trade its priority ranking to other Purchasers.” (DX 2.063 at ARC0010538.) EEI requested explicit language allowing exchanges. (DX 2.034 at ADM002.0291-92.) Yankee Atomic and others also made the request. (DX 2.023 at ADM002.00197; DX 2.012 at ADM002.0111 (Northern States Power); DX 2.015 at ADM002.00136 (Consumers Power); DX 2.018 at ADM002.00173 (Gulf States Utilities); DX 2.033 at ADM002.0264 (Portland General Electric).)

DOE granted the request; exchanges were provided for in the final Standard Contract. DOE recognized that exchanges were necessary for program efficiency. “After consideration, aside from some complex recordkeeping, this poses no problem – no great problem to us and consequently, we [DOE] have accepted this suggestion. It will require our approval and we intend to be reasonable. . . . [w]e felt that it was a necessary component to make that system work efficiently.” (PX 30 (DOE Memorandum of April 8, 1983 to and approved by Secretary Hodel concerning the final contract explaining the establishment of exchange rights).)

Priority for shut down reactors

Despite industry comments opposed to possible priority for shut down reactors, that provision was retained. *See* 48 Fed. Reg. at 5,464 (proposed contract, Art. VI(B)(3)(b) (“Notwithstanding the age of the SNF and/or HLW, priority 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.”); 48 Fed. Reg. at 16,590, Art. VI(B)(1)(b) (“Notwithstanding the age of the SNF and/or HLW, priority 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.”). “This type of priority is necessary to prevent reactors from waiting 20 or 30 years to be decommissioned after they finish generating electricity.” 48 Fed. Reg. 16,590, 16,593 (April 19, 1983) Supplementary Information, Art. (VI).

Final contract

On April 18, 1983 DOE issued the final Standard Contract. 48 Fed. Reg. 16,590-01.

This contract applies to the **delivery by Purchaser^{11/} to DOE of SNF and/or HLW^{12/} of domestic origin from civilian nuclear power reactors, acceptance of title**

^{11/}The Standard Contract defines the signing utility as the “Purchaser.” 10 C.F.R. § 961.11 (Preamble).

^{12/}HLW was defined as highly radioactive material resulting from reprocessing and “other (continued...) ”

by DOE to such SNF and/or HLW, **subsequent transportation** and, with respect to such material, establishes the fees to be paid by the Purchaser for the services to be rendered hereunder by DOE. The SNF and/or HLW shall be specified in a delivery commitment schedule as provided in Article V below. 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 specified in Appendix A, annexed hereto and made a part hereof, has been **disposed of**.

10 C.F.R. § 961.11 at Art. II (emphasis supplied). DOE's obligation to commence performance was not conditioned on the existence of "a facility."^{13/} The "not later than January 31, 1998" qualifies that possibility – DOE's performance was to begin no later than such time as a "facility" was operational, or January 31, 1998, whichever first occurred. *Ind. Mich.*, 88 F.3d 1272, 1276-77 (D.C. Cir. 1996); *N. States Power Co. v. Dep't of Energy*, 128 F.3d 754, 760 (D.C. Cir. 1997).

Notably, the Standard Contract did not contain an acceptance rate, despite industry comments. Relying on the Standard Contract's amendment provision, Robert Morgan, Director, Nuclear Waste Policy Act, Project Office, on June 11, 1983 (the deadline for executing the Standard Contract was June 30, 1983) wrote to John Kearney, Senior Vice President of Edison Electric Institute:

[i]ssues of concern to the industry and the Government can be reexamined, and modifications may be made to the standard contract provided that sufficient justification exists and it does not change the intent of the final rule. This is precisely the reason we have Article XV, 'Amendments' in the standard contract.

(PX 461.)

Each of the plaintiffs here entered a Standard Contract with DOE.^{14/} (PX 1CY, PX 1MY, PX 1YA.)

^{12/}(...continued)

highly radioactive material that the [NRC], consistent with existing law, determines by rule requires permanent isolation." 10 C.F.R. § 961.11 at Art. I(12)(b).

^{13/}The final Standard Contract defined "DOE facility" as "a facility operated by or on behalf of DOE for the purpose of disposing of spent nuclear fuel and/or high-level radioactive waste, or such other facility(ies) to which spent nuclear fuel and/or high-level radioactive waste may be shipped by DOE prior to its transportation to a disposal facility." 10 C.F.R. § 961.11 at Art. I(10).

^{14/}If there was any doubt that the contract was with the United States, explanatory comments prefatory to the published final contract noted that twelve commentators requested the definitions of DOE include successor agencies. DOE declined that request in part because "the Purchaser is not contracting, as such, with DOE, but rather with 'the United States of America represented by the U.S. Department of Energy.'" 48 Fed. Reg. at 16,591, Supplementary Information, Art. I.

While the Standard Contract did not contain a rate or schedule for the acceptance of SNF and HLW either on an industry-wide basis or by specific utility, it did establish a process by which a schedule and quantities were to develop. This process, although started and abandoned several times, is summarized for background purposes. See *Tenn. Valley Auth. v. United States*, 69 Fed. Cl. 515, 521 (2006) (noting that “DOE effectively short-circuited this process by its failure to perform under [the] Standard Contract”).

Beginning in April of 1991, DOE was to issue industry-wide “acceptance priority rankings” (“APRs”) based on the date of discharge of fuel from the reactor – oldest fuel first (“OFF”).^{15/} “The oldest fuel or waste will have the highest priority for acceptance, except as provided in paragraphs B and D of Article V (DOE approved-delivery commitment quantities adjusted by plus or minus 20 percent and with up to two month delivery adjustments) and paragraph B.3 of Article VI of this contract (right to reject for improper description).” 10 C.F.R. § 961.11, Art. IV(B)(5)(a) (parentheticals added). “[APR] is, simply speaking, a ranking from earliest to latest of all discharges of commercial spent fuel from utilities and some other non-utility contract holders.” (Tr. 3921 (Pollog) (“It ranks basically starting with the earliest of first discharge coming first and the last discharge at the end of the queue.”).) The age information came from the RW-859 data forms submitted to DOE periodically by the utilities.^{16/} “The APR will be used in conjunction with waste acceptance rates to be published in the 1991 Annual Capacity Report (“ACR”) as the basis for purchasers to submit delivery commitment schedules (“DCS”) beginning January 1992 for the department’s approval. In turn, purchasers will have the opportunity to exchange approved DCSs, also subject to departmental approval.” (PX 629 at HQR0011537.) “Delivery Commitment” identified “all SNF and/or HLW the Purchaser wished to deliver to DOE.”^{17/} 10 C.F.R. ¶ 961.11 at Art. V(B)(1). Also, the Purchaser could adjust the quantities committed by plus or minus 20 percent

^{15/}OFF was “based on the age of SNF and/or HLW as calculated from the date of discharge of such material.” 10 C.F.R. § 961.11 at Art. IV(B)(5)(a).

^{16/}The report ranked all the fuel by age with notation as to those utilities (as well as others) who had not paid their fees. Cumulative totals were over 22,000 tons. The report highlighted inefficiency that would result if small, haphazard and scattered amounts were picked-up. Witness testimony that campaigning would evolve and DOE would not run the program inefficiently is credited.

^{17/} The “commitment” was that of the utilities, not DOE. From the history, the reason could relate to the cited potential value of recoverables in the waste. The fuel is not truly “spent” but can, through processes beyond the pale of this Opinion, be potentially reprocessed. With transfer of title, the government will be entitled to the proceeds of the SNF. Also, “[t]he Purchaser may change the specific assemblies to be delivered so long as the SNF meets the acceptance criteria of the contract. These adjustments shall be subject to DOE’s prior written approval, which approval shall not be unreasonably withheld.” 48 Fed. Reg. at 5,463.

and the delivery schedule by two months until the submission of the “final delivery schedule.” *Id.* at Art. V(B)(2).

Adopting in part the reasoning of *Commonwealth Edison Co. v. United States*, 56 Fed. Cl. 652 665-66 (2003), this court declined to find these provisions created a binding mechanism that limited the amount of SNF DOE was contractually required to accept. Order of June 26, 2003. *See also Yankee Atomic Elec. Co.*, 2004 WL 1535686, at *1 (Fed. Cl. 2004); *Systems Fuels, Inc. v. United States*, 66 Fed. Cl. 722, 730-32 (2005); *Entergy Nuclear Generation Co. v. United States*, 64 Fed. Cl. 336, 343 n.8 (2005); *Sacramento Mun. Util. Dist. v. United States*, 63 Fed. Cl. 495, 503-05 (2005).

If the aggregate requests for acceptance exceeded the annual capacity of the disposal facility, acceptance would generally be based on the age of the fuel – “OFF”:

1. Acceptance Priority Ranking. Delivery commitment schedules for SNF and/or HLW may require the disposal or [sic] more material than the annual capacity of the DOE disposal facility (or facilities) can accommodate. The following acceptance priority ranking will be utilized:

(a) **Except as may be provided for in paragraph (b) below and Article V.D. of this contract, acceptance priority shall be based upon the age of the SNF and/or HLW** as calculated from the date of discharge of such materials from the civilian nuclear power reactor. 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.

10 C.F.R. § 961.11 at Art. VI(B)(1)(a) (emphasis supplied).

The referenced paragraph (b) provides that “[n]otwithstanding the age of the SNF and/or HLW, priority 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.” *Id.* at Art. VI(B)(1)(b). This is referred to as the “priority for shut down reactors.” Article V(D) allows DOE to accept emergency deliveries. Article V(B) establishes a process for a utility to submit the amount of waste it wished to deliver to DOE.

Background Corporate Facts

Maine Yankee, an electric utility company incorporated in Maine, commenced commercial operation of its nuclear power plant, its only electricity generating facility, located near Wiscasset, Maine, in December 1972. (MY PFF 5-7 and Def.’s Resp.) Maine Yankee last generated electricity at its nuclear power plant in December 1996 and decided in August 1997 to permanently cease operation of its plant. (MY PFF 14,16 and Def.’s Resp.)

Connecticut Yankee is an electric utility company incorporated in Connecticut. Its stock is owned by nine utilities. Its only electricity generating facility, a nuclear power plant located in

Haddam, Connecticut, commenced operations in January 1968. The 550-acre plant is now permanently shut down. (CY PFF 5-7 and Def.'s Resp.)

Yankee Atomic is an electric utility company incorporated in Massachusetts. Its only electricity generating facility, a nuclear power plant located in Rowe, Massachusetts, commenced operations in early 1960 and is now permanently shut down. The Yankee Atomic plant last generated electricity in late 1991. (YA PFF 17-18 and Def.'s Resp.)

Witnesses

The court benefitted from witness testimony, including several venerable pioneers in the nuclear industry, government regulators prior to and at the inception of the NWPAA, and those who subsequently developed the spent nuclear fuel program(s). The following persons testified at the trial of this case: Edward Abbott; John Wesley Bartlett; Thomas W. Bennet, Jr.; Ken Blair; Patrice Bubar; John Buchheit; Dan M. Collier; Daniel R. Fischel; Frank Graves; Rudy Grube; Kenneth J. Heider; David Huizenga; R. Larry Johnson; Robert Jordan; Andrew Kadak; Kathleen Jewel-Kelleher; Christopher Kouts; Michael James Meisner; Russell Mellor; Loring Mills; Ronald Milner; Robert L. Morgan; Charles W. Pennington; Thomas E. Pollog; Frances X. Quinn; Benard C. Rusche; Thomas Smith; Todd Daniel Smith; Ivan Stuart; Michael Eric Thomas; Scott Vance; George D. Whittier; Kenneth Tod Wise; and David Zabransky.

Liability for breach of contract

Breach of contract has been established. *Maine Yankee*, 225 F.3d 1336, 1343 (Fed. Cir. 2000), *aff'g Yankee Atomic Electric Co. v. United States*, 42 Fed. Cl. 223 (1998) (DOE's failure to begin disposal services by January 31, 1998 comprises a partial breach of Article II of the Standard Contract); *Gould, Inc. v. United States*, 67 F.3d 925, 930 (Fed. Cir. 1995) (law of the case doctrine bars trial courts from re-litigating issues decided by the appellate court). *Ind. Mich.*, 422 F.3d 1369, 1372-73 (Fed. Cir. 2005) (noting DOE's liability for breach of contract).

These cases were tried on a comparison of the real "breach world" to the hypothetical nonbreach world. The court was asked to find and apply an SNF acceptance rate; determine whether or not Greater-Than-Class-C radioactive ("GTCC") waste and failed fuel^{18/} would have been accepted by DOE; decide if the containers selected, purchased and loaded to store SNF would have been received by DOE for emplacement in a not-as-yet licensed Yucca Mountain repository; determine how and to what extent utilities would have exchanged not-as-yet issued allocations; divine how and to what extent DOE would have granted priority to shut down reactors; and consider other imponderables. These determinations would be factored into the equation to determine what

^{18/} "[W]hen the fuel is declared spent and being considered for either storage or shipment, it's examined to determine if it's intact or failed. And if the examination shows anything larger than what is called a pinhole in any one of these rods, it is designated as failed or damaged fuel." (Tr. 1409 (Mills).)

incremental costs the utilities had (and would have in the future through 2010) in comparison to what would have been spent in the mythical nonbreach world. *Indiana Michigan* altered the landscape considerably by parsing utility claims into actual expenditures and framing the inquiry as one of mitigation.

Damages for mitigation costs incurred

When did right or obligation to mitigate begin?

Plaintiffs seek to recover costs they incurred in mitigating the impact of DOE's impending delay and partial breach(es). That mitigatory measures were required is "beyond debate." *Ind. Mich.*, 422 F.3d at 1375. The utilities had, at minimum, a good idea that the deadline of January 31, 1998 would not be met and were required to respond appropriately. "Should plaintiffs have waited until [January] 31, 1998 and then decided what to do with their nuclear waste? The court thinks not." See *Yankee Atomic*, 2004 WL 1535688 at *6; *Tenn. Valley Auth. v. United States*, 60 Fed. Cl. 665, 674 (2004) (concluding the utility was "justified, indeed obligated, to take steps to minimize its losses in light of DOE's imminent non-performance."). "Once party has reason to know that performance by the other party will not be forthcoming, he is expected to take such affirmative steps as are appropriate in the circumstances to avoid loss by making substitute arrangements or otherwise." *Restatement (Second) Contract* § 350 cmt. b.

May 25, 1994 is the date of DOE's announcement that it would not begin performance under the Standard Contract until 2010 because its planned storage repository would not be ready until then. Notice of Inquiry, Office of Civilian Radioactive Waste Management Waste Acceptance Issues, 59 Fed. Reg. 27,007-02, 27,009 (May 25, 1994). One year later, DOE asserted it had neither a contractual or statutory obligation to accept SNF or HLW, absent a repository or interim storage facility. Final Interpretation of Nuclear Waste Acceptance, 60 Fed. Reg. 21,793-02 (May 3, 1995). The Federal Circuit in *Indiana Michigan* characterized DOE's May 25, 1994 announcement as "unequivocal," and as a result, "[i]t is beyond debate that because the government **unequivocally** announced in 1994 that it would not meet its contractual obligations beginning in 1998, the utilities were in fact **obligated to take mitigatory steps.**" *Ind. Mich.*, 422 F.3d at 1375 (emphases supplied).

Defendant asserts Connecticut Yankee's and Maine Yankee's decisions to rereack (and certain costs incurred) before May 25, 1994 were too early to be mitigation. (Def.'s Br. Concerning the Effect of *Indiana Michigan*, pp. 8-9.) Plaintiffs respond that the Federal Circuit determined that May 25, 1994 was the *last* possible date that the right (or obligation)^{19/} to mitigate arose. *Indiana Michigan*'s citation to the 1994 DOE announcement was a benchmark of when there was no question the mitigation duty or right commenced – the latest, not the earliest date. An earlier date for a particular utility was not foreclosed, but rather dependent upon circumstances known at that time. "Mitigation is appropriate where a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage." *Ind. Mich.*, 422 F.3d at 1375 (citing *Robinson*, 305 F.3d

^{19/}Defendant maintains that mitigation is a duty, not a right.

at 1334 (citing *Restatement (Second) of Contracts* § 350 cmt. b.). See also *First Heights Bank, FSB v. United States*, 422 F.3d 1311,1316 (Fed. Cir. 2005) (constraining mitigation by what is fair and reasonable under the circumstances) (citing *Home Sav.*, 399 F.3d at 1353). Reasonableness, in light of particular facts and circumstances, is plaintiff-specific. The 1994 date is the latest date when mitigatory obligations arose – whether that obligation or right ripened earlier is dependent on the facts and circumstances of each case and will be examined in appropriate circumstances. With DOE’s May 25, 1994 statement, there was no question – it was “beyond debate” – that the **obligation** to mitigate arose. That it could be debated prior thereto was neither raised nor resolved.

To avoid issues concerning the possible application of the statute of limitations, 28 U.S.C. § 2501, mitigation expenses that pre-date the complaint by six-years may be considered. *But see Franconia Assocs. v. United States*, 536 U.S. 129, 144 (2002). Yankee Atomic’s Complaint was filed Feb. 18, 1998; Connecticut Yankee’s Complaint was filed March 4, 1998; Maine Yankee’s Complaint was filed June 2, 1998.

When does it end?

What is the date of the “claim?”

At trial, plaintiffs presented damage claims that included, in addition to past expenses, future damages out to 2012 (2011 for Maine Yankee). These damage models were complex and evolved pursuant to the court’s pre-trial procedure designed to vent accounting issues and limit evidentiary issues. *Yankee Atomic*, No. 98-126C (November 4, 1998) (Pre-trial Order). Following the Federal Circuit’s decision in *Indiana Michigan*, supplemental briefing was ordered.

The parties’ view of “past” or “incurred” damages in post-*Indiana Michigan* briefing and argument were divergent. Defendant would limit damages to those incurred (*i.e.*, paid) as of the date of the filing of the respective complaints in 1998, relying on *Indiana Michigan*, wherein the Federal Circuit stated that “[b]ecause [the nuclear utility’s] claim is premised upon the government’s partial breach, its damages were limited to those costs incurred **prior to the date of its suit.**” 422 F.3d at 1376-77 (emphasis added). Plaintiffs urge expanding the definition of “past” to encompass subsequent expenses– at least to the date of trial.

According to plaintiffs, until recently, amending or supplementing their complaints would be an unnecessary formality. Defendant disagreed, characterizing an amended or supplemental complaint as jurisdictional prerequisite to consideration of post-complaint incurred damages. (Def.’s Resp. to Pls.’ Supp. Post-Trial Br. Addressing Impact of *Indiana Michigan*, filed January 5, 2006 at 2.)

Discovery, trial and original post-trial briefing encompassed damages through 2011 (2012 for Maine Yankee) including actual-incurred expenses that post-date the filings of the complaints here. Defendant has not alleged prejudice as to consideration of incurred costs. “[T]he Yankees provided actual cost information to the Government against which discovery was taken, and an audit was performed through 2001 (for Yankee Atomic and Connecticut Yankee) and through 2002 (for

Maine Yankee). Actual cost information through these years likewise was provided as evidence to the Court at trial.” (Def.’s Resp. to Pls.’ Suppl. Post-Trial Br. Addressing Impact of *Indiana Michigan*, filed Jan. 5, 2006 at 8, citing Tr. 2982, 3247-48, 3254, 3259.)

At post-*Indiana Michigan* oral argument, counsel for the defendant admitted that with an amended or supplemental pleading, incurred costs presented at trial would be properly before the court. “Your Honor, if the Plaintiffs filed a motion for leave to add that to this case through an appropriate amended or supplemental complaint, there would be no reason to relitigate those costs that we have already litigated here, so we would not have a problem doing that so long as we’re not getting into the cost-estimate years.” (Post *Ind. Mich.* Oral Argument Tr. 42.) Defendant suggested, albeit in the alternative and before the Federal Circuit’s decision in *Indiana Michigan*, that damages be limited to those through the date of trial. (*See* Def.’s Initial Post-Trial Br. at 71 n.22.)

In other pending SNF cases, defendant has not objected to amended complaints to cover damages actually incurred after the filing of the original complaint, providing that there was sufficient time for discovery and examination prior to trial.

The Government has been consistent in its interpretation of the *Indiana Michigan* decision in the other spent nuclear fuel cases pending before the Court. In *Systems Fuels, Inc. v. United States*, No. 03-2624C, the Government has maintained that trial in that case should consider damages incurred prior to the date that Systems Fuels filed its complaint in this Court, November 2003. In *Southern Nuclear Operating Co. et al. v. United States*, No. 98-614C, the Government agreed that, if Southern Nuclear filed an amendment to its complaint and consolidated that amended complaint with its original complaint in October 2005, that the damages to be considered in the trial that began in October 2005 could include damages incurred through December 31, 2004, because the Government had an opportunity to examine the basis for these claimed damages during discovery in that case. . . . Finally, in *Pacific Gas and Electric Co. v. United States*, No. 04-0074C. . . the Government simply explained that it may oppose, and the Court may deny, a motion to amend the complaint if the plaintiff seeks to amend its complaint too close to the date scheduled for trial because of the prejudice to the Government from such an amendment. If the complaint is amended too close to the date of trial, the Government may not have sufficient time to properly examine the damages claimed and the support for those damages and would object to the amendment on these grounds.

Def.’s Resp. to Pls.’ Mot. for Leave to File its Am. and Suppl. Compl. filed January 19, 2006 in *Florida Power and Light Co. v. United States*, No. 98-483C (Fed. Cl.) at 7-8.

We do not oppose [plaintiff’s] motion for leave to amend and supplement its complaint or [plaintiff’s] proposal that any trial on damages, when scheduled, include consideration of damages allegedly incurred by [plaintiff] through December 31, 2005. However, the leave requested should be conditioned on allowing the Government an enlargement of the presently-scheduled discovery deadline . . . to allow for an appropriate investigation of the claimed damages.

Defs.' Resp. to Pls.' Motion for Leave to File its Am. and Suppl. Compl. filed March 10, 2006 in *Wisc. Elec. Power Co. v. United States*, No. 00-697C (Fed. Cl.) at 1.

“The Government has **never** suggested in the spent nuclear fuel cases that a plaintiff cannot seek leave to file a supplemental complaint pursuant to Rule 15(d).” Resp. by Def.-Appellee, the United States, to Pl.-Appellant’s Pet. for Panel Reh’g, at 12, filed Nov. 10, 2005 in *Ind. Mich. Power Co. v. United States*, No. 04-5122 (Fed. Cir.). “The government has never opposed the filing of supplemental or amended complaints when it doesn’t prejudice the government.” Yankee Atomic’s Reply on its Mot. to Amend Compl., No. 98-126C (filed April 17, 2006), Exh. 1 (Tr. in *System Fuels, Inc. v. United States*, No. 03-2623C, 12:7-9, Mar. 14, 2006) (gov’t counsel.). *See also Tenn. Valley Auth. v. United States*, 69 Fed. Cl. 515, 523-24 (2006) (“[U]nder [the Rules of the Court of Federal Claims (“RCFC”)] 15(a), (b) and (d), . . . TVA has sought and pursued an amended and supplemental complaint alleging damages through [cut-off date of damages set prior to trial and before discovery was concluded].”); *Pacific Gas and Elec. v. United States*, 70 Fed. Cl. 758, 764-65 (2006) (similar).

On May 6, 2006, the court granted in part plaintiffs’ Motion to Amend Complaint, filed February 27, 2006. Plaintiffs’ Motion proposed that, pursuant to RCFC 54(b), on the basis of trial proceedings to date, a partial final judgment be entered for incurred damages with subsequent partial judgments to issue thereafter as recoverable incurred costs are awarded. Adopting the reasoning of *Pacific Gas & Electric Co. v. United States*, 70 Fed. Cl. 758 (2006), pursuant to RCFC 15(a), (b) and (d), the Complaints were deemed amended and supplemented to encompass trial evidence in the record and claims for costs incurred by Yankee Atomic and Connecticut Yankee through 2001 and costs incurred by Maine Yankee through 2002. Damage claims beyond these dates were dismissed, without prejudice to their timely assertion in a subsequent action(s).^{20/}

When is past not past?

Inquiry does not end, however. The parties quarrel over the definition of incurred or past expenses. At trial (and in the reports of plaintiffs’ economic expert Dr. Wise), damages claimed through 2002 were labeled “past,” and 2003 and beyond, “future.” When Dr. Wise’s reports were submitted in March of 2003, 2002 was indeed “past,” thus his use of the word “past” referred to the date of his analysis. In reality, costs after 2001 for Yankee Atomic and Connecticut Yankee (after

^{20/}The defendant had full discovery and trial venting, and certainly would not be prejudiced if costs from the date of the filing of the Complaints here through 2001 or 2002 were resolved at this time and in this action. Here, the Complaint clearly encompassed subsequent costs and was filed before the Federal Circuit’s *Indiana Michigan* decision. *See Brandon v. Holt*, 469 U.S. 464, 469-71 (1985). “In the case of the continuing contractual obligations owed after an initial suit for partial breach has been filed, subsequent claims for future damages are considered to accrue for the purposes of the statute of limitations at the time such damages are incurred.” *Ind. Mich.*, 422 F.3d at 1378. *See also Restatement (Second) of Judgments* § 26(1)(b).

2002 for Maine Yankee) were estimates. Accordingly, only those costs incurred (paid) through 2001 for Yankee Atomic and Connecticut Yankee, and through 2002 for Maine Yankee, which were subject to the government's verification through the court's pre-trial audit process in this case, will be considered in this action.^{21/}

Standards for recoverability of incurred mitigation costs

There exist elements of proof that must be met to qualify for a recovery of incurred mitigation expenditures. "The presence of a duty to mitigate does not perforce make the pre-breach costs incurred by Indiana Michigan to store its SNF recompensable; [Indiana Michigan] must prove foreseeability, causation, and reasonableness." Plaintiffs must establish that "(1) the damages were 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." *Ind. Mich.*, 422 F.3d at 1373 (citing *Energy Capital Corp. v. United States*, 302 F.3d 1314, 1320 (Fed. Cir. 2002)).

Mitigation efforts must be reasonable. The Federal Circuit in *Indiana Michigan* confirmed the application of this bedrock principle in ascertaining pre-breach damages for DOE's partial breach:

[W]e see no reason why efforts to avoid damages in contemplation of a partial breach should not . . . be recoverable. Section 350, comment b of the Restatement of Contracts advises that "once a party has reason to know that performance by the other party will not be forthcoming, he is expected to take such affirmative steps as are appropriate in the circumstances to avoid loss by making substitute arrangements or otherwise." *Indiana Michigan* is "not precluded from recovery to the extent that it has made reasonable but unsuccessful efforts to avoid loss."

422 F.3d at 1375 (citing *Restatement (Second) of Contracts* §350(2)). "[M]itigation damages are available for pre-breach costs should the obligee elect to treat the obligor's breach as partial, while pre-breach damages for anticipatory breach are available should a party elect to treat the obligor's breach as total." *Id.*

"Mitigation is appropriate where a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage." 422 F.3d at 1375 (citing *Robinson*, 305 F.3d at 1333 (citing *Restatement (Second) of Contracts* §350 cmt. b^{22/})). "[W]hen mitigating

^{21/}Indeed, limiting costs to those incurred may work to plaintiffs' advantage. Actual costs were generally higher than estimates. (Pls.' Supp. Post-Trial Br. Addressing Impact of *Indiana Michigan*, filed Dec. 6, 2005 at 6.)

^{22/}"The Restatement of Contracts is recognized as an appropriate source of authority in
(continued...)

damages from a breach, a party ‘must only make those efforts that are fair and reasonable under the circumstances.’” *Old Stone Corp. v. United States*, 399 F.3d at 1353 (quoting *Robinson*, 305 F.3d at 1333); *see also* 11 *Corbin on Contracts* § 57.11, at 311 (2005 ed.) (“The doctrine of avoidable consequences merely requires reasonable efforts to mitigate damages.”); 3 *Dobbs: Law of Remedies* § 12.6(1), at 127 (2d ed. 1993) (“[T]he damage recovery is reduced to the extent that the plaintiff could reasonably have avoided damages he claims and is otherwise entitled to.”).

Defendant has the burden of showing that plaintiffs’ mitigation efforts were unreasonable. *Old Stone Corp. v. United States*, 450 F.3d 1360 (Fed. Cir. 2006) (government did not meet burden to establish actual expenditures were not reasonable); *Tenn. Valley Auth. v. United States*, 69 Fed. Cl. 515, 523 (2006) (citing *Restatement (Second) of Contracts* § 350(2); *First Heights Bank, FSB v. United States*, 422 F.3d 1311, 1316-17 (Fed. Cir. 2005); *Long Island Savs. Bank, FSB v. United States*, 67 Fed. Cl. 616, 642 (2005)).

Accordingly, foreseeable and reasonable costs incurred prior to, but substantially caused by, DOE’s announced partial breach(es) are recoverable. This court previously recognized the recoverability of pre-partial breach mitigation expenses – that is expenses incurred prior to January 31, 1998. *Yankee Atomic Elec. Co.*, 2004 WL 1535688 at *6-7 (Fed. Cl. June 28, 2004); Order of August 29, 2003 at 3 (“[T]he issue with respect to mitigation of damages is grounded in a determination as to reasonable commercial judgment on the part of plaintiff.”) (citing *N. Helex Co. v. United States*, 207 Ct. Cl. 862, 883, 524 F.2d 707, 718 (1975)).

Damages categories

Plaintiffs’ trial evidence of damages fell into three cost categories: wet-pool-related, Independent Spent Fuel Storage Installation (“ISFSI”) construction (dry storage) and ISFSI operations. Following the limitations imposed as a result of the *Indiana Michigan* decision precluding future damages, because no ISFSI operation costs have been “incurred” during the time period covered by this litigation, no damages in that category are relevant at this time.

Upon due consideration, the court concludes that, with some exceptions, the plaintiffs’ mitigation expenditures here meet the standards of *Indiana Michigan*.

^{22/}(...continued)

contract cases.” *Hansen Bancorp, Inc. v. United States*, 367 F.3d 1297, 1308 n.9 (Fed. Cir. 2004). Also, contract principles governing the sale of goods provide “useful guidance in applying general contract principles.” *Hughes Commc’ns Galaxy, Inc. v. United States*, 271 F.3d 1060, 1066 (Fed. Cir. 2001). Damages for partial breach include the costs incurred by the seller in mitigation. “A buyer can obtain cover damages even if it has not cancelled the contract and has accepted a partial delivery” 24 *Williston on Contracts* 4th Ed., § 66.44, pp. 610-613.

Foreseeability

Mitigation damages must have been “reasonably foreseeable by the breaching party at the time of contracting.”^{23/} *Ind. Mich.*, 422 F. 3d at 1373. That plaintiffs would incur storage expenses of the nature and magnitude sought here was reasonably foreseeable. *Yankee Atomic*, 2004 WL 1535688, at *7 (June 24, 2003). “[T]he intent of the NWPAs and the parties to the Standard Contract was to avoid the construction by utilities of additional at-reactor storage after January 31, 1998.’ DOE’s failure to perform under the Standard Contract thus has led to the very thing the NWPAs and the Standard Contract were designed to forestall, *i.e.*, the construction of dry storage facilities for spent nuclear fuel at nuclear power electricity generating plants throughout the United States.” *Tenn. Valley Auth.*, 60 Fed. Cl. at 674 n.10, citing *Commonwealth Edison*, 56 Fed. Cl. at 667.

Regulators were aware that utilities faced enormous storage costs. DOE planning documents cited avoidance of these costs as a program goal. Whether aspirational goals rather than contractual requirements, the court nevertheless relies on these statements for foreseeability as well as what would have been reasonable or unreasonable performance by DOE, discussed *infra*. See generally *Fed. Group, Inc. v. United States*, 67 Fed. Cl 87, 103-04 (2005).

The September 13, 1983 Draft Mission Plan^{24/} summarized DOE’s prior planning meetings and decisions and recited DOE’s planned “acceptance rate during the first five years such that no utility would have to build additional storage facilities after 1998.” (PX 633 at PNL-173-1283). The absence of a repository would not delay the acceptance of SNF; the acceptance rate after five years would equal the annual industry-wide rate discharge of SNF; if necessary, utilities would purchase rights in the shipping queue; storage could be at a geological repository, “buffer storage,” and/or a monitored retrievable storage facility (“MRS”) and DOE could take title to the SNF, place it in dry storage casks and pay a rental fee to the utility for on-site storage. (*Id.*, at PNL-173-1283-84.) Even in 1983, regulators noted the “current best schedule estimate of first repository operation is 2002, four years later than the initial fuel acceptance date.” (PX 633 at PNL-173-1285.)

^{23/}Indiana Michigan invested in a private storage facility that had not been licensed or built. The court found it was a speculative venture for Indiana Michigan that could not have been foreseen. *Ind. Mich.*, 60 Fed. Cl. at 658-59. Subsequently, NRC granted a license to Private Fuel Storage, LLC to construct and operate an ISFSI in Skull Valley, Utah. The facility is intended for storage of up to 44,000 tons of SNF from domestic nuclear power plants. www.nrc.gov/reading-rm/doc-collections/news/2006/06-028.html (last visited July 5, 2006).

^{24/}The Mission Plan was “to provide the informational basis sufficient to permit informed decisions to be made in carrying out the repository program and the research, development, and demonstration programs required under [the NWPAs].” 42 U.S.C. § 10221(a). (Def.’s Resp. to YA PFF 60.)

The annual Waste Acceptance Schedule in the December 20, 1983 Draft Mission Plan was 1800 MTUs for the first five years starting in 1998, then 3000 MTUs. (PX 636 at CTR-042-1072.) “Waste accepted during 1998 through 2002 will come preferentially from those reactors that would otherwise have insufficient on-site storage. The increase in the backlog during these years can be accommodated by limiting the amount of waste accepted from reactors with sufficient storage.” (*Id.* n.2). These matters were contemplated by DOE at the time of the signing of the Standard Contract.

An OCRWM informational meeting sponsored by the DOE on December 12-15, 1983, subsequently published and distributed in February of 1984, included a “Program Overview” by Robert Morgan, Acting Director. Given close in time to the signing of the Standard Contract, Director Morgan’s statements have substantial relevance. Director Morgan explained that:

[t]he basic strategy . . . is that beginning in 1998, utilities will not have to provide any additional storage facilities on site. During the first year of operation of the repository in 1998, we should be receiving fuel at a rate so that no utility would have to add any further storage facilities either on site or at another location. After the initial operation of the repository through the first few years, we would anticipate that the weight [sic (probably “rate”)] of acceptance of fuel should be the rate of discharge from the reactors that are in operation at the time so, by the year 2000 or 2001, we should be accepting in the repository the amount of fuel as being discharged from reactors.

(PX 678 at SN069599-600.)

Richard Lawrence, Acting Director of the OCRWM, in his February 22, 1984 Statement to the House Subcommittee on Energy Conservation and Power, declared that by meeting the objective of the NWPA and with an appropriate waste acceptance schedule “this will initially preclude the need for additional at-reactor storage by nuclear utilities after January 31, 1998. . . .” (PX 378, PNL-173-0228.)

Program objectives of the NWPA in a March 28, 1984 Draft Mission Plan included DOE’s acceptance of waste at reactor sites so that utilities would not have to build additional storage capacity beyond 1998 if the repository was delayed. (PX 642 at 1-2.) There was early awareness that increasing storage shortages at utilities would require the use of new technologies not yet fully developed. (*Id.*, 3-D-2.)

A March 30, 1984 internal Memorandum from Michael J. Lawrence, Acting Director of OCRWM seeking comments on Draft Civilian Radioactive Waste Management Program stated that acceptance would be at a rate “such that no utility will have to provide additional storage capacity after January 31, 1998.” (PX 643 at 2-1.) “Waste accepted during 1998 through 2002 will come preferentially from those reactors that would otherwise have insufficient on-site storage. The increase in the backlog during these years can be accommodated by limiting the amount of waste accepted from reactors with sufficient storage through brokering arrangements.” (*Id.* at Table II-1.) Exchanges, or “brokering arrangements” after 1998 were contemplated. “[A]fter 1998, individual utilities who actually realize this need (for additional on-site storage) will arrange for the right to ship

spent fuel to the Department from a utility who is next in the queue in shipment allocation (subject to prior approval by the Department based on submittal of a request no less than six months prior to the scheduled delivery date). The use of such brokering arrangements should prevent the need for any utility to expand on-site storage and minimize transshipments.” (*Id.* at 2-4.) Thereafter, the rate would increase “until, beginning with operation of the second repository, it is equal to or greater than the actual discharge rate of spent fuel each year.” (*Id.* at 2-1.) Annual discharge rates taken from government records ranged between 2700 and 2900 in the years from 1998 to 2004. (*Id.* at Table II-1.)

To eliminate the need for additional at-reactor storage after January 31, 1998, the initial waste acceptance level would have to be more than 2800 MTUs. On July 23, 1984, Mr. Lawrence, then as Manager of DOE Richland Operations Office wrote to Mr. Rusche, Director OCRWM that seventeen years of additional at-reactor cost after 1997 would be about one billion dollars in 1983 estimated costs, “assuming storage casks are utilized,” a concession to the foreseeability of costs in the magnitude asserted. (PX 647 at 1.) And, “[i]f title to the fuel passes to the DOE on January 31, 1998, as implied in the [Standard Contract], the financial responsibility for this post-1997 storage could rest with DOE. This cost has not yet been considered in the Nuclear Waste Fund Fee Adequacy Analysis.” (*Id.* at 2.) Additional comments were that, the minimum acceptance rate, based on the NWPA should be annual generation rate, there noted as being consistent with the goal of avoiding additional storage after 1998, the initial rate would be 2800 MTUs per year increased to 3,500 per year in six years. However, as a practical matter, the initial rate would probably be 400 MTUs. (*Id.* at 3.) Two thousand MTUs would be required initially if acceptance was selective, given only to those facing loss of full core reserve. DOE’s liability for failure to meet contractual commitments was estimated at one billion dollars. Transportable storage casks were predicted to be available and licensable in 1986-1987 for shipment in 1998. (*Id.* at 2.) This is a mark-up of the 1984 draft which provided in 1984 that transportable storage casks may be feasible. (PX 647 at 3-C-5.)

Trial record testimony was that the intent not only of the NWPA, but of the parties (including the government) at the time of contracting was to avoid the tremendous costs of additional on-site storage. (Tr. 3682 (Morgan); 6/28/04 Dep. Desig. 4/22/02 Barrett, at 55-56 and 59; 7/24/04 Dep. Desig. 5/10/02 Milner, at 73.)

Separate contracts for possible pre-1998 interim storage needs were contemplated under the once-proposed Federal Interim Storage contemplated by section 136(a)(1) NWPA, 42 U.S.C. § 10156(a)(1), with fees on a sliding scale depending on the needs, but as high as \$670 a kilogram – \$670,000 per MTU. For purposes of illustrating the magnitude of costs contemplated at the time of contracting and in 1983 dollars, the interim storage costs for Yankee Atomic’s SNF would have been \$84 million dollars. (DX 1 at SNO069675; 48 Fed. Reg. 54391-02 (December 2, 1983).)

Accordingly, the court concludes that absent DOE performance the need to spend substantial sums for additional at-reactor storage was reasonably foreseeable at the time of contracting.

Substantial causal factor and commercial reasonableness

Defendant's position is that (1) plaintiffs' storage costs were not incremental to DOE's delayed performance or partial breach, but were motivated in whole or in part by business concerns; (2) costs, or at least some of them, were not reasonable. As for the ISFSI decisions, defendant argues that "had DOE commenced performance in 1998 under an oldest-fuel-first queue – regardless of the acceptance rate applied to that queue – all three Yankees would have constructed dry storage facilities to reduce costs and to facilitate, among other things, their decommissioning efforts. Therefore, as with the post-1998 ISFSI costs, any costs incurred by Maine Yankee and Yankee Atomic pre-1998 for their ISFSIs would have been incurred even if DOE had performed its contractual obligations." (Def.'s Supp. Br. on *Ind. Mich.* at 11.) Defendant makes the same argument about reracking and wet pool operational costs, asserting they would have been incurred even if DOE had performed; therefore, DOE's partial breach could not have been a substantial causal factor.

Plaintiffs assert they need not establish precisely how much SNF DOE would have removed and when; rather their burden is to establish that DOE's failure to commence performance was a substantial causal factor in their decisions to rerack and build dry storage. Plaintiffs also contend their decisions to implement dry storage and to rerack were "reasonable" mitigation responses, citing *Chain Belt Co. v. United States*, 127 Ct. Cl. 38, 115 F. Supp. 701 (1953), and argue they would have been able to eliminate certain wet-pool operational expenses if DOE had commenced performance.

In *Indiana Michigan*, the Federal Circuit upheld the finding that Indiana Michigan's decision to perform a full rather than a partial rerack (its asserted mitigation effort) "was purely a business judgment which it would have had to pursue irrespective of DOE's partial breach." 422 F.3d at 1376. 1376. See also *Sacramento Municipal Util. Dist.*, 70 Fed. Cl. at 373 (finding certain costs were not substantially caused by DOE's impending breach); *Tenn. Valley Auth.*, 69 Fed. Cl. at 543 (awarding as mitigation damages, the costs of constructing and operating dry storage except for a \$25,000 expense to study whether the multi-purpose canister could be used for transportation).

The court's analysis in determining commercial reasonableness and substantial causation here is also informed by *Hughes Communications Galaxy v. United States*, 271 F.3d 1060, 1066-68 (Fed. Cir. 2001). In *Hughes*, the Federal Circuit affirmed an award of the nonbreaching parties' mitigation costs. By contract the National Aeronautics and Space Administration ("NASA") agreed to use its "best efforts" to launch ten of Hughes' HS-393 satellites on future Space Shuttle missions no later than September 30, 1994. Before that date, following the tragic explosion of the Space Shuttle Challenger in January of 1986, shuttle operations were suspended. President Reagan announced there would be no more commercial satellite launches. In mitigation, Hughes launched ten satellites, three HS-393s and six HS-601s and one HS-376, on private expendable launch vehicles ("ELV"). The HS-393 was not well suited for ELV launch, so Hughes developed the HS-601 which was more powerful but had higher launch costs. The Federal Circuit upheld findings that Hughes would not have developed the HS-601 if the government had not breached and that the development of the HS-601 was a commercially reasonable substitute.

As the victim of the breach, Hughes was within its rights to obtain commercially reasonable substitute launch services even if the substitute services were not identical to those covered by the LSA. The Court of Federal Claims thus did not clearly err in holding that Hughes successfully covered by launching HS-601s on ELVs.

271 F.3d at 1067.

Hughes sued for damages for its increased launch costs. The Court of Federal Claims modified damage theories presented by the experts, determining that using its “best efforts” in the nonbreach world, NASA would have launched only five of the maximum ten satellites. The court awarded the actual costs of the three ELV launches of the HS-601, took the average of those costs to determine what the “reasonable” cost of launch four and five would have been (in lieu of Hughes’ increased costs of, but added benefits from, launching the HS-601) and added that extrapolated sum to the mitigation cost award. Affirming, the Federal Circuit cited bedrock contract principles. Damages are to place the nonbreaching party in “as good a position as he or she would have been had the breaching party fully performed.” 271 F.3d at 1066 (citing *San Carlos Irrigation & Drainage Dist. v. United States*, 111 F.3d 1557, 1562-63 (Fed. Cir. 1997)). However, damages must have been foreseeable at the time of contracting, and “the natural and proximate result of the breach.” 271 F.3d at 1066 (citing *Locke v. United States*, 151 Ct. Cl. 262, 283 F.2d 521, 526 (Ct. Cl. 1960)). The Federal Circuit found no abuse of discretion in the Court of Federal Claims’ (1) determination that in the nonbreach world, using “best efforts,” NASA would have launched 5 of the 10 Hughes satellites; (2) calculation of the average cost of the three actual launches and application of that average to the remaining two in lieu of an expert’s calculation; or (3) selection of parameters for calculating cost escalation other than those used by an expert. 271 F.3d at 1068-70.

Regardless of rate, these plaintiffs are faced with at least a twelve-year delay in commencement of performance. With due regard to the long lead time required for these mitigation decisions, the evidence establishes that the mitigating decisions and resulting expenditures were commercially reasonable, and substantially caused by DOE’s impending partial breach(es) and delay(s). *S. Calif. Edison v. United States*, 422 F.3d 1319, 1337 (Fed. Cir. 2005). In the nonbreach world, the evidence shows that Maine Yankee and Connecticut Yankee would not have reracked and plaintiffs would not have built expensive dry storage.

Reasonable certainty

Reasonable certainty applies in at least two aspects of these cases. First, the amount of otherwise appropriate incurred mitigation costs must be established with reasonable certainty. Here, voluminous supporting data from the utilities was exchanged in the informal pre-trial audit procedure that continued through trial, eliminating issues concerning whether a cost was really incurred and for what purpose. Secondly, in determining whether a decision was substantially caused by DOE’s delay, reasonable not absolute certainty suffices. “The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable.” *Locke*, 283 F.2d at 524. “[W]hen damages are hard to estimate, the burden of imprecision does not fall on the innocent party.” *La Salle*, 317 F.3d at 1374. *See S. Cal. Fed. Sav. & Loan Ass’n v. United States*, 422 F.3d 1319, 1336 (Fed. Cir. 2005) (applying

the threshold evidentiary standard for a damage award of sufficient evidence “from which the court could ‘make a fair and reasonable approximation of the damages,’” citing *Bluebonnet Sav. Bank v. United States*, 266 F.3d 1348, 1357 (Fed. Cir. 2001)). Also, mitigation decisions must be commercially reasonable. *Hughes Commc’ns Galaxy*, 271 F.3d at 1067 (“As the victim of the breach, Hughes was within its rights to obtain commercially reasonable substitute launch services.”).

Reasonableness of the costs incurred was generally satisfied here by regulatory venting and rate-setting by the Federal Energy Regulatory Commission (“FERC”). Accordingly, all three plaintiffs here are subject (and have been subject) to regulatory approval of the substantial capital expenditures for long-term storage of their SNF/HLW and other costs sought in this action. While an exposition on the nature and extent of rate-making is beyond the scope of this Opinion, it is sufficient to note generally that vigorous advocacy and opportunities for intervention, exposition and venting of the expenses occurred there.^{25/}

To the extent that the court’s analysis depends in part on opinions expressed by plaintiffs’ expert Frank Graves, defendant’s objection to the lack of certainty in the exchange market on which he bases his analysis is discounted. As the court previously concluded pre-trial, in denying a motion in limine to preclude Graves’ testimony, defendant’s breach is established. That breach prevented the very market defendant assails as speculative because there is no “real” market data on exchanges of non-existent allocations for pick-ups that have not been scheduled. There is no market data because defendant’s breach thwarted this possibility. *Yankee Atomic Co.*, 2004 WL 1535686 at *4.

What was done – a look at the breach world

Evidence and testimony, largely unchallenged, described the extensive time and expense incident to planning, designing, and constructing additions or modifications to these nuclear power plants to accommodate additional storage, wet or dry. Six to twelve months for ISFSI planning and procurement, six to fourteen months for license application, fifteen to twenty-two months for NRC review and another six to twelve months for construction preparation, appeared standard. (DX 160 at YDK042463.)

Utility awareness of delay and commencement of mitigation

All three plaintiffs made mitigation decisions before May of 1994, the date cited in *Indiana Michigan* by which it was beyond debate that the obligation to mitigate arose. Mindful that the

^{25/}In *Town of Norwood, Mass. v. F.E.R.C.*, 80 F.3d 526, (D.C. Cir. 1996), ratepayers appealed a FERC order authorizing the addition of decommission and operating costs to the rate base and recovered from ratepayers. The Appeals Court, noting the contract between Yankee Atomic and the New England Power Company allowed “full recovery,” upheld the Commission’s decision to allow 100% of its recovery of decommissioning costs and operating expenses (\$68.9 million). (See YA PFF 28, 148; CY PFF 29, 163; MY PFF 166.)

mitigation decisions here were made by three separate plaintiffs, many, if not most, of the DOE's statements, are cited by all three utilities. Therefore, the following discussion applies to all three.

Plaintiffs assert that shortly after signing their respective Standard Contracts in 1983, they became increasingly less confident, then apprehensive, then resigned to DOE's delay and accordingly took reasonable mitigatory measures, some before May 25, 1994.

As confirmed in company documents cited hereinafter and supported by witness testimony credited by the court, plaintiffs closely monitored DOE's developments with respect to the SNF program as planning, budgeting, applications, regulatory approvals, and the like necessitated industry awareness. In the late 1980s and throughout the 1990s, DOE correspondence and announcements caused Yankee Atomic, Connecticut Yankee and Maine Yankee to reasonably anticipate that DOE would not commence acceptance of SNF by January 31, 1998 as required by the Standard Contract, and would not commence performance until 2010 at the earliest.

Shortly after the NWPA was enacted and the Standard Contracts signed, DOE's public statements raised concern in Congress and with nuclear utilities that the January 31, 1998 deadline was not going to be met. While defendant points out that many of these statements concern compliance with the NWPA, not the Standard Contract, as DOE's obligations under the Act and the Standard Contracts are significantly co-extensive, plaintiffs' growing anxiety (later confirmed) was justified.

DOE's June 1987 Mission Plan Amendment stated acceptance at a permanent repository would not commence until 2003 and then only at a rate of 400 MTUs annually. (PX 99 at 6, 10, 61.) In DOE's November 1989 "Reassessment" Report to Congress, that date slipped to 2010. (PX 101 at vii and 9-11; PX 99 at 61.) Tom Bennet joined Yankee Atomic in 1995 after nine years as a financial manager at Vermont Yankee. He was the Vice President and Chief Financial Officer of Yankee Atomic and Connecticut Yankee. As such, Mr. Bennet was responsible for all financial matters, including long-term cost estimates, FERC submissions and the damage calculations submitted in this matter. Mr. Bennet testified the 1989 OCRWM report to Congress telegraphed numerous problems with the repository program and "really did a thorough assessment of the project as being in trouble. In fact, itremared [sic] that the view at the time was that repository operations would be delayed until 2010. So 6 years into the contract, they were looking at a 12-year delay.") (Tr. 1718-19.)

In its November 1989 "Reassessment Report to Congress," DOE predicted a 2010 repository commencement date. (PX 101 at vii, 9-1.)

DOE suggested in the 1987 Mission Plan and the 1989 "Reassessment" that the 1998 start date could be met by accepting SNF at a Monitored Retrievable Storage ("MRS") facility. During 1985-1987, DOE was concerned about missing the 1998 commencement date and proposed to Congress a plan to utilize an MRS as an interim solution until the repository was operational. *See Tenn. Valley Auth. v. United States*, 69 Fed. Cl. 515, 520 (2006). Amendments to the NWPA in 1987 included provisions for an MRS subject to several conditions. *See Nuclear Waste Policy*

Amendments Act of 1987, Publ. L. No. 100-203, §§ 5001-5065, 101 Stat. 1330, 1330-227 to 1330-255 (1987) (codified in scattered sections of Title 42 of the United States Code, including 42 U.S.C. § 10168.). First, assuming a location site was “negotiated” (and efforts of an MRS negotiator were not successful), an MRS could not be built until a permanent repository site had been selected and approved. 42 U.S.C. § 10168(d)(1). Also, the total capacity of the MRS was limited to 10,000 MTUs until the permanent repository became operational. 42 U.S.C. § 10168(d)(3). In its 1989 Reassessment, DOE estimated it would not receive construction authorization for a repository until 2004. (PX 101 at x (“the current linkages between the repository and the MRS program make it impossible for the DOE to accept waste at an MRS facility on a schedule that is independent from that of the repository.”), 12 (“If the current statutory linkages to the repository are maintained, an additional delay of 5 years would result, with startup estimated at 2007 for the basic MRS facility.”).)

As noted in *Indiana Michigan*, DOE made announcements in 1987 and 1989 “projecting delays in the scheduled January 1998 acceptance start date.” 422 F.3d at 1376.

DOE’s published ACRs for 1991 and 1992 assumed an operational MRS for ten years starting in 1998. The lowered acceptance rates in those ACRs reflected the MRS’s pre-repository 10,000 MTUs maximum capacity. The 1994 combined ACR and Annual Priority Ranking (“APR”) published in March, 1995 continued to show an acceptance rate based on the limited capacity of an MRS. (PX 63.)

David Zabransky at the time of trial was the Contracting Officer for the Standard Contract and previously served as the Contracting Officer’s technical representative from July of 1995 to 2002 (Tr. 4110-11.) Prior to that time he had been employed at Wisconsin Electric Power Company where he monitored DOE’s performance. Mr. Zabransky testified that in the 1992 time frame “there was some uncertainty as to whether [DOE] would actually come and perform in 1998,” so storage plans did not assume DOE would timely perform. (Tr. 4156.)

DOE’s May 1994 Federal Register Notice stated that DOE would not be able to begin disposing of spent fuel in 1998 because a repository would not be operational until 2010 at the earliest. (PX 951, “Waste Acceptance Issues,” 59 Fed. Reg. 27,007, 27,008 (1994) (soliciting comments).) By that date, at the latest, nuclear utilities’ mitigation duty began. *Ind. Mich.*, 422 F.3d at 1373; *Hughes Comm’n Galaxy*, 271 F.3d at 1064; *Wisconsin Power & Light Co. v. Century Indem. Co.*, 130 F.3d 787 (7th Cir. 1997) (disclaiming contractual duty is breach of contract even if time specified in contract for performance has not yet arrived). Following the comment period, in May of 1995, DOE issued its “Final Interpretation of Nuclear Waste Acceptance Issues” (PX 516; 60 Fed. Reg. 21,793, 21,795 (1996), that its obligation to commence SNF acceptance by January 1998 was conditional upon either an operating repository or an interim storage facility under the NWPA.).

Following the May 1994 “Notice of Inquiry,” in June 1994, Yankee Atomic’s President, Dr. Kadak, wrote to Secretary of Energy Hazel O’Leary on April 20, 1994: “when does DOE expect to begin the acceptance process?” and “[w]hat is your best estimate of the shipping schedule when you begin accepting spent fuel?” (DX 218 at YDK007566-67.) The response by Ronald Milner

(Associate Director for Storage and Transportation, Office of Civilian Radioactive Waste Management) on the Secretary's behalf was:

It is the Department's preliminary view that it has no statutory obligation under the Act to accept spent nuclear fuel beginning in 1998 in the absence of an operational repository or other facility constructed under the [NWPA], though such an expectation may have been created through implementation of the Standard Contract [T]he earliest possible date for acceptance of waste for disposal at a repository is 2010 The 1992 Annual Capacity Report represents the best current estimate of the rate at which [Yankee Atomic's] spent nuclear fuel would be accepted. . . . assuming availability of an MRS [and] developing a meaningful waste acceptance schedule for the period beyond the initial ten years is not possible at this time.

(*Id.* at YDK007570-72.) Yankee Atomic was aware of and relied upon these representations in its planning. (Tr. 2342 (Bennet) (noting reliance on Kadak/Milner exchange in preparing Yankee Atomic's 1995 FERC case).) (*See also* Tr. 2277-91 (Heider) (discussing DX 218).)

DOE's May 1995 Federal Register statement that its obligation to commence SNF acceptance was conditional upon an operating repository or interim storage facility under the NWPA, had been previously articulated in communications to Yankee Atomic approving delivery dates in delivery commitment schedules "dependent upon the existence of an operational repository or interim storage facility" (DX 30.18.) As a repository was then admittedly not going to commence operations in 1998, at some point DOE abandoned contingency planning for an MRS.

Rates and impact on causation

Early program documents not only confirmed the 1998 date for commencement of performance at a repository, but planned a robust rate of acceptance. DOE's July 1983 report to Congress on the adequacy of fees under the Standard Contract assumed repository commencement in 1998 with a design capacity of 72,000 MTUs and receipt rate of 1800 MTUs for the first five years and 3000 annually thereafter. (PX 420 at PA-178250-01.) The July 1984 report used the same commencement date, design and receipt rate. (PX 421 at PA-177342). DOE's 1983 Draft Mission Plan recited an annual acceptance rate of 1800 MTUs for five years starting in 1998 and 3000 MTUs thereafter. (PX 636); A December 1984 draft report assumed a repository design rate of 70,000 metric tons, retained the 1998 start date, but lowered the receipt rates to 400 MTUs for the first three years, 900 MTUs in year four, 1800 MTUs in year five, and 3000 MTUs thereafter. The February 1985 and March 1986 reports were the same. (PX 415 at DER 003-0972; PX 545 at PNL-023-0473-74.)

The 1987 ACR warned utilities that an acceptance schedule was uncertain and that both a repository and an MRS was necessary in order to commence acceptance in 1998.^{26/} (DX 16.) Discussing priority for shut down reactors (one of several factors considered by the court herein), DOE stated that such priority was “possible” and “would result in a reordering of the Final Delivery Schedules (approved delivery commitments).” (*Id.*, at HQR-001-2724.) “Illustrative” annual acceptance rates commencing in 1998 were 1200 MTUs for the first five years, 2000 MTUs in 2003, and 2650 MTUs in 2004 through 2007. (*Id.*, at HQR-001-2717.) The June 1988 ACR also warned of a delay in the repository and cautioned that while an MRS was possible in the interim, its capacity was limited.^{27/} (DX 17.) “Illustrative” annual acceptance rates starting in 2003 and assuming an

^{26/} DOE acknowledges that uncertainty with regard to the waste acceptance schedule and the integrated [waste management system (“WMS”)] derives, in part, from decisions yet to be made by Congress. DOE has presented the appropriate issues to Congress in the form of the OCRWM Mission Plan Amendment (proposing an MRS).

...

The waste acceptance schedule presumes Congressional approval of DOE’s MRS proposal and reflects DOE’s plans to integrate an MRS facility into the WMS to begin waste acceptance in 1998.

(DX 16 at HQR0012714-15 (¶¶ 1.2.1 & 1.2.2)(footnotes omitted).)

^{27/} Article II of the Contract, indicates that “[t]he services to be provided by DOE under this Contract . . . shall begin after the commencement of facility operations, not later than January 31, 1998.” DOE recognizes that, under current conditions, operations of and waste acceptance at a DOE facility probably cannot begin in 1998. The delay in the repository schedule, first noted in the OCRWM Mission Plan Amendment published in June 1987 and the conditions imposed on the siting and construction of an MRS facility by the Nuclear Waste Policy Amendments Act of 1987 make it unlikely that DOE will be able to start accepting SNF significantly before 2003. As recognized in the draft Mission Plan Amendment, earlier waste acceptance would require additional Congressional action or an acceleration of the system development schedule by some other means. Under current conditions, the owners and generators of SNF will continue to be responsible for storing their spent fuel until acceptance by DOE.

(DX 17 at HQR-001-2620 (parenthetical and footnotes omitted).)

“[T]he quantity of [SNF] or [HLW] at the site of such an [MRS] facility at any one time may not exceed 10,000 metric tons of heavy metal until a repository . . . first accepts [SNF] or solidified
(continued...)

MRS facility would operate simultaneously were 1200 MTUs for 2003 and 2004; 2000 for 2005 and 2006; 2700 for 2007; and 3000 for 2008 through 2012, for a total acceptance of 24,100 MTUs. (*Id.* at HQR0012621.) The 1990 ACR contained “upper bounding” and “lower bounding” acceptance schedules. The upper bounds annual rate starting in 1998 was 1200, 1200, 2000, 2000, 2700 and then 3000 MTUs through 2007 for a total acceptance of 24,100 MTUs. The lower bounds annual rate starting in 1998 was 300, 400, 550, and then 875 MTUs through 2007 for a total acceptance of 7375 MTUs. (DX 18 at HQR-001-2499.) The upper bounding rates came from the 1998 Draft Mission Plan Amendment and the June 1988 ACR. The lower bounding rates assumed an MRS and the 10,000 MTUs limit prior to repository operation. The 1990 ACR also stated that it was “not contractually binding on either DOE or the Purchasers” and that it would be the last ACR. (DX 18 at HQR0012494; *See also* DX 130 at EDB0011518.)

Despite that statement of finality, in December of 1991 DOE issued another ACR. “Although the 1990 ACR indicated that it would be the last ACR published, DOE has elected to continue publication of the ACR after discussions with the Purchasers.” (DX 24 at HQR0012362.) The December Report again provided that “[a]s specified in the Standard Contract, the ACR is for planning purposes only and thus is not contractually binding on either DOE or the Purchasers.” (*Id.* at HQR0012362-63.) Projected annual acceptance rates starting in 1998, assuming Congressional action to eliminate restrictions on an MRS, were 400 in 1998, 600 in 1999 and then 900 MTUs annually, for a total acceptance through 2007 of 8200 MTUs. (*Id.* at HQR0012366.) Absent further Congressional action, “it is estimated that commencement of facility operations and initial acceptance of SNF by DOE could not start until at least 2007.” (*Id.* at HQR0012365.)

The 1992 ACR (DX 26), dated May 1993, stated that absent removal of the statutory limitations on an MRS, initial acceptance by DOE would not commence until 2007. (DX 26 at HQR0012323.) If the linkages were removed, nominal annual acceptance rates of 400 MTUs in 1998, 600 in 1999 and 900 in years 2000 through 2007 were given. (*Id.* at HQR0012324.) There was no ACR in 1993.

“Due to the uncertainty associated with the commencement of operations of the waste management system,” the 1994 consolidated APR and ACR as well as the 1995 combined APR and ACR dated September 1996 (which, like the others, was for planning purposes and was not contractually binding) abandoned calendar years of commencement in favor of ubiquitous years of operation with annual rates of 400 MTUs for “Year 1,” 600 MTUs for “Year 2,” and 900 MTUs thereafter. (PX 63; DX 27.)

There was testimony that the low rates in the 1991 ACR were an attempt to limit DOE’s liability for breach of contract, not because of statutory capacity limitations on an MRS because by

²⁷(...continued)

[HLW].” Should the start of repository operations be delayed for any reason, waste acceptance at the MRS is to be limited to 10,000 MTUs. The maximum capacity of the MRS is limited to 15,000 MTUs by the Amendments Act. (DX 17 at HQR0012622-23.)

then, that interim storage option was not realistic. Scott Vance was called as an impeachment witness by plaintiffs. He had been present for most of the more than 35 days of trial and during trial (and unsolicited), he informed one of plaintiff's attorneys that testimony of one of defendant's witnesses concerning the 1991 ACR was not accurate. On that basis, and over defendant's objections, Mr. Vance was called as an impeachment witness. Defendant asks that his testimony be stricken.

Mr. Vance testified he was employed as a nuclear regulatory specialist at the law firm of Shaw Pittman in Washington, D.C.^{28/} Mr. Vance has a bachelor of science degree in general engineering from Idaho State University and two master's degrees from the Massachusetts Institute of Technology in nuclear engineering and in technology and policy. Mr. Vance testified he assisted in the preparation and editing, and provided input into the 1991 ACR while he was employed by Pacific National Laboratories ("PNL").^{29/} PNL's role was to support the Office of Waste Acceptance which had the task of dealing with contractually required documents. Mr. Vance testified he was aware of the annual acceptance rates in the 1991 ACR (DX 24 at HQR-001-2366), (400 in 1998, 600 in 1999 and 900 in years 2000 through 2007) and "[a]t least one of the foundations for that rate was DOE's desire to limit their liability to purchasers from the standard contract." (Tr. 7618-21.)

I was told at that time specifically from Alan Brownstein that the lower rate was going to be used. The decision had already been made. And the reason for that was that it was obvious at that point that '98 was not going to be met and that they desired to limit the liability to purchasers.

(Tr. 7622 (Vance).) *See* (Tr. 3995-97 (Pollog) (DOE stopped processing DCS submittals in late 1996/early 1997 and thought that might limit liability).) Defendant moved to strike Mr. Vance's testimony because he was not disclosed pre-trial and his testimony was substantive rebuttal, not impeachment.

"[I]t is clear that 'exclusion of critical testimony by unlisted witnesses is disfavored.'" *Berroyer v. Hertz*, 672 F.2d 334, 338 (3rd Cir. 1982) (citation omitted.) Plaintiffs cite the wide discretion afforded the court in considering testimony regardless of whether a witness was disclosed on a witness list. The bona fides of the 1991 and 1995 ACRs has relevance as these documents do appear as pivotal evidence in the government's arguments on rate in the nonbreach world which in turn impacts directly on causation. Factors include (1) prejudice or surprise; (2) the ability to overcome any prejudice or surprise; (3) any disruption of the trial by calling the unlisted witness; (4)

^{28/}While Shaw Pittman is not counsel in these cases now before the undersigned, that firm represents plaintiffs in some 19 of the other SNF cases pending in the Court of Federal Claims.

^{29/}At the time, various aspects of implementation of DOE's civilian radioactive waste program were accomplished by various laboratories. (Tr. 7619.) *See Yankee Atomic Electric Co. v. United States*, 2004 WL 2450874 (September 17, 2004) (discussing evidentiary issues relating to DOE's contractor documents).

bad faith or willfulness. Defendant does not dispute that Mr. Vance came to plaintiffs' counsel of his own volition. Also, Mr. Brownstein, a DOE employee was deposed extensively, and could have been called to rebut Vance's statement. While at trial defendant did request an opportunity to depose Mr. Vance, which the court denied, leaving open however, any objection to use of his testimony as substantive evidence. (Tr. 6472, 7624.)

Mr. Vance's testimony was brief and not technical, consisting primarily of testimony concerning DOE's reason for using lower rates. He was subject to extensive cross-examination. His testimony was similar to that of Mr. Zabransky, DOE's Contracting Officer, who testified that among other reasons, "the Department was trying to minimize its obligations to utilities," in using the low 900 MTU rate in the 1995 ACR. (Tr. 4166-67 (Zabransky).) Furthermore, the government could have, but did not seek any time or brief recess to refute Vance. Finally, given Mr. Zabransky's testimony, the substance of Mr. Vance's testimony should not have been a total surprise.

Defendant asserts that the decision to admit or reject the testimony depends on whether the witness is rebuttal or impeachment. It is true, plaintiffs argued for admission of Mr. Vance's testimony on the grounds that he was an impeachment witness. Defendant points to plaintiffs' counsel's representation that Mr. Vance was an impeachment witness. (Tr. 6466 (plaintiffs' counsel: "It's impeachment"); Tr. 7618 (plaintiffs' counsel: "Mr. Vance, since you're called as an impeachment witness . . .").) "Impeachment is an attack on the credibility of a witness, whereas rebuttal testimony is offered to explain, repel, counteract, or disprove evidence of the adverse party." *Martinez v. Union Pac. R.R. Co.*, 82 F.3d 223, 227 (8th Cir. 1996) (citing *Sterkel v. Fruehauf Corp.*, 975 F.2d 528, 532 (8th Cir. 1992) and affirming the trial court's exclusion of a previously undisclosed rebuttal witness). Plaintiffs' counsel identified two issues upon which Mr. Vance would testify: (1) that Mr. Pollog who had testified about the 1991 ACR had very little to do with it; rather, Mr. Vance had the major drafting role; and (2) that "everybody" in the DOE knew that GTCC waste was "going to the repository" and he was instructed to minimize any written statement to that effect. (Tr. 6467-68.) And, Mr. Vance testified to neither. After Vance testified, plaintiffs' counsel defended his impeachment characterization on the grounds that Vance's testimony impeached Pollogg's testimony as to the rationale for the 1991 rates and was thus impeachment by contradiction. (Tr. 7623-24.)

Impeachment witnesses are not subject to disclosure requirements. RCFC, App. A, IV(13)(b). For compelling reasons, an unlisted witness can be called but shall be subject to discovery. "Failure of a party to list a witness shall result in the exclusion of a witness's testimony at trial absent agreement of the parties to the contrary or a showing of a compelling reason for the failure. Any witness whose identity has not been previously disclosed shall be subject to discovery." *Id.*

There were compelling reasons for not listing Mr. Vance. His identity as a witness was not known to counsel until trial. His direct testimony was very limited, and cross-examination was more extensive. The court finds no substantial prejudice. In its exercise of its discretion, the court considers Mr. Vance's testimony. *See Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1122 (Fed. Cir. 1996) (reviewing decision whether or not to allow witness testimony for abuse of

discretion); *Guisse v. Department of Justice*, 330 F.3d 1376, 1379 (Fed. Cir. 2003) (noting substantial discretion of administrative law judge to allow or exclude witness testimony). However, even if Mr. Vance's testimony were not considered, the court's findings herein would not differ in that rates based on a proposed MRS which could exist only in conjunction with an approved repository lacked credibility.

Accordingly, it was reasonable for these three plaintiffs to believe that DOE would not commence performance by January 31, 1998, and to question the level of performance that would evolve once it was commenced. Subjectively, their reasonable concern pre-dates the 1994 Federal Register pronouncement cited in *Indiana Michigan*.

Connecticut Yankee and Maine Yankee reracked their spent fuel pools. A substantial causal factor in their decisions to rerack was DOE's partial breach(es). These at-reactor costs were reasonably foreseeable to DOE at the time of contracting, and decisions were commercially reasonable and the costs were shown with reasonable certainty.

As about one-third of the rods in the reactor core are replaced approximately every eighteen months to two years ("fuel cycles"). With each fuel cycle, spent fuel rods are discharged and stored in the wet pool. Accordingly, pool capacity was carefully monitored and the ever-decreasing amount of available space inventoried.

Connecticut Yankee seeks reracking costs of \$8,350,893. Maine Yankee seeks \$10,069,018. (PX 2043a.19; PX 2043a.22.) Yankee Atomic did not rerack in this relevant time frame.

Defendant argues that the decisions to rerack were not the result of DOE's delay. It is asserted that both Connecticut Yankee and Maine Yankee expected to run out of wet pool space before 1998 and would have to rerack anyway. "[B]ecause they were expected to run out of storage space before DOE was to begin acceptance from utilities in 1998, any reracking decisions were unrelated to DOE's delay in accepting SNF." (Def.'s Supp. Br. at 10 (citing *Ind. Mich.*.) Defendant also claims these expenditures were unnecessary in that both utilities permanently shut down their reactors before the end of their license period, and "[t]o the extent that they would have had sufficient wet pool space to continue operations until DOE was obligated to begin accepting their SNF, they could have waited to incur those reracking costs to ensure that they would be necessary." (*Id.*)

Connecticut Yankee and Maine Yankee counter that DOE's partial breach(es) were a substantial causal factor in their decisions to rerack, that those decisions were commercially reasonable and that their costs were established with reasonable certainty.

Maine Yankee reracking

Mindful of storage limitations and implementation lead time, from at least the mid-1980s, Maine Yankee monitored DOE's preparation for commencement of performance under the Standard Contract and was well aware of significant delays. (Tr. 2861 (Whittier) (Maine Yankee "always

considered that there would come a time where we would need to increase storage capacity unless DOE honored its contract obligations. So we always had . . . a low-level effort monitoring . . . DOE developments.”); Tr. 403 (Mills) (describing concerns raised by low acceptance rates in 1983 draft Mission Plan and by DOE’s failure to meet statutory deadline for issuing repository siting guidelines); Tr. 408-09 (Mills) (“great anxiety” caused by statements by Mr. Morgan at a December 1983 conference, which “did not satisfy our understanding earlier in the year when we signed the contract”); DX 1 at 11-12.)

Maine Yankee’s spent fuel pool (also referred to as a “pit”) comprised “a water filled, stainless steel-lined concrete structure approximating a cube with 40 foot sides and 6 feet of concrete on all sides except the top, which is open to the enclosed fuel building atmosphere.” (PX 1456MY at MPA022571.) Radiation levels prevent repairs or maintenance to the reactor core or to the fuel inside the core while the fuel is in the core, so fuel from the reactor core must be transferred to the pool. (MY PFF 111 and Def.’s Resp.) Accordingly, to allow for repairs or maintenance, Maine Yankee always maintained a full core reserve (“FCR”). There was always sufficient capacity in its pool to discharge all the fuel assemblies from the reactor core. (MY PFF ¶ 111 and Def.’s Resp.) While it was operating, Maine Yankee discharged all the assemblies from the reactor core into the pool to repair the thermal shield and also to inspect the reactor vessel. (MY PFF 114 and Def.’s Resp.)

While NRC prefers that a licensee maintain FCR and NRC in-service inspections performed every ten years require all assemblies from the reactor core be discharged into the spent fuel pool, maintenance of FCR was not required. (MY PFF 113 and Def.’s Resp.) (“NRC did not require that we maintain full core offload capability, but they did state it as a preference. And Maine Yankee also believed that it was a prudent business decision If you were to lose the ability to offload the core, and a need came up to offload the core for a maintenance reason, then the plant might not be able to operate.” (Tr. 2856 (Whittier).)

Michael Thomas, Vice President and Chief Financial Officer, joined Maine Yankee in 1991 and is the formal contracting officer – the Standard Contract corporate contact. He testified that before joining Maine Yankee, he was aware of and monitored DOE’s performance under the Standard Contract. At the time he joined Maine Yankee in 1991, it was “understood . . . that there was certainly risk that the [DOE] would not come beginning in 1998 and remove our fuel” and it “was very much in serious jeopardy, that the DOE would actually begin performing under the contract.” Operation of Maine Yankee’s reactor until 2008 was planned, although earlier shut down was always possible. The “primary concern was to make sure we had enough room for the spent fuel in the pool.” (Tr. 2734-36 (Thomas).)

In January 1993, Maine Yankee still did not expect DOE to perform in 1998. (Tr. 2866 (Whittier).) Starting in the late 1980s and early 1990s, faced with DOE’s impending non-performance, Maine Yankee considered several options in detail – dry storage, off-site storage and fuel or pin consolidation. Pin consolidation (taking the fuel assembly apart, removing the individual fuel pins and placing them in a tighter cage or a cage with no array at all so that more fuel pins can

fit in the pool) was rejected as too labor intensive, costly and dangerous (removing pins could potentially release radioactivity into the pool). (Tr. 2861-62.)

Maine Yankee submitted its application to the NRC on January 25, 1993 to rerack to increase the storage capacity of the wet pool from 1,417 to 2,019 assemblies. (PX 829.) The NRC approved. The design of the racks was finalized and the racks were fabricated in 1994. The physical installation of the racks was in December of 1996 when the reactor was shut down. (Tr. 6226-27 (Jordan); Tr. 2869-70, 2909-11 (Whittier).) At that time, Maine Yankee still intended to continue operations. (Tr. 2735-36 (Thomas); Tr. 2910 (Whittier) (Maine Yankee expected to continue plant operations); Tr. 6240 (Jordan) (when he was Maine Yankee's project manager for reracking, he had no understanding that the plant was going to shut down in 1997).) Defendant does not dispute that Maine Yankee planned to operate until 2008 when its license would expire, until its decision to permanently cease operations in 1997. (Def.'s Resp. to MY PFF 109.) Maine Yankee's reracking created an additional 576 spaces at a cost of \$10.3 million.

Maine Yankee's January 25, 1993 application to the NRC for this reracking is probative on causation. "The spent fuel storage pool with the existing racks will be unable to accommodate the fuel planned to be discharged after the 1999 refueling. The unavailability of a high-level waste repository and lack of assurance that the Federal Government will take possession of the spent fuel by the date that the spent fuel pool is full necessitates the reracking of the pool." (PX 829 at MOF035617; Tr. 2868, 2870-71 (Whittier) ("If we had believed that DOE was going to perform its contract obligations, we would not have performed the third reracking" because "additional storage . . . capability beyond what we already had, assuming that DOE was going to perform, was not required," but instead Maine Yankee would have used "the temporary rack . . . that we were licensed to use [to] provide[] sufficient additional storage such that the full core could have been offloaded on a temporary basis, should it have been required."); Tr. 6256-57 (Jordan) (stating that Maine Yankee pursued alternative storage options because "[w]e recognized at that time . . . the probability of the successful transfer of fuel to the Department of Energy was low."); Tr. 2866 (Whittier) (by January 1993, Maine Yankee "did not expect DOE to perform in '98"); (Tr. 2870-74, 2904-06 (Whittier) (January 1993 and January 1996 fuel data projections confirm that only a temporary rack would have been needed.); Tr. 2899 (Whittier) (stating that the Maine Yankee Board of Directors approved the decision for a third rerack in 1991-92); Tr. 6226 (Jordan) (the project was started in the 1992-93 time frame).)

Douglas Whittier, started working for Maine Yankee in approximately 1983. He has an MBA from the University of Miami and was as officer in the United States Navy with formal training in the Navy's nuclear power program, assigned to a nuclear submarine. His civilian experience included a position as a start-up engineer for Consolidated Edison of New York at Indian Point nuclear plant and various nuclear engineering positions for Florida Power and Light including managing interface with the NRC. He was then with a private nuclear consulting firm. At Maine Yankee he was licensing section head, responsible for communicating with NRC, EPA, FEMA and state regulatory agencies. He was manager of nuclear engineering licensing in the 1990 time-frame (the licensing effort for the first rerack started in 1983) during which Maine Yankee went through a second reracking, the cost of which is not sought in this litigation but he was aware of it. In 1990

he became vice president of licensing and engineering. In 1997, he left Maine Yankee to become a consultant. (Tr. 2840-46.) Mr. Whittier testified that following the second reracking, either DOE would have to begin performance in 1998 or additional reracking was going to be necessary. (Tr. 2853.) He testified that growing uncertainty over DOE honoring its contractual commitments lead to the decision to perform the third rerack.

Q. And what was your understanding – what was Maine Yankee’s understanding, expectations, really, as to what DOE would do as far as picking up Maine Yankee’s spent fuel?

A. We were doubtful that DOE would be able to perform its obligations under the contract to begin taking possession of spent fuel in 1998.

Q. And how did this doubt, this uncertainty over DOE’s picking up Maine Yankee spent fuel on a timely basis influence Maine Yankee’s planning with respect to its storage of spent fuel?

A. What we decided to do is wait as long as possible before committing to any additional on-site storage capability or projects. And that had really a couple of benefits. It would defer expenditures. It would allow us to monitor changes in technology with respect to spent fuel storage. And, also, it would give DOE every opportunity to perform under their contractual obligations to pickup fuel in ’98.

(Tr. 2853-54.)

Using a series of demonstratives,^{30/} Mr. Whittier illustrated that following the second reracking, the spent fuel pool had a 1,476 assembly capacity. The reactor core held 217 assemblies, 121 assemblies could be stored in a temporary rack. He charted fuel cycles and remaining space.

	Total assemblies discharged pool (cumulative)	Remaining space in pool (FCR is 217)
Cycles 1 - 12 (from June 1974 to approximately February of 1992)	1,058	418
Cycle 13 (77 assemblies discharged July 1993)	1,135	341
Cycle 14 (81 assemblies discharged January 1995)	1,216	260
Cycle 15 (65 assemblies discharged May 1997)	1,281	195 (22 spaces needed)

^{30/} Whittier demonstratives 1-10.

Under this schedule, FCR would be lost at the end of Cycle 15 then projected for May of 1997. Defendant also argues that Maine Yankee periodically evaluated the potential loss of FCR and in 1992, 1993 and 1994 predicted the loss of FCR in 1996. (Tr. 5432-34 (Abbott); Abbott demonstrative, unnumbered 27; Tr. 2851-52.) This, defendant insists, establishes that Maine Yankee would lose FCR **before** DOE was required to commence performance, thus the third reracking could not have been caused by DOE's partial breach.

Maine Yankee counters that its decision to rerack was reasonably motivated, at least in substantial part, by concern that DOE was not going to timely commence performance. Some early predictions of loss of FCR by 1998 were overcome by technological innovations which allowed for more efficient "burning" of the reactor fuel, thus lengthening fuel cycles and extending the time when the pool would reach capacity. Smaller reload batches and higher burn-ups of spent fuel resulted in smaller discharges of spent fuel into the pool. Also, a plant shutdown for repair of steam generator tubes further delayed the need for additional slots. Any need for full-core reserve could have been met by the use of so-called "temporary" racks. (Tr. 6258-59 (Jordan).) A temporary rack for 30 assemblies could have handled the full core reserve deficit. The rack would not have been inserted into the pool unless and until it was actually needed so that the cask loading area would have been open. (Tr. 2874 (Jordan).) Mr. Whittier testified he took these numbers from two snapshots in time - one beginning in 1993 and another was the beginning of 1996 using actual Maine Yankee data with projections then being made for future reloads, both as to the timing and the size of those projections. (Tr. 2905-06.) Maine Yankee's operating license allowed for the use of a temporary rack for up to 121 assemblies. The \$115,000 cost of a 30-assembly temporary rack was deducted from Maine Yankee's claim. Mr. Whittier estimated the cost by looking at actual costs of the third reracking, subtracted the cost of inserting the racks into the pool and then computed a per module cost and multiplied that number by 30. (Tr. 2875-76.) The government does not dispute the amount of this offset or that it was taken. (Def.'s Resp. to MY PFF 120.)

Robert Jordan, one of the government's witnesses, was the project manager for this the third rerack and reported to Mr. Whittier. (Tr. 6225-27.) Mr. Jordan prepared a draft report of the evaluation of long term spent fuel storage at Maine Yankee (DX 129) acknowledging that Maine Yankee was going to lose full core reserve in 1996, before DOE's performance was to commence. (Tr. 6228.) His draft report concluded at that time that dry storage was the best storage option. (Tr. 6230.) The report dated December 18, 1990 warned that DOE's admitted delay necessitated examination of storage. "One of the challenges confronting Maine Yankee in the next several years is the question regarding the temporary disposition of the spent fuel now residing in the spent fuel pool. This challenge is necessitated by the failure of DOE to meet its contractual obligation to assume timely control of the spent fuel for placement in a repository." (DX 129; Tr. 6257.) That report was finalized and presented to Maine Yankee's corporate officers who decided to proceed with the third rerack nevertheless. (Tr. 6231.)

Mr. Jordan testified that if DOE had commenced pickup in 1998, Maine Yankee still would have needed space for approximately 150 to 225 additional assemblies. He favored dry storage. Maine Yankee spent approximately \$10.3 million to create space for 576 additional assemblies. (Tr. 6238-40.) He explained the cost would have been about the same regardless of the number of

additional racks because of the configuration. (Tr. 6242.) In connection with decommissioning studies, Mr. Jordan wrote that he assumed Maine Yankee would shut down in 2008 and DOE would remove SNF starting in 1999 and concluding in 2018 based on the 1992 ACR. (DX 743; Tr. 6246-47.) When the decision to rerack was made, Maine Yankee intended to operate until 2008.

On cross-examination, Mr. Jordan testified that if Maine Yankee had a fair degree of confidence that DOE was coming in a timely manner to pickup Maine Yankee's SNF, and they were confident with the schedule, "then in all probability, we would have accepted the loss of full core discharge and we would have accepted the use of the temporary rack in the cask pit area and be able to have waited for the Department of Energy to alleviate the storage problem in the spent fuel pool." (Tr. 6259-60.) Maine Yankee could have lived with loss of FCR for a short time. ("[Maine Yankee] would have considered loss of full core offload capability if that loss was for a limited period of time." (Tr. 2857 (Whittier).)

Maine Yankee finalized the design of the racks and then obtained concurrence to proceed with the manufacturing of the racks. Following a delay of approximately one year^{31/} and one refueling cycle, the racks were installed. Most of the racks (26 out of 29) were installed when in August of 1997, the plant was shut down and installation ceased. (Tr. 2868-70.) The reracking efforts and attendant costs were from 1992 to 1997. (MY PFF 90.)

The circumstance that Maine Yankee shut down in 1997, before loss of FCR, does not convert the prior reasonable mitigation decision into an unreasonable decision. Reracking was a result of Maine Yankee's understandable anxiety and skepticism over the timing and extent of DOE's performance. DOE's delay was a substantial causal factor. (MY PFF 126.)

Defendant does not dispute that the costs for the reracking totaled \$10.3 million. (MY PFF 127 and Def.'s Resp.^{32/}; Tr. 2780 (Thomas) (the cost of the third reracking was \$10.3 million); Tr. 6240 (Jordan) (agreeing that "Maine Yankee incurred costs totaling [approximately] \$10.3 million to create space for 576 additional assemblies"); PX 1731MY (summary of categories of reracking costs.)

^{31/} Maine Yankee had a fairly extensive shut down in the 1995 time frame to repair steam generators and the board, concerned about cash flow, deferred the time that the new racks needed to be in place. (Tr. 2870.)

^{32/} In the defendant's proposed finding, 327 (f), an assertion is made that it would have cost more than \$115,000 for a temporary rack, citing Abbott and Jordan; and alleging the temporary rack would not have alleviated Maine Yankee's concern of retaining full core reserve capability. However, a temporary rack would have been inserted only if a full core reserve was needed. Accordingly, in the nonbreach world, there would have been room to load DOE's casks in the extra-deep cask loading area. Also, Jordan testified to two different contingency plans for using a temporary rack while maintaining the capability to move fuel out of the pool if necessary. (Tr. 6258-59 (Jordan).)

The court concludes and finds that DOE's delays substantially caused Maine Yankee's decision to rerack for the third time. If DOE had commenced performance by January 31, 1998, Maine Yankee may have had to operate with less than FCR, but that risk would have been assumed and alternate short-term measures would have been taken. The decision to rerack was commercially reasonable and defendant did not show to the contrary. That Maine Yankee might need to rerack was reasonably foreseeable to DOE at the time of contracting.

Connecticut Yankee reracking

Although Connecticut Yankee's 40-year license was to expire in 2007, the plant ceased operations in December 1996 based on a study that replacement power from other sources would save ratepayers as much as \$130 million. (DX 471; Def.'s PFF 282; CY PFF 119 and Def.'s Resp.) In 1976, prior to the cessation of reprocessing in this country, Connecticut Yankee sent 82 of its spent fuel assemblies to a Morris, Illinois facility owned by General Electric where they have remained. (Tr. 2301; CY PFF 20 and Def.'s Resp.) In settlement of litigation, General Electric agreed that for a fee, the SNF could remain. (Tr. 2302.)

In October of 1992, Connecticut Yankee estimated that there was less than a 25% probability that DOE would commence performance by 1998. (Tr. 2596 (Mellor); PX 1444CY (October 1992 Spent Fuel Storage Strategy by Northeast Utilities) at CDB006684 (reporting conclusion of Nuclear Fuel Engineering that "there is less than a 25% probability that DOE would remove fuel from utility sites by 1998") and at CDB006685 ("There is some likelihood (perhaps 50%) that DOE may begin to remove fuel by 2010.")) From 1995 through 1996 Connecticut Yankee expanded its spent fuel racks for the second time. (Tr. 2588-2620 (Mellor).) Russell Mellor, with bachelor's and master's degrees in chemistry, initially worked for Yankee Atomic starting in 1973 as a chemist responsible for the radiochemical analyses of the primary coolant and subsystem. His responsibilities increased through the years, and in 1984 he became chemistry manager. In 1987, he was technical director, responsible for chemistry, health physics, reactor engineering and emergency planning. In late 1990, he moved to corporate headquarters as engineering project manager, then decommissioning manager, responsible for all decommissioning. He joined Connecticut Yankee in March of 1997 where he worked until April of 2003. (Tr. 2584.) He was promoted to director of operations and decommissioning, then vice president of operations and decommissioning, then President and CEO of Connecticut and Yankee Atomic. His duties included oversight of the spent fuel pool at Connecticut Yankee. (Tr. 2585.) At the time of trial in 2004, he was president of West Valley Nuclear Services Company in charge of managing, operating and decommissioning the West Valley Nuclear Center in West Valley, New York. (Tr. 2588.)

From his review of Connecticut Yankee documents, he familiarized himself with the 1996 reracking. (Tr. 2589.) He testified it was his understanding that the pool was reracked in 1996 in order to assure full core offload capability. (Tr. 2591.) As for the importance of full core reserve, Mellor's testimony is credited in reaching the court's findings herein, as to all three plaintiffs, that the maintenance of full core reserve (FCR) was a common and important operational concern that, while not required by the NRC, was preferred. Accordingly, decisions based on maintenance of FCR, were neither unreasonable nor unforeseeable. "It's an operational consideration. Any time the

reactor is shut down and there may be some repairs that may have to be accomplished that would require removal of the fuel, you really do need a place to store the fuel when it is removed from the reactor.” (Tr. 2591-92 (Mellor).) He also explained the consequences of not having FCR: “Well, you wouldn’t undertake repairs that required the full core offload capability until you had it.” (Tr. 2592.) At the time this reracking was under consideration in the summer of 1996, and at the time the reracking was completed, the permanent shutdown of the plant was not under consideration. The expectation at that time was for the plant to continue to operate. (*Id.*) Connecticut Yankee concluded, as early as 1992, that the most reasonable cost-effective method to avoid loss of full core reserve in the spent fuel pool was to rerack the spent fuel pool. (PX 1444CY at CDB006681; PX 1445CY at CDB005938, CDB006692, CDB006697; PX 1448CT at CDB006660-661; PX287CY at 2, ¶ 2; CY PFF 117 and Def.’s Resp.)

Mr. Bennet, Chief Financial Officer of Connecticut Yankee, testified that from his review of documents and discussions (coupled with his knowledge of DOE’s delays from his prior experience at Yankee Atomic) that Connecticut Yankee reracked in 1996^{33/} in order to avoid loss of full core reserve around 2000. (Tr. 1531, 2297, 2307 (Bennet) (“Since the [DOE] . . . was believed to not be capable of removing fuel in 1998, and that would cause Connecticut Yankee to lose full-port [sic – core] discharge approximately around the year 2000,” Connecticut Yankee decided to rerack in 1996.))

A September 1992 spent fuel study (PX 1444) authored by Northeast Utilities (the manager of Connecticut Yankee’s plant), in a section titled “DOE Acceptance Uncertainties,” reported DOE’s then estimated 12 year delay in the commencement of its contract obligations.

DOE’s latest Draft Mission Plan (dated September, 1991) noted that two fuel disposal avenues are currently being pursued. First, DOE is hopeful of beginning receipt of spent fuel at a Monitored-Retrieval Storage (MRS) facility in 1998. The responsibility for cutting a deal to site a MRS currently rests with a Presidentially-appointed, Nuclear Waste Negotiator. Unless extended by Congress, the Negotiator’s term expires on January 1, 1993. In the event that no MRS-site materializes, DOE is hopeful of receiving fuel at a repository in 2010. Since the Nuclear Waste Policy Act was passed nine (9) years ago, the start-date for a repository has slipped by twelve (12) years. (PX 1444 at CDB006671.)

Maintenance of FCR is noted as a goal and challenges include pursuing technological storage options that are economical but allow for flexibility “to accommodate DOE progress.” (*Id.*) Cost was estimated at \$8 million if DOE did not timely perform and there was less than a 25% probability that DOE would timely perform by 1998; but if DOE was going to perform, reracking would not be necessary. (*Id.* at CDB006683-84.) There was “some likelihood (perhaps 50%) that DOE may

^{33/}Connecticut Yankee’s 1996 rerack was a reconfiguration with denser rack arrays. (Tr. 2306.)

begin to remove fuel by 2010” so planning was done incrementally with flexibility to scale down if DOE began to perform. (*Id.* at CDB006685.) The study predicted loss of FCR in August of 2000 if DOE did not begin to perform; with reracking, there would be no loss of FCR through 2012, the end of the life of the plant. (*Id.* at CDB006991.) Engineering for reracking would be in 1993, with rack installation complete by the end of cycle 18, 19 or 20 as appropriate. (Tr. 2597.)

An update of the fuel study in late 1993 reiterated that DOE was not expected to meet its 1998 commitment and there was no firm performance date. By reracking, storage needs would be met.

The Department of Energy, DOE, is not expected to meet its contractually required 1998 commitment to begin removing the spent fuel from our nuclear units. Furthermore, there is no firm date by which they can be expected to begin this removal. It is therefore necessary to pursue a strategy that does not depend on DOE action through the end of the license life of each of our plants. It is also desirable to defer major expenditures as long as reasonably possible in the event that DOE . . . [d]oes begin to accept fuel.

(Tr. 2600-01, quoting from PX 1445 at CDB 006692.)

Similar to testimony summarized above, Mr. Mellor testified to technical innovation that increased the amount of energy that could be extracted from fuel in the reactor core thereby lengthening the time between re-loads, postponing storage demands. (Tr. 2602-03.) As then adjusted, Connecticut Yankee expected to lose FCR in 2000. A partial rerack to add approximately 1,500 spaces would prevent loss of FCR through 2012,^{34/} which was consistent with the company plans at that time. (Tr. 2597-98.) Engineering work in 1994 was anticipated with actual implementation planned for 1995. (Tr. 2603.) For technical reasons, in order to have adequate available space to install the racks, installation was planned during fuel cycle 19. The 82 fuel assemblies from GE Morris might have to be added to the pool. (PX 1445 at CDB006697.)

Connecticut Yankee was licensed to store 1,172 assemblies (1,168 “usable” spaces^{35/}). (Mellor Demonstratives 1 - 8.)^{36/} Existing inventory as of December 15, 1993 was 816 which means the pool had unused capacity of 352 spaces not including full core reserve of 157 assemblies. With

^{34/}Whether Connecticut Yankee’s license would expire in 2007 or 2012 does not alter the court’s conclusions herein. In the 1995-96 time frame when the reracking was done, Connecticut Yankee expected to continue operations until the end of its operating license in 2007. (CY PFF 119 and Def.’s Resp.)

^{35/}Although the original licensing was for 1,172 assemblies, the actual capacity was 1,168 assemblies. (Tr. 2609 (Mellor).)

^{36/}The data depicted in this demonstrative was taken from PX 1445: Update of Spent Fuel Storage Strategy, December 15, 1993, Table 1 and Table 2.

projected reactor discharges commencing in 1994 of from 52 to 56 assemblies about every two years (approximately one third of the core), total storage space for 1,439 assemblies would be needed by 2006 considering full core reserve of 157 assemblies. (*Id.* at CDB006706.)

In March of 1995, Connecticut Yankee submitted its reracking application to the NRC. (PX 287.) The reracking, including replacing some racks with higher density modules “will increase the total storage space from 1,168 to 1,480 which will provide sufficient capacity to allow operation until the end of the current plant operating license.” (*Id.* at 5.) Connecticut Yankee’s decision to rerack was caused by DOE’s delay, breach(es) and lack of confidence if and/or when performance would commence.

At the present time, [Connecticut Yankee] has contracted with [DOE] to begin taking delivery of its spent fuel in 1998. However, DOE has indicated that all of [Connecticut Yankee’s] spent fuel may remain on site until a repository is operational or until some other facility is constructed under the [NWPAs]. Since 1987, DOE had made no legislative proposal to construct any facility other than a repository. Accordingly, in [Connecticut Yankee’s] judgement, [sic] it is not likely that a facility will be constructed and operational early enough to avoid loss of full-core-discharge capability at the Haddam Neck site, even if Congress mandates an interim storage facility, in an amendment to the NWPAs [Following evaluation of alternatives] a partial rerack would provide an increase in storage capacity which would maintain the Unit’s capability to accommodate a full-core-discharge.

(PX 287 at 2.)

The NRC approved the application and the reracking, which was completed in the summer of 1996, expanded the storage capacity of the pool from 1,168 assemblies to 1,480 assemblies. (CY PFF 120-22 and Def.’s Resps.) The reracking provided the capability to maintain full core reserve to the end of Connecticut Yankee’s operating license in 2007.

Defendant does not dispute that Connecticut Yankee always maintained FCR. (CY PFF 111 and Def.’s Resp.) The court rejects the government’s assertion that Mellor’s testimony and opinions lack foundation because he was not employed by Connecticut Yankee during relevant times. (CY PFF 109 and Def.’s Resp.) The foundation of Mr. Mellor’s knowledge in this regard is considered and weighed appropriately, giving due regard to knowledge he acquired prior to coming to Connecticut Yankee when employed by another nuclear utility. Having observed his demeanor and considered the documents that corroborate his testimony, Mellor’s testimony is duly credited.

Defendant also agrees that in October 1992, Connecticut Yankee estimated that, absent DOE performance, FCR would be lost in 2000. But, defendant adds, Connecticut Yankee also estimated it would lose FCR in 1996 and 1997 before the DOE’s performance was to commence. (CY PFF 114 and Def.’s Resp.) Indeed, as the government points out, the October 1992 estimate of loss of FCR by 2000 was arguably superceded by a later estimate – the March 1995 submittal to the NRC, CY PFF 95, that estimated loss of full core reserve capacity in 1997. Therefore, it is argued, DOE’s breach(es) and delay were not the cause of these expenses and cannot be attributed to the

government. Defendant also relies on the testimony of Mr. Abbott, one of its expert witnesses, that the reracking would have been done regardless of DOE's breach or delay. (Def.'s PFF 328.) The document relied upon by Mr. Abbott was a July 24, 1992 multi-utility study of potential allocation exchanges among New England reactors, (DX 156 at YDK008475 (Table B).) The reported date for loss of FCR for several utilities including Connecticut Yankee was 1996. The document was authored by Yankee Atomic, and as Mr. Abbott, the government's expert admitted, the derivation of that number could not be determined from the document and it "could have been wrong." (Tr. 5620-21 (Abbott).)

An internal memorandum recited loss of full-core capability after fuel cycle 19, predicted to be in December of 1996 assuming 64-assembly batch size and 18-month cycle. (PX 286CY at A1 of A.) This statement was contained in a 437-page proposal to the NRC to revise the technical specifications of Connecticut Yankee's spent fuel pool. (*Id.* at Table 5.3.1; 5-19.) The application included an evaluation of the thermal-hydraulic limits of the pool with the expanded capacity based on a conservative or worst-case scenario to create the maximum heat offloading. It was assumed that 64 assemblies would be offloaded in each cycle as opposed to the more typical 53 to 56. (Tr. 2612, 2618 (Mellor).) The spent fuel projections that Connecticut Yankee actually used to plan for reracking employed actual fuel batch sizes of 52 to 56 assemblies. (PX 1445CY at CDB006706.) Mr. Abbott admitted these projections were to calculate maximum heat load not for planning for storage. (Tr. 5637-39 (Abbott).) These statements do not alter the court's conclusions in this regard.

Documents subsequent to the July 24, 1992 Yankee Atomic memo which show plans for a loss of full core reserve in 2000 because of DOE's inactions are accorded substantial weight. (PX 1445CY at CDB006672 and 6691; PX 1445CY at CDB005938 and 6705-06; PX 1448CY at CDB006668.) Furthermore, the actual application, licensing and construction were not consistent with loss of full core reserve in 1997.

Commencement of performance was a long way off regardless of what acceptance rate(s) would be used or was contemplated at the time these mitigation decisions were made. Testimony and documents confirm that the breach was a substantial causal factor in the decision to incur these reracking charges, particularly given the long lead time for application, licensing and construction. The mitigation decisions were commercially reasonable at the time and the government did not establish unreasonableness. Subsequent events do not vitiate the reasonableness of the decisions when made.

The rerack increased pool capacity from 1,168 to 1,480 assemblies at a cost of \$8,350,893. (Tr. 2589.) Defendant does not dispute that Connecticut Yankee incurred reracking costs of \$8,350,893. (Tr. 3256-57 (Wise); Tr. 2307 (Bennet); CY PFF 125 and Def.'s Resp.; PX2043a.19 (Wise demonstrative).)

Defense that reracking subsequently proved to be unnecessary

For both Maine Yankee and Connecticut Yankee, defendant asserts that reracking ultimately became unnecessary because both utilities shut down before the need for the additional space

materialized. (Def.'s Opening Br. at 69 ("They could have waited to incur those reracking costs to ensure that they would be necessary."); *Id.*, at 70, citing *Standard Fed. Bank v. United States*, No. 95-478C, slip. op. at 17 (Fed. Cl. Oct. 2, 2004) (unpublished opinion) ("plaintiff has pointed to no reason why plaintiff was compelled to take action immediately, rather than wait until the need was clear, [several] years hence, before making the decision.")) Rather, they should have waited until January 31, 1998, the date of the breach according to the defendant before taking action. *Indiana Michigan* eliminates defendant's argument that plaintiffs' should or even could have waited until January 31, 1998 to rerack. The obligation to mitigate commenced no later than May 25, 1994. Witnesses testified to the lead time measured in years, for licensing, design and construction of spent fuel racks as well as most of the components of these nuclear power plants. Spent fuel racks are simply not an off-the-shelf commodity that these utilities could wait to design, license, fabricate and install on February 1, 1998. Defendant's argument does not cast sufficient doubt on the reasonableness of the reracking to warrant rejection of the costs as damages.

As DOE's delays and level of performance continued to slip, Maine Atomic, Connecticut Yankee and Yankee Atomic each built dry storage facilities. A substantial causal factor in their respective decisions was DOE's partial breach(es). In the main, these at-reactor costs were reasonably foreseeable to DOE at the time of contracting, the decisions were commercially reasonable and the costs were shown with reasonable certainty.

Maine Yankee's ISFSI

The motivations which led to Maine Yankee's development, licensing and construction of its ISFSI and the licensing, purchasing and loading of dry storage containers were disputed by the parties. Fuel assemblies were taken from the racks in the spent fuel pool, placed into canisters, transported and placed in 250-ton concrete casks. The magnitude of this endeavor was demonstrated in photos, miniature displays, and video tape at trial.

In December 1996, while the plant was shut down, analysis determined that some \$190 million in repairs to steam generators were needed and there was no guarantee the repairs would work. Repairs would have had to go through a three-year approval process and there were defective fuel and cable separations issues. (Tr. 273-39.) These "dual uncertainties concerning the steam generators and the cable separation issue . . . led [Thomas] to compare that to the cost of purchasing alternative power." (Tr. 2740.) Examining the cost-benefit from a ratepayer standpoint, particularly with relatively lower costs of electricity and oil and some opportunities to import power from Canada, Maine Yankee decided not to take the financial risk of continued operation. (Tr. 2741.) In May 1997, the decision was made to either shut down or sell the plant. A potential sale did not go through. (Tr. 2742.) In August of 1997, the decision was made to permanently shut down. (Tr. 2741-42.)

After its nuclear plant ceased operation in 1997, although the third reracking alleviated the immediate need to maintain full core reserve, focus shifted to long-term storage and comparison of leaving all the spent fuel in the pool or making other arrangements. This planning was done in the breach world, caused and necessitated by DOE's delay. Long-term options were explored:

Q. What options was Maine Yankee considering in terms of long-term storage of its spent fuel?

A. Well, we really were faced with dispositioning or dealing with the fuel in one way or another [W]e considered maintaining the spent fuel pool in a wet storage condition. We considered dry cask storage, which we ultimately established and have now completed. And we were also mindful, as we had been previously, to look for any - - any other alternatives should some develop whereby we would be able to remove the fuel responsibly from the site.

(Tr. 2747-48 (Thomas).)

Maine Yankee retained Raytheon to make fuel storage recommendations resulting in a November 3, 1997 “Independent Assessment of Wet v. Dry Spent Fuel Storage.” Thomas testified that, to his recollection, the Raytheon study gave an approximate \$30 million nod to dry storage. (PX 1456MY at MPA022596, ¶ 1; “[T]he ISFSI option provided significant economic (from 31 to 42 million dollars), decommissioning^{37/} interfacing, and public acceptance benefits.”); MPA022596 at ¶2; MPA022597 at Figure 7.1; MPA022598 at Figure 7.2 (an ISFSI with a 1997 start would become more economical than wet storage commencing in 2008).) In this regard, Maine Yankee also recognized that the plant could not be decommissioned if the spent fuel pool was there and was also concerned about low-level waste associated with the wet pool. Flexibility was important. (Tr. 2748-49.) Private fuel storage was considered as a mitigating option, but rejected. (*Id.*) Dry storage had higher initial costs, but lower annual maintenance costs. (Tr. 2751.)

That DOE’s delay and partial breach was at minimum a substantial causal factor in the underlying assumption of long-term storage that prompted the analysis is replete in the Raytheon study. (PX 1456MY.) “[T]he history of government actions (or inactions) regarding removal and disposal of commercial utility spent fuel despite contractual commitments and the difficulties and costs for implementation of private centralized interim fuel storage imply that Maine Yankee planning should be based on some spent fuel remaining on-site until year 2023, or more realistically, year 2028.” (*Id.* at MPA022574.) The schedule assumed a 1997 Request for Proposal (“RFP”), and with selection of a vendor, licensing, receipt of storage and transportation canister, loading would be completed in August of 2003. (*Id.* at MPA 022575.)

[I]f the DOE would have shown up on site at Maine Yankee and removed the fuel in the committed time frame per the contract, there would have been no need to even construct the ISFSI or to transfer fuel. . . . [T]he real point, the real fact is that if the DOE would have performed according to their contract, [there] would never have been a need to construct an ISFSI or move spent nuclear fuel.

^{37/}Generally, decommissioning refers to the shut down, dismantling and disposing of the plant. Plants need to decommission prior to using or selling the land. There was considerable testimony that the three plaintiffs made storage decisions based in part on ease and cost of decommissioning. That decommissioning may have factored into plaintiffs’ decisions does not alter the conclusions reached herein.

(Tr. 7345 (Smith).)

Following the decision to go with dry storage, implementation proceeded. After bid solicitation, Maine Yankee selected Stone & Webster to design, license and construct an ISFSI and decommission the plant in phases. (Tr. 2750-53.) Safety, experience, financial qualification, as well as technical terms, were among the factors cited in selecting Stone & Webster.^{38/} (Tr. 2756.) Payment bonds were required. (Tr. 2757.) The contract was signed in 1998. The contract was designed to be flexible. (Tr. 2754.) Stone & Webster would construct an ISFSI unless Maine Yankee removed it from the phased contract. (Tr. 2758.) Early effort included soil and foundation work^{39/} and procuring canisters. (Tr. 2757-58.) This work was done in 1999 and the beginning of 2000. (Tr. 2758-59.)

Concerned about the contractor's financial condition, Maine Yankee terminated its contract with Stone & Webster on May 4, 2000. (Tr. 2763.) Stone & Webster subsequently filed for bankruptcy. (Tr. 2765.) Maine Yankee exercised its right to have certain subcontracts assigned to it, including the NAC International contract for the hardware for dry storage – canisters and related equipment. (Tr. 2766.) NAC International was chosen to move the fuel from the pool to the pad. (Tr. 2768.) The NAC contract was later terminated in January of 2003. (Tr. 2770.)

Multi-purpose containers

For their dry storage systems, plaintiffs acquired containers that could be used for both storage and transportation – sometimes referred to as dual purpose containers, or multipurpose canisters (“MPCs”). (MY PFF 93.) When questioned why Maine Yankee decided to use a dual purpose transportable dry storage system, Thomas responded:

[F]rom a practical point of view, we knew the fuel was going to leave the site, and that's consistent with our wishes and finishing our responsibility and meeting that liability. And we understood that that was what the DOE has intended and intends to do, to come in and remove the fuel.

^{38/}An October 8, 1998 report (“Evaluation of Fuel Storage Options”) “revisit[ed] an important decision and [made] sure that it was the best course for us to continue on,” factoring in the additional cost information provided by the Stone & Webster bid. (Tr. 2759 (Thomas).) The report confirmed the operation and maintenance (O&M) savings of dry storage over wet. (DX 297 at MOFO67652 (“[D]ry storage provides an economically favorable option to store Maine Yankee’s spent nuclear fuel inventory when compared to the wet storage option.”).)

^{39/}According to the Raytheon study, the ISFSI storage pad was 86' x 225,' designed for 60 casks (4 rows of 15 each) with a pad thickness of 2 feet on top of 4 feet of engineered fill. (PX 1456 at MPA 022576.)

So, therefore, it made sense to make sure that it was licensed both for storage, [and transport] since the period of time is not certain, and today remains uncertain, as well as from a practical matter of having it ready to go and ready to be shipped. (Tr. 2749-50.)

MPCs are also included in the claims of Yankee Atomic and Connecticut Yankee. SNF, failed fuel and GTCC waste (discussed hereinafter) is placed inside the canister which is then placed inside a sophisticated concrete cask on the ISFSI pad where it waits for DOE. (Def.'s PFF 301; DX 801.) Maine Yankee acquired the NAC-UMS storage system, designed by NAC International. Maine Yankee's canisters each hold 24 spent fuel assemblies. (Def.'s PFF 301(c); DX 801.) Connecticut Yankee used the NAC-MPC storage system also provided by NAC International. Connecticut Yankee's canisters hold 26 assemblies. (Def.'s PFF 301(b); DX 801A.) Yankee Atomic also used the NAC-MPC storage system with a canister that holds 36 assemblies. (Def.'s PFF 301(c); DX 404 at YDK029229.) NRC approved all three systems, a nod to their commercial reasonableness. (DX 801 at NCT0050047 (Maine Yankee); DX 801A (Connecticut Yankee); DX 401 at YDK029219 & YDK029228 (Yankee Atomic).)

Defendant contends multipurpose canisters were not required under the Standard Contract, their use in mitigation was not reasonably foreseeable to DOE at the time of contracting, nor was their expenditure caused by DOE's anticipated and announced partial breach. Under the Standard Contract, DOE is required to provide casks to transport SNF from the utility site to DOE's facility. Casks must be suitable for use at the utility's site. Art. IV(B)(2). The utility is responsible for loading the casks; DOE supplies "[w]ritten procedures for cask handling and loading, including specifications on Purchaser-furnished canisters for containment of failed fuel." Art. IV(A)(2)(a) and (B)(2)(a). Defendant does not suggest the design for any eventual cask or other mode of transportation has been established. Neither was it established that canisters of SNF or material other than failed fuel could or would not be taken by DOE. Thus it is speculative whether or not these canisters will be able to be placed inside a yet-to-be developed transportation mode defendant argues. However, if plaintiffs have to unload the canisters when DOE performs, any appropriate adjustments can be asserted at that time. *See Tenn. Valley Auth. v. United States*, 69 Fed. Cl. 515, 543 (2006) (denying offsets for costs the utility did not have to spend because of DOE's breach as speculative, finding "the 'benefits' the government seeks to setoff are too speculative to meet the standards set forth by the Federal Circuit in *Indiana Michigan . . .*"). At least as of the time of trial, the Yucca Mountain repository design included a facility to open closed containers and remove the individual rods, although this may not have been considered as a "normal throughput activity," (Tr. 4188 (Zabransky), any adjustment to these plaintiffs' commercially reasonable mitigation decisions would be sheer speculation.

Even if the precise storage system had not been finalized in 1983 at the time the Standard Contracts were signed, mitigation in a contract that spans the ages is not limited to decades-old technology. At the time of the Standard Contract, the program was in its infancy – indeed the hundreds of million of dollars paid by utilities to DOE were to be used to finance the development and implementation of the program. It would be ironic if the utilities, required to pay these very substantial sums to and for DOE to develop a program, are denied recompense for equipment that

had not been developed by the very program they are funding. Noticeably, the government does not contest the commercial reasonableness of their use. Because of DOE's announced partial breach(es) and delays, plaintiffs did and were required to mitigate and their selection of these containers was commercially reasonable and defendant did not establish that it was unreasonable. Costs incurred were established with reasonable certainty.

DOE's contemplation of dual-purpose containers on-site guides the court's analysis of their subsequent use in mitigation. As early as December 30, 1983 in the Draft Civilian Radioactive Waste Management Program Mission Plan, contingency planning included multi-purpose casks. "As a further contingency, [DOE] will continue to explore the feasibility of a multipurpose storage cask that could be used for the [federal interim storage] either at commercial reactors or at a federal site. If feasible, such a cask would be designed so that it would later be used in the repository program, the MRS program, or in the transportation of spent fuel." (PX 636 at 2-15.) "[I]t may be more practical to have a standard waste canister which is then stored and shipped in reusable 'dual purpose' casks." (*Id.* at 3-E-2; *See also* PX 647 at 3-C-5 (1984 prediction that transportable storage casks would be available and licensable in 1986-87).) "The casks will be designed . . . for . . . storage as well as transportation so that once a particular cask is loaded it may remain at that reactor site in a storage mode until the repository is ready to receive that particular batch of fuel." (PX 641 at 2.) Despite a "draft" moniker, the court relies on these and other documents for foreseeability and reasonableness of decisions made by the utilities.

Incorporating changes based on responses to the October 20, 1983 plan, in early 1984 DOE revised its Mission Plan prior to submitting it to Congress. (PX 683 at 2.) Under the NWPA, the plan was "to permit informed decisions . . . in carrying out the repository program and the research, development, and demonstration programs required under this Act." (*Id.*) In discussing system integration, particularly an integrated waste packaging and handling system, "as an example of a system that appears to have considerable promise in this regard . . . [is] "'all purpose' nuclear waste canisters and disposable self-shielded casks that could be loaded at the source, sealed, stored at the reactor site or transported and stored either at a Federal Interim Storage site, a Monitored Retrievable Storage site or geologic repository without being reopened." (PX 683 at 2-12). "[T]ransportable storage casks appeared to be "feasible." (*Id.* at 2-9). Availability of this system by the late 1980s was predicted. (*Id.* at 2-12.)

A March 30, 1984 internal Memorandum from Michael J. Lawrence, Acting Director of OCRWM, seeking comments on Draft Civilian Radioactive Waste Management Program, included contingent planning for federal storage in transportable storage containers at the reactor site. "To provide this federal storage, the Department will consider the possibility of taking title to spent fuel according to the waste acceptance schedules, but arranging for continued storage at the utilities. This federal storage could be in dry storage casks, or, alternatively, in transportable storage casks or containers . . ." (PX 643 at 2-1.) "This alternative has minimal technical and economic uncertainty since such casks have been designed, fabricated, licensed and used in Europe." (*Id.* at 2-14.) "As a further contingency, [DOE] will continue to explore the feasibility of a multipurpose storage cask that could be used for Federal Interim Storage either at commercial reactors or at a Federal site. If

feasible, such a cask would be designed so that it could later be used in the repository program, the Monitored Retrievable Storage Program, or in the transportation of spent fuel.” (*Id.* at 2-19.)

Contingency planning in the 1985 Mission Plan predicted full pools and dry storage in casks if there were significant delays.

The baseline program assumption, of course, is that the repository is built on schedule. Should the repository be substantially delayed, one of two contingency approaches would be pursued. If the MRS facility is authorized by Congress and constructed, it can begin to accept spent fuel in a timely manner and package and store it (up to the authorized storage-capacity limit) until a repository becomes operational. If the MRS facility is not authorized, or if it is significantly delayed, increasing quantities of spent fuel will have to be stored at reactor sites. In that event, the pools for storing the fuel will continue to be filled, and additional onsite storage capacity through the use of dry storage in casks or similar technologies will have to be employed.

(PX 95 at HQ0005299.)

In July of 1994, Ivan Selin, Chairman of the NRC spoke of the preference for dry storage for shut down plants and spoke favorably of multi-purpose containers at the International Nuclear Materials Management Association. (PX 1457YA at PPL 007230 (“Pool storage requires a greater and more consistent operational vigilance and the satisfactory performance of a larger number of active systems, while dry storage is almost passive. . . . [T]he NRC increasingly views dry storage as the preferred method of interim storage at mature spent fuel for plants in permanent shutdown.”).) Chairman Selin also spoke favorably of the dual purpose cask.^{40/} “In the very near future we expect to certify the nation’s first dual purpose cask, that is designed for both storage and transportation, a design developed by the Nuclear Assurance Corporation.” Ivan Stuart, who was working on the very design Mr. Selin referenced, testified that this published report, expressing NRC preference for dry storage by such a senior government official, was unusual and dramatic for NAC. (Tr. 1351 (Stuart).)

Plaintiffs’ respective decisions to use containers that could both store and transport SNF were based, in part, on DOE’s statements of preference for multipurpose containers and their decisions were commercially reasonable.^{41/} (Tr. 1355-65 (Stuart) (noting that Secretary of Energy Watkins

^{40/}The term “cask” refers to the concrete storage structure on the ISFSI pad in which the loaded canister is placed. “Cask” is also used more generically to describe a system, including canisters and casks. As an alternative to canister storage, bare fuel assemblies would be placed in basket inside a storage cask submerged in the wet pool. Eventual transportation would include removal of the bare assemblies from the cask. (Tr. 1354-55 (Stuart).)

^{41/}A dry storage system includes a stainless steel canister. A canister-based system allows
(continued...)

advocated multipurpose canisters); PX 947; Tr. 1358 (Stuart) (listing advantages of multipurpose canisters); Tr. 1360-61 (Stuart) (“I believe everyone in the industry at that point in time [early 1990s] felt that the handwriting was on the wall by DOE that MPC concept would be the acceptable way for the program to progress.”); Tr. 1578-79 (Bennet) (giving reasons for selecting multi-purpose containers: (1) “that was the path that was envisioned by DOE. In fact, they even went through a process of going to procure multipurpose casks themselves,” and (2) “[b]ut to us, and our stakeholders at Yankee Atomic, the most important issue was, since this fuel was to go to Yucca Mountain, that is, indeed, be transportable”); Tr. 1603-07, 1609 (Bennet) (discussing DOE’s 1994 initiative to procure multipurpose canisters decision and adoption of that method); Tr. 1826-27 (Bennet) (elaborating significance of having SNF transport-ready); Tr. 2749-50 (Thomas) (Maine Yankee chose a “dual purpose transportable dry storage system” with fuel “ready to go and to be shipped” because Maine Yankee “understood that . . . DOE has intended and intends [to] come in and remove the fuel”); Tr. 3142-44 (Meisner) (Maine Yankee used containers “designed for storage and later transportation”); Tr. 2329-30 (Bennett) (“The type of canisters were essentially the same type of canisters that Yankee Atomic procured . . . that would allow for potential synergies on down the road for commonality of transport casks and simplification of our oversight of Bechtel during the licensing engineering and design of that equipment.”); Tr. 2352 (Bennet) (“We had already made the decision at the award of the Bechtel contract that we would be using the same transportable cask designed as Yankee Atomic . . . [W]e had always wanted to follow the DOE plan that these casks be transport ready.”).)

In its Spent Fuel Storage Study for Connecticut Yankee, in comparing costs of wet versus dry storage, Duke Engineering cited several advantages of the dry storage option being considered including that the SNF would be “transport ready” with the use of an MPC which DOE had indicated “might” be acceptable.

A major advantage of dry storage is that, once fuel is transferred to an ISFSI, it is ready to be placed in a transport cask for shipment to an off site storage/disposal facility. Using a canister/cask system design which complies with the DOE MPC Design Procurement Specification, provides some assurance that the fuel may be acceptable in this form. DOE has indicated that NRC licensed canisters may be acceptable as long as they are transportable.

(DX 266 at 17 (citing an October 4, 1991 DOE letter to Congressman Dicks).) The report cautioned however, that “there is a risk that the design requirements of a future DOE facility would be

^{41/}(...continued)

both storage and transportation without the need to repackage the fuel, thus making it dual-purpose. The number of assemblies the canister would hold varied (Connecticut Yankee’s held 24). Two stainless steel lids are welding onto the top of the canister, the internal atmosphere purged and replaced with helium to preclude corrosion and enhance heat transfer. Further internal stainless steel structural discs make the design rigid enough for both storage and transfer. (DX 266 (Connecticut Yankee’s February 1998 Fuel Study at 12).)

incompatible with the current canister system. This would require that the fuel be repackaged, at significant expense.” (*Id.* at 18.)

The court finds that substantial SNF and HLW dry storage costs were reasonably foreseeable to DOE, the breaching party at the time of contracting. At the time the mitigation decisions were made, while the details of the implementation of dry storage may not (and likely could not) have been foreseen due to the state of technology in 1983 compared to performance some decades in the future, the nature and magnitude of alternate storage was, and the decisions were commercially reasonable.

The court in *Sacramento Municipal Utility District v. United States* found on the evidence presented there that dual-purpose containers were not foreseeable to DOE at the time of contracting. “There [was] no evidence in the record . . . that the Government anticipated or was aware on June 14, 1983 that any breach of the Standard Contract might require the Government to be responsible for the costs of “dual-purpose” dry storage. At the time, the NRC was more than a decade away from issuing the requisite license for a utility to implement a “dual-purpose” system.” While dry storage was foreseeable, DOE could not foresee that interim storage might include dual-purpose storage.” 70 Fed. Cl. at 361. Unlike *Sacramento Municipal Utility*, the record in this case reflects DOE’s awareness of, and later contingency planning involving multi-purpose storage and transportation containers to store SNF at reactor sites if the repository was significantly delayed. That these plaintiffs made that same decision was not only foreseeable, but foreseen. And, defendant did not prove the utility decisions were other than commercially reasonable.

If any friction exists between foreseeability at the time of contracting and commercial reasonableness of the mitigation decisions made more than ten years later, particularly in handling radioactive waste, the nod goes to commercial reasonableness. It was reasonable for plaintiffs to choose a type of storage then being contemplated by DOE. Defendant did not establish it was unreasonable to do so.

Connecticut Yankee’s ISFSI

Thomas Bennet, was hired by Connecticut Yankee in 1997. Connecticut Yankee had been shut down for about a year at that time and was looking for management with experience in decommissioning, which Bennet had from his prior employment at Yankee Atomic. Mr. Bennet testified that from at least 1989 he was skeptical of the DOE’s performance based in part on the 1989 OCRWM report to Congress which outlined numerous problems including a delay in the repository. “So 6 years into the contract, they were looking at a 12-year delay.” (Tr. 1718-19.) From his experience, he was well aware of these delays.

By vote of the Board of Directors, Connecticut Yankee permanently shut down in December of 1996. (Tr. 2302.) Including discharge of the core, a total of 1,019 fuel assemblies were stored in the wet pool together with five or so metal canisters of failed fuel pins. (Tr. 2303.)

DOE's actions (and lack thereof) were a substantial causal factor in Connecticut Yankee's decision to design, license, apply for regulatory approval, and eventually construct and load its ISFSI. Company planning documents during the 1990s, leading up to the construction of the ISFSI, reflect the company's serious concern and growing awareness that DOE could not and would not begin pickup of SNF by January 1998. Planning documents during this time were crafted in the breach world, on a worst case type of outcome, a premise confirmed by testimony. (Tr. 1705, 1842.)

After evaluating alternatives, an April 1996 Decommissioning Cost Study by Northeast Utilities Service Company, concluded that technically and economically, prompt dismantlement ("DECON") was the appropriate shutdown procedure. (DX 236 at 2.) As noted earlier, prompt dismantlement assumes the spent fuel pool is emptied and fuel stored dry. Storage in an ISFSI was assumed. (*Id.* at CDB000135.) The study also assumed the DOE would not commence performance until 2003 (assuming the availability of an interim storage facility in 2003) with all fuel removed by 2025. (*Id.* at CDB000084.) The study warned that long-term storage of spent fuel would be "a significant expense. Therefore, the assumptions used to construct the current scenario need periodic evaluation as DOE moves closer to developing a repository for high-level waste and finalizes its acceptance schedule." (*Id.* at CDB000119.)

Northeast Utilities Service Company updated the report in December of 1996. (DX 89.) The update was necessitated because of Connecticut Yankee's decision to permanently cease operations as of December 4, 1996 instead of operating until 2007 – the end of its license. (*Id.* at 1.) Prompt dismantlement remained as the recommended alternative, both technically and economically. The study assumed the DOE would commence performance in 2006 and spent fuel would remain on-site until 2022. (*Id.* at 3.) Decommissioning costs are reduced with dry storage because dismantling the reactor and other structures is simplified. (*Id.* at 38 ("One advantage of isolating the fuel assemblies from the remainder of the site is that decommissioning can commence unimpeded by the presence of the fuel, providing a substantial cost saving.")) Estimated cost for the prompt dismantling was approximately \$427 million; cost of the SAFSTOR and ENTOMB alternatives considered along with DECON were approximately \$592 million and \$584 million respectively. (*Id.* at 47.)

Apparently at the request of the NRC, Duke Engineering and Services prepared a Spent Fuel Storage Study dated February 1998. (DX 266.) The report recommended wet pool storage based on the optimistic assumption that DOE would commence performance in 2006. (*Id.* at COF8 006449.) If that start date was pushed back 4 years, which would push the final fuel-out date back 8 years, dry would be economically advantageous. The report is consistent with the basic principle seen in these studies – that as the number of years of storage increases, the reduced annual operation and maintenance costs of dry storage makes dry storage more and more economically attractive. (*Id.* at COF006440, COF006451.) The study included a recommendation for an MPC Design Procurement Specification which provides some assurance that the fuel may be acceptable in this form and the DOE has indicated NRC licensed canisters may be acceptable as long as they are transportable. (*Id.* at COF006435 (referencing a DOE letter to Congressman Dicks dated October 4, 1993); *Id.* at COF006447.)

Although the reracking was completed in the summer of 1996 (following approval of its 1995 NRC application), in December of 1996, the plant was shut down and Connecticut Yankee was evaluating decommissioning costs. When Bennet arrived in 1997, a FERC rate case concerning decommission plans and costs was pending, and Connecticut Yankee was in the process of creating a spent fuel island – essentially maintaining a wet pool while dismantling the surrounding plant. (Tr. 2315.) There was tremendous opposition by interveners in the FERC proceedings, particularly the Connecticut Department of Public Utilities (“CDPU”). Connecticut Yankee’s decision to go to dry storage was litigation-driven in part by the CDPU. In this regard, the government does not dispute that the CDPU was a “forceful proponent” in favor of dry storage, but cites testimony from Connecticut Yankee in the rate case in opposition to CDPU’s advocacy of dry storage. (DX 87.) A 117-page decision issued August 31, 1998, recited CDPU’s criticism of wet versus dry conclusions; asserted the costs of spent fuel storage should be born by DOE, not by the ratepayers; and complained that Connecticut Yankee’s study did not take into consideration priority for shut down reactors. *Conn. Yankee Power Co.*, 84 FERC ¶ 63,009 at 77-80 (1998). Connecticut Yankee defended adding costs to the rate base, pointing out that there were no other sources of funds to pay for these very real costs, and any recovery from DOE could be later used to reduce customer costs. *Id.* at 45. The administrative law judge (“ALJ”) also questioned the inclusion of costs to cover the possibility that DOE would charge an additional fee for GTCC waste disposal (discussed *infra*), finding “there is a reasonable likelihood that GTCC waste removal and disposal is covered in the standard DOE contract.” *Id.* at 56. He did, however, conclude that the decision to continue to rely on wet storage was well-supported, and 80 percent of shut down reactors have stored their fuel in a wet pool. The ALJ ordered Connecticut Yankee to prepare a new submittal.^{42/}

Following the ALJ’s determination, Connecticut Yankee proceeded with a new cost estimate and worked with CDPU with the end result being a fixed price decommissioning operations contract (“DOC”) similar to that Maine Yankee used, “a newly emerging seemingly growing business of large architect engineers getting involved with fixed-price decommissioning contracts at nuclear power plants.” (Tr. 2321 (Bennet).) As a result, Connecticut Yankee issued a Request for Proposals in December of 1998, a concept embraced and advocated by CDPU. As Bennet explained CDPU was in favor of a DOC contract because a fixed price contract “would . . . account for a significant component of costs that previously had to go through cost estimates. And [CDPU] liked that. The second was that they believed that the burgeoning industry in New England for decommissioning these plants would yield cost savings and cost energies [sic] that could be achieved by doing this. And they also thought that it would streamline and help Connecticut Yankee decommission efficiently.” (Tr. 2323.) An Offer of Settlement between Connecticut Yankee and CDPU was approved by letter order of July 26, 2000. *Conn. Yankee Atomic Power Co.*, 92 FERC ¶ 61,055 (2000). In the end, however, a settlement agreement required for these expenditures (whether wet or dry), following an adverse decision by an administrative law judge, was a reasonable solution. Defendant has not established that the decision was unreasonable.

^{42/}The Decision requested the new estimate assume that DOE would accept its responsibility to pay for spent fuel delay costs. *Conn. Yankee Atomic Power Co.*, 84 FERC ¶ 63,009 at 81.

There were two bidders – Bechtel and Stone & Webster. (Tr. 2323.) Both bids contained both wet and dry options. (*Id.*) Dry storage was economically advantageous in the Bechtel bid. (Tr. 2364.) Independently, Connecticut Yankee had been re-evaluating the wet versus dry costs. Length of storage pointed to dry because, despite high initial capital costs, maintenance costs were lower. Basically, because dry storage is closed and passive compared to an open wet pool which needs more monitoring, dry storage becomes more economical as the period of storage extends. “Cost information we had done through the analysis as well as the additional cost information we got from the bids were significant factors as well as what I had said earlier, the length of time we would be looking at fuel storage and a number of other risks that I’m not specifically mentioning here.” (Tr. 2326 (Bennet).) Connecticut Yankee entered into a contract with Bechtel in April 1999. (Tr. 2324.) The Bechtel contract covered transfer of the fuel from wet storage to dry storage and projected project completion in 2004. (Tr. 2327.) The Bechtel contract was a fixed price turn-key agreement with numerous milestones upon which payment was contingent and included. licensing, design, engineering and fabrication of canisters. (Tr. 2329 (Bennet).)

Mr. Bennet, over defendant’s objection, testified that Connecticut Yankee would not have built the ISFSI if DOE had commenced performance:

Q: [w]ould Connecticut Yankee have decided to convert its fuel storage from wet to dry storage absent the government’s breach of contract?

[Government counsel]: Objection. Calls for speculation.

THE COURT: Well, if the witness has knowledge in that respect, he can testify.

[Plaintiffs’ counsel]: Do you have knowledge?

A. Yes.

Q. Okay.

A. We wouldn’t have built the ISFSI if the government was performing.

Q. Okay. And why do you say that?

A. It’s fairly clear, not to denigrate the positions, but the construction of an ISFSI is not something that’s what I call fun to do. And, clearly you wouldn’t do it if fuel was being removed from the site. There wouldn’t be a need to, if you will.

(Tr. 2328 (Bennett).)

At the time these storage decisions were made, Connecticut Yankee believed that dry storage was the most reasonable method of storing its spent fuel. (Tr. 2361-62 (“Based on the amount of time that DOE would not be performing, dry storage was believed to be the most reasonable way to store the fuel.”).)

[Bennet] Well, [the] most significant factor [in Connecticut Yankee’s decision to go to dry storage] is the fact that DOE would not be performing on the contract by starting fuel removal as of January 1998. And the expected long duration of that nonperformance was the most critical factor in our mind.

But once that factor was undertaken in terms of our analysis and understanding of other factors, economics, the cost of dry storage is, over long periods of time such as that, much cheaper than wet storage.

It helps address risk such as the availability of low-level waste sites to complete the decommissioning of the plant. As well as the costs that I mentioned the other day, decommissioning usually doesn't get less expensive and cheaper over time, it tends to get more complicated and more costly.

So those element, as well as since the performance breached by DOE was going to be so long, so exceptional, the desire to have the fuel in a transportable stage such that there became opportunity to move it someplace, either to the DOE site, such transportability was factored in. And/or if we were able to see private fuel storage come to fruition, that would also provide for the need for transportability as well.

(Tr. 2362-63 (Bennett).)

Integrated into Connecticut Yankee's decision-making at the time was uncertainty about when DOE would be coming to remove SNF and HLW and indications were that it would be very long time. "My understanding that we integrated into our decision making was that we didn't know absolutely when they would be coming. We had a lot of information that it would be a very long time before they came and, importantly, a long time before the repository was opened or a long time before they were even starting to do things such as build the canister hardware necessary to do that." (Tr. 2363-64 (Bennet); *see also* CY PFF 99(h) (p. 111-12).)

Although planned to commence in 2002, actual construction of the ISFSI did not start until 2002 because the City of Haddam denied a zoning permit. (Tr. 2345.) Litigation over the building permit and zoning issues ended in a settlement and consent order. (Tr. 2346-47.) Under the consent order, Connecticut Yankee is prohibited from bringing the SNF back from the GE Morris site. (PX 1920; Tr. 2347-48.) The settlement agreement also required Connecticut Yankee to pay an annual fee to the City of Haddam beginning at \$1 million a year and escalating thereafter until 2011. (Tr. 2349 (Bennet).)

Also under the consent order, Connecticut Yankee was required to "take all reasonable steps to enter into a contract for procurement and fabrication at the earliest practicable date subject to regulatory requirements and commercial conditions of a fuel transportation cask, which will be available, if necessary, to allow transportation of the waste from the property." (Tr. 2350.) Accordingly, Connecticut Yankee, in collaboration with Yankee Atomic issued an RFP to procure a transportation cask. Mr. Bennet was questioned whether absent this settlement agreement's requirement that efforts would have been made to procure a transport cask, whether Connecticut Yankee would have done so. (Tr. 2351.) Several factors went into the decision to have a transport cask.

[Mr. Bennet]: There were other factors. We had already made the decision at the award of the Bechtel contract that we would be using the same transportable cask designed as Yankee Atomic. And that was driven by our desire to have the fuel transport ready.

In particular, should DOE fail to procure a transport cask, that was one possibility. There was a further possibility that if we could transport it to private fuel storage during the long-term period, that may become an option.

But we had always wanted to follow the DOE plan that these casks be transport ready. And it was also, we understood very much so, that the availability of the transport casks as far as our stakeholders perceived, would provide for the earliest possibility of transport to some facility that was not in their state or their town, as they looked at it.

And we valued that type of input and tend to integrate it into our planning as well.

(Tr. 2352-53.)

These were commercially reasonable mitigation decisions at the time. It is not unreasonable to incur mitigation costs under terms approved by regulators or required by settlement agreements, both following rigorous venting. It certainly was foreseeable at the time of contracting that mitigation decisions would require regulatory approvals in which equipment dictates were not uncommon.

Connecticut Yankee subsequently terminated Bechtel's contract in 2003 – a time period beyond the court's consideration at this time. By way of background, after Bechtel's termination, Connecticut Yankee finished the ISFSI construction and had begun loading, anticipating that all fuel would be loaded by early 2005.

The ISFSI pad is about the size of a hockey rink and is located about 3/4 of a mile from the containment dome. (Tr. 2358-59.) The ISFSI site itself is a total of 15 acres. (Tr. 2385 (Bennet) (“The property we’re speaking of there is the 15 or so acres of real estate on our plant site on which the ISFSI is placed and/or directly controlled by.”).) Mr. Bennet gave his opinion of the fair market value of the 15 acres as approximately \$30,000 an acre based on a real estate appraisal of the total parcel of \$450,000. (Tr. 2387; PX 1729CY.)

Yankee Atomic's ISFSI

Yankee Atomic incurred ISFSI construction costs through 2001. Defendant contests causation and reasonableness, asserting Yankee Atomic knew it was facing substantial and lengthy SNF storage costs well before DOE admitted performance would be delayed, and began to explore dry storage options in the early 1990s, in part because the plant was projected to lose FCR in its spent fuel pool by April of 2000, several months prior to the expiration of Yankee Atomic's operating license and before DOE's performance would commence. (DX 140.) Yankee Atomic's plant was shut down initially in October 1991, and then permanently in February 1992 for economic reasons which saved its customers an estimated \$116 million. (DX 246 at COF024030.)

Like Connecticut Yankee and Maine Yankee, Yankee Atomic studied storage options over several years and monitored DOE's lack of progress. Yankee Atomic's mitigation decisions were subject to regulatory analysis, its equipment choices were NRC-licensed as was its ISFSI. Indeed,

the NRC oversight on decisions made not only by Yankee Atomic, but by Maine and Connecticut Yankee, speaks to the commercial reasonableness of the decisions made. Similarly, the circumstances that many (if not most) of the expenses incurred were approved by respective regulatory rate-making bodies, also is given weight in reaching the court's findings herein as to the reasonableness of the mitigation decisions, their implementation, and cost.

A May, 1992 internal memorandum stated earlier studies in 1980, 1984 and 1989 assumed a DOE repository in 1998, priority for shut down reactors would be extended and all SNF would be removed in first year following plant shut down. (DX 153.) DOE's delay is recited; an MRS was noted to be unrealistic. The study analyzes and then discounts both priority for shut down reactors and exchanges, based not on the terms of the Standard Contract, but on DOE's subsequent statements. The assumption was that SNF would remain on-site until 2018 based on the 1991 ACR which was DOE's statement of timing and extent of expected performance. The memorandum concludes that dry cask storage is the most economical.

A Spent Nuclear Fuel Study for Yankee Atomic in September, 1992, four months after the above memorandum recommended continuing to press DOE to accelerate priority acceptance for shut down reactors or take responsibility for SNF, and to propose exchanges. Design work preliminary to a "custom concrete dry storage system in cooperation with an [ISFSI] vendor" was also recommended. (PX 1465 at 81.) Although Yankee Atomic had previously concluded that concrete casks were the most economical dry storage option, this new study added information that a significant disadvantage was their size, approximately 100 tons per cask. Following at least six pages of technical analysis of this option, in summary, the advantages of standard concrete casks included its lowest estimated life cycle cost among the examined options. Three disadvantages were substantial initial investment for hardware, lack of a compatible DOE shipping cask for any dry cask system (although it was noted that DOE may be "forced" to resolve the lack of shipping casks because several utilities have, or were planning to use these types of casks). Thirdly, use of concrete casks would require modification to the plant superstructure, the crane, and possibly the Sherman Dam Bridge. This is a 156 page detailed technical and economic analysis of several types of wet and dry storage options including possible storage at other domestic facilities, exchanges of allocations under the DOE contract, offsite storage and reprocessing overseas. The major advantage of dual-purpose metal containers was that they are licensed for both storage and shipping, which would avoid the cost of transferring the SNF twice, but at a higher cost – an estimated \$1.5 million per container. (PX 1465 at 73.) This study concluded the concrete dry system was the best. Advantages were lower operation and maintenance costs, that it likely would not require any building modifications; and it was possible to design to be compatible with DOE's eventual transport system. A disadvantage would be possible problems with licensing. The study included a detailed analysis of exchanges:

Article V.E of our contract with DOE . . . allows utilities to exchange delivery commitments (position in the queue) for SNF. The possibility of swapping delivery allocations with other New England utilities has been investigated. A preliminary

plan (Reference 6)^{43/} has been developed to exchange allocation rights which would permit YAEC to remove all SNF from YNPS within three years of startup of the DOE Waste Management System (WMS). Success of such a plan depends on the timely startup of the WMS and the ability of the other New England utilities to swap allocation rights. These are difficult, but not necessarily insurmountable hurdles. The startup date of the WMS will be determined more by politics than by technical issues. This is based on what has happened in Nevada and other states, where attempts to site disposal facilities have been made. The utility industry must do what it can to move the process along. In the meantime, the allocation exchange option will be pursued with our owners, sister utilities, and with industry organizations such as the EEI/UWaste Group.

Exchanging places in the SNF shipping queue could have substantial economic benefit to all utilities which participate in such a program, without compromising any utility's ability to operate to the end of their license. This option is actively being pursued with the preparation of proposals to YAEC sister utilities. These proposals are intended to determine their interest in exchanging allocations and to pursue common benefits. It may be financially beneficial, especially for our owner utilities, to make such a swap.

(PX 1465 at 12-13.)

An October 9, 1992 internal memorandum to Yankee Atomic management (Thayer) (DX 173 copied to thirteen others at Yankee Atomic including Kadak, Grube and Heider), further refined the recommendations in the study. The study recommended the continued use of the wet pool with a modified cooling system for the next several years, while at the same time proceeding with the evaluation of a custom dry storage system with concrete casks. DOE's 1998 commencement date was cited as optimistic. As a result, the longer the storage period, the better dry storage options were from a cost perspective. Exchange of allocations was again discussed with the prediction that with exchanges, all SNF could be removed from Yankee Atomic's site in as little as three years following commencement of DOE's facility. After further detailed technical analysis, the memorandum concluded that exchange of shipping allocations should proceed immediately along with the development of a custom concrete dry ISFSI system in cooperation with a cask vendor selected on a competitive basis. Documenting the "but for" scenario back in 1992, the memorandum predicted that **"[i]f SNF can be removed from YNPS [Yankee Nuclear Power Station] in the next 8 to 10 years, there will be no need to construct an ISFSI of any type. In fact, even if SNF remains onsite several years longer, no cost benefit is gained by building an ISFSI."** (DX 173 at 10-11 (emphasis supplied.)) In other words, assuming fuel-out by 2002 (ten years from the 1992 memorandum) or a year or so thereafter, an ISFSI would not make economic sense. Conversely, as time went on and DOE's delay became more of a concern and the fuel-out date pushed back more than ten years, an ISFSI was a reasonable and prudent mitigation decision at the time. Pressing DOE

^{43/}The reference is to a July 24, 1992 memorandum to A.R. Allen from Buchheit, "Spent Fuel Allocation Exchanges." (PX 1465YA at 83.)

for accelerated priority for shut down reactors or accepting financial responsibility for the SNF was repeated. The report recommended that: “The system should be compatible with either a certified shipping cask, a DOE shipping cask (10 C.F.R. 71), or should be certified for shipping (dual purpose).” (*Id.* at 12.)

That DOE’s performance was pivotal to the decision to be made was evident in the final recommendation that if exchanges and/or priority for shut down reactors were not successful, then the decision to build an ISFSI would be based on DOE’s performance (or lack thereof).

If [DOE does not grant priority for shutdown reactors or exchanges cannot be arranged], and if a dry storage system has been designed and certified, [Yankee Atomic] should again review the economic and technical viability of the dry storage system versus continued [wet pool] operation in light of the DOE situation at that time. If dry storage proves the best alternative then, construct the custom dry storage system and make it operational prior to the end of the SAFSTOR period. Transfer all SNF and discontinue operation of the [wet pool] prior to the scheduled decommissioning date.

(DX 173 at 13.)

Two months later, DOE rejected YA’s DCSs as being in excess of allocation in the 1991 ACR. Yankee Atomic had requested all its SNF (127 MTUs) be delivered in the first three years of operation. (DX 177.)

A June 20, 1994 study in connection with a July 1, 1994 FERC filing on decommissioning costs favored dry storage. (DX 207.)

While not the only evidence on this point, defendant objects to Mr. Bennet’s testimony concerning Yankee Atomic’s knowledge at these times because Bennet did not join the company until 1995. (Tr. 1534-36 (Bennet).) Bennet was previously employed in the nuclear industry and was qualified to testify. (Tr. 1533.) Furthermore, the major Yankee Atomic ISFSI decisions were made after 1995 and Bennet was well qualified to testify in this regard. (Tr. 1533-37 (Bennet) (understood when he joined Yankee Atomic in 1995, based on “what DOE had published at that time, that DOE’s performance would be ‘very delayed’ until “no sooner than 2010”); Tr. 1536-37 (Bennet) (“I personally always understood it would be somewhat later than that, if not a great deal later than that. And I also had my own view that they very well may never perform.”); Tr. 1537-38 (Bennet) (noting comparable view held throughout the nuclear utility industry); Tr. 1718-19 (Bennet) (outlining spent fuel program failures from 1989 forward); Tr. 2363-64 (Bennet) (“My understanding that we integrated into our decision making was that we didn’t know absolutely when [DOE] would be coming. We had a lot of information that it would be a very long time”)) Bennet’s testimony summarized Yankee Atomic’s decision to build the ISFSI. DOE’s delay was a substantial causal factor in that decision. His conclusion is consistent with the contemporaneous documents and the court credits his testimony. (“[P]ackaging the fuel in dry storage was the, in our view the most – the best way to take care of the fuel given that long time frame of having to store it pending DOE coming to get it.” (Tr. 1574 (Bennet).)

An updated fuel storage study dated August 7, 1995 concluded a commercial dry transportable system was the least costly. (DX 228.)

An August, 1997 Spent Fuel Storage study concluded Yankee Atomic should continue with its plan for an ISFSI upon approval of the NAC International Storage application and some technical applications filed by Yankee Atomic, both of which should be done by 2000. Projected schedule was fuel transfer in 2001; decommissioning of the spent fuel building and support facilities in 2002. DOE shipments were stated as commencing in 2007 and ending in 2018 based on the 1991 ACR. (PX 1462.) Indeed the study explains “[a]lthough DOE is responsible for their ultimate disposal, it is apparent that DOE will not start removal until well after its January 1998 contractual date.” (PX 1462 at YDK007505.) Nominal life-cycle cost for dry was \$31 million less than wet (\$123 million dry versus \$154 million wet). (*Id.* at YDK007523.) Decommissioning would be accelerated, thus reducing Yankee Atomic’s liability sooner rather than later. Wet storage would delay decommissioning until 2019 at the earliest and with cost of low level waste rapidly increasing, proceeding with the ISFSI minimized risks associated with low level waste disposal. Yankee Atomic would not commit fully until fabrication funds are authorized (estimated to be in 1999) – therefore, remained flexible and could change options if the economics warrant.

Shipment in a canister-based system by rail was assumed in the 1997 study. The study reported that shipment in a truck cask (uncanistered) was an option if the spent fuel had remained in the wet pool, but that DOE’s OCRWM indicated that an interim facility would not be designed to handle uncanistered fuel (further support for the reasonableness of plaintiffs’ dual-purpose container mitigation decision). That the interim DOE facility was never built does not make Yankee Atomic’s decision unreasonable. (*Id.* at YDK007506; *see also* YDK007523 (“A major advantage of dry storage is that, once fuel is transferred to an ISFSI, it is ‘ready to transport’ to an off site storage/disposal facility. This conservative design approach, which complies with the DOE MPC Design Procurement Specification, provides added assurance that the fuel will be acceptable in this form.”).) The report recognized that DOE could change its mind which would limit Yankee Atomic’s options. (*Id.* at YDK007525 (“One of the primary reasons for choosing the NAC system is to assure compatibility with the DOE Multi Purpose Canister (MPC) System Design Procurement Specification. DOE had intentions of using a single canister-based system for the storage, transport, and disposal of spent fuel. However, no final decision has been made on the method for placement of spent fuel in the repository.”); and YDK007527 (“The design requirements of a future DOE facility have not been finalized. Although the dry storage system selected takes into account all known design criteria, changes could occur which necessitate the repackaging of fuel in the future. Without a fuel pool on site, repackaging of fuel would require use of a “hot cell” or transport to another site at significant cost.”).) While certainly circumstances could change, the court concludes that Yankee Atomic’s storage decisions were reasonable (and not unreasonable) and substantially caused by DOE’s delay.

Defendant does not dispute that Yankee Atomic concluded that dry storage was the preferred method of long-term SNF storage “in light of Yankee Atomic’s own objectives and goals.” (*See* Def.’s Resp. to YA PFF 100.) Defendant also does not dispute that economics generally favor dry storage for long-term storage, based on lower operation and maintenance costs associated with dry

storage. (*Id.* at 102.) Defendant's objection to the conclusions of these studies is basically three-fold. (*Id.* at 101.) First, wet storage costs were over-stated. The court does not find they were overstated or other than reasonable. Secondly, costs were improperly compared based on "nominal" dollars. The court notes that comparison is charted by category of cost or expenditure from 1997 to 2020. All the data is "escalated" to 1997. (PX 1462 at YDK007537-39.) All data, both for wet and dry was treated this way. Thirdly, defendant cites the 1997 study's reasons for the "dry" recommendation as permitting early decommissioning and minimizing risk of low-level waste ("LLW") disposal. The latter, is a laudatory goal, and the former an admitted advantageous consequence. Analysis of advantages as well as disadvantages neither detracts from nor negates the prime and substantial motivator for the lengthy studies and hefty expenditures – DOE's delay.

Defendant asserts decommissioning concerns, not DOE's partial breach, "caused" the mitigation decisions. Decommissioning was in the confluence mix. After its reactor ceases operation, a nuclear utility must "decommission" the reactor and environs before the site can be used for other purposes. (Tr. 2402-05 (Bennet); DX 236 at CDB000082; DX 152 at YDK016746.) The presence of SNF in the spent fuel pool precludes decommissioning techniques such as the use of demolition explosives, which cannot be used because of the potential damage to the pool or to the SNF. (DX 256 at MPA022595 (use of explosives instead of diamond wire cutting, used if the spent fuel pool was still there, would result in savings of approximately \$33.7 million.)) Placing the SNF in dry storage away from the reactor allows decommissioning activities to proceed unimpeded. (DX 741 at GPE0050476; DX 370 at MIR000557; DX 266 at COF006435, COF006439.) However, as plaintiffs point out, in order to complete decommissioning, plaintiffs must remove all SNF from their sites, not just from the spent fuel pools. (YA PFF 27.)

Decommissioning options include: (1) prompt decommissioning, which involves the decontamination and dismantlement of the plant structures soon after the reactor is shut down; and (2) delayed decommissioning, in which case decontamination and dismantlement wait until all the SNF is off-site. (DX 88 at GPE0010131032; DX 89 at COF003001-02; DX 150 at YDK006388-89; Tr. 1561 (Bennet); Tr. 2742-43 (Thomas).) In 1992, Yankee Atomic planned to transfer all of its SNF into dry storage by June 30, 1996 in part, so that decommissioning activities could proceed unhindered by spent fuel pool restrictions. (DX 150 at YDK006408.) All three utilities cited significant cost savings from decommissioning fairly soon after shutting down. Yankee Atomic estimated savings of \$165 million in one study and \$40 million in another. (DX 89 at COF0030004; DX 196 at MPA01871; Tr. 1561-62 (Bennet).) In 1987, Connecticut Yankee concluded prompt decommissioning was the most cost effective option. (DX 107 at CDB000344.) Maine Yankee's conclusion was similar. (Tr. 2743-45 (Thomas).) That decommissioning costs were impacted favorably as a collateral consequence of plaintiffs' reasonable mitigation efforts, does not detract from the primary and substantial causation being DOE's delays.

Another concern was the availability of a disposal site for low-level waste which as explained to the court included the exterior components of the reactor, etc. This waste was not included in the scope of the Standard Contract. Defendant points out that the only place plaintiffs could take their low-level waste was Barnwell, South Carolina, and future availability of that disposal site was questionable. (Def.'s PFF 293(c)(i)-(iii).) While low-level waste disposal issues were a factor in

decommissioning planning for all three plaintiffs, they were ultimately not a significant factor. (Tr. 3164 (Meisner).) (“[T]he availability of a low-level waste site at that point in time [1997] was – was not at all a major determiner in order – in going forward with decommissioning.”) and Tr. 3169 (Meisner) (“Q [by government counsel]: So at the time this report [Maine Yankee’s post-shut down decommissioning report to the NRC, DX 783] was written in August of 1997, there was a concern that Maine Yankee might lose access to [Barnwell] for the disposal of its low-level waste, right? A: Not particularly. No. All this says is we considered the possibility, which is what I was saying just a few minutes ago.”); Tr. 1722-24 (Bennet) (similar).) In 1992, Yankee Atomic estimated the cost of LLW disposal to be \$22,340,000 out of total decommissioning costs of \$204,478,600. (DX 159 at YSB003486, 3510.) Three months later, the estimate was \$43,682,000 out of total decommissioning costs of \$232,135,000. (DX 150 at YDK006448.) In October of 1994, the estimate was \$42 million out of a total of \$341,170,689. (DX 214 at YDK007865-67 and YDK007877.) Estimates for Connecticut Yankee and Maine Yankee were similar. (Def.’s PFF 293(d)(ii) and (iii) [p. 150].)

The 1992 decommissioning cost study prepared for Yankee Atomic by TLC Engineering, (DX 150), considered the breach world scenario of DOE’s delay, assuming that the assemblies would remain in the spent fuel pool for 56 months after the October 1991 shut down after which they would be transferred to dry storage where they would remain for up to 23 years based on Yankee Atomic’s “projections” of when DOE would accept SNF at its “yet-to-be developed high level waste repository.” (DX 150 at YDK006389-90.) That study estimated the difference in cost between prompt decommissioning and delayed dismantling to be approximately \$15 million. (DX 150 at YDK006391; DX 157 at YSB003465.) Plaintiffs do not contest the significant costs savings. (See Def.’s PFF 292 (to which plaintiffs did not respond); Pls.’ Resp. to Def.’s PFF at 56.)

That there was an independent or secondary reason for building the ISFSIs does not detract from the primary or substantial causal factor - the delay of over a decade in DOE’s acceptance, transportation and disposal. Regardless of rate, plaintiffs are facing at least 12 additional years of storage. The collateral consequences dovetail and reach the same conclusion – that an ISFSI was a reasonable course of action. This does not destroy the mitigation nature of these decisions.

Before FERC, Russell Mellor testified that Yankee Atomic had several decommissioning cost studies (1980, 1984 and 1989). (DX 152.) The 1989 study concluded the cost of decommissioning would be \$98.4 million in 1992 dollars. On May 1, 1990, FERC approved rates based on the \$98.4 million decommissioning cost. Apparently a new study estimated a cost of \$247 million in 1992 dollars. Mellor testified to several reasons why a new cost study was undertaken, including that “DOE has indicated that it will not remove all spent nuclear fuel from the Yankee plant in sufficient time to avoid a potentially significant impact on the decommissioning process. Other reasons are given, including increase in costs for other components of the decommissioning process including disposal fees for low level wastes.” (DX 152 at YDK016739.)

The court has reviewed the studies and documents in this regard and considered witness testimony. The court finds that Yankee Atomic’s decision to build the ISFSI was reasonable at the time, that DOE’s delay in commencing contract performance was a substantial factor in this commercially reasonable decision, and defendant did not establish that the decision was

unreasonable. The decision to build the ISFSI was based on a confluence of factors, but DOE's delay and the tremendous uncertainty surrounding not only whether DOE would commence performance, but when was the predominate consideration. Understandably, many planning documents included DOE's then-proposed dates and acceptance amounts because as a regulated utility, plaintiffs had to plan using the current breach world scenario. Parroting DOE's delays and acceptance rates did not and does not evidence acquiescence in them. (Tr. 1842-43 (Bennet) ("We did not at all believe that this [ACR-based acceptance rate assumption in Yankee Atomic's FERC filings] was what DOE should do under the contract or that it was what was required under the contract. These were just assumptions that we were forced to make to ensure adequate funding under our FERC regulation.")).

Yankee Atomic entered into a phased contract with NAC International on October 2, 1996 for a transportable dry fuel storage system.^{44/} Due to the phased nature of the NAC contract, Yankee Atomic could defer the decision to fully commit to dry storage until licensing issues could be resolved (late 1999 to early 2000).

Impending DOE delays were a substantial factor in the decisions of these utilities. Defendant does not contend that dry on-site storage is unreasonable now. Private storage on-site has assumed the function planned for Yucca Mountain but with storage sites scattered throughout the nation. Funding for these sites does not come from the Waste Fund as contemplated by Congress for Yucca Mountain and for the process contemplated by the Standard Contract. Instead, utility ratepayers have had to pay electricity rates which reflect the substantial fees utilities pay to fund the DOE waste disposal program and the costs incurred by utilities in providing temporary SNF storage absent contract performance by DOE. Certainly increased storage costs were foreseeable. Then, to the extent they are reasonable, foreseeable, and caused by the impending breach, those mitigation costs will be borne by the American taxpayers in judgments for mitigation costs. In the interim, the burden rests with ratepayers.^{45/}

^{44/}Exemplary of the time and effort in these activities, the NAC transport cask license amendment requirements were submitted to NRC in December of 1996 and the storage system application in April of 1997. Approval of the storage submitted was expected to take three years. (PX 1462 at YDK007517.) Fabrication was estimated to take one year following approval. (*Id.* at YDK007518.)

^{45/}While plaintiffs are, by virtue of contractual privity, seeking recompense for their mitigation expenditures, those costs have been absorbed into the rate base and the cost passed on to their customers. Reimbursement damages would come from the public fisc. Dr. Wise admitted such:

[The Court:] [W]hat we're dealing with here is who is going to bear the economic impact of fuel storage over a period of time, either the ratepayers in the particular jurisdictions or the federal government by means of damages in this litigation. But either way, I take it the company doesn't really suffer. It can recover

(continued...)

Plaintiffs did not establish that DOE’s partial breach(es) were a substantial causal factor in their respective wet-pool operating expenses incurred.

Plaintiffs assert that because of DOE’s failure to commence performance, they incurred substantial costs to operate their respective wet pools, expenditures they would not have had if DOE had performed. If DOE had performed, they would not have had any wet pool maintenance costs in that DOE performance would have emptied their pools. All their SNF and HLW would have been removed. Plaintiffs rely on expert testimony from economist Frank Graves. Graves presented what he opined was an economically reasonable schedule for SNF acceptance that would have developed in the nonbreach world. Utilizing utility cost of storage and applying fundamental concepts of cost-savings and cost avoidance, Graves also composed an economic model of exchanges, swaps, purchases and sale of DOE pick-up commitments, based on the classic “invisible hand” of economic market development.^{46/} If utility A faces a cost of \$10 million to store 1 MTU of SNF, and utility B has available space in its pool to store that SNF, with business acumen honed by a utility’s duty to its ratepayers, utility A has an incentive to avoid paying \$10 million and negotiates with B say for \$7 million to accept utility A’s fuel. Utility A saves \$3 million and utility B gains \$7 million. Ratepayers of both utilities benefit. Responding to criticism that political pressures would impede the “invisible hand,” Graves’ responded that his model would work even if only half the utilities participated.

Graves also assumed the SNF and HLW disposal program would be efficient and DOE would allow exchanges and utilize “campaigns” to minimize trips to utility sites. Instead of picking up small amounts from a particular reactor site each year, tremendous costs could be avoided by simply picking up more each trip. Graves’ demonstratives dramatically highlighted the wisdom and economic sense of campaigning.

^{45/}(...continued)

these costs because FERC has approved its budgets on which you based your damages so that it will recover in its rate base the amounts involved, continue on as before, and have no real impact.

.....

[Dr. Wise]: I’m not an expert on rate making. My understanding is that’s correct. At the present, through FERC rate hearings or whatever, the – the costs will be borne by the ratepayers unless there’s recovery of those costs in this matter, in which case the ratepayers will not bear costs to the same degree.

(Tr. 3367-68.)

^{46/}First proclaimed by Adam Smith, the “invisible hand” theory “holds that in selfishly pursuing only his or her personal good, every individual is led, as if by an invisible hand, to achieve the best good for all.” (Tr. 4256 (quoting Paul Samuelson & William Nordhaus, *Economics* (15th ed. 1995).)

Mr. Graves has a Bachelor of Arts degree in mathematics and a Master of Science and Management from the MIT Sloan School of Management with a concentration in finance and operations modeling. He served as a consultant to the Secretary of Energy for over twenty years. The majority of his work was with the electrical industry, addressing capacity planning, service design and pricing, valuation of assets, risk management, financial practices and rate design. (Tr. 742.) He has analyzed whether a nuclear plant under construction should be completed and the economics of selling a nuclear power plant and repurchasing the power supply. He has conducted market analysis on restructure of the electricity industry, developed market performance evaluation metrics and consulted in antitrust proceedings in which the quality of the markets was disputed. He has forecast industry supply, marginal cost and demand. (Tr. 755.) Graves has testified in state and federal regulatory forums and in state and federal courts, including several occasions as a “prudence witness.” (Tr. 760.) He is a member of the American Finance Association, the International Association of Energy Economists, the Mathematical Association of America and the Stanford Energy Modeling Forum, a group of around 100 academic and industry representatives invited by Stanford University faculty to meet several times annually to consider global energy market issues. Graves was invited to join the Stanford Forum following his publication “in the area of incorporating economic considerations into the modeling of electric transmission systems” (Tr. 764) and submitting comments to several public policy forums on restructuring rules for the electric industry.” Mr. Graves was qualified as an expert in economics without objection.^{47/} (Tr. 765.)

Graves testified to his development of methodology for valuing option-based contracts including trading of emission allowances. In 1995, the Environmental Protection Agency (“EPA”) imposed tighter controls on sulfur dioxide emissions. Utilities could comply in one of three ways: (1) improve pollution controls; (2) burn cleaner fuel; or (3) buy emission allowances. Emission allowances were (or are) intangible rights to emit pollutants at a higher emission level in return for another utility having a correspondingly proportional lower emission level – for a market-driven price. (Tr. 751-52.) Graves analogized the utility emission allowance market to the exchange market for SNF/HLW delivery commitments that would have developed in the nonbreach world, an “option pricing paradigm” (Tr. 752.) Presumably, there were political environmental pressures attendant a utility taking on “excess” pollution for a price, akin to the pressures the defendant argues here would prevent allocation exchanges. Nevertheless, an emission allowance market developed.

Mr. Graves was tasked with determining an overall acceptance rate in the nonbreach world sufficient to avoid additional at-reactor costs and a “sequence of removal amongst the various parties that had spent nuclear fuel [that] would be attractive to reduce overall costs for the utilities that were bearing those storage costs.” (Tr. 766.)

^{47/}The court denied defendant’s pre-trial motion in limine to exclude Mr. Graves testimony, finding his proffered opinion was not based on unsupported speculation nor rogue economic principles. *Yankee Atomic Elec. Co. v. United States*, 2004 WL 1535686, at *4-6 (Fed. Cl. 2004).

By way of background, Graves noted that an operating nuclear power plant removes about a third of its nuclear fuel from the reactor core every eighteen to twenty-four months and inserts new fuel. The removed fuel has to be stored somewhere. If the spent fuel is discharged into wet storage pools, as was true for the three plaintiffs here, there is a fairly fixed cost of operation. If there is room in the pool, there is no incremental cost of accommodating that discharge; however, at some point the pools will be full. With a “full-pool situation,” the excess SNF is “must move.” Shut down plants comprise the second category of those with “must move” SNF. A utility with “must move” fuel seeks to avoid the capital expenditure for additional storage. On the other hand, a utility with space to spare would have economic incentive to reach agreement to accept the first utility’s SNF for a negotiated price. Applying classic market principles, yet acknowledging that political realities would drive prices upwards, Graves opined that a market would have developed. (Tr. 767-68.)

Graves then formulated an economic accounting model tracking the capacities of all domestic reactors’ spent fuel pools (publically available data^{48/}), updating remaining capacities with discharges either from removal of SNF from the reactor core or shut down status. (Tr. 771.) Information as to historic and future discharge from the reactor into the pool was obtained from Nuclear Assurance Corporation (“NAC”). (Tr. 772.) Future discharges “are extremely easy to predict;” fuel cycles are well understood therefore discharge rate can be estimated with reasonable accuracy. (Tr. 850.) He testified his model is based on “extremely well known public, predictable, stable inputs compared to most modeling problems that we routinely address.” (Tr. 851.)

Graves analyzed the approximately 115 plants and calculated aggregate “must move” fuel in order to determine an acceptance rate that would avoid additional utility storage cost. Using aggregate calculations, Graves applied various rates of acceptance and plotted those rates on a graph against “must move” fuel. He calculated that around 2015, the annual rate of must move fuel will be approximately 3000 MTUs. (Tr. 778.) Assuming an acceptance rate of 1200 MTUs in 1998, 1200 MTUs in 1999, 2000 MTUs in 2000, 2000 MTUs in 2001, 2700 MTUs in 2002, and 3000 MTUs thereafter starting in 2003, would avoid additional at-reactor costs by staying ahead of the aggregate must move fuel.^{49/} (Tr. 778-79.)

Besides achieving the goal of avoiding accumulation of “must move fuel” and avoidance of additional individual at-reactor storage cost, Graves opined that a 3000 MTUs annual rate was contemplated by DOE at the time of contracting. Graves reviewed DOE documents and testified that the 3000 MTU rate “is used in essentially every planning and program specification document that I found and reviewed from about 1983 to 1990. And it’s used in several thereafter.” (Tr. 781-82.) He cited the Mission Plan, the Amended Mission Plan, several of the Annual Capacity Reports, total system costs and studies related to Yucca Mountain. Government studies showed that a rate of at least 3000 MTUs would minimize total storage and at-reactor costs. He believed a 3000 MTU rate

^{48/}Graves obtained pool capacity from a 1995 DOE report. (Tr. 772.)

^{49/}Graves’ analysis is depicted in demonstratives that accompany the record.

was technologically feasible based on his review of the reports of Mr. Bartlett and Mr. Stuart. In contrast, he testified that the 900 MTU rate used by defendant's experts Fischel and Abbott would not keep up with the accumulation of "must move" fuel. (Tr. 776-82.)

Graves assumed that the Standard Contract (1) initially allocates contractual rights based on oldest fuel first ("OFF"); (2) grants the possibility that shut down reactors be given priority; (3) allows utilities to exchange allocation slots. OFF would not be economically efficient. OFF would remove SNF from facilities without any economic benefit while not removing SNF from another to the latter's economic detriment. There would be strong incentive for utilities to "swap" and pay to move up the queue to avoid additional storage costs. He testified to DOE documents that supported his opinion that exchanges would have been used. The third contractual mechanism he spoke of, priority for shut down reactors, is accommodated in his acceptance rate and exchange analysis which would have taken care of both must-move fuel related to full pools and shut down reactors, such to eliminate any distinction between the two. (Tr. 800-06.) Graves testified that the economic analysis he used was no different than other markets in intangible rights that had developed. "Except in the details of the precise commodity or right that's traded, it's very much like many, many other markets that trade intangible rights of various kinds, such as emission allowances, service priority rights, ... [or] performance obligations in the utility industry. There are many examples. And in general, this is the underpinnings of our economic system, that we let markets reallocate goods and services efficiently and price them." (Tr. 825.)

Applying this model, Graves opined that Yankee Atomic would have paid \$11.8 million to accelerate their position in the OFF queue so that all its SNF would be removed by January 1999. Connecticut Yankee would have had all its SNF removed by August of 2001; Maine Yankee would have had its fuel removed by June of 2002. Plaintiffs' claims for wet pool operational costs commence from those respective dates. Both Connecticut Yankee and Maine Yankee would realize net revenues from exchanging valuable early allocations for less expensive later slots. (Tr. 825-26; Graves demonstrative 70-73.) The enormous costs that could be saved from exchanges would have correspondingly "trivial" administrative costs. (Tr. 740-41.) Brokers would have surfaced to facilitate these exchanges. Also, the infrastructure as well as industry receptiveness to exchanges was already in place. ("The utility industry which would have been participating in this market is already very experienced in trying to find efficient ways of trading rights and services and obligations amongst themselves through market mechanisms in order to improve their efficiency So there's a culture and an infrastructure in place already in that industry to pursue these kinds of solutions." (Tr. 841.) In discussing analogous markets, Graves testified that exchange of excess storage rights and relinquishment of OFF allocations was similar to exchange of emission allowances. These are mutually beneficial exchanges. "[T]he reasons some companies agree to over comply with the pollution control targets is because they can do so at a cost below what the market is willing to pay for the rights to not have to control. And if you can control at a lower cost . . . you're more than happy to bear someone else's burden, in effect, for a profit." (Tr. 844-45.)

He explained that it was not necessary to identify individual trades; it was typical in marketing forecasting to look at the industry as a whole. For example, oil market dynamics are forecast on the aggregate market, not on individual sales. "[T]he invisible hand takes care of that and

actually fulfills those modeling expectations largely through just the virtues of capitalism.” (Tr. 847.)

He concluded that:

most utilities would participate It’s not the case that some utilities win and some lose by participating. Everyone wins by participating in this. You avoid the inconvenience of premature pickups and disruptions at your facility if you don’t yet have a must-move situation. And you have the opportunity to gain some money by participating in a sale. Conversely, you obviously benefit if you can move – accelerate your rights and get them to match an early must-move problem. So this is jointly beneficial. It’s not something where winners have to compensate losers. There’s two kinds of winners out of the process. And that’s very auspicious for markets to evolve.

(Tr. 859.)

He admitted market confidence that DOE would perform would have been (or will be) a pre-requisite to market development, although some uncertainty would not prevent the market from forming although higher prices might result. (Tr. 860.) In the end, Graves testified that just how the market would develop, what particular sales or swaps would occur, and who the participants would be in any particular trade, was not all that important. The market forces would have been there, and a market would have developed because of the corresponding costs and benefits.

[T]here’s an enormous opportunity to pursue that program efficiently by allowing swaps or by utilities arranging for deals amongst themselves, for intermediaries arising who will provide brokerage services. And the value of that is extremely high. And it’s extremely simple to develop both the proof and the mechanisms for . . . I think an economic solution something like mine would occur. Whether or not it occurred through an auction mechanism that used the same pricing algorithm as I have shown is really not relevant. All I’m saying is there is so much compelling economic attraction to pursuing an efficient solution and so little barrier to doing so, that something like that would have been a reasonable thing for utilities to expect. And that not only is that good for the utilities, it’s good for the program.

(Tr. 863.)

Defendant’s criticism of the Frank Graves’ Market

Defendant argues that plaintiffs’ damages rely on the acceptance rate used by Frank Graves (1200, 1200, 2000, 2000, 2700, 3000). Imputation of a rate by an expert, or the court would be improper and contrary to the parol evidence rule as well as the integration clause of the Standard Contract.^{50/} Before a representation can be contractually binding, it must be in the form of a promise

^{50/}Article XXII – ENTIRE CONTRACT provides in pertinent part:

A. This contract, which consists of Articles I through XXII and Appendices A through G,
(continued...)

or undertaking, not a mere statement of intention, opinion, prediction, planning or aspirational goal. Even if there were a two-part goal or understanding that DOE's acceptance rate would equal the annual generation of SNF plus some towards the backlog, with the goal of eliminating the need for additional at-reactor storage, then neither a 3000 MTU nor the augmented Graves' rate would be necessary to reach those goals. With an annual generation rate of 2000 MTUs,^{51/} an acceptance rate of 2100 would attain those goals, which Bartlett and Graves admitted. Documentary evidence supporting a 3000 MTU rate in planning documents assumes an operational repository and an operational repository is not required under the contract. The Standard Contract provides that DOE may accept SNF either at a repository or at "such other facility(ies) to which [SNF] and/or [HLW] may be shipped by DOE prior to its transportation to a disposal facility." Indeed the final form Standard Contract differed from the one proposed in that the final had a broader definition of the type of facilities, allowing an interim storage facility or facilities. 48 Fed. Reg. 16590-91 (April 18, 1983).

Having heard the evidence over a seven-week trial, and upon due consideration, the court concludes that exchanges would have occurred in the nonbreach world. DOE's partial breach(es) thwarted the market. Utilities would have exchanged among themselves considering their own interests, including political and economic pressures. Indeed, utilities requested the right to exchange; a provision that was not in the initial draft. Shortly after the enactment of the NWPA, Loring Mills, Vice President of E.E.I. in his May 4, 1983 presentation on the NWPA at The Institute of Nuclear Materials Management discussed the allocation of SNF acceptance then some fifteen years hence and anticipated exchanges.

[A]s we understand it, DOE will provide individual allocations to contract holders. Once an annual allocation is assigned, contract holders will be permitted to substitute other spent fuel and swap allocations to mesh with operating needs. If one company can accommodate its spent fuel longer than another, it may be able to swap its allocation space with another organization.^{52/}

^{50/}(...continued)

annexed hereto and made a part hereof, contains the entire agreement between the parties with respect to the subject matter hereof. Any representation, promise, or condition not incorporated in this contract shall not be binding on either party. No course of dealing or usage of trade or course of performance shall be relevant to explain or supplement any provision contained in this contract. (PX 1CY at HQ0016928-29; PX 1YA at HQ0007969; and PX 1MY at TLG005238.)

^{51/}The annual rate of generation of SNF is about 2000 MTUs. (Tr. 712, 770, 1151.)

^{52/} Mr. Mills also summarized the contractual expectations of the utilities in return for the anticipated billions to be paid into the Nuclear Waste Fund. "We are placing a great deal of faith on the ability of the Federal Government to carry out the task efficiently and on a timely basis. Utilities are paying for the service, and they expect the service to be available within the legislated (continued...)

(PX 458 at YDK024128; *see also* PX 636, December 20, 1983 draft Mission Plan at CTR-042-1073 (recognizing that “after 1998, individual utilities who [need additional on-site storage] will arrange for the right to ship spent fuel to the Department from a utility who is next in the queue in shipment allocation The use of such brokering arrangements should prevent the need for any utility to expand on-site storage and minimize transshipments.”).) Graves’ testimony on the efficiencies and cost avoidances from campaigns and trades was compelling.

Given the long lead time contemplated by the Standard Contract, and the possible, if not probable, use of campaigning, DOE would not be prejudiced by exchanges. Exchanges in conjunction with campaigning would lessen the number of trips DOE would make to a particular utility, thus fostering efficiency and lessening environmental and other hazards. Certainly defendant is not advocating that DOE would implement the program inefficiently and at higher cost. Indeed, the government had a track record of efficiency and reliability with reprocessing, enrichment and other programs.

That a market would develop around the exchange provision of the Standard Contract is supported by experience with other regulatory-based exchange arrangements, including those associated with environmental emissions programs under the Clean Air Act. *See* 42 U.S.C. §765b(b) (sulfur dioxide allowance transfer system); *Clean Air Markets Group v. Pataki*, 338 F.3d 82, 87-89 (2d Cir. 2003) (New York law restricting utilities’ ability to transfer emissions allowances created actual conflict with federal law authorizing allowances to be transferred and was preempted.) Tellingly, it is significantly less speculative that a market would develop around the SNF-exchange provision in the Standard Contract than that government’s overall mitigation-limiting scenario would actually unfold.

Tenn. Valley Auth. v. United States, 69 Fed. Cl. 515, 533 (2006) (finding that an exchange market would have developed.). *See Yankee Atomic Elec. Co. v. United States*, 112 F.3d 1569, 1572, n.1 (Fed. Cir. 1997) (recognizing secondary market that developed for government uranium enrichment services); *Entergy Nuclear Indian Point 2, LLC v. United States*, 64 Fed. Cl. 515, 519 (2005) (describing “SNF put-option trading” which “permitted the market to influence the order of SNF disposal, which presumably would benefit those facilities with less storage space”); *Entergy Nuclear Generation Co. v. United States*, 64 Fed. Cl. 336, 339 (2005) (same); *Boston Edison Co. v. United States*, 64 Fed. Cl. 167, 172 (2005) (“This provision created what some in the industry called ‘SNF put-option trading.’”).

Indeed, the robustness of exchange markets is implicit in DOE’s publication entitled “Sequestration,” particularly the “Trading” section. The August 2005 publication of “The Carbon

^{52/}(...continued)
time period.” (PX 458 at YDK024129.)

Sequestration Newsletter,” published by the National Energy Technology Laboratory,^{53/} touts three industry and economic articles on carbon emission trading markets, including one on the burgeoning European carbon emissions trading, “springing up all over the place.” www.netl.doe.gov/publications/carbon_seq./news/2005/08-05.pdf (last visited February 22, 2006). See also Ben Hallman, “*Having a Gas*,” *The American Lawyer*, March 2006 (discussing emerging carbon dioxide trading market); *Huffman v. Western Nuclear, Inc.*, 486 U.S. 663, 664 (1988) (“Another competitive alternative was the emergence of a secondary market in which domestic utilities, bound by long-term contracts to purchase enrichment services in excess of their needs, sold their enriched uranium to other utilities at substantial discounts.”); *PSI Energy, Inc. v. United States*, 411 F.3d 1347, 1348-49 (Fed. Cir. 2005) (concerning taxation on utility’s sale to other utilities on the “secondary market” of uranium enrichment services purchased from the government); *IES Industries, Inc. v. United States*, 253 F.3d 350, 357-59 (8th Cir. 2001) (concerning taxation of government uranium enrichment services including those purchased on the secondary market). and 42 U.S.C. § 2297g-1(c), the Energy Policy Act of 1992 (concerning secondary market sales of government enrichment service contracts).

Witness testimony was in accord. In the uranium market, half of annual sales are from the secondary market, that is individual sales from existing inventory, a “very, very active” market in enriched uranium.^{54/} The economic forces that resulted in the creation of this secondary market included the government monopoly on the supply of enriched uranium. All enrichment services were provided by the government under requirements contracts – whatever the utility needed, it could get from the government and the government was required to supply those needs. In 1973, the Nixon administration sought to begin privatization of the market and changed the contracts to a long-term fixed commitment contracts. Instead of telling the government six months in advance of the need for enriched uranium, a utility had to contract eight years before any delivery and had to commit for ten years of delivery without any flexibility, so the utilities were committing for up to eighteen years into the future. During this time, there were a record number of new nuclear power plants in the works. Future enrichment services were going to be limited. Accordingly, utilities signed up for more enrichment commitments than they might need. Enrichment contracts were not given to foreign plants. In short, domestic companies had future commitments they may not need and foreign companies needed commitments but could not buy them directly. Collier’s company, NAC,

^{53/}The National Energy Technology Laboratory, part of DOE’s national laboratory system, is owned and operated by DOE. www.netl.doe.gov/about/index.html (last visited February 22, 2006).

^{54/}As Collier testified, from uranium that is mined, only one isotope (uranium 235) is fissionable and can be used in reactors to produce heat to produce electricity. In nature, less than 1 percent of uranium is uranium 235. In a technically sophisticated process, natural uranium is processed to extract the 235 isotope – approximately 10 kilograms of uranium is processed (enriched) to get 1 kilogram of uranium 235 – referred to as UF₆ at this point in the process. UF₆ is then fabricated into UO₂ - a powder that is pressed into pellets for use in fuel rods. (Tr. 1229-30.)

developed brokerage services to arrange for sales of these future commitments. Government approval was required, and, as Collier testified, a reasonable way to operate developed. The requirement that DOE approve the assignment of uranium enrichment contracts did not preclude the development of a robust secondary market. (Tr. 1235-41.)

Collier also testified to a variety of secondary markets among nuclear utilities, describing the industry as “pretty innovative” with all kinds of transactions, “straight purchases and straight sales to loans, swaps, barter, leases, almost any kind of transaction that you can imagine. The industry is fairly creative in the way it goes about its business. And it’s certainly motivated to save money or to make money, whichever the case might be, as much as anybody I’ve ever seen.” (Tr. 1242.) Collier testified this market had around 100 buyers and 20 to 30 sellers or middlemen. (*Id.*) He also testified to secondary markets in enriched uranium itself as distinct from enrichment contracts, described how swaps of enrichment contracts worked,^{55/} and explained de-enrichment de-conversion – swaps of natural uranium plus cash for enriched uranium. (*Id.* at 1244- 46.) He testified to markets in goods or services even with negative value. (*Id.* at 1247.)

Loring Mills also testified about the robust exchange market in uranium enrichment contract rights, approved by the DOE. He understood that the exchange of SNF commitments would be handled in the same manner and that DOE would be reasonable in approving exchanges. (Tr. 363-65.) Mills admitted that by use of exchanges and campaigning to fill up the transportation container, efficiency could be maximized. (Tr. 362-63; PX 459 at YDK023785 (notes of meeting on May 12, 1983 with representatives of industry and DOE to discuss the Standard Contracts – stating in part “DOE would not unnecessarily withhold approval for transfer of shipping ‘slots.’”).) Utilities could “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.” Discretion must be exercised reasonably. The inquiry is “whether an agency imbued with discretion by a contract, exercised that discretion reasonably in administering a contract provision.” *Cuyahoga Metropolitan Housing Authority v. United States*, 65 Fed. Cl. 534, 560 (2005) (citing *Pacific Far East Line v. United States*, 184 Ct. Cl. 169, 394 F.2d 990, 998 (1968) and *Everett Plywood Corp. v. United States*, 206 Ct. Cl. 244, 512 F.2d 1082, 1090 (1975); *McDonnell Douglas Corp. v. United States*, 182 F.3d 1319, 1329 (Fed. Cir. 1999) (citing *Lisbon v. United States*) (requiring nexus between the government’s exercise of discretion to terminate a contract for default and performance issues under the contract); *See also Orange Cove Irrigation Dist. v. United States*, 28 Fed. Cl. 790, 800-01 (1993) (similar). Accordingly, a blanket prohibition on approval of any exchanges or on priority for shut down

^{55/} “We’ve got one utility that has natural uranium that is in Europe and it’s going to enrich in the US. And another utility that has natural uranium in the United States and is going to enrich in Europe. You can transport that material back and forth. And everybody’s needs are met. But it’s much simpler if you can swamp [sic] them. So the utility that wants its uranium in Europe, gets it in Europe. The utility that wants its uranium in the United States, gets it in the United States. They save transportation cost and savings the hassle of moving the material That kind of transaction occurred a lot.” (Tr. 1243-44.)

reactors is not to be anticipated and would be neither fair nor reasonable. *Darwin Const. Co., Inc v. United States*, 811 F.2d 593, 597 (Fed. Cir. 1987) (where the government has discretion under a contract “exercise of that discretion must be fair and reasonable, not arbitrary or capricious.”) See *First Nationwide Bank v. United States*, 431 F.3d 1342, 1349 (Fed. Cir. 2005) (finding the government bound by the covenant of good faith and fair dealing in performing its contractual obligations).

Furthermore, the Federal Circuit has held that deference to agency interpretation is inappropriate in the context of a contract dispute in which the agency has a financial interest. See *S. Cal. Edison Co. v. United States*, 226 F.3d 1349, 1357 (Fed. Cir.2000) (“When a party enters into a contract with the government, that party should reasonably expect to be on equal legal footing with the government should a dispute over the contract arise.”); see also *Brown v. United States*, 195 F.3d 1334, 1340 (Fed. Cir.1999) (“The interpretation of regulations which are incorporated into government contracts is a question of law which this court is free to resolve.”).

Campaigning would have developed in the nonbreach world. DOE would take title at the reactor site and would be responsible for transportation. “It is the Department’s goal to carry out these responsibilities in a safe, environmentally acceptable, timely and cost-efficient manner **minimizing to the extent possible the number of shipments.**” (PX 683 at 2-10 (emphasis supplied).) “There is a clear incentive to minimize the total number of operations and length of time that wastes have to be handled to reduce exposure, costs and the potential for accidents.” (*Id.* at 2-12.) “This approach will assist in standardization of equipment and facilities and help to ensure that any packaging and handling steps taken early in the process will facilitate rather than impeded later steps.” (*Id.*)

Accordingly, in determining the commercial reasonableness of the utility decisions, as well as whether DOE’s breach was a substantial causal factor, the court credits the expert opinion of Frank Graves, at least to the extent that through exchange markets, possible priority for shut down reactors and campaigning, as well as the plus or minus 20 percent allowed by the contracts, these three utilities would have been able to increase their pick-up allocations significantly particularly during the first years following commencement of performance in 1998. The court credits the testimony of company witnesses, and cited documents that these mitigation decisions and expenditures would not have been made had DOE not stated it would partially breach. *Hughes Comm’n’s Galaxy, Inc. v. United States*, 271 F.3d at 1067 (rejecting government’s argument Hughes’ actual expenditures on the HS-601 satellite – the substitute – were developed for independent business reasons).

An augmented rate was also foreseeable to DOE and required by the Standard Contract. The plus-or-minus 20 percent float was in the Standard Contract, as was the priority potential for shut down reactors and the exchange option. The April 1984 Mission Plan circulated to government agencies for planning purposes contemplated acceptance commencing in 1998 at 400 MTUs, then ramping up annually to 800, 1200, 2100, 3900, 6900 and beyond. (PX 683.) These rates, whether contractually required or aspirational goals are cited, as evidence that, when removal commenced, a robust acceptance schedule was foreseeable (indeed planned) by the government and that utility

mitigation planning was not unreasonable. Contracting Officer Zabransky testified DOE would do whatever was necessary to accommodate the extra 20 percent. (Tr. 4162-65 (Zabransky).)

However, plaintiffs' would still have incurred wet pool operational costs because it is concluded their pools would not have been emptied by the fuel-out dates tendered. (January 1999 for Yankee Atomic, August 2001 for Connecticut Yankee and June 2002 for Maine Yankee). Plaintiffs admit that recovery of their wet-pool operation expenses are dependant upon all SNF out of the pool by those dates. (Tr. 7908-09, 7933-34.) The rate opined by Graves must be discounted to some degree to reflect the impact of the factors shown by defendant to retard market development. Applying several different acceptance rates, but augmenting the rates by various percentages to reflect the impact of exchanges, priority for shut down reactors, increases in allotments due to campaigns or other efficiencies and/or the twenty percent float in the Standard Contract, plaintiffs' wet pools would simply not have been emptied for the time periods of the requested wet pool operational and maintenance costs.^{56/} The amount and allocation year is taken from DOE's chronologized industry-wide inventory list in the 1991 APR (PX 92), and remains constant. Two variables are applied – acceptance rate and the percentage increase DOE would reasonably have been able to achieve in the nonbreach world.

The utilities had the following inventories:

Yankee Atomic (“YA”): 533 assemblies; 21 containers of GTCC waste and a number of failed pins for a total of 122 MTUs. (PX 1462YA; PX 1465YA at YDK042336.)

Connecticut Yankee (“CY”): 1,024 assemblies; 46 containers of GTCC waste and a number of failed fuel pins. (PX 1457CY at COF007350.)

Maine Yankee (“MY”): 1,432 fuel assemblies; 2 containers failed fuel and 2 consolidated fuel containers; four containers of GTCC waste. (PX 1456 at 22571.)

^{56/}This is not either to preclude or foster the possibility of recovery in subsequent litigation of proportionate capital and/or operational costs. *See Chain Belt Co. v. United States*, 127 Ct. Cl. 39, 115 F. Supp. 701 (1954); *L.L. Hall Const. Co. v. United States*, 117 Ct. Cl. 870, 379 F.2d 559 (1966); *Nat'l Presto Indus. Inc. v. United States*, 167 Ct. Cl. 749, 338 F.2d 99 (Ct. Cl. 1964).

Allocations on OFF basis at **1800, 1800, 1800, 1800, 1800, 3000 MTU rates*** and 20 percent and 50 percent increase.

YA	1998	1999	2000	2001	2002	TOTALS
MTUs	9.84 10.09 9.65	8.62	9.40	8.46		56.06
ASSEMBLIES	36 37 40	36	40	36		225
CY	1998	1999	2000	2001	2002	TOTALS
MTUs	21.44 9.69 12.21 22.12 22.47 19.75	21.77 21.40 .41	19.78 .41	21.81		193.26
ASSEMBLIES	23 51 29 53 55 48	53 52 1	48 1	53		467
MY	1998	1999	2000	2001	2002	TOTALS
MTUs	26.31 57.86	27.24	50.64	26.25	28.17 28.11	244.58
ASSEMBLIES	72 152	70	133	73	73 73	646

*Source for rate 1983 Draft Civilian Radioactive Waste Management Program Mission Plan, PX 636 (Table II-1, CTR-042-1072).

As of the end of 2001 (last date of incurred costs), Yankee Atomic would have had 225 assemblies picked-up; Connecticut Yankee would have had 467. By end of 2002 (last date of incurred costs), Maine Yankee would have had 646 assemblies picked-up.

Assuming a 50 percent increase, Yankee Atomic would have had a total of 337.50 assemblies picked up by end of 2001 (225 plus 112.50) which is **63 percent** of its 533 assembly inventory.^{57/}

^{57/}Neither GTCC waste nor failed fuel is included in this calculation which is merely an approximation of the mythical nonbreach world, used in reaching a causation determination. That some of the increases may have come from exchanges or purchases of slots which would have
(continued...)

With a 20 percent increase, Yankee Atomic would have had 270 assemblies picked up by the end of 2001 (225 plus 45) which is **50.6 percent** of its inventory.

For Connecticut Yankee, as of the end of 2001 (last date of incurred costs), 467 assemblies would have been picked up. A 50 percent increase would be 700.50 (467 plus 233.50) which is **68 percent** of the total of 1,024 assembly inventory. Assuming a 20 percent increase, would result in 560.4 assemblies picked up (467 plus 93.4), **55 percent** of inventory.

For Maine Yankee, as of end of 2002 (last date of incurred costs), 646 assemblies would have been picked up. Increase that number by 50 percent equals 969 (646 plus 323) which is **68 percent** of the total of 1,432 assemblies. Increase that number by 20 percent results in 775 (646 plus 129) or **54 percent** of inventory.

Allocations on OFF basis at **400, 400, 400, 900, 1800, 3000 MTU rates***

YA	1998	1999	2000	2001	2002	TOTALS
MTUs	9.84	10.09		9.65		29.58
ASSEMBLIES	36	37		40		113
CY	1998	1999	2000	2001	2002	TOTALS
MTUs	21.44 9.69 12.21 22.12	22.47		19.75 21.77		129.45
ASSEMBLIES	51 23 29 53	55		48 53		312
MY	1998	1999	2000	2001	2002	TOTALS
MTUs		26.31		57.86 27.24	50.64	162.05
ASSEMBLIES		72		152 70	133	427

*Source for rate: Draft Mission Plan July 1984 – PX 683.

Applying strictly the OFF priority at the rates in the 1984 Draft Mission Plan, as of the end of 2001 (last date of incurred costs), Yankee Atomic would have had 113 assemblies picked-up -

^{57/}(...continued)

required out-of-pocket expenditures, does not alter the court's conclusions. GTCC waste and failed fuel are discussed further in a subsequent section of this Opinion.

Connecticut Yankee would have had 312. By end of 2002 (last date of incurred costs), Maine Yankee would have had 427 assemblies picked-up.

Assuming a 50 percent increase for those early years, Yankee Atomic would have had a total of 169 assemblies picked up by end of 2001 (last date of incurred costs) (56 plus 113) which is **32 percent** of the total of 533 assembly inventory. Assuming a 20 percent increase, Yankee Atomic would have had 135.60 assemblies picked-up which would have been **25 percent** of its assembly inventory.

For Connecticut Yankee, as of the end of 2001 (last date of incurred costs), 312 assemblies would have been picked up. Increase that number by 50 percent equals 468 (312 plus 156) which is **46 percent** of the total of 1,024 assemblies. A 20 percent increase equals 374 (312 plus 62) which would result in a **37 percent** of its assembly inventory.

Maine Yankee : As of end of 2002 (last date of incurred costs), 427 assemblies would have been picked up. Increase that number by 50 percent equals 641 (427 plus 214) which is **45 percent** of the total of 1,432 assemblies. A 20 percent increase equals 512 (427 plus 85) which would result in a **36 percent** increase.

Allocations on OFF basis at **1200, 1200, 2000, 2000, 2700, 3000 MTU rates***

YA	1998	1999	2000	2001	2002	TOTALS
MTUs	9.84 10.09	9.65	8.62 9.40			47.60
ASSEMBLIES	36 37	40	36 40			189
CY	1998	1999	2000	2001	2002	TOTALS
MTUs	21.44 9.69 12.21 22.12 22.47	19.75 21.77	21.40 .41 19.78 .41	21.81		193.26
ASSEMBLIES	51 23 29 53 55	48 53	52 1 48 1	53		467
MY	1998	1999	2000	2001	2002	TOTALS
MTUs	26.31	57.86	27.24 50.64	26.25	28.17 28.11	244.58
ASSEMBLIES	72	152	70 133	73	73 73	646

* Source for rate – Graves expert opinion.

Totals: As of end of 2001 (last date of incurred costs), Yankee Atomic would have had 189 assemblies picked up; Connecticut Yankee would have had 467. By end of 2002 (last date of incurred costs), Maine Yankee would have had 646 assemblies picked up. MTU totals would have been 47.59, 193.22 and 244.58 respectively.

Yankee Atomic as of end of 2001 (last date of incurred costs): 189 assemblies would have been picked up. Increase that number by **50 percent** (189 plus 95) equals 284 which is **53 percent** of 533 assemblies. Increase that number by **20 percent** equals 227 (189 plus 38) which is **43 percent** of the total of 533 assemblies.

Connecticut Yankee as of end of 2001 (last date of incurred costs): 467 assemblies would have been picked up. Increase that number by **50 percent** (467 plus 234) equals 701 which is **68 percent** of the total of 1,024 assemblies. Increase that number by **20 percent** equals 560 (93 plus 467) which is **55 percent** of the total of 1,024 assemblies.

Maine Yankee as of end of 2002 (last date of incurred costs): 646 assemblies would have been picked up. Increase that number by **50 percent** equals 969 (323 plus 646) which is **68 percent** of the total of 1,432 assemblies. Increase that number by **20 percent** equals 775 (129 plus 646) which is **54 percent** of the total of 1,432 assemblies.

Accordingly, using any of several reasonable SNF/HLW disposal rates and augmenting these rates by 20 to 50% to account for the possible impact of adjustments provided for in the contracts involved, shows that each of the utilities would still have SNF to store in their wet pools during the time periods for which wet pool operating cost is claimed. Therefore, the wet pools were needed and their operating cost cannot be recovered as damages for DOE's delay. Applying any of the reasonable rates plus some augmentation also shows that in the nonbreach world, performance by DOE would have rather promptly removed substantial amounts of SNF such that, with demonstrated DOE performance, it would have been highly unlikely that the plaintiffs would have then proceeded to incur the substantial expense of building dry storage facilities.

Failed fuel

The Standard Contract requires waste be classified prior to delivery to DOE. There are three types of fuel – (1) Standard Fuel; (2) Nonstandard Fuel; and (3) Failed Fuel. (DX 6, 7, & 8, Art. VI.A.1(b) & App. E, ¶ A.1.) There are three categories of Failed Fuel – (1) Class F-1: Visual Inspection (assemblies with visual evidence of structural deformities or damage to cladding or spacers which may require special handling); (2) Class F-2: Radioactive “Leakage;” and (3) Class F-3: Previously Encapsulated Assemblies (encapsulated prior to classification). (DX 6-8 App. E, Para. B.6.)

Defendant concedes that failed fuel is encompassed in the Standard Contract, but adds that scheduling obligations are different. It is argued DOE has “discretion” to indefinitely postpone the

acceptance of failed fuel, and, as a result, plaintiffs would have been required to store failed fuel for a potentially indefinite period of time and should not recover any cost of its storing.

Defendant's conclusion is contrary to the Standard Contract, witness testimony and evidence that plaintiffs' failed fuel could and would have been accepted by DOE on the same schedule as other spent fuel, or at least that is what plaintiffs reasonably believed on or about the time they made their respective mitigation decisions. Acceptance adjustments would have applied only if there were technical feasibility issues. As noted above, the Standard Contract requires classification of the fuel before DOE arrives. For technical reasons schedule adjustments were possible.

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 . . . 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.

Art. VI.A.2(b).

This language may not be fairly construed to indefinitely defer or postpone disposal. DOE indicated that failed fuel would be handled on the same schedule as standard fuel. Shortly after the terms of the Standard Contract were published, a DOE/utility meeting was held. Representatives of the DOE Nuclear Waste Act Project Office were present to answer questions. Nine DOE representatives, including two from the Office of General Counsel, attended. The meeting notes stated: "DOE will accept 'cans' containing fractional fuel elements or debris removed from the reactor (such as in the case of severely damaged fuel); the utility must identify such 'cans' in their schedule." (PX 459 at YDK023786.) Indeed, in response to an August 21, 1985 inquiry by James Hall, Director, Utility Nuclear Waste Management Group, shortly after the contracts were signed, Robert Bauer, Associate Director for Resource Management of the OCRWM wrote about DOE's intent concerning "other than standard fuel:"

It is the Department's intent that all currently designed nuclear fuel, including that falling outside the maximum physical dimensions specified in Appendix E, will be subject to the same scheduling procedures. It is also the Department's intent that consolidated fuel assemblies, including the non-fuel components removed during consolidation (control spiders, thimble plugs, neutron sources, etc.), may be delivered for disposal in accordance with the Standard Contract subject to the same scheduling procedures as for other spent fuel. Further, such consolidated fuel assemblies and associated non-fuel components canned in a container provided by or approved by the Department, will be treated as the equivalent of one fuel assembly for acceptance priority allocation purposes provided that this does not reduce the acceptance rate of other contract holders. Failed fuel canned in a container provided by or approved by the Department also will be subject to the same scheduling procedures as other spent fuel.

(PX 989 at CTR0060044.)

It was understood at the time the contracts were signed that failed fuel would be accepted at the same time as intact fuel. Failed fuel was “not an issue.” “[T]he understanding was that it would be accepted on the same schedule as unfailed fuel.” (Tr. 445 (Mills).) At the time of the contract, failed fuel was typically canistered by the utilities. (PX 31 at 16597.) Lake Barrett, who served as the Director or Deputy Director of OCRWM from 1993-2002 in a designated deposition admitted that he expected DOE would accept Yankee Atomic’s failed fuel at the same time as other fuel. (9/21/04 Dep. Desig. 5/15/02 Barrett at 394:11-395:17.)^{58/} He also testified that there were no technical impediments to DOE’s implementation and operation of a robust program for acceptance, transportation and disposal of SNF and GTCC waste at 3000 MTUs annually. (Tr. 1376-77.)

Ivan Stuart testified as an expert in the transportation of spent nuclear fuel. Mr. Stuart has a degree in mechanical engineering. (Tr. 1292 (Stuart).) He was employed for nearly 30 years at General Electric’s Nuclear Division, as Manager of Licensing for almost a decade (supervising over 100 engineers), then Manager of Training (again supervising over 100 engineers), and beginning in 1987, as Manager of Waste Management Services, which included the Vallecitos Laboratory in California, which studied damaged or failed nuclear fuel, and the Morris Fuel Storage Facility in Illinois. (Tr. 1293-1311 (Stuart).) In March of 1990, Mr. Stuart became Vice President of Engineering at NAC International, where he had overall responsibility for the design and licensing for all of NAC’s casks. (Tr. 1341-43 (Stuart).) He also worked on numerous projects at NAC involving transportation of spent fuel and GTCC waste, including NAC’s contract with DOE to take research reactor fuel from around the world to the United States to be stored in South Carolina. (Tr. 1369-70.) He testified that “there is no technical impediment to the Department picking up and transporting failed fuel. Failed fuel has been transported many times.” (Tr. 1407-08.) “[O]nce the failed fuel is identified and once it is put in a canister, it can be handled just like intact fuel.” (Tr. 1408-10; Tr. 141-15 (“the [damaged fuel] canister can be loaded into the cask directly, just like intact fuel”).) He also testified that there were no technical impediments to DOE’s implementation and operation of a robust program for acceptance, transportation and disposal of SNF and GTCC waste at 3000 MTUs annually. (Tr. 1376-77.)

No special handling was needed by plaintiffs, all of whom canistered their failed fuel. (Tr. 3157-59 (Meisner) (Maine Yankee used “absolutely no special handling equipment” for failed fuel; failed assemblies were loaded into “damaged fuel” cans within the dual-purpose canisters.)) The same tools are used to pick up a canister, regardless of whether or not it contains failed fuel. (Tr. 1415 (Stuart).) In Europe, failed fuel is regularly accepted, handled and moved. (Tr. 1417 (Stuart).) Based on his experience and interacting with DOE during the development of the program, Stuart testified it was his opinion that in 1998 DOE would have handled failed fuel in the same way they would have handled intact fuel. (Tr. 1419-21.)

In final argument (pre-*Indiana Michigan*), defendant disputed plaintiffs’ position that only a “modest” adjustment at most would result for failed fuel. (Tr. 7990; Def.’s Post-Trial Reply Br.

^{58/}Plaintiffs’ Corrected Motion to File Designated Deposition Testimony as Substantive Evidence was granted to the extent discussed in the court’s Order of September 21, 2004.

at 17.) The word “modest” is not in the Standard Contract defendant states and there are no limits on DOE’s discretion to adjust the acceptance schedule as needed. DOE’s Contracting Officer, David Zabransky, testified that technical acceptance of failed fuel would be on a case-by-case basis, and schedule adjustment is not limited to “modest.” As a result, defendant argues, plaintiffs have not proven that their failed fuel would have been picked up by DOE in the nonbreach world; therefore the storage costs would have been incurred in the nonbreach world and are not damages for DOE’s partial breach/delay of performance.

As failed fuel has been canistered along with plaintiffs’ SNF, the unreasonableness of that mitigation decision was not established, nor were any costs parsed for isolating storage of failed fuel. Neither does the presence of a relatively small amount of failed fuel alter the court’s determinations. Defendant’s suggestion that delay due to technological limitations cannot be determined because a repository has not yet been licensed is speculative. *Sacramento Mun. Utility Dist. v. United States*, 70 Fed. Cl. 332, 371 (2006) (determining government’s arguments storage costs would have been incurred anyway because of the presence of failed fuel was too speculative to disallow mitigation cost of a failed fuel canister) (citing *Tennessee Valley Auth.*, 69 Fed. Cl. at 543 (citing *Ind. Mich.*, 422 F.3d at 1373).) The presence of failed fuel does not alter the court’s conclusions that the mitigation decisions were caused by DOE’s delay(s) and partial breach(es) and that the failed fuel would most likely be removed by DOE along with plaintiffs’ SNF.

GTCC waste

In decommissioning their nuclear reactors plaintiffs removed activated metal from near the reactor core which is highly radioactive and is classified as Greater-Than-Class C (“GTCC”) waste. This waste was segmented and stored in the same type of containers used for SNF. GTCC waste storage expense is included in plaintiffs’ incurred cost claims.

Defendant objects to any recovery by plaintiffs of GTCC waste storage costs, as it is argued that this waste is not within the scope of the Standard Contract executed by the parties, and should not be the subject of damages for its partial breach.

As noted previously, the Standard Contract executed by the parties encompassed both SNF and HLW:

ARTICLE II - SCOPE

This contract applies to the delivery by Purchaser to DOE of SNF and/or HLW of domestic origin from civilian nuclear power reactors, acceptance of title by DOE to such SNF and/or HLW, subsequent transportation, and disposal of such SNF and/or HLW and, with respect to such material, establishes the fees to be paid by the Purchaser for the services to be rendered hereunder by DOE. The SNF and/or HLW shall be specified in a delivery commitment schedule as provided in Article V below. 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 specified in Appendix A, annexed hereto and made a part hereof, has been disposed of.

SNF is defined as “fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.” Art. I, ¶ 18. GTCC waste is not SNF, which means that it would have to qualify as “HLW” to be within the scope of the Standard Contract. Article I, 12(b) of the Standard Contract defines “high-level radioactive waste” (HLW) as “other highly radioactive material that the [NRC], consistent with existing law, determines by rule requires permanent isolation.” This definition of HLW is also set forth in the NWPA, 42 U.S.C. § 10101(12)(B).

The Low-Level Radioactive Waste Policy Amendments Act of 1985 (“LLRWPA”) codified and confirmed DOE’s responsibility for the disposal of GTCC waste. Defendant is responsible for the disposal of “any other low-level radioactive waste with concentrations of radionuclides that exceed the limits established by the [NRC] for class C radioactive waste, as defined by section 61.55 of title 10, Code of Federal Regulations, as in effect on January 26, 1983.” 42 U.S.C. § 2021c (b)(1)(D). Defendant acknowledges this responsibility. (Def.’s Resp. to CY PFF 132, YA PFF 118 and MY PFF 134.) See PX 1047 at iii (DOE’s 1987 GTCC Report to Congress and the President: “Under paragraph 3(b)(1) of the Act. . . [DOE] has responsibility for the disposal of . . . [GTCC waste].”) This Act contemplates that the generators of the waste will “bear all reasonable costs of disposing of such wastes.” 42 U.S.C. § 2021c (b)(3)(E). Those costs have not been ascertained nor assessed.

Defendant points out the absence of a money-mandating provision in the LLRWPA. As such, the Act confers no substantive right to money damages and the court lacks jurisdiction to award damages based on any obligation found to arise under the Act. *Testan v. United States*, 424 U.S. 392, 398 (1976).

On May 25, 1989, the NRC promulgated a final rule, effective June 26, 1989, addressing the disposal of GTCC wastes. 54 Fed. Reg. 22,578-01 (May 25, 1989). The NRC’s Summary of the Rule stated:

SUMMARY: The NRC is amending its regulations to require disposal of greater-than-Class-C (GTCC) low-level radioactive wastes in a deep geologic repository unless disposal elsewhere has been approved by the Commission. The amendments are necessary to ensure that GTCC wastes are disposed of in a manner that would protect the public health and safety and therefore obviate the need for altering existing classifications of radioactive wastes as high-level or low-level.

54 Fed. Reg. at 22,578-01.

With respect to funding for the disposal of GTCC waste, the NRC commented:

[T]his type of disposal should not cause an increase in the present HLW fee charged nuclear utilities—a specific concern raised on behalf of industry. Rather, as suggested

by DOE's study of the matter pursuant to section 3(b) (3) of the LLWPA, it is likely that a separate fund, similar to the HLW Nuclear Waste Fund, would be established to provide for payment of disposal costs by the generators of GTCC wastes, either as an advance fee or as a charge upon waste receipt (Recommendations for Management of Greater-than-Class C Low Level Radioactive Waste, U.S. Department of Energy, DOE/NE-0077, 1987). The Commission anticipates that new legislation would be enacted if required so that the current situation does not represent a major impediment to disposal of GTCC wastes.

Id. at 22,580.

In discussing the nature of the regulatory change involved, the NRC stated:

The second change, pertaining to the disposal of greater-than-Class-C radioactive wastes in a geologic repository, is minor. The existing regulations in 10 CFR Part 61 already preclude disposal of GTCC in a Part 61 licensed disposal facility without further review and approval. This amendment does no more than state the Commission's conclusion that, in the absence of such an approved alternative, **a geologic repository is the only currently authorized facility acceptable for GTCC disposal without further review by the Commission.** It is thus a minor change to specify that the "more stringent" methods are to include disposal in a repository, where it is also expressly provided that, as before, proposals for other methods of disposal may still be submitted to the Commission for approval. No substantial modification of existing regulations is involved.

Id. at 22,582 (emphasis added).

The Rule amended 10 C.F.R. § 61.55(a)(2)(iv) "Waste Classification" to provide that GTCC waste "must be disposed of in a geologic repository. . . unless proposals for disposal of such waste . . . are approved by the Commission."

Plaintiff insists that NRC's 1989 Rule requires permanent isolation of GTCC waste in the absence of an NRC-approved alternative, which does not exist, thus bringing GTCC waste into the scope of the Standard Contract as "other highly radioactive material that the [NRC] . . . determines by rule requires permanent isolation." Plaintiff also cites to trial evidence. (*See* YA PFF 113-14 (metal from reactor internals is highly radioactive)); 115 (NWPA encompasses highly radioactive utility waste other than SNF and disposal in a repository constitutes permanent isolation),^{59/} 116 (at the time of contracting, utilities thought waste from reactor internals was too radioactive for burial at low-level waste sites); 117 (at time of contracting, plaintiff understood DOE would remove GTCC waste and dispose of it in repository); 119 (DOE planned to dispose of utilities' GTCC waste in the

^{59/} "Permanent isolation" is not defined, defendant points out, and could include a below-ground facility other than Yucca Mountain. (Def.'s Resp. YA PFF 115.)

repository).^{60/} Defendant cites to contrary testimony and evidence that plaintiff did not believe GTCC waste was encompassed under the Standard Contract. (Def.'s PFF 217-23.)

Citing the same Federal Register announcement, defendant points to commentary disclaiming an intent to classify GTCC waste as HLW,^{61/} adopting instead a flexible approach. And, “the NRC has **never** ‘required’ DOE to dispose of GTCC waste in ‘permanent isolation,’ [but] has left DOE with the discretion to determine the most appropriate manner in which to recommend disposing of GTCC, and has affirmatively interpreted its own rules as **not** turning GTCC waste into HLW.” (Def. Initial Br. at 75.) But, “the Government does not dispute plaintiff’s assertion that DOE has not yet proposed an alternative disposal path to the NRC.” (Def.’s Resp. to YA PFF 122.) No determination has been made and cannot be made until DOE has completed an environmental impact statement. (*Id.*)

Defendant also cites the NRC’s 2001 Rule allowing interim storage of GTCC waste at ISFSIs. (Defs.’ Initial Br. at 76; Pls.’ Resp. Br. at 30 n.8.) This is not an approved alternative for disposal that would opt out of the 1989 NRC Rule.

Finally, the court notes, but does not rely upon for its findings in this regard, Section 631 of the Energy Policy Act of 2005, entitled “Safe Disposal of Greater-Than-Class C Radioactive Waste” requires a report to Congress of the estimated cost and “a proposed schedule to complete an environmental impact statement and record of decision for a **permanent disposal facility for greater-than-Class C radioactive waste.**” Pub. L. No. 109-58, § 631, 119 Stat. 594, 631 (2005) (emphasis added).

An administrative law judge in a rate case found “[t]here is a reasonable likelihood that GTCC waste removal and disposal is covered in the standard DOE contract.” *Conn. Yankee Power Co.*, 84 FERC ¶ 63,009, 65,132 (1998).

In these circumstances it is concluded that plaintiffs’ GTCC waste is encompassed within the scope of the contracts executed with DOE requiring SNF and HLW disposal in permanent isolation. In the absence of any approved alternative, disposal of GTCC waste in a geologic repository is required by NRC Rule, thus meeting the contract definition for HLW. The waste is

^{60/}In response, defendant alleges that DOE has not decided and could not have decided whether or not the repository will handle GTCC waste and that the cited exhibits and testimony do not support the contractual interpretation plaintiff advocates.

^{61/}Defendant cites “GTCC wastes would not be classified as HLW under these amendments,” Def. Resp. to YA PFF 122, citing 54 Fed. Reg. at 22,578. The Standard Contract’s scope is not however, tied to the regulatory definition of HLW, but to “highly radioactive material” determined by the NRC to require permanent isolation. Furthermore, cited comments denying an intent to classify GTCC waste as HLW do not trump the unambiguous substance of the rule that permanent isolation is required until such time, if ever, an alternative is approved.

highly radioactive. Defendant does not dispute that NRC has determined GTCC waste requires permanent isolation. (Def.'s Resp. to YA PFF 122.) The trial evidence demonstrates that it is very unlikely that DOE would remove all SNF without also taking plaintiffs' GTCC waste. If DOE were to obtain NRC approval for an alternative disposal method not requiring the permanent isolation a geologic repository such as Yucca Mountain provides, a question concerning contract coverage would arise.

However, the GTCC waste costs have been incurred in the absence of any such NRC approved alternative. In *Sacramento Municipal Utility v. United States*, 70 Fed. Cl. 332, 374 (2006), a contrary conclusion as to contract coverage for GTCC waste was reached, but in the instant cases, the text of NRC's 1989 Rule coupled with the preponderance of trial evidence concerning removal by DOE of GTCC waste along with SNF leads to the conclusion that the waste is within the scope of the contracts involved.

Given disposal contract coverage for plaintiff's GTCC waste, and the finding that it is highly likely to be removed by DOE along with plaintiffs' SNF, the conclusions reached with respect to recoverability of SNF storage expenses are equally applicable to GTCC waste, which is stored on-site in the same manner as SNF.

The question of an additional fee for GTCC waste disposal remains for resolution, but absent further agreement of the parties in this regard, as provided in Article XV "Amendments" to the contracts involved, or further legislation, the determination of a reasonable cost for the disposal of plaintiffs' GTCC waste will constitute a matter for further proceedings when the cost is incurred by DOE.

Takings

Plaintiffs' assertion that the government has taken the land on which the ISFSI sits for a public purpose, namely the storage of SNF and HLW, predates the Federal Circuit's *Indiana Michigan* decision, and is premised on the fuel-out dates the court has not accepted. Should removal of HLW, SNF, and GTCC waste be delayed for periods beyond the permissible scope of the Standard Contract or, otherwise not be covered by the Standard Contract, a "taking" situation may occur. However, this situation has not transpired to date. Accordingly, those claims are determined not to be ripe. This conclusion is specifically without prejudice to the raising of such claims at a later date in a later action.

Election of Remedies

The court previously rejected defendant's position that plaintiffs had elected their remedy – partial breach of contract – thus should be precluded from restitution or other total breach relief. Under RCFC 8(c), "[p]laintiffs may demand relief in the alternative." and "[r]estitution was raised over a year ago and will not be excluded pre-trial. . . . On this record it cannot be concluded that a final election has been made by plaintiffs, or that defendant would be prejudiced if plaintiffs were allowed to offer evidence, testimony, and argument in this regard." *Yankee Atomic Co. v. United*

States, 2004 WL 15356888, at *3-5 (2004). “[P]laintiffs could make a “final” election “at some point prior to judgment,” noting “an election of remedies is generally made after a verdict but prior to judgment.” *Id.* (citing *Wynfield Inns v. Edward Leroux Groups, Inc.*, 896 F.2d 483, 488 (11th Cir. 1990)).

While plaintiffs’ “preferred remedy” has been and remains partial breach, in view of defendant’s position that damages should be zero, plaintiffs wished to retain the right to make an election to pursue restitution or other relief. (*See* Pls.’ Initial Post-Trial Br. at 37.) Evidence is in the record to support an alternative election plaintiffs state, referring to paragraph 1 of the respective plaintiffs’ Proposed Findings, which defendant did not dispute – that is the amounts the respective utilities have paid into the NWF – Yankee Atomic has paid \$22.5 million; Connecticut Yankee has paid \$41 million; Maine Yankee has paid \$65 million.

However, subsequent to the above-cited ruling, the Federal Circuit in *Indiana Michigan* eliminated any option plaintiffs may have had to declare a total breach and retrieve their payments. The Federal Circuit interpreted the NWPA and the Standard Contract as compelling suit for partial rather than total breach.

The NWPA directed that DOE and all nuclear utilities enter into Standard Contracts, 42 U.S.C. § 10222(a)(1), and concomitantly conditioned the issuance and renewal of [NRC] operating licenses upon the execution of those contracts, *id.* §10222(b)(1)(A). Additionally, the NWPA provided that DOE was exclusively responsible for SNF collection and disposal in the United States, thereby prohibiting Indiana Michigan or any other nuclear utility from seeking alternative disposal means. *See* 42 U.S.C. § 10131(a)(4), (b)(2); *Roedler*, 255 F.3d at 1350. Therefore, **Indiana Michigan had no choice but to hold the government to the terms of the Standard Contract while suing for partial breach.** 422 F.3d at 1374. (emphasis supplied).

Accordingly, adopting the further reasoning in *Pacific Gas & Electric Co. v. United States*, 70 Fed. Cl. 766, 771-75 (2006) (granting defendant’s summary judgment on plaintiff’s restitution claim), the court concludes that *Indiana Michigan* precludes plaintiffs in these circumstances from electing restitution.

Administrative dispute remedy

Defendant suggests this court has no jurisdiction to decide SNF or HLW quantities or scheduling issues because if a utility and DOE fail to reach agreement on these matters, DOE’s Contracting Officer will issue a decision which may be appealed to DOE’s Board of Contract Appeals under the Disputes clause of the Standard Contract. *See* Arts. V.B.2 & XVI. The “Disputes” clause provides:

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under the contract which is not disposed of by agreement shall be decided

by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Purchaser. The decision of the Contracting Officer shall be final and conclusive unless within ninety (90) days from the date of receipt of such copy, the Purchaser mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the DOE Board of Contract Appeals (Board). The decision of the Board shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith or not supported by substantial evidence.

Defendant cites *McDonnell Douglas Corp.*, ASBCA No. 26747, 83-1 BCA ¶ 16,377, at 81,421 (1983) (describing boards of contract appeals' historical authority to decide non-monetary issues), and *United States v. Joseph A. Holpuch Co.*, 328 U.S. 234, 239-40 (1946) (construing substantively identical pre-Contract Disputes Act clause) as "controlling as to all disputes 'concerning questions arising under this contract' unless otherwise specified in the contract," "[n]o court is justified in disregarding its letter or spirit," and "[s]olely through its operation may claims be made and adjudicated as to matters arising under the contract."

Precedent subsequent to the *Holpuch* decision establishes that, for contracts not covered by the Contract Disputes Act, 41 U.S.C. §§ 601-613, the scope of the "Disputes" Clause is restricted to relief-granting contract clauses. *See, e.g., Crown Coat Front Co. v. United States*, 386 U.S. 503, 505 (1967). The jurisdictional issue as to the appropriate tribunal to resolve the claims presented in this litigation concerning DOE's failure to commence contract performance at least by January 31, 1998, was decided in *Maine Yankee Atomic Power Co. v. United States*, 225 F.3d 1336, 1341 (Fed. Cir. 2000). In the absence of a contract provision providing complete relief under the contracts at issue, for the claims asserted, the Department of Energy Board of Contract Appeals ("EBCA") lacks jurisdiction and plaintiffs' remedy is a breach of contract suit in this court. *Id.* Were DOE to commence performance of the contracts involved, there may well then arise disputes, over matters for which the contracts contain a complete relief-granting provision, which may then be subject to EBCA jurisdiction. *See United States v. Utah Constr. & Min. Co.*, 384 U.S. 394, 418-19 (1966). Such matters are not involved in the instant litigation. *De novo* jurisdiction to resolve the breach of contract claims presented by plaintiffs resides in the Court of Federal Claims. *Id.*; *PSEG Nuclear, L.L.C. v. United States*, No. 05-5162, 2006 WL 2801877 (Fed. Cir. Sept. 29, 2006)

Incurred costs

Dr. Kenneth Wise was one of plaintiffs' damage experts. Dr. Wise has a bachelors degree in physics from Harvey Mudd College and a doctorate in economics from the Massachusetts Institute of Technology. (Tr. 3188.) Since 1990, Dr. Wise has been with the Brattle Group, an commercial litigation damages consultant. In prior litigation he testified as an expert on the allocation of environmental liabilities and insurance recoveries and the economic benefits of noncompliance. He also has testified as to property valuation, environmental litigation, breach of contract, deceptive trade practices, takings and product liabilities cases. Dr. Wise explained his previous work in cases involving the economic benefit of noncompliance – that is analyzing the failure of a company to

comply with some environmental regulation and consequent assessment of a penalty. Economically, Dr. Wise testified that the penalty has to equal the economic benefit of noncompliance, or the economic benefit of postponing an environmental investment. He explained the damage model he formulated for these SNF/HLW cases in that there is “an actual world in which the company delayed making the necessary expenditures. And you have a but-for world in which, hypothetically, the company would have made expenditures in a timely manner.” He has testified in trial or deposition in thirteen such cases and has been involved in about thirty others. His damage analysis in this case was comparable to the methodology in other cases – comparison of an actual and a but-for world – a breach and a nonbreach world.^{62/} (Tr. 3191-93.)

In approaching damages in this case, Dr. Wise relied on plaintiffs’ budgets and tracking of their costs, business records maintained in their ordinary course of business, subjected to rate-setting regulatory scrutiny and discovery in this case. Breach world budgets were well established; nonbreach world budgets were not. (Tr. 3196.) He testified he was very familiar with plaintiffs’ breach world budgets – the so-called 10/29/02 budgets for Yankee Atomic and Connecticut Yankee and the Rev.7 budget for Maine Yankee) and described them as the type of data typically relied upon by experts. (Tr. 3204.) Yankee Atomic and Connecticut Yankee also had an ACT-NOM budget consisting of past costs – from 1999 to 2002. (Tr. 3206.) There was a longer period of past costs for Maine Yankee, also taken from books and records, all subject to the extensive pre-trial audit in this case. (Tr. 3207.) Costs prior to 1999 for Yankee Atomic and Connecticut Yankee and 1997 for Maine Yankee were taken from compilations from a PriceWaterhouseCoopers accountant, Chris Barry. (Tr. 3222, 3338.) While Dr. Wise did not review any of Barry’s work papers nor original source documents, he relied on Barry’s professional opinions and incorporated Barry’s cost compilation into his (Wise’s) analysis. (Tr. 3338-39.) Mr. Barry’s accounting of these past costs is the type of data he, Dr. Wise, has relied upon in other cases. Verifying the numbers in the report was not part of his assignment in this case, although he testified his firm could have done so and has in other cases. (Tr. 3362.)

All past costs sought here were subject to discovery and audit by defendant. They were presented by Dr. Wise in his expert report (subject to discovery and deposition) and at trial. (Tr. 1679 (Bennett) (Yankee Atomic incurred pre-1999 costs of about \$2.1 million related to the ISFSI or dry storage, which were presented first to PriceWaterhouseCooper and then conveyed by PriceWaterhouseCooper to Dr. Wise.); Tr. 3221 (Wise) (pre-1999 costs for ISFSI design work and studies included in Yankee Atomic’s damages claim); Tr. 3222-23 (Wise) (Dr. Wise reviewed with Yankee Atomic, pre-1999 cost information tabulated in expert report submitted with Yankee Atomic’s 1999 damages submission.)) His reliance on past costs compiled from company business records by PriceWaterhouse was appropriate. Fed. R. Evid. 703; *Health Ins. Plan of Greater New York v. United States*, 62 Fed. Cl. 33, 45 n.20 (2004) (citing *LaCombe v. A-T-O, Inc.*, 679 F.2d 431, 436 (5th Cir. 1982) (“when the expert witness has consulted numerous sources, and uses that information together, with his own professional knowledge and experience, to arrive at his opinion,

^{62/}Dr. Wise was admitted without objection as an expert in economics and the determination of economic damages. (Tr. 3193.)

that opinion is regarded as evidence in its own right and not as hearsay in disguise.”); *United States v. Sims*, 514 F.2d 147, 149 (9th Cir. 1975) (“the expert synthesizes the primary source material – be it hearsay or not – into properly admissible evidence in opinion form”).) That Dr. Wise got the numbers from an outside accountant expert is not fatal to his evidence.

Dr. Wise assumed in the nonbreach world DOE would perform on the dates and to the extent expressed in Mr. Graves’ expert opinion. (Tr. 3211.) On causation, he testified it “seemed completely implausible” that any of these plaintiffs would have gone dry in the nonbreach world. In his nonbreach world budgets, each of the utilities relied on their wet pools until DOE came and took the fuel away. (Tr. 3239.) All damages (past and future) were subject to the pre-trial audit, damages presented at trial were through 2011 (2012 for Maine Yankee) and were not necessarily segregated by past (or incurred) versus future. *See* YA’s PFF ¶ 137 (referencing trial exhibits and testimony). Commendably through cooperation of counsel and the ordered pre-trial audit procedure, plaintiffs reduced their claims substantially and eliminated numerous costs – both past and future. Those adjustments were generally aggregated by category not by year, although there is no allegation that the date costs were incurred was not disclosed. The incurred versus future component of those adjustments were known. In supplemental briefing ordered by the court following the *Indiana Michigan* case, costs (including those actually incurred) taken from trial evidence, were parsed by years (“supplemental cost data”). The supplemental cost data was compiled from trial exhibits, demonstratives and testimony with two exceptions, both credits.^{63/} The amount and category of these credits are in the trial record. The year(s) of allocation is not.^{64/}

Defendant objects to the plaintiffs’ reliance on Dr. Wise’s demonstratives. The demonstratives or the calculations were part of Dr. Wise’s expert report. (Tr. 3246, 3250-51, 3255, 3257, 7471-72.)

Q: The title of this chart (referring to demonstrative PX 2043a.15) is Yankee Atomic damages by year.

[Dr. Wise] That’s correct. This provides the same information that was on the previous chart but at a much greater level of detail year by year. So it contains the pre-1999 costs. It contains all the past costs through 2002

Q: All right. Let me just ask, this – this information, anyway, something very comparable to this schedule was attached to your expert report?

A. Yes, it is. This is from my expert report.

(Tr. 3250 (Yankee Atomic).)

^{63/}The court commends, as it did at trial, the cooperation, albeit delayed, between counsel in the pre-trial audit process and, as here, in adjusting claims.

^{64/}See plaintiffs’ supplemental brief filed December 6, 2005 at pp. 11-12 for a description of how this issue arose at trial.

A: This (referring to demonstrative PX 2043a.18) is all information that would have been in my expert report.

Q: And the schedule in particular, the numbers and year-by-year numbers?

A: That's correct.

(Tr. 3260-62 (Maine Yankee).)

Q. Okay. And on the next page, again, we have a chart or a schedule that is entitled Maine Yankee damages by year (referring to demonstrative 2043a.21), very similar or identical to the ones we've seen for the other two companies, except the actual numbers and values in the schedule are different. Is that right?

A: That's correct.

Q. Again, this is the risk-adjusted version in the year-by-year damages, right?

A: That's correct.

Q: And this is a schedule that was attached to your Maine Yankee expert report in this case?

A. Yes, it was.^{65/}

(Tr. 3255-57 (Connecticut Yankee).)

Adjustments by year were part of plaintiffs' rebuttal case.^{66/} Rather than have Dr. Wise read numerical components of the demonstratives into the record like defendant's expert did, defendant accepted plaintiffs' counsel's suggestion that, to save time near the end of a seven-week trial, Dr. Wise could simply adopt the numbers which he did. The court concurred. The demonstratives accompany the record. (Tr. 7858-59.) These six pages (Pls.' Supp. Br. Addressing Impact of *Indiana Michigan*, App., Exs. A4-9) are costs for each plaintiff for ISFSI construction, ISFSI operation, and wet pool related expenses by year (pre-1999 to 2011).^{67/} While defendant did not

^{65/}In charting damages by year for all three utilities, Dr. Wise charted both the "past" damages discussed here and future damages to 2011 for Maine Yankee and 2012 for Yankee Atomic and Connecticut Yankee. One chart applied present value January 2003 dollars using a risk-free discount rate (PX 2034a.22); the other a risk-adjusted discount rate (PX 2034a.21). Variations affect only future damages and are irrelevant to the court's current analysis with a few exceptions discussed later.

^{66/}Defendant admitted such. "We certainly looked at the base numbers (referring to the numbers behind the budget compilations). . . . We could audit the underlying support and ultimately decide which components from a strict numerical standpoint we were going to disagree with. . . ." (Tr. 3422-24.)

^{67/}A4 contains 41 seven digit minimum dollar amounts; A5 contains 39 six digit minimum dollar amounts; A6 contains 36 six digit minimum dollar amounts; A7 is a listing of the value of 12 categories of costs Yankee Atomic agreed to remove from the claims containing 30 large dollar figures; A8 is a listing of the dollar value of 11 categories of costs Connecticut Yankee agreed to
(continued...)

object to the demonstratives accompanying the record, “any agreement by the Government not to oppose allowing the demonstratives to ‘accompany the record’ was premised upon the desire to save time by eliminating the requirement that Dr. Wise read into the record the asserted damages amounts presented in the rebuttal case.” (Def.’s Resp. to Pls.’ Supp. Post-Trial Br. Addressing Impact of *Indiana Michigan*, filed January 5, 2006, at 11.) The relevant exchange:

MR. STOUCK: . . . [R]ather than have Dr. Wise sort of read it these numbers into the record, if it’s okay with the court just proceeding with this general testimony on endorsement of these conclusions, we would like to do that, . . . or we can read the numbers into the record the way, you know, Mr. Johnson (defendant’s expert) has done . . .

And my proposal would be, if it’s acceptable, to simply have Dr. Wise testify generally that these numbers are the results of his conclusions so we don’t have to clog up the record. But if that’s not acceptable, then we will go ahead and read these numbers into the record.

MR. CRAWFORD: Your Honor, we have no objection to that proposal. That sounds logical.

THE COURT: That’s fine with me.

MR. STOCK: Okay.

THE COURT: As long as it’s clear what’s happening.

(Tr. 7472-73.)

The relevant data from these demonstratives is:

Yankee Atomic

	Pre-1999	1999	2000	2001
ISFSI CONSTRUCTION	\$ 2,177,131	\$ 5,260,242	\$ 11,279,391	\$ 18,893,198
ISFSI OPERATIONS				
WET POOL RELATED		\$ 10,867,912	\$ 6,810,083	\$ 9,911,002

(Pls.’ Supp. Br., Ex. A4 (also PX 2043a.15 and.16 (demonstratives accompanying the record).)

⁶⁷(...continued)

remove from its claim and contains 36 large dollar figures; and A9 is a listing of the dollar value of 11 categories of costs Maine Yankee agreed to remove from its claims and contains 36 large dollar figures.

Connecticut Yankee

	Pre-1999	1999	2000	2001
ISFSI CONSTRUCTION	\$ 104,744	\$ 4,389,891	\$ (414,761)	\$ 27,236,488
ISFSI OPERATIONS				
WET POOL RELATED	\$8,350,893 ^{68/}			\$ 3,522,883

(Pls.' Supp. Br., Ex. A5 (also PX 2043a.18 and .19 (demonstratives accompanying the record).)

Maine Atomic

	Pre-1999	1999	2000	2001	2002
ISFSI CONSTRUCTION	\$ 255,829	\$ 6,938,038	\$ 25,238,084	\$ 26,958,060	\$ 12,231,837
ISFSI OPERATIONS					
WET POOL RELATED	\$10,069,018 ^{69/}				\$ 2,315,096

(Pls.' Supp. Br., Ex. A6 (also PX 2043a.21 and .22 (demonstratives accompanying the record).)

The court may rely on these demonstratives. They are chronological parsing of cost evidence in the record or reasonably available as part of the audit/discovery process. Defendant deposed and cross-examined Dr. Wise on these numbers and their underlying particulars. At trial, defendant did not object to the summary nature of these demonstratives and no prejudice is alleged. Accordingly, the documents meet the criteria for summaries even though they were not then sought to be admitted. Fed. R. Evid. 1006; RCFC Appendix A, ¶ 13. *See Conoco, Inc. v. DOE*, 99 F.3d 387, 393-94 (Fed. Cir. 1996); *Jade Trading, LLC v. United States*, 67 Fed.Cl. 608, 613 (2005) (citing *Fraser v. Major League Soccer*, 284 F.3d 47, 67 (1st Cir.2002)) (“It is hard to imagine an issue on which a trial judge enjoys more discretion than as to whether summary exhibits will be helpful.”).

At post-*Indiana Michigan* oral argument, defendant narrowed its objection.

We don't dispute that [Dr.] Wise was, you know, reading these pages into the record. We agreed to allow these demonstratives at Appendix A-4 through 9, which are attached to the supplemental brief, to come into the record or to accompany the record so that [Dr.] Wise didn't have to actually read the numbers. But our problem is not with the fact that the numbers are on the page. It's that there's no reference to

^{68/} This is the reracking cost. (Tr. 3256-57 (Wise); CY PFF 123 and Def.'s Resp.)

^{69/} This is the reracking cost. (Tr. 3262 (Wise).)

any trial evidence that actually supports those numbers. These summaries in Appendix A-1 through A-3 are simply a further calculation based on these demonstrative[s] that none of which refer back to the trial evidence, so we don't know where all these numbers come from.

(Tr. 79-80 (Oral argument January 10, 2006.))

Defendant's objections are rejected. Plaintiffs' proposed findings submitted before the *Indiana Michigan* decision, described aggregate "past" damages, and referenced Dr. Wise's testimony and these very demonstratives. (YA PFF 137 ("As of year-end 2002, approximately \$101.9 million of Yankee Atomic's minimum damages had already been incurred as 'past damage,' as adjusted for changes agreed to by Yankee Atomic . . .") (citing PX2043A.14-.16 and Tr. 3246, 3249); Connecticut Yankee's PFF 151 (\$82.9 million of "past damages" through 2002) (citing PX2043A.17- .19 and Tr. 3247-48; Tr. 3253-55); MY PFF 152 and 153 (\$78.1 million of "past damages" through 2002) (citing PX2043A.20- .22 and Tr. 3260).) While objecting to causation, disagreeing with labeling of "past" (discussed *infra*), and contesting the amount of adjustments taken from these past costs (discussed *supra*), defendant did not object to the past costs, nor object to the cited evidentiary basis (Dr. Wise's or the demonstratives), nor complain that the numbers to which Dr. Wise opined were not linked or derived from other record evidence.

Dr. Wise was deposed and cross-examined. Defendant has not established any prejudice. While defendant is entitled to know of and examine all source material upon which Dr. Wise based his opinion, Dr. Wise did not have to further annotate his conclusions. Furthermore, defendant admits that actual cost data was provided and subject to discovery for costs incurred through 2001 (for Yankee Atomic and Connecticut Yankee) and through 2002 (for Maine Yankee), and included in trial evidence. (*See* Defs.' Resp. to Pls.' Supp. Br. at 8 addressing impact of *Indiana Michigan* ("In fact, the Yankees provided actual cost information to the Government against which discovery was taken, and an audit was performed through 2001 [for Yankee Atomic and Connecticut Yankee] and through 2002 [for Maine Yankee]. Actual cost information through these years likewise was provided as evidence to the Court at trial.") (citing Tr. 2982, 3247, 3254, 3259).^{70/} Alternatively, the court admits the cited demonstratives in evidence.

^{70/}There is other record support for these actual incurred costs independent of Dr. Wise's analysis. For Yankee Atomic, except for pre-1999 costs, the amounts from demonstrative PX 2043a.15 are supported by PX 1726YA at YA-DOE-200301017_Section 2 (the last two pages of a lengthy and cumbersome exhibit, albeit rounded to the nearest thousand. For Connecticut Yankee, the pre-1999 ISFSI cost of \$104,744 and wet pool related cost (reracking) of \$8,350,893 in DX 438 at PWC005148 are the same as in PX2043a.18. For Maine Yankee, actual costs shown in PX2043a.21 for ISFSI construction in 1999 and 2000 are identical to (but \$627,000 less for 2001 than) those in PX 1726MY) (back-up to Section 2, total ISFSI capital costs dated January 2003). 1998 and other actual costs are in PX 1726. The court is confident that the parties could further glean the voluminous record and find additional support.

Indiana Michigan, issued post-trial, limited damages to costs incurred. Evidence at trial encompassed both past and future – to 2010 and 2011. While not parsed in integrated exhibits, evidence of past costs is in the record and included in Dr. Wise’s expert opinion, and defendant does not suggest to the contrary. These demonstratives were generated after defendant’s expert testified and presented in rebuttal. The data was not new. It was annualized. Defendant had ample opportunity thereafter to counter the parsing. Under these circumstances, the court in its discretion considers them. *Voice Tech. Group, Inc. v. VMC Sys., Inc.*, 164 F.3d 605 (Fed. Cir. 1999) (indicating court’s reliance on demonstrative video included in summary judgment record); *Young Dental Mfg. Co. Inc. v. Q3 Special Products, Inc.*, 112 F.3d 1137, 1146-47 (Fed. Cir. 1997) (no error in admitting demonstrative evidence); *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1470 (Fed. Cir. 1997) (sanctioning use of demonstrative exhibits by expert and commenting that “effective cross-examination is the remedy for [the] objection [that the exhibit over simplified issues]”); *Pete v. United States*, 209 Ct. Cl. 270, 299, 531 F.2d 1018, 1035 n.37 (1976) (noting reliance on demonstrative evidence); *Tritek Tech. v. United States*, 67 Fed. Cl. 727 (2005) (discussing demonstratives and allowing substantive use in oral argument where it was relevant to substantive issues); *Am. Capital Corp. v. United States*, 66 Fed. Cl. 315, 330 (2005) and *Am. Capital Corp. v. United States*, 63 Fed. Cl. 637, 651 (2005) (citing demonstratives)

Plaintiffs’ adjustments to costs

Plaintiffs have reduced their claims. The cooperation of counsel in the extensive pre-trial audit procedure continued through trial.

[The court]: The best solution is for plaintiffs to work them [any further adjustments by Dr. Wise resulting from cross-examination, witness testimony or further analysis] up as soon as you can and provide them to counsel for defendant so that they can address them in their case if they have any objections.

(Tr. 3287.)

[The court]: You can be assured that counsel will be asked to provide as a part of final conclusions the actual mathematical effect of any adjustment that you agree to or want to make in the process.

(Tr. 3284.)

[The court]: I’m assuming that you can probably agree what the quantification is.

(Tr. 3286.)

Accordingly, in an August 11, 2004 letter to defendant’s counsel, plaintiffs’ counsel wrote:

there are a few discrete items, which following the pre-trial audit process and a review of criticisms offered by the government’s experts, we have determined should be adjusted from the Yankee Utilities’ damage claim. Pursuant to the Court’s suggestion, we have prepared the attached summary of these adjustments along with their approximate quantification

(Pls.' Supp. Post-Trial Br. Addressing Impact of *Ind. Mich.* Exh. A10 at 1.) Annual break-down by plaintiffs, by year and by category was attached. (*Id.* Attachment D, E and F.) Defendant had an opportunity to address these adjustments in its case and no prejudice has been asserted. These adjustments, done at the court's urging and consistent with on-going audit procedures, are considered, the evidentiary record in this case is reopened and the August 11, 2004 letter and the attachments are admitted into evidence as PX 2050. See *LaSalle Talman v. United States*, 64 Fed. Cl. 90 (2005) (awarding damages based on damages model altered on remand after Federal Circuit decision).

These are reductions, not additions to damages. Defendant objects to the adjustments as conflicting with adjustments proposed by its economic expert, Larry Johnson and technical expert, Edward Abbott. Indeed defendant offered numerous offsets in additional factual findings in this regard. (Def.'s Resp. to YA PFF, pp. 201-26; to CY PFF, pp. 247-75; MY PFF, pp. 226-59.). While the bulk of the adjustments were to "future" damages, not now a part of this litigation, the dates of the proposed adjustments were not readily ascertainable. Post-*Indiana Michigan* briefing by plaintiffs pointed to record evidence and demonstratives of "incurred" mitigation damages by years and corresponding adjustments. Other than making evidentiary objections and suggesting plaintiffs were attempting to increase their mitigation damages, defendant did not contest the plaintiffs' concessions. Defendant did not offer any time-specific adjustments in post-*Indiana Michigan* briefing. "Although it appears that some of the information reflects reductions that the Yankees made as a result of the Government's audit and case-in-chief, it is unclear whether Attachment No. A11 reflects the allegedly additional increased costs to the Yankees beyond those costs submitted into evidence at trial. As the Court may recall, during their rebuttal case, the Yankees attempted to submit evidence of additional costs that they had not presented during their case-in-chief, and this court, after the Government objected, expressly excluded that evidence." (Def.'s Resp. to Pls.' Supp. Post-Trial Br. addressing Impact of *Indiana Michigan*, at 13 (citing Transcript of Trial Proceedings on August 25, 2004).) The above-cited August 11, 2004 letter pre-dates these post-*Indiana Michigan* proceedings and cites reductions to claimed damages, not additions.

From the court's review of defendant's proposed additional responses to damages, two responses readily concern incurred costs and must be considered. Addressing Connecticut Yankee's claims, defendant advocates a \$276,605 reduction to eliminate non-incremental ISFSI labor construction costs, consisting of labor costs of \$271,794 in 1999 and \$4,811 in 2000. (Def.'s Resp. to CY PFF, Add'l Resp. 10, pp. 250-01.) Defendant's expert Larry Johnson testified that payroll records were unavailable. (Tr. 6556.) The court credits the testimony of Ms. Jewell-Kelleher who testified that, during defendant's audit of Connecticut Yankee's damages claims, government auditors asked for and received payroll distribution reports with each individual's name, the dollar amounts and project numbers codes, and time sheets. (Tr. 1899-1900, 2528-32.) It is concluded that defendant did not establish that the labor cost cited was not incurred.

The second time-specific requested offset to incurred costs is again for Connecticut Yankee, for costs of \$430,289 in 2000, \$1,361,531 in 2001 for storage of 82 SNF assemblies at GE Morris. (Def.'s Resp. to CY PFF, Add'l Resp. 43 at 265.) Defendant states that Connecticut Yankee could have avoided these storage costs by paying a one-time cost of \$5.2 million (\$2.2 million for

additional ISFSI storage casks and \$3 million to move the 82 fuel assemblies stored at the GE Morris fuel storage facility back to its site. The deduction or offset is not warranted. The settlement agreement concluding litigation over Connecticut Yankee's ISFSI building permit and zoning with the town of Haddam, Connecticut expressly precludes bringing the 82 assemblies from GE Morris facility back to the site. (PX 1920 at p. 5, ¶ 5 ("Any Connecticut Yankee Waste which is currently stored in Morris, Illinois pursuant to a contract with General Electric Company will be stored on the Property only if Connecticut Yankee is either obligated to remove such materials from their present location and/or to store them on the Property by government order, directive or regulation."); Tr. 2347-49 (Bennet).)

Maine Yankee received a \$44 million settlement in litigation against Stone & Webster's surety, arising out of the termination of Stone & Webster as Maine Yankee's Decommissioning Operations Contractor. Maine Yankee booked the \$44 million on January 9, 2002 (Tr. 2835), which brings it into the applicable time period for incurred costs for this plaintiff.^{71/} Defendant asserts all \$44 million should be credited to ISFSI construction. (Def.'s Resp. to MY PFF, Add'l Resp. 23 at 232.) Maine Yankee responded that this recovery was appropriately allocated to decommissioning. (MY Reply filed February 18, 2005 at 43.) Mr. Thomas testified that there were favorable tax consequences by allocating to the decommissioning phase which was in the best interest of the ratepayers. (Tr. 2773-75, 7181-82.) Defendant has not established a valid basis for undoing plaintiff's allocation decision and reallocating the entire \$44 million as an offset to ISFSI cost. *Lisbon Contractors, Inc. v. United States*, 828 F.2d 759, 769 (Fed. Cir. 1987) ("The burden was on the government to prove the amount [of the claimed offset]. . . .").

Incurred costs and adjustments by category are as follows:^{72/}

^{71/}Maine Yankee's \$10.4 million settlement with NAC was in Spring of 2003, a period outside the parameters now before the court. (Tr. 2775-76 (Thomas).)

^{72/}Adjustments were taken from Pls. Supp. Post-Trial Br. Addressing Impact of *Ind. Mich.* Ex. A1, Tables YA 2, YA3; Ex. A2, Tables CY2, CY3; Ex. A3, Tables MY2 and MY3.

Yankee Atomic's adjustments

	Pre-1999	1999	2000	2001
ISFSI CONSTRUCTION	\$ 2,177,131	\$ 5,260,242	\$ 11,279,391	\$ 18,893,198
offset for spent fuel transfer to DOE as adj. for contingency	\$ (3,080,825)			
offset officer contract benefits			\$ (826)	\$ (9)
offset rack removal				\$ (1,352,936)
ADJUSTED TOTAL ISFSI CONSTRUCTION	\$ (903,694)	\$ 5,260,242	\$ 11,278,565	\$ 17,540,253
WET POOL RELATED		\$ 10,867,912	\$ 6,810,083	\$ 9,911,002
offset officer contract benefits			\$ (11,275)	\$ (68)
TOTAL WET POOL RELATED		\$ 10,867,912	\$ 6,798,808	\$ 9,910,934
YANKEE ATOMIC TOTAL			\$60,753,020.00	

Connecticut Yankee's adjustments

	Pre-1999	1999	2000	2001
ISFSI CONSTRUCTION	\$ 104,744	\$ 4,389,891	\$ (414,761)	\$ 27,236,488
offset for spent fuel transfer to DOE as adj. for contingency			\$ (5,857,552)	\$ 623,827
offset officer contract benefits			\$ (12)	
offset crane upgrade		\$ (278,639)		
ADJUSTED TOTAL ISFSI CONSTRUCTION	\$ 104,744	\$ 4,111,252	\$ (6,272,325)	\$ 27,860,315
TOTAL WET POOL RELATED	\$ 8,350,893			\$ 3,522,883
CONNECTICUT YANKEE TOTAL			\$37,677,762.00	

Maine Yankee's adjustments

	Pre-1999	1999	2000	2001	2002
ISFSI CONSTRUCTION	\$ 255,829	\$ 6,938,038	\$ 25,238,084	\$ 26,958,060	\$ 12,231,837
offset for spent fuel transfer to DOE as adj. for contingency				\$ (4,838,720)	\$ 313,500
offset crane upgrade			\$ (345,795)	\$ (724,946)	\$ (320,351)
ADJUSTED TOTAL ISFSI CONSTRUCTION	\$ 255,829	\$ 6,938,038	\$ 24,892,289	\$ 21,394,394	\$ 12,224,986
TOTAL WET POOL RELATED	\$ 10,069,018				\$ 2,315,096
MAINE YANKEE TOTAL				\$78,089,650.00	

Costs not recoverable

Wet pool-related costs fall into two categories – reracking costs and wet pool expenses which “consist[] of costs that are incrementally incurred by the companies because they have the pool on the facility at a point in time after which you would have been empty by the DOE removal campaign in our nonbreach world.” (Tr. 3305 (Wise); YA PFF 142 and Def.’s Resp. (citing Dr. Wise and PX 2043A.16 to which the government did not object).) These are the costs the utilities incurred to operate their spent fuel (wet) pool for the period beyond the date it is claimed the pool would have been emptied by DOE in the nonbreach world.

The court has determined that Connecticut Yankee and Maine Yankees’ decisions to rerack were commercially reasonable and reasonably foreseeable to DOE at the time of contracting, that DOE’s partial breach (and/or breaches) was a substantial causal factor in the decisions and attendant costs which were shown with reasonable certainty for the applicable time periods. All three plaintiffs also seek to recover the costs of operating their respective wet pools beyond the fuel-out dates testified to by Frank Graves (January 1999 for Yankee Atomic; August 2001 for Connecticut Yankee; and June 2002 for Maine Yankee). The claimed wet pool costs are dependent upon Graves’ fuel-out dates as plaintiffs’ economic expert Dr. Wise admitted. (Tr. 3329 (Wise).)

It has been determined, that, had DOE performed at a reasonable SNF/HLW pick-up rate, all the fuel would not have been removed from the respective pools by the close of the periods for which damages are claimed in this litigation and plaintiffs would still need to incur wet pool operation cost. As a result, recoverable wet pool related expenses are limited to the reracking costs for Connecticut Yankee of \$8,350,893 and for Maine Yankee of \$10,069,018.

For Yankee Atomic, defendant claims that \$578,000 for NRC annual fees from 1999 to 2002 should be deducted from amounts claimed because these fees would have been incurred in the non-breach world because of on-going decommissioning activities which would still require NRC involvement. (Def.'s Resp. to YA PFF, Add'l Resp. 16 at 207.) For purposes of costs incurred through 2001, the period applicable for Yankee Atomic, the licensing fees according to Larry Johnson are \$206,000 for 1999 and \$106,000 for 2000. (Johnson-YA slide 13.) For the same reason plaintiffs' wet pool operating costs are not recoverable as damages because they would have been incurred even if DOE had performed the contracts at a reasonable SNF or HLW pick-up rate, these NRC fees would also have been so incurred and, therefore are deducted from Yankee Atomic's claim.

One time fee for Maine Yankee and Connecticut Yankee

The utilities had three fee payment options covering pre-April 7, 1983 SNF. Standard Contract, Art. VIII(B)(2). The utilities could (1) prorate the fee evenly over forty quarters with interest on the unpaid portions, (2) defer the fee with interest, or (3) pay the fee in full by June 30, 1985 without interest.^{73/} Neither Connecticut Yankee nor Maine Yankee have paid their pre-April 7, 1983 SNF fees. Defendant argues the amount of these fees (plus interest) should be set-off from mitigation damages awarded herein in order to prevent these utilities from being placed in a better place than if the contract breach had not occurred. (Def.'s Initial Br. at 93-97.) These plaintiffs counter that there is no way they would be in a better place, because their SNF/HLW is still at their site and not scheduled for removal. To offset the one-time fee now, while leaving the SNF/HLW in place would be unfair and contrary to the terms of the Standard Contract, would effectively penalize their partial breach election, reduce the contractual incentive for DOE to commence performance.

It is concluded that any claim for payment of the pre-April 7, 1983 SNF/HLW fee is premature. The deferred payment option for pre-April 7, 1983 fees is keyed to the first delivery of SNF/HLW to DOE under an approved schedule. This has not occurred and apparently will not occur for some period of time. No prejudice to DOE is involved as plaintiffs' fee debts accrue interest until paid. Therefore, in accord with the analysis in *Systems Fuels v. United States*, 65 Fed. Cl. 163,

^{73/} The deferred payment provision provides:
The [utility's] financial obligation shall be paid in the form of a **single payment anytime prior to the first delivery, as reflected in the DOE approved delivery commitment schedules, and shall consist of the fee plus interest on the outstanding fee balance.** Interest is to be calculated from April 7, 1983, to the date of the payment based upon the 13-week Treasury bill rate, as reported on the first such issuance following April 7, 1983, and compounded quarterly thereafter by the 13-week Treasury bill rates as reported on the first such issuance of each succeeding assigned three-month period until payment.

10 C.F.R. § 961.11 at Art. VIII(A)(2) (emphasis added).

173 (2005), while leave is granted for defendant to file an amended answer and counterclaim for setoff or recoupment for the pre-April 1983 SNF fees concerned, upon the filing, the counterclaims shall be denied. *Consumers Energy v. United States*, 65 Fed. Cl. 364, 372 (2005).^{74/}

Disparities

Defendant asks that the court in its discretion limit the damages because of the asserted gross disparity in the amounts plaintiffs paid into the Nuclear Waste Fund and substantial amount of damages sought. Plaintiffs reply that this request is unprecedented and counter to the basic principle that contract damages are to place the parties in the position they should have been in had the contract not been breached and point out that defendant's cited authority limits damages for consequential, not direct damages. Plaintiffs note that the contractual plan to collect and dispose of all the SNF/HLW in one place is much more cost-efficient than individual utilities incurring separate construction, storage and operating costs for SNF and/or HLW as required by DOE's delay in commencing performance. Defendant also points to the varying total ISFSI costs among these three utilities as indicative of unreasonableness. No valid basis has been shown on which damages could be limited as defendant proposed.

CONCLUSION

In this Opinion it has been shown that, on a historical basis, for reasons of public safety and health, the federal government has long assumed responsibility for disposal of highly radioactive waste such as that involved in this litigation. As provided by the NWPAA, in 1983 the United States, represented by DOE, entered into contracts with plaintiffs that required DOE, in return for plaintiffs' payment of fees, to pick-up plaintiffs' SNF/HLW, commencing not later than January 31, 1998, at the reactor sites for permanent disposal at a deep geologic repository. The contracts have been breached by DOE's continuing delay in commencing performance. As a result, plaintiffs Connecticut Yankee and Maine Yankee reracked their spent fuel pools to gain additional on-site

^{74/}Moreover, offset would bypass the NWPAA's requirement that fees be "paid" into the Nuclear Waste Fund and used only for the purposes therein delineated. The NWPAA required that spent fuel fees must be deposited into the Nuclear Waste Fund (the "NWF") "immediately upon their realization." 42 U.S.C. § 10222(c). The NWF can be used only "for purposes of radioactive waste disposal services." 42 U.S.C. § 10222(d). *Ala. Power Co. v. DOE*, 307 F.3d 1300 (11th Cir. 2002) held that the "NWPAA clearly does not allow the Department [of Energy] to utilize NWF monies to pay for the interim storage costs of the Department's contract creditors." 307 F.3d at 1312. Allowing defendant to offset damages with fees would bypass the NWF and effectively use NWF dollars to pay partial breach damages, or more precisely deny the NWF the fees, in violation of the NWPAA – the precise situation condemned in *Alabama Power*. Damages come from the Judgment Fund, not the NWF. 31 U.S.C. § 1304; 28 U.S.C. § 2517.

storage. All three plaintiffs determined to build dry storage facilities that would not have been necessary if DOE had commenced performance at a reasonable pick-up rate. In these circumstances, it is concluded that plaintiffs are entitled to recover the following listed damages in satisfaction of their claims for partial breach of the contracts through December 31, 2001 for Connecticut Yankee and Yankee Atomic, and through December 31, 2002 for Maine Yankee.

It is **ORDERED** that judgment be entered for the total amounts as follows:

(1) For **Yankee Atomic**:

ISFSI construction costs through 2001:	\$ 33,175,366.00
less NRC licensing fees:	\$ 312,000.00
Subtotal: ISFSI construction costs:	\$ 32,863,366.00
deposition ^{75/} costs	\$ 2,721.55

Total: **\$ 32,866,087.55;**

(2) For **Connecticut Yankee**:

Reracking costs:	\$ 8,350,893.00
ISFSI construction costs through 2001:	\$ 25,803,986.00
Total:	\$ 34,154,879.00;

(3) For **Maine Yankee**:

Reracking costs:	\$ 10,069,018.00
ISFSI construction costs through 2002:	\$ 65,705,536.00
Total:	\$ 75,774,554.00;

^{75/}On February 21, 2002, Yankee Atomic filed a motion to recover all of its expenses incurred in connection with the deposition of Richard Emil Leotta. The motion was opposed by defendant and by Order, filed May 1, 2002, its resolution was deferred to the close of this litigation. The deposition involved revealed that, contrary to information in a letter from defendant's counsel, Mr. Leotta, a former Contracting Officer for the SNF/HLW Standard Contract, when deposed, declined to recall any involvement in the events for which defendant had listed him as knowledgeable. In these circumstances, plaintiff seeks its deposition costs as a sanction pursuant to RCFC 26(g)(3). Defendant's opposition stressed the limited time available to respond to plaintiff's substantial discovery requests and argued that its reliance mainly on documents to list Mr. Leotta's area of knowledge was reasonable in the circumstances. Both parties have reasonable positions with respect to this controversy, but from the submissions, it appears that defendant's listing of Mr. Leotta, due to his unfortunate lack of memory, was without substantial justification. Plaintiff is entitled to recover reasonable deposition expenses which comprise: \$946.00 (court reporter); \$547.05 (photocopying); and \$1,228.50 (fee for attorney taking deposition). As the subject matter listed for deposition was generic to issues actually litigated, preparatory activity was not wasted effort and is not included in the award. The \$2,721.55 total amount is included in the recovery awarded to Yankee Atomic.

(4) Except for the amounts set forth above, all other claims for costs incurred by Connecticut Yankee and Yankee Atomic through December 31, 2001 and by Maine Yankee through December 31, 2002 are **DENIED**;

(5) Defendant's Motions for Leave to File Amended Answer and Counterclaims in Nos. 98-154C and 98-474C are **GRANTED**, and the pleadings shall be promptly filed by defendant, and upon their filing the Counterclaims shall be **DENIED**, without prejudice to their reassertion at an appropriate time in future litigation.

s/ James F. Merow

James F. Merow

Senior Judge