In the United States Court of Federal Claims

No. 03-2625C
(Filed: April 14, 2016)[1]

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ENTERGY GULF STATES, INC., and ENTERGY GULF STATES LOUISIANA, L.L.C.,	*	**Spent Nuclear Fuel; Partial Breach of Contract; Damages; Causation; Cask Loading Costs; Cask Drop Analysis; Fuel Handling Building Modification Costs; Payroll Loaders; Materials Loaders; NRC Fees; Allegedly Unsupported Transactions; Partial Stay.**
Plaintiffs,	*	
v.	*	
THE UNITED STATES,	*	
Defendant.	*	
* *		

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[1] The Court issued this opinion under seal on March 31, 2016, and directed the parties to file any proposed redactions by April 14, 2016. Neither party has proposed redactions. Accordingly, the Court publishes this Opinion correcting errata.

OPINION AND ORDER ENTERING PARTIAL JUDGMENT

WILLIAMS, Judge.

This spent nuclear fuel ("SNF") case comes before the Court following a trial on damages.[2] Because the Government's liability for partial breach of contract has been established, the only issue before this Court is the quantum of damages owed to Plaintiffs. Plaintiffs Entergy Gulf States, Inc., and its successor-entity, Entergy Gulf States Louisiana, L.L.C., ("Plaintiffs") seek $49,687,975 in damages incurred from January 1, 1999 through December 31, 2010, stemming from the Department of Energy's ("DOE") partial breach of the 1983 Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Radioactive Waste ("Standard Contract"). The Government challenges $13,707,636 of Plaintiffs' claim. Based on the record developed at trial, the Court awards Plaintiffs $42,341,604 in damages.[3]

Findings of Fact[4]

The Nuclear Waste Policy Act and the Standard Contract

In 1982, Congress enacted the Nuclear Waste Policy Act ("NWPA" or "the Act") in response to safety and environmental concerns about the accumulation of radioactive waste. 42 U.S.C. §§ 10101-270 (2012). The Act authorized the Secretary of Energy "to enter into

[2] Congress defined spent nuclear fuel ("SNF") as fuel that "has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." 42 U.S.C. § 10101(23) (2012). SNF contains toxic uranium and byproducts, such as plutonium, and "remains radioactive after it is removed from a nuclear reactor and must be isolated in safe disposal facilities for thousands of years." Sacramento Mun. Util. Dist. v. United States, 63 Fed. Cl. 495, 496 n.2 (2005).

Like many spent nuclear fuel cases, this case was stayed pending appellate consideration of governing legal issues. The stay was in effect from January 19, 2007 until January 19, 2010, and reinstated from March 16, 2010 until July 22, 2010, and again from December 12, 2011 until June 12, 2013.

[3] The Court stays resolution of Plaintiffs' claims for fuel characterization costs and cask loading costs pending the Federal Circuit's decision in System Fuels, Inc. v. United States, Nos. 2015-5094, 2015-5095 (Fed. Cir. filed Sept. 2, 2015).

[4] These findings of fact are derived from the evidence adduced at trial and stipulations. The Court uses "PX," "DX," and "JX" to designate exhibits admitted during trial and "Tr." to cite trial testimony. The cited exhibit page numbers are the last four digits of the Bates number assigned to a given page or to the document's internal page numbers or section numbers as appropriate. Demonstrative exhibits are cited as "PDX" and "DDX." The Court does not correct grammatical or typographical errors in quotations from the record.

contracts with any person who generates or holds title to high-level radioactive waste, or spent nuclear fuel [SNF] of domestic origin for the acceptance of title, subsequent transportation, and disposal of such waste or spent fuel." Id. at § 10222(a)(1), held unconstitutional on other grounds by Ala. Power Co. v. U.S. Dep't of Energy, 307 F.3d 1300, 1307-08 (11th Cir. 2002). Pursuant to section 302 of the NWPA, utilities would enter into a Standard Contract with the Government acting through DOE. In return for fees assessed against the utilities contracting with DOE for disposal of spent nuclear fuel, Congress imposed on DOE the unconditional obligation to take title to, transport, and dispose of the spent nuclear fuel generated by these utilities no later than January 31, 1998. Id. at § 10222(a)(5)(B); JX 1, Art. II. The Act prohibited the Nuclear Regulatory Commission ("NRC") from issuing or renewing licenses to utilities that had not "entered into a [Standard Contract] with the Secretary" or who were not "actively and in good faith negotiating with the Secretary for a contract," effectively making such contracts mandatory for the industry. Me. Yankee Atomic Power Co. v. United States, 225 F.3d 1336, 1337 (Fed. Cir. 2000). As a result, the entire nuclear electric industry entered into individual contracts with the Government for the disposal of spent nuclear fuel. See NWPA § 10222(b)(1)(A)(i)-(ii); see also Maine Yankee, 225 F.3d at 1337.

Pursuant to the Standard Contract, DOE is responsible for taking title to the utilities' spent nuclear fuel and transporting the spent nuclear fuel to its facility, and each utility is responsible for preparing and loading the spent nuclear fuel for transportation. JX 1, Art. IV.A.2, B.1-2.; see also Energy Nw. v. United States, 641 F.3d 1300, 1302-03 (Fed. Cir. 2011) ("Energy Northwest III"). The Standard Contract provides:

> The Purchaser [the utility] shall arrange for, and provide, all preparation, packaging, required inspections, and loading activities necessary for the transportation of [spent nuclear fuel] and/or [high-level radioactive waste] to the DOE facility.

JX 1, Art. IV.A.2(a).

The Standard Contract further provides:

> DOE shall arrange for, and provide, a cask(s) and all necessary transportation of the SNF and/or HLW [high-level radioactive waste] from the Purchaser's site to the DOE facility. Such cask(s) shall be furnished sufficiently in advance to accommodate scheduled deliveries. Such cask(s) shall be suitable for use at the Purchaser's site, meet applicable regulatory requirements, and be accompanied by pertinent information including, but not limited to, the following:
>
> (a) written procedures for cask handling and loading, including specifications on Purchaser-furnished cannisters for containment of failed fuel;
>
> (b) training for Purchaser's personnel in cask handling and loading, as may be necessary;
>
> (c) technical information, special tools, equipment, lifting trunnions, spare parts and consumables needed to use and perform incidental maintenance on the cask(s); and

(d) sufficient documentation on the equipment supplied by DOE.

JX 1, Art. IV.B.2.

The Standard Contract did not set forth the rates at which, or the order in which, DOE would accept spent nuclear fuel from nuclear facilities. Instead, the contract required DOE to issue annual capacity reports ("ACRs") to establish how much fuel DOE was obligated to accept each year, and annual priority rankings to establish the order in which DOE would allocate the projected capacity across the nuclear facilities. Id. at Art IV.B.5(b). Pursuant to the Standard Contract, DOE issued its first report on the acceptance rate in June 1987, and subsequent reports in June 1988, December 1990, and December 1991. The Federal Circuit later designated the 1987 Annual Capacity Report as the official report on SNF acceptance rates for calculating rate commitments and damages because it more accurately depicted the parties' intent for complete contract performance. See Yankee Atomic Elec. Co. v. United States, 536 F.3d 1268, 1274 (Fed. Cir. 2008). The 1987 Annual Capacity Report included DOE's spent nuclear fuel acceptance rates for the first 10 years of DOE's SNF acceptance - - from 1998 through 2007. Additionally, as stated in the Standard Contract, the spent nuclear fuel acceptance priority among contract holders was on an "oldest fuel first" basis - - determined by the date of permanent fuel discharge from a licensee's nuclear power plant. JX 1, Art. VI.B.1(a).

On August 28, 1984, Plaintiffs entered into a contract with DOE to collect and dispose of spent nuclear fuel at River Bend Nuclear Generating Station ("River Bend") beginning in 2006. Second Am. Compl. ¶ 9; see JX 1. The Purchaser listed in the Standard Contract was Gulf States Utility - - Entergy Gulf States' name at the time the parties signed the Standard Contract. Second Am. Compl. ¶ 2, n.3.

DOE's Partial Breach of the Standard Contract

In 1987, Congress amended the NWPA to require DOE to develop only one permanent geologic repository for nuclear waste - - Yucca Mountain in Nevada - - and to forbid DOE from constructing an interim storage facility until the NRC authorized the permanent facility. Nuclear Waste Policy Amendments Act of 1987, Pub. L. No. 100-203, §§ 5001-65, 101 Stat. 1330, 1330-227 (codified at NWPA § 10172(a)-(b)). On February 17, 1993, DOE issued a statement asserting that it did not have a legal obligation to accept spent nuclear fuel prior to the operation of a permanent fuel repository. Sys. Fuels, Inc. v. United States, 125 Fed. Cl. 331, 336 (2016). At this point, the utilities estimated that DOE would not have a functioning repository until 2010. Id.

On April 28, 1995, DOE issued its "Final Interpretation" of its obligation under the Standard Contract that it would not begin accepting spent nuclear fuel by the January 31, 1998 deadline and did not have an unconditional obligation to commence performance on that date. Office of Civilian Radioactive Waste Mgmt; Nuclear Waste Acceptance Issues, 60 Fed. Reg. 21,793, 21,794-95 (May 3, 1995). Utilities challenged this Final Interpretation in the United States Court of Appeals for the District of Columbia ("D.C. Circuit"). Ind. Mich. Power Co. v. Dep't of Energy, 88 F.3d 1272, 1274 (D.C. Cir. 1996). Finding that the NWPA created an unconditional obligation for DOE to commence acceptance of spent nuclear fuel by 1998, the D.C. Circuit vacated and remanded DOE's Final Interpretation. Id. at 1277.

Nevertheless, DOE notified utilities that it would not timely accept spent nuclear fuel because it was bereft of a permanent or temporary repository. DOE asserted that under Article IX of the Standard Contract, the "unavoidable delays" clause, its delay in collecting SNF was not compensable. Utilities subsequently petitioned the D.C. Circuit for review and a writ of mandamus to compel DOE to fulfill its statutory obligation. In Northern States Power Co. v. United States Department of Energy, the D.C. Circuit reaffirmed that DOE had an unconditional obligation to accept spent nuclear fuel by 1998, and issued a limited writ of mandamus "precluding DOE from advancing any construction of the Standard Contract that would excuse its delinquency on the ground that it has not yet established a permanent repository or an interim storage program." 128 F.3d 754, 756 (D.C. Cir. 1997). This order did not require specific performance or impose any contractual remedies, which remained within the purview of the United States Court of Federal Claims. Neb. Pub. Power Dist. v. United States, 590 F.3d 1357, 1376 (Fed. Cir. 2010) (en banc). The Federal Circuit later afforded this ruling res judicata effect on the issue of liability. Id. at 1363-65, 1376.

On August 31, 2000, the Federal Circuit held that the Government breached every Standard Contract it had entered into upon failure to commence the collection of spent nuclear fuel on January 31, 1998. Maine Yankee, 225 F.3d at 1342-43. This failure to begin collecting spent nuclear fuel in 1998 constitutes a partial breach of the Standard Contract. Yankee Atomic, 536 F.3d at 1280.

Nevertheless, the Government has continued to push back the date it would collect and dispose of spent nuclear fuel, and in the Fiscal Year 2010 federal budget, announced that the program to construct a federal repository for spent nuclear fuel disposal at Yucca Mountain was terminated. The Government continued to collect the fees required by the Standard Contract from the utilities until November 19, 2013, when the D.C. Circuit ordered the Secretary of Energy to submit a proposal to Congress to change the fee to zero. See Nat'l Ass'n of Regulatory Util. Comm'rs v. U.S. Dep't of Energy, 736 F.3d 517, 521 (D.C. Cir. 2013). Plaintiffs allege that they paid more than $152.5 million into the Nuclear Waste Fund as of December 31, 2010. Second Am. Compl. ¶ 9.

River Bend Power Plant

River Bend is a boiling water reactor ("BWR") located in Saint Francisville, Louisiana. The NRC issued an operating license to River Bend in November 1985. Id. at ¶ 2. A BWR produces electricity by using the heat generated by nuclear reactions within the reactor core to convert water to steam, which is passed through a series of turbines to produce electricity. Tr. 160, 1677. River Bend's nuclear reactor holds 624 fuel assemblies. Id. at 114. A fuel assembly is a group of approximately 14-foot zirconium rods that contain uranium fuel pellets. Id. at 50, 160-61. Every 24 months, River Bend must replace one-third to one-half of the fuel assemblies in the reactor to remove spent fuel and load new fuel. Id. at 51. The reactor cannot continue to generate electricity if spent fuel is not unloaded. Id.

The spent fuel assemblies are stored underwater in stainless-steel racks in a spent fuel pool. Id. at 560. Spent fuel must be kept underwater because it contains highly radioactive fission products. Id. at 51-52. River Bend has two pools for underwater or "wet" spent fuel storage: the main spent fuel pool and a second "upper" pool used for full core off-loads. Id. at 560. The main spent fuel pool is connected to a third, separate pool by a gated channel. Id. at

576. This third pool, called the "cask pool," is used to load spent fuel assemblies into casks for storage or transportation. The cask pool has two levels of elevation, or "shelves" - - the upper shelf, which is at a depth of 20 feet, and the lower shelf, which is at a depth of 43 feet. Id. at 1121; PDX 30.

River Bend is equipped with a cask handling crane located in the eastern end of the fuel handling building. PX 29 at 9.1-39. This cask handling crane, which was included in the plant's original design, is capable of lifting 125 tons on its main hook and travels in a north-south direction. Id. The crane was designed to be operated from an operator's cab built under the main trolley. Id. The primary function of the cask handling crane is to lift and transfer spent fuel transportation casks. Id.

In 1999, upon realizing that DOE would not begin collecting spent fuel by 2006, Plaintiffs began evaluating options to increase the capacity of the River Bend spent fuel pool. Tr. 559-60. River Bend forecasted running out of storage space in its spent fuel pool by 2006. PX 320 at 8599. Plaintiffs considered several options, including reracking the upper pool, reracking the main pool, fuel consolidation, extending the storage pool, and dry fuel storage, and ultimately determined that dry fuel storage was the most prudent route. Id. at 8600-05. Dry fuel storage is "a method of spent fuel storage that removes older spent fuel from the pool and stores it in metal canisters with a concrete overpack. This method permanently removes the fuel from the pool enabling continued operation without modifications to the pool or its associated systems." Id. at 8604. Plaintiffs increased their storage capacity by designing, constructing, and operating a 10 C.F.R. Part 72 storage facility, otherwise known as an Independent Spent Fuel Storage Installation ("ISFSI"), which was ready for use in 2005.[5] Tr. 1380.

Plaintiffs selected Holtec International ("Holtec") to supply the cask system that Plaintiffs used for dry fuel storage. Id. at 93. Specifically, Holtec supplied Plaintiffs with the HI-STORM 100 MPC-68 cask system.[6] Id. at 1574. The HI-STORM overpack is a steel shell filled with concrete that holds the Multi-Purpose Canister - - a steel enclosure with a welded lid that holds 68 spent fuel assemblies - - and provides radiation shielding and protection. Id. at 131, 204. The HI-STORM lid is also made of steel and concrete and is bolted to the body of the HI-STORM. PX 63 at 1.2-6-7. The HI-TRAC is used inside the fuel handling building to protect the Multi-Purpose Canister while it is being moved into the cask storage area to be loaded with fuel. The HI-TRAC is also used to transfer the Multi-Purpose Canister into the HI-STORM. Id. at Table 1.0.1. The HI-TRAC has lifting trunnions that attach to a device called a lift yoke, which can be attached to the fuel handling building's cask handling crane. Tr. 173. Another feature of the HI-TRAC is a removable "pool lid" bottom that allows the Multi-Purpose Canister to be moved out of the HI-TRAC and into the HI-STORM. Id. Plaintiffs use their existing cask handling crane to lift and move the Holtec casks during loading operations. PX 3 at 15.

During the claim period, Plaintiffs procured a total of 15 Holtec HI-STORM 100 MPC-68 dry fuel storage casks. Tr. 136-37. In December of 2005, Plaintiffs loaded the first dry cask

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[5] The NRC regulations at 10 C.F.R. Part 71 govern the transportation of nuclear fuel, while Part 72 governs the storage of spent fuel.

[6] HI-STORM is an acronym for Holtec International storage module. Tr. 131.

with fuel from the pool, and subsequently loaded two more casks in 2006. PX 126. In addition, Plaintiffs loaded four casks in 2007, another four casks in 2008, and four more casks in 2010. Id.

Discussion

Damages for Partial Breach of Contract

The remedy for breach of contract is an award of "damages sufficient to place the injured party in as good a position as it would have been had the breaching party fully performed." Indiana Michigan Power Co., 422 F.3d at 1373. Mitigation damages are intended to reimburse a non-breaching party for the expenses it incurred in attempting to rectify the injury caused by the breach. In particular, mitigation damages are available to compensate plaintiffs for "efforts to avoid damages in contemplation of a partial breach." Id. at 1375 ("Mitigation is appropriate where a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage."); see generally Restatement (Second) of Contracts § 347 cmt. c (Am. Law Inst. 1981) ("[T]he injured party is entitled to recover for all loss actually suffered . . . includ[ing] costs incurred in a reasonable effort, whether successful or not, to avoid loss."). Damages should not place the non-breaching party "in a better position . . . than if there had been no breach." Bluebonnet Sav. Bank, FSB v. United States, 339 F.3d 1341, 1345 (Fed. Cir. 2003) (per curiam); see also San Carlos Irrigation & Drainage Dist. v. United States, 111 F.3d 1557, 1563 (Fed. Cir. 1997). Damages for a breach of contract are recoverable if they were reasonably foreseeable, were substantially caused by the breach, and are shown with reasonable certainty. Indiana Michigan Power Co., 422 F.3d at 1373. In an action for partial breach of contract, any damages claimed must be reasonably foreseeable by the defendant at the time the contract was executed. See Citizens Fed. Bank v. United States, 474 F.3d 1314, 1321 (Fed. Cir. 2007); see also Indiana Michigan Power Co., 422 F.3d at 1373.

Plaintiffs may recover damages for partial breach of the Standard Contract if they can show that "but for the breach, the alleged damages would not have been suffered." San Carlos Irrigation & Drainage Dist., 111 F.3d at 1563. The Federal Circuit has expressed a preference for this traditional "but-for" test in spent nuclear fuel cases. See Yankee Atomic, 536 F.3d at 1272-73. Although a plaintiff must show that the claimed losses "would not have occurred but for the breach," the breach need not be the sole cause of the incurred damages. Cal. Fed. Bank v. United States, 395 F.3d 1263, 1268 (Fed. Cir. 2005); Anchor Sav. Bank, FSB v. United States, 81 Fed. Cl. 1, 60 (2008).

In order to establish that the breach caused their damages, Plaintiffs must present a "comparison between the breach and non-breach worlds." Yankee Atomic, 536 F.3d at 1273. The plaintiff bears the burden of proving "the extent to which his incurred costs differ from the costs he would have incurred in the non-breach world." Energy Northwest III, 641 F.3d at 1306. Therefore, "a plaintiff seeking damages must submit a hypothetical model establishing what its costs would have been in the absence of breach." Id. at 1305 (citing Glendale Fed. Bank, FSB v. United States, 239 F.3d 1374, 1380 (Fed. Cir. 2001) ("Glendale I")). "It is only by comparing this hypothetical 'but-for' scenario with the parties' actual conduct that a court can determine what costs were actually caused by the breach, as opposed to costs that would have been incurred anyway." Id. (citing Glendale I, 239 F.3d at 1380); see also Yankee Atomic, 536 F.3d at 1273.

To show damages with reasonable certainty "it is not essential that the amount [of damages] be ascertainable with absolute exactness or mathematical precision: 'It is enough if the evidence adduced is sufficient to enable a court or jury to make a fair and reasonable approximation.'" Bluebonnet Sav. Bank, FSB v. United States, 266 F.3d 1348, 1355 (Fed. Cir. 2001) (quoting Elec. & Missile Facilities, Inc. v. United States, 189 Ct. Cl. 237 (1969)). Recovery for speculative damages is precluded. Indiana Michigan Power Co., 422 F.3d at 1373; see also Glendale Fed. Bank, FSB v. United States, 378 F.3d 1308, 1313 (Fed. Cir. 2004).

"[T]he defendant may eliminate or reduce the alleged damages by showing either that the '[p]laintiffs did not undertake reasonable mitigation efforts, or that the efforts they did undertake were unreasonable.'" Entergy Nuclear Vt. Yankee, LLC v. United States, 95 Fed. Cl. 160, 184 (2010), aff'd in part, rev'd in part on other grounds sub nom. Vt. Yankee Nuclear Power Co. v. Entergy Nuclear Vt. Yankee, LLC, 683 F.3d 1330 (Fed. Cir. 2012) ("Vermont Yankee I") (citing Carolina Power & Light Co. v. United States, 82 Fed. Cl. 23, 44 (2008)) (alteration in original).

Categories of Challenged Damages

Defendant asserts that Plaintiffs' claimed damages of $49,687,975 should be reduced by the following unrecoverable costs:

1) $3,122,653 for site modifications to handle a heavy load;
2) $1,075,196 for site modifications to handle a dry storage cask;
3) $5,702,669 for cask loading costs;
4) $267,289 in payroll loader costs;
5) $98,548 in materials loader costs;
6) $210,444 in allegedly unsupported costs;
7) $1,644,251 in additional security costs; and
8) $1,586,586 in NRC Part 171 fees.

The parties stipulated that, except for the category of allegedly unsupported costs, Plaintiffs' damages claims are "supported by adequate contemporaneous documentation to demonstrate that such costs were incurred for the particular activity to which they have been assigned in Plaintiffs' accounting system." Joint Stip. ¶ 4.

Site Modifications to Handle a Heavy Load

In order to implement dry storage, Plaintiffs made certain modifications to the plant equipment and fuel handling building, including site modifications to handle a heavy load and site modifications to handle a Holtec cask. Defendant contests $3,122,653 in costs that Plaintiffs incurred for modifications to the River Bend plant to handle heavy loads. These modifications entailed:

1) Updating River Bend's safety analysis report;

2) Performing a cask drop analysis;

3) Purchasing and installing impact limiters and redundant rigging;

4) Performing a seismic analysis of the cask handling crane;

5) Performing "commercial grade dedication," or special quality control tests, to River Bend equipment;

6) Procuring a cask lift yoke extension; and

7) Installing a remote control system for operation of Plaintiffs' fuel handling building cask handling crane.

Defendant contends that Plaintiffs would have made these modifications in the non-breach world.

Plaintiffs' Updated Safety Analysis Report, Cask Drop Analysis, Impact Limiters and Redundant Rigging

Plaintiffs seek $1,680,170 for costs incurred to amend their Updated Safety Analysis Report (USAR), perform a cask drop analysis, and purchase and install impact limiters and redundant rigging at River Bend in 2005.[7] Plaintiffs argue that they undertook these activities to accommodate the Holtec cask system but that these activities would not have been necessary if an NRC-licensed transportation cask had been provided by DOE. The parties agreed that these three activities should be analyzed together for the purpose of assessing damages. Joint Stip. ¶ 6(a).

USAR

The USAR is the original licensing basis document for the plant. The USAR contains descriptions of the plant's design and equipment, and any calculations and analyses supporting the plant's compliance with governing NRC regulations and recommendations. Tr. 1747. When Plaintiffs implemented dry storage at River Bend, they submitted an application to update their USAR so that their license would reflect that no drop of a Holtec cask would have unacceptable consequences on the integrity of the fuel, the structure of the cask, or the structure of the plant itself. Plaintiffs updated their license in accordance with NUREG-0612, the NRC guideline that governs control of "heavy loads" - - including spent fuel casks and cask lids - - at nuclear power plants. Id. at 586. Specifically, NUREG-0612 provides that a plant can demonstrate its ability to handle a "heavy load" by testing the consequences of a cask drop on the equipment and structures that effectuate a safe shutdown of the nuclear reactor. DX 3 at 5.1.1. The parties referred to this equipment alternately as "safe shutdown equipment," "safety-related equipment," or "safety-related structures, systems, and components." See, e.g., Tr. 605, 650, 1720.

NUREG-0612 provides that a nuclear plant can demonstrate compliance either by lifting a heavy load using a single-failure-proof crane, or by installing appropriate safety equipment

[7] The parties stipulated that Plaintiffs' claim for these activities consists of $1,680,170 in adequately supported costs plus $138,984 in allegedly unsupported costs. Joint Stip. ¶¶ 4, 6(a).

where a cask drop analysis indicated that a drop of the cask would cause damage to the cask, fuel, or "safety related equipment" of the plant.[8] Id. at 1723; JX 26, Attach. 4 at 1. Plaintiffs' cask handling crane is not single-failure-proof. JX 26, Attach. 1 at 1. Plaintiffs chose not to upgrade the existing cask handling crane to make it single-failure-proof, but instead updated their USAR by performing a cask drop analysis for a Holtec cask. Id. Based on the results of that cask drop analysis, Plaintiffs employed mitigation measures - - installing impact limiters in two places in the plant and attaching redundant rigging links to the cask handling crane where necessary. Tr. 1111-14.

Cask Drop Analysis

Plaintiffs performed a cask drop analysis in 2005, to evaluate potential drops of a Holtec cask in support of their application to amend their USAR. To qualify for their original operating license, Plaintiffs had conducted an original cask drop analysis in 1985, to determine the effect that a dropped transportation cask would have on their plant structure at three locations along the haul path. Id. at 1773. This 1985 cask drop analysis assumed a hypothetical drop of a transportation cask with a diameter of 10 feet, weighing between 75 and 125 tons. PX 871 at 1202-03. The conclusion of the 1985 cask drop analysis was that a drop of a 10 C.F.R. Part 71 certified DOE transportation cask within these dimensions would not have caused unacceptable damage to either the fuel or the plant's structure and equipment. PX 29 at 9.1-70. Plaintiffs used the results of this cask drop analysis to substantiate the statement made in their USAR that the River Bend fuel handling building design was based upon a cask with the approximate dimensions of 12 feet in diameter and 18 feet in length, with a maximum loaded weight of approximately 125 tons. PX 3 at 19. Despite the apparent discrepancy between the diameters of the hypothetical casks in the 1985 cask drop analysis and the hypothetical cask in Plaintiffs' USAR, the NRC approved River Bend to handle heavy loads based on the 1985 cask drop analysis. PX 230.

The 1985 cask drop analysis did not address potential drops of the Holtec cask or the Holtec cask lid over sensitive plant equipment. Tr. 605. Although the total weight of a loaded Holtec cask and lid did not exceed 125 tons - - the maximum weight Plaintiffs' existing cask handling crane could handle - - Ms. Eve Clevenger,[9] a senior engineer at River Bend, and Ms. Eileen Supko,[10] Plaintiffs' technical expert, explained that the HI-STORM system is more

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[8] Single-failure-proof means that the crane is made so that no single component could fail and allow the load to drop. Tr. 1108.

[9] Ms. Clevenger is employed by Entergy Operations, Inc. as a senior engineer and has worked in this position since 2005. Id. at 536-37. Ms. Clevenger began working at the River Bend plant in 1992, as an engineer in the licensing department. Id. at 540.

[10] Ms. Supko was qualified as an expert in nuclear fuel management, spent nuclear fuel storage and transportation, and associated nuclear plant modifications and regulatory requirements. Id. at 1079. Ms. Supko is currently employed as the president of Energy Resources International ("ERI"), a nuclear fuel cycle consulting company. Id. at 1048. She received a bachelor of science in nuclear engineering from Pennsylvania State University in 1985, and worked as a fuel projects engineer and in-core analysis engineer for the Carolina

vulnerable than a shipping or transportation cask. Id. at 593, 605-06, 1183, 1194-95. As Ms. Clevenger testified, "[t]he HI-TRAC is not as robust as a transportation cask. It can't take that high of a drop. It would damage the cask itself." Id. at 593. In a similar vein, Ms. Supko testified that "the HI-TRAC transfer cask is not a transportation cask and . . . can't . . . necessarily withstand certain drops because of . . . the way that it is designed. It's not meant to . . . withstand the same kinds of drops as a transportation cask." Id. at 1194-95. As a result, Plaintiffs had to conduct an additional cask drop analysis to determine how a Holtec cask and its fuel would be affected if that cask were dropped. Id. at 238-39.

Ms. Clevenger testified that Plaintiffs had not performed this analysis as part of their original USAR, because in the non-breach world, DOE would have supplied Plaintiffs with a 10 C.F.R. Part 71 transportation cask that was required under NRC regulations to be capable of withstanding a 30-foot drop onto an unyielding surface without damage to the cask or the fuel. Id. at 584-85. As such, Plaintiffs had to update their USAR to reflect their ability to lift a Holtec cask without an accidental drop damaging the fuel, the cask, or the plant.

Upon conducting a cask drop analysis for the Holtec cask system, Plaintiffs discovered that there were two points along the haul path where the drop of a Holtec cask would cause an unacceptable amount of damage to the cask and the fuel inside, requiring Plaintiffs to install impact limiters and redundant rigging. Id. at 587-88.

Impact Limiters and Redundant Rigging

Because there was insufficient room to install impact limiters along the entirety of the haul path, Plaintiffs installed impact limiters at the points of the biggest drops: in the lower shelf of the cask pool and at the bottom of the cask washdown pit. Id. at 1103. Impact limiters are rectangular cushioning devices made of energy-absorbing material that are used to protect a surface from a drop or sudden deceleration. Id. at 202, 207. Because a Holtec cask is generally not as robust as a transportation cask, the impact limiters function to "absorb or cushion the drop" of the cask to avoid damaging the fuel inside the cask. Id. at 207.

Where Plaintiffs were not able to install impact limiters, they attached "redundant rigging" links to their cask handling crane. Redundant rigging links are load-bearing structural connections capable of holding the full 125-ton load of the crane in the event the crane is unable to hold the load. JX 22 at 9151. Redundant rigging effectively makes the River Bend cask-handling crane temporarily single-failure-proof while the links are engaged. Tr. 1113.

Defendant contends that Plaintiffs would have incurred the costs for amending the USAR, performing a cask drop analysis, and installing impact limiters and redundant rigging in the non-breach world and challenges Plaintiffs' model of the non-breach world for three reasons.

Power & Light Company. Id. at 1048-49; PX 3 at B-4. Ms. Supko began working for ERI in 1990, as a consultant. Tr. 1048; PX 3 at B-3. Ms. Supko provides consulting services associated with nuclear fuel management, spent nuclear fuel management, radioactive materials and spent fuel transportation, and radioactive materials and spent fuel disposal. Tr. 1052. From 1990 to 2004, Ms. Supko "was a direct participant in technical exchanges between the nuclear industry and DOE . . . ." PX 1 at 3.

First, Defendant argues that Ms. Supko failed to evaluate whether any of the DOE-supplied casks that she identified as "suitable for use" at the River Bend plant would fall within the parameters of the 1985 cask drop analysis. According to Ms. Supko, River Bend's licensing documents certified that River Bend could handle up to an 18-foot long, 125-ton transportation cask with a 12-foot diameter without the need for facility modifications or revisions to the plant license - - including the 1985 cask drop analysis. PX 3 at 11-12. Ms. Supko opined that in the non-breach world, Defendant would have brought a Part 71-certified transportation cask to River Bend that met the cask parameters in River Bend's USAR and identified four examples of such DOE-supplied transportation casks. Id.

Defendant points out that, while the River Bend USAR reflects that the plant is licensed to handle a transportation cask of up to 12 feet in diameter, the 1985 cask drop analysis used a hypothetical cask with a diameter of 10 feet. Defendant appears to argue that the discrepancy between the cask diameter described in the USAR - - a maximum of 12 feet - - and the cask diameter tested in the 1985 cask drop analysis - - 10 feet - - somehow created an obligation for Plaintiffs to evaluate any cask with a diameter of less than 12 feet against the 1985 cask drop analysis. In her expert report, Ms. Supko identified four possible transportation casks that DOE could have brought to River Bend in the non-breach world, all of which had a diameter of less than 12 feet. PX 3 at 12. Defendant contends that because Ms. Supko did not evaluate these four hypothetical casks against the 1985 cask drop analysis, Plaintiffs have not proven that the River Bend license covers a drop of a transportation cask with a diameter of less than 10 feet. As such, Defendant contends that Plaintiffs would need to conduct additional analyses and plant modifications to safely load casks in the non-breach world. Id. at 14. However, Defendant cites no evidence supporting its speculation that the 10-foot diameter casks would not fall within the River Bend design basis.

In contrast, Ms. Clevenger testified:

> Q: If the cask were smaller in diameter, would the River Bend design basis still bound the handling of that cask?
>
> A: Yes.
>
> Q: Why?
>
> A: Because of the way the analysis is done. The diameter of the cask is insignificant compared to the design of the facility. We have a lot of margin in our concrete. We put a lot of concrete into the fuel building. It's designed with a large factor of safety. You only get one shot at pouring your concrete and, so, you want to make sure that there's no future concerns with that.

Tr. 585-86.

Given this testimony and the record as a whole, Defendant's vague suggestion that Plaintiffs would be required to conduct additional cask drop analyses in the non-breach world is not borne out by the record. Moreover, as Plaintiffs argue, because DOE agreed to supply a transportation cask "suitable for use" at River Bend under the Standard Contract, Plaintiffs would not have needed to amend the plant's licensing basis or make modifications to the structure of the plant in the non-breach world. JX 1, Art. III.B.1. Plaintiffs argue that the

Standard Contract term "suitable for use" means that the transportation cask may be used without modifications to the site. In support of this interpretation, Plaintiffs rely on the testimony of Mr. Frank Rives,[11] Entergy's manager for the Standard Contract, who testified that a cask "suitable for use" at River Bend is one that "does not require plant modifications, does not require - - it doesn't require to add things, to change things at the site in order to deal with it." Tr. 78. To that end, Ms. Supko opined that DOE would have been able to select one of at least four transportation casks that were suitable for use at the River Bend site and also fell within the cask handling parameters identified in River Bend's licensing basis. PX 3 at 12.

The Court credits Mr. Rives' testimony that a cask that is "suitable for use" does not require plant modifications, as well as Ms. Supko's opinion that a DOE-supplied transportation cask "suitable for use" at River Bend would not have required Plaintiffs to make revisions to the plant license or facility modifications. Id. at 19; Tr. 78; see also Ala. Power Co. v. United States, 119 Fed. Cl. 615, 634 (2014) ("The term 'suitable for use,' read along with the government's obligation to provide equipment 'needed to use' the casks, implies that the casks chosen would not require major building renovations.") (alteration in original). As a result, Plaintiffs would not have needed to conduct an additional cask drop analysis or install impact limiters or redundant rigging or amend their USAR in the non-breach world.

Second, Defendant argues that Ms. Supko's opinion is flawed because she misunderstood that there were "no safety related structures, systems, or components in the [cask's] load path associated with cask loading operations," and she erroneously concluded that "[t]herefore, the [1985] load drop analysis concerns only the impacts of a drop on the cask and its contents." PX 3 at 19; Def.'s Post-Trial Br. 15. However, the record indicates that there are two safety-related structures - - one safety-related pipe and some safety-related electrical cables that run underneath the floor of the cask washdown pit, which are on the cask's haul path during loading operations. Tr. 649-50. According to Defendant, this mistake led Ms. Supko to conclude erroneously that Plaintiffs would not have been required to analyze the effect of a cask drop on the plant itself in the non-breach world.

However, regardless of whether the cask's haul path traverses safe shutdown equipment, Plaintiffs' witnesses testified that a drop of a DOE-supplied transportation cask would not cause unacceptable harm to any of the plant's safe shutdown structures or equipment. Mr. Jerrell Campbell,[12] a senior project manager for Plaintiffs, credibly testified that, based on his review of the 1985 cask drop analysis, the River Bend plant "was designed to handle the drop of a cask weighing up to 125 tons, or 250,000 pounds, without damage to the structures underneath." Id. at 414. Ms. Eve Clevenger, a senior engineer, elaborated:

> Our [1985 cask drop] analysis showed that the floor was unaffected and that the structure in the bottom of the cask washdown pit -- that the drop onto the bottom

[11] Mr. Rives is employed by Entergy Services, Inc. as the Director of Nuclear Fuels and has worked in this position for approximately 27 years. Tr. 46-48. Mr. Rives is the contract manager for Entergy's contracts with DOE. Id. at 48.

[12] Mr. Campbell is employed by Entergy Operations, Inc. as the senior project manager for dry fuel storage and has worked in this position since 2003. Id. at 97. Mr. Campbell has worked at the River Bend plant since 1979. Id.

> of the cask washdown pit was acceptable. Why would we need to analyze something past that? If the cask can't damage the floor, there's no way it can get to the pipe tunnel below or affect any of that equipment below.

Id. at 652.

The Court credits Ms. Clevenger's and Mr. Campbell's testimony that, since the original cask drop analysis showed that the floor of the cask washdown pit would be unaffected by a transportation cask drop, Plaintiffs would have no reason to analyze whether a transportation cask drop could damage equipment underneath the floor. Id. at 414, 652. Ms. Supko's misunderstanding that there were no safe shutdown components along the cask's haul path does not affect her conclusion that the drop of a DOE-supplied transportation cask would have acceptable results at the River Bend plant. Thus, Plaintiffs would not have had to conduct additional cask drop analyses in the non-breach world to test the effects of a drop on the safe shutdown equipment.

Third, Defendant argues that Ms. Supko's non-breach world model is flawed because Plaintiffs would be required in the non-breach world to conduct a cask drop analysis to account for the consequences of a transportation cask drop when the cask is not in its transportation ready configuration. The parties do not dispute that DOE would have provided Plaintiffs with a Part 71-certified transportation cask in the non-breach world. Id. at 556, 1848. However, Defendant submits that a transportation cask's Part 71 certification only addresses the effects of a cask drop on the fuel and the cask itself when the cask is in its "transportation ready configuration" - - that is, when the cask lid is closed and bolted, with all cask closures secured and any DOE-supplied impact limiters installed. The parties do not dispute that, in the non-breach world, the Part 71-certified, DOE-supplied transportation cask would not be in the transportation ready configuration throughout the loading process at River Bend. Id. at 1243; DX 98 at 7.

Defendant contends that it would be Plaintiffs' responsibility to ascertain that no drop of a DOE-supplied transportation cask from the cask handling crane would unacceptably damage the cask itself or the fuel inside the cask. In support of its argument, Defendant cites a 1999 NRC Information Notice stating: "[w]hen a cask is moved in other than the transportation ready configuration, a plant-specific analysis would be necessary to determine that the consequences [to the cask and fuel] are bounded by the current design basis of the plant." DX 23 at 0359. Defendant relies on the interpretation of its technical expert, Mr. Warren Brewer,[13] that "the Part 71 licensing analysis done is not done for the cask being other than a transportation ready configuration. So, again, the analysis of Part 71 is . . . an analysis of the cask in its transportation ready configuration. Any other configuration has not been demonstrated . . . ." Tr. 1745. Thus, Defendant argues that a plant cannot rely on a DOE-supplied transportation cask's Part 71 certification to satisfy the requirements of NUREG-0612 and must conduct its own analysis of

[13] Mr. Brewer was qualified as an expert in nuclear engineering, including nuclear power plant systems, operations, regulations, and modifications. Id. at 1709-10. Mr. Brewer has a master of science degree in nuclear engineering from Massachusetts Institute of Technology, and a bachelor of science degree in electrical engineering from Louisiana Tech University. Id. at 1675. He also completed a course of study at the Bettis Reactor Engineering School. Id. Mr. Brewer has worked in the nuclear industry for approximately 40 years. Id. at 1676. He is a founder and owner of ABZ, Inc., an engineering management consulting company. Id. at 1675.

the impact of a transportation cask drop on the fuel and the cask itself when the cask is not in the transportation ready configuration.

In response, Plaintiffs state, "[u]nder the Standard Contract, DOE would have brought a cask to River Bend that was suitable for the River Bend site and thus was within River Bend's original licensing basis and would not require Plaintiffs to conduct additional cask drop analyses." Pls.' Post-Trial Reply 16. The Court agrees. Defendant attempts to impose too heavy a burden on Plaintiffs in using a DOE-supplied transportation cask when it was DOE's responsibility under the Standard Contract to provide a transportation cask that had features that fell within the cask handling parameters identified in River Bend's USAR and that was suitable for use at River Bend.

Plaintiffs are awarded $1,680,170 for costs incurred to amend their Updated Safety Analysis Report (USAR), perform a cask drop analysis, and purchase and install impact limiters and redundant rigging.

Seismic Analysis of Plaintiffs' Cask Handling Crane

Plaintiffs claim $361,845 for correcting an error in the original seismic analysis that they performed on their cask handling crane to determine the effect of an earthquake on cask loading operations.[14] Tr. 36.

In 2005, in preparation for implementing the dry fuel storage system at River Bend, Plaintiffs conducted a comprehensive review of River Bend's original design and construction documents. JX 22 at 9147. During their review, Plaintiffs discovered that the seismic analysis included in the plant's original design documents analyzed the effect of an earthquake on the cask handling crane without a load hanging from the hook. Id. at 9149. Although the NRC did not require Plaintiffs to have documentation proving that their cask handling crane could hold a cask during an earthquake, Plaintiffs were concerned that if a loaded cask fell from a crane during an earthquake, any leaking fuel could potentially release radiation into the plant. Tr. 594, 612. Therefore, Plaintiffs redid their seismic analysis. Id. at 613. In Ms. Clevenger's words, Plaintiffs redid their seismic analysis because "[i]t provided additional assurance to the regulator that the crane was suitable" for lifting dry fuel storage casks. Id. As a result of this seismic analysis, Plaintiffs concluded that two structural welds on their cask handling crane had to be upgraded to hold a dry storage cask during an earthquake. Id. at 612-13. Plaintiffs therefore upgraded the two welds on their crane where the main girt is attached to the two end trucks. JX 22 at 9149.

Plaintiffs contend that they would not have performed a new seismic analysis or upgraded the two welds in the non-breach world because River Bend's original 1985 cask drop analysis accounted for the drop of a Part 71-certified transportation cask during an earthquake. Thus, if Defendant provided a transportation cask "suitable for use" at River Bend, Plaintiffs would not have needed to review the seismic qualifications of the crane. Tr. 611-12.

[14] The parties stipulated that Plaintiffs' claim for performing the seismic analysis calculations and replacing two welds in the cask handling crane consists of $361,845 in adequately supported costs, plus $6,557 in allegedly unsupported costs. Joint Stip. ¶¶ 4, 6(b).

Defendant argues that Plaintiffs would have re-performed the seismic analysis in the non-breach world because the River Bend USAR contains a statement that Plaintiffs' cask crane is seismically qualified, and Plaintiffs would have needed to bring their crane into compliance with their USAR. Defendant points to Plaintiffs' March 8, 2005 License Amendment Request to the NRC, in which Plaintiffs identify the deficiency in their original cask crane analysis, stating:

> During the review of design documents for the [River Bend Site] dry cask storage project it was discovered that the seismic analysis was performed with no load on the crane hook. This is contrary to the [River Bend Site] USAR, which states that the crane is qualified to maintain the load during a design basis seismic event. This issue was entered into the [River Bend Site] corrective action system and a re-analysis was performed which concluded that, with the exception of two welds, the crane system is qualified to hold the maximum critical load during a design basis seismic event.

JX 22 at 9149 (emphasis added). According to Defendant, this statement shows that Plaintiffs performed the corrected analysis and modified the welds for the specific purpose of bringing the crane into compliance with the statements in the River Bend USAR, which would have been necessary in the non-breach world as well. Defendant ignores the fact that Entergy was reviewing documents for "the dry cask storage project," and in doing so, unearthed an erroneous representation in their USAR. In Plaintiffs' view, this erroneous statement was not required for a compliant design and could have simply been removed.

The record demonstrates that if Plaintiffs had discovered the incorrect statement in their USAR in the non-breach world, they would simply have updated their USAR to remove the statement that the cask handling crane was seismically qualified, rather than re-performing a seismic analysis. Tr. 612. As Ms. Clevenger testified, no NRC regulations require the cask handling crane to be seismically qualified to handle a spent fuel transportation cask, and any drop of a DOE-supplied transportation cask during an earthquake would not have had unacceptable adverse results. Id. at 611-12.

As the Court credits Ms. Clevenger's testimony, Plaintiffs are awarded $361,845 for costs incurred to conduct a new seismic analysis of their cask handling crane.

Commercial Grade Dedication

Plaintiffs seek $811,885 for "commercial grade dedication" of River Bend's cask handling crane and the crane trolley outside the fuel handling building.[15] The existing cask handling crane at River Bend was "commercial grade," or manufactured for commercial use, and it was unclear whether it met the engineering requirements that would make it "safety-related" or suitable for use during the safe shutdown of a nuclear power plant. Id. at 606-07. As such, Plaintiffs performed tests and inspections of the cask handling crane and the crane trolley outside the fuel handling building, in an effort to certify that equipment as either "safety-related" or otherwise sufficiently quality-controlled to achieve "commercial grade dedication." Id. at 607-

[15] The parties stipulated that Plaintiffs' claim for commercial grade dedication activities consists of $811,885 in adequately supported costs. Id. at ¶¶ 4, 6(c).

08. Ms. Clevenger testified that Plaintiffs performed this commercial grade dedication on their cask handling crane "to provide additional assurance . . . to the NRC" that Plaintiffs could safely load dry fuel storage casks. Id. at 608.

Plaintiffs' commercial grade dedication efforts entailed reviewing the original documentation for the cask handling crane and trolley, using ground-penetrating radar to examine the spacing of the steel reinforcements in the footings for the crane structure, examining the welds in the crane structure, and contacting the manufacturer for more information on the crane and trolley to determine how they were fabricated. Id. at 607-08. In the course of performing the commercial grade dedication inspections, Plaintiffs discovered that the root weld on the header beam of their crane "was observed to have a lack of fusion in a number of areas." JX 22 at 9148. As a result, Plaintiffs upgraded that weld and performed "ultrasonic inspection" on all load-bearing welds. Id. The NRC approved the use of the cask handling crane at River Bend for handling the Holtec cask system on December 1, 2005. PX 50 at 1.

Plaintiffs argue that they would not have performed the commercial grade dedication of the crane and crane trolley in the non-breach world because the NRC had already approved the use of River Bend's cask handling crane for handling DOE-supplied transportation casks as part of its decision to issue River Bend an operating license. See Tr. 609-10; JX 22 at 9144. Therefore, Plaintiffs would not have needed to provide any additional assurance that their cask handling crane was suitable for use in the non-breach world. Tr. 609-10. However, in the breach world, Plaintiffs are loading Holtec casks, which are more vulnerable than shipping or transportation casks. Id. at 605-06.

Defendant argues that Plaintiffs would have undertaken commercial grade dedication of their cask handling crane in the non-breach world. In support of its position, Defendant relies on Ms. Clevenger's candid generalized acknowledgment that the NRC would have had concerns about the suitability of Plaintiffs' cask handling crane to handle fuel in transportation casks in the non-breach world. Although Defendant construes Ms. Clevenger's testimony as a concession that Plaintiffs would have undertaken a commercial grade dedication of the cask handling crane structure and trolley in the non-breach world, her testimony does not go that far. Rather, when asked if the NRC "would have the same concern with handling fuel in a transportation cask," Ms. Clevenger replied, "I mean, they would have those concerns." Id. at 608.

Nor does Defendant's technical expert, Mr. Brewer, offer a persuasive opinion that Plaintiffs would have undertaken commercial grade dedication in the non-breach world. Id. at 1735-36; DX 98 at 7-8. When asked whether Plaintiffs would have performed commercial grade dedication in the non-breach world, Mr. Brewer testified, "I can see no reason why not. You're handling spent fuel in either case. So, there's no reason to conclude that suddenly because it's a transportation cask rather than a storage cask that you would not want this same level of assurance that the crane had a high quality." Tr. 1844. Mr. Brewer's testimony ignores the fact that Plaintiffs, due to Defendant's partial breach, are loading more vulnerable Holtec casks for dry fuel storage instead of DOE-supplied casks for transport.

The Court credits Ms. Clevenger's testimony that Plaintiffs undertook commercial grade dedication efforts of their cask handling crane and crane trolley in order to reassure the NRC that Plaintiffs' crane could safely load dry fuel storage casks, which are more vulnerable than transportation casks. The Court further credits Ms. Clevenger's testimony that, in the non-breach

world, Plaintiffs would not have needed to reassure the NRC of the suitability of their cask handling crane, since the NRC had approved its use when granting River Bend an operating license. Plaintiffs are awarded $811,885 for the commercial grade dedication efforts of the fuel handling building cask handling crane and the cask trolley.

Cask Lift Yoke Extension

Plaintiffs seek $247,828 for procuring a cask lift yoke extension and a hangar to store this yoke extension when it is not in use.[16] Plaintiffs argue that they purchased the lift yoke extension in order to lift the HI-TRAC transfer cask and Holtec Multi-Purpose Canister into and out of the lower shelf of the cask pool during spent fuel loading operations. PX 3 at 15. Plaintiffs purchased the storage hangar to house the yoke extension when it is not in use. Id. A cask lift yoke is a device that attaches to both the cask handling crane and the cask itself, allowing the crane to lift the cask. Plaintiffs' cask lift yoke extension is a steel bar that extends from the lift yoke up to the crane, enabling Plaintiffs to avoid dipping their crane hook and cabling into the cask pool. Tr. 689-90, 1831.

Although Plaintiffs were not prohibited from dipping their crane hook and cabling into contaminated water during cask loading, Plaintiffs would have needed to decontaminate the crane and its cabling for every cask loaded before it could take the cask outside of the fuel handling building. Id. at 690; DX 98 at 11. This would not only have been inefficient, but would have resulted in a greater risk of spreading contamination outside of the fuel handling building. Tr. 1280-81. As Ms. Supko explained, procuring a cask lift yoke extension to avoid dipping the crane hook was a reasonable approach. Id. at 1279-81.

Plaintiffs established that, in the non-breach world, DOE would have brought a cask lift yoke extension compatible with the DOE-supplied cask for Plaintiffs to use during loading, as DOE was required to provide its own special tools and equipment needed for use of the DOE cask. Accordingly, in the non-breach world, Plaintiffs would not have needed to purchase their own lift yoke extension or hangar.

As Plaintiffs have demonstrated that, but for Defendant's breach, they would not have had to procure a lift yoke extension or a hangar, they are awarded $247,828 for these items.

Cask Handling Crane Remote Control

Plaintiffs claim $20,924 for the installation of a remote control system on their cask handling crane to minimize the increased radiation exposure to the crane operator resulting from loading Holtec casks.[17] The cask handling crane at River Bend was constructed with the operator cab positioned above the cask. Id. at 219; PDX 13. In the non-breach world, the crane would be handling transportation casks, which have more shielding than the Holtec transfer cask.

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[16] The parties stipulated that Plaintiffs' claim for cask yoke lift extension costs consists of $247,828 in adequately supported costs. Id. at ¶¶ 4, 6(d).

[17] The parties stipulated that Plaintiffs' claim for installing the cask handling crane remote control system consists of $20,924 in adequately supported costs. Id. at ¶¶ 4, 6(e).

Tr. 241. Thus, in the non-breach world, the crane operator, sitting above a loaded transportation cask, would not be exposed to excessive radiation. Id. However, since the Holtec casks create a much higher radiation field, Plaintiffs had to move the crane operator to the floor of the fuel handling building, out of the way of the crane, and equip him with a remote control driving apparatus. The Holtec transfer casks used at River Bend release a high dose of radiation because the cask lids have a large hole in them. Id. at 630, 633; PX 670 at 3793.[18] The resulting radiation exposure from sitting above the Holtec casks - - approximately 60 millirem per hour - - is about 6 times the permissible hourly dose.[19] Tr. 219. Plaintiffs therefore installed the remote control to allow the crane operator to stand on the floor, out of the way of the loaded cask, and drive the crane remotely. PX 670 at 3799; see also Tr. 629, 1931.

Defendant does not contest that there is a higher risk of radiation exposure from the Holtec casks. Instead, Defendant suggests that the installation of a remote control would have been "reasonable" in the non-breach world, since a crane operator will always be exposed to less radiation if he is not sitting in the crane cab directly above a loaded cask and since using a remote control system allows the operator a better view of the cask handling crane's movements. Tr. 1931. Defendant's reasonableness argument does not render Plaintiffs' non-breach world implausible or defeat Plaintiffs' claim that Defendant's partial breach required loading Holtec casks with increased radiation exposure, requiring a mitigation measure.

Plaintiffs have shown that the unique structure of the Holtec cask lids required them to move their cask crane operator out of the cab and away from the cask, and modeled a plausible non-breach world where installing a remote control system on their cask handling crane would be unnecessary. Plaintiffs are awarded $20,924 for installing this remote control system.

In total, the Court awards Plaintiffs $3,122,653 for site modifications to handle a heavy load.

Site Modifications to Handle a Dry Storage Cask

The Government challenges $1,075,196 in costs Plaintiffs incurred to handle Holtec dry storage casks - - costs attributable to:

1) Modification of the cask loading pit;

2) Modification of the cask washdown pit;

3) Modifications to handle and store cask lids and equipment; and

4) Installation of permanent demineralized water lines.

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[18] The hole in the Holtec cask lid allows the crane hook to attach to the lid so that the crane can lift the Holtec cask. Tr. 630; PDX 21.

[19] Ten millirem or less per hour is the acceptable dose of radiation exposure to personnel. See Tr. 219.

Modification of Cask Loading Pit

Plaintiffs seek $475,846 in costs for removing an inclined fuel transfer system and a set of test weights from the cask pool.[20] Plaintiffs removed these items from the upper shelf of the cask pool, where they were normally stored, to make room for the Holtec cask. Id. at 335, 1823-24; DX 6 at 1698.

Plaintiffs use test weights to verify that the cask handling crane is functioning properly before picking up irradiated fuel. Tr. 343. Mr. Campbell testified that "these test weights are picked up in lieu of picking up a real fuel assembly," so that if the crane is not functioning properly, the crane will drop a load of test weights instead of irradiated fuel. Id. The inclined fuel transfer system is an inclined tube designed to carry two fuel assemblies at a time between the reactor building and the spent fuel pool. Id. 165-66. The inclined fuel transfer system is used to move fuel from the reactor vessel down to the storage pool in the fuel handling building during an outage when the plant is shut down, and to move fuel out of the fuel handling building up to the reactor building during normal operations. Id. at 165-66, 575.

The parties agreed that Plaintiffs moved these items to make room for the Holtec cask in the upper shelf of the cask pool. Id. at 1823. Mr. Campbell testified that Plaintiffs moved the inclined fuel transfer system and test weights from the cask pool because, "due to the diameter of the cask [Plaintiffs] were putting in the pool, there would have been interferences." Id. at 335. Similarly, Mr. Brewer testified, "the test weights had to be moved to allow setting the Holtec cask on that upper shelf [of the cask pool]." Id. at 1823. In his expert report, Mr. Brewer explained, "[t]he activities to remove the weight restraints included the use of divers to grind the restraint brackets from the floor of the upper shelf." DX 98 at 8 n.25.[21]

Defendant's sole argument is that Plaintiffs should not recover costs for removing this equipment because Plaintiffs would have removed the equipment in the non-breach world. Defendant relies on Mr. Brewer's nonspecific testimony that "[t]he Holtec cask, in fact, is not particularly different in size than the cask described in the River Bend [U]SAR as being an allowable cask for use in transportation at River Bend. Given that, there's no reason you wouldn't also have to move those weights to load a DOE cask." Tr. 1823-24. Based on this testimony alone, Defendant argues that Plaintiffs would have moved the test weights and the inclined fuel transfer system insert rack prior to loading DOE-supplied transportation casks in the non-breach world.

The Court credits Mr. Campbell's testimony that the test weights and inclined fuel transfer system insert rack were removed from the upper shelf of the cask pool to make room for the Holtec casks. The record does not support Mr. Brewer's generalized assumption that Plaintiffs would have needed to relocate the test weights for a hypothetical DOE-supplied transportation cask. Of the four possible DOE transportation casks that Ms. Supko identified in

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[20] The parties stipulated that Plaintiffs' claim for removing the inclined fuel transfer system and test weights consists of $475,846 in adequately supported costs, plus $37,569 in allegedly unsupported costs. Joint Stip. ¶¶ 4, 6(f).

[21] Plaintiffs do not address the divers or restraint brackets.

her report, the largest transportation cask is still eight inches smaller in diameter than the Holtec storage cask. Plaintiffs established that Defendant's partial breach required moving equipment from the upper shelf of the cask pool and that they would not have done this in the non-breach world.

The Court awards Plaintiffs $475,846 for removing the test weights and inclined fuel transfer system insert rack from the cask loading pit to accommodate the Holtec cask system.

Modification of Cask Washdown Pit

Plaintiffs seek $187,784 in damages for installing the following items in the cask washdown pit: scaffolding, a work platform, lighting, a concrete pedestal, and an impact limiter at the bottom of the cask washdown pit above the concrete pedestal.[22] Plaintiffs contend that they installed these items to accommodate features of the Holtec cask.

Work Platform

Plaintiffs installed a work platform, including grating and handrails, over the cask washdown pit to allow workers close access to the top of the Holtec HI-TRAC, so they could weld the lid closed. Id. at 225-26, 1920. The work platform is an area of metal flooring encircling the top of the cask washdown pit. DX 114 at 6. The metal flooring in turn is surrounded by a large handrail. Id. The top of the cask washdown pit is covered by grating. Id. Plaintiffs installed the work platform because the process of welding the Multi-Purpose Canister lid to the canister is an involved process that requires continual contact with the top of the canister. Tr. 227-29. Prior to loading Holtec casks, the top of the cask washdown pit consisted of "a large open hole" with a narrow grating structure surrounding it. Id. at 226. Plaintiffs were concerned that, without a work platform to stand on, Entergy employees risked falling through the hole during the welding process required for the Holtec system. Id.

Mr. Campbell credibly testified that the cask washdown pit was originally designed to accommodate a cask that needed to be washed off with a hose or miniature pressure washer after loading. Id. at 226-27. Thus, the top of the cask washdown pit had been mostly open, and only partially covered with some grating. Id. at 226. In the non-breach world, Entergy personnel would have been able to hose down transportation casks through the open hole and the grating at the top of the cask washdown pit. Id. at 227. Mr. Campbell testified that if Plaintiffs had constructed a work platform in the non-breach world, the platform would have blocked the spray of the water during washdown. Id. at 226-27. However, since the Holtec storage casks require close and prolonged work to dry and weld and do not need to be washed down, Plaintiffs installed a work platform for personnel to stand on during the drying and welding phase. Id. at 226.

[22] The parties stipulated that the amount Entergy claimed for installing scaffolding, a work platform, lighting, a concrete pedestal, and an impact limiter altogether is $187,784 in adequately supported costs. Id. at ¶¶ 4, 6(g). However, in their post-trial briefs, the parties only discussed the installation of the work platform, impact limiter, and concrete pedestal.

Defendant argues that Plaintiffs should not recover the cost of installing a work platform because they would have constructed it in the non-breach world. In support of this argument, Defendant relies on the testimony of Mr. Brewer that Plaintiffs installed the work platform so that River Bend personnel could stand near the cask and perform work on it, which is not a Holtec-specific activity. Id. at 1829-30. Defendant cites Mr. Brewer's testimony that Plaintiffs could have used scaffolding instead of a permanent platform, although at trial, Mr. Brewer testified that scaffolding is ultimately more expensive to maintain and "the platform's a very simple solution for the problem." Id. at 1924-25.

The Court finds that Plaintiffs have met their burden of proving that they installed the work platform to dry and weld the Holtec cask and that they would not have constructed this platform in the non-breach world. Plaintiffs are therefore awarded the costs of installing the work platform.

Impact Limiter

Plaintiffs installed an impact limiter in the cask washdown pit to protect the fuel building structure, safety-related items, and dry fuel storage components in the event of a load drop. JX 7 at 4722. This was one of the impact limiters that Plaintiffs installed as a mitigation measure in response to the results of their additional cask drop analysis. As such, for the reasons discussed above, the Court awards Plaintiffs the cost of installing this impact limiter in the cask washdown pit.

Concrete Pedestal

Plaintiffs installed a concrete pedestal at the bottom of the cask washdown pit for the dry fuel storage project. Tr. 205-06. The pedestal, constructed of safety-related concrete, replaced three steel-covered beams at the bottom of the cask washdown pit, which were originally designed to support the transportation cask. Id. at 616. These three beams were unable to support the Holtec transfer cask, which was designed for placement on a solid surface. Id. at 616, 619, 647. The concrete pedestal is also used to raise the HI-TRAC cask up to a working level to give workers access to the top of the cask for the welding and drying operations of the canister. Id. at 206. According to Mr. Campbell, it would have been unnecessary to raise a transportation cask in the non-breach world because "there wouldn't be any welding operations occurring on top" of a transportation cask. Id. Instead, workers would only need to be able to access the bolts on the transportation cask lid with a torque wrench to close the lid. Id. at 206-07.

Plaintiffs argue that they would not have installed a concrete pedestal in the non-breach world because the bottom of the cask washdown pit was designed to accommodate a DOE-supplied transportation cask. Ms. Clevenger testified that, in the non-breach world, the three steel beams that originally supported the bottom of the cask washdown pit would have been sufficient to support loading a transportation cask. Id. at 619. Mr. Campbell testified that, in the breach world, the HI-TRAC cask required a flat surface at the bottom of the cask washdown pit. Id. at 305.

Defendant argues that Plaintiffs should not recover the cost of installing the concrete pedestal because Plaintiffs did not prove that a DOE-supplied transportation cask could have

been placed on the three steel beams in the non-breach world. Plaintiffs relied on their interpretation of the "suitable for use" provision of the Standard Contract to argue that they would not have needed to make expensive plant modifications to accommodate a DOE-supplied cask if Defendant had performed.

The Court credits Mr. Campbell's testimony that the cask washdown pit would have accommodated a DOE-supplied transportation cask and would not have needed to be modified in the non-breach world. The Court also credits Ms. Clevenger's testimony that a DOE-supplied transportation cask could have been placed on the steel-covered beams at the bottom of the cask washdown pit. Because Plaintiffs established that they installed the pedestal to accommodate the Holtec cask and that the pedestal would have been unnecessary in the non-breach world, they are awarded the costs of installing the concrete pedestal.

The Court awards Plaintiffs $187,784 for modification of their cask washdown pit.

Modifications to Handle and Store Cask Lids and Equipment

Plaintiffs seek $386,674 for the installation of a jib crane near the cask washdown pit and for a cask lid stand and cart to provide storage for the cask lid during loading operations.[23] Of this amount, Plaintiffs allocated $291,406 to the installation of the jib crane, $87,539 to the design and construction of the cask lid stand and cart, and $7,729 to internal labor costs related to the cask lid stand and cart. Id. at 2058. Plaintiffs acquired the jib crane in order to access and store a forced helium dehydration system and welding equipment - - equipment necessary for loading Holtec casks - - in an area they could not otherwise access in the cask pit. Id. at 266-67, 269.

After Plaintiffs load a Multi-Purpose Canister with spent fuel assemblies in the cask pool, Plaintiffs remove the Multi-Purpose Canister from the cask pool and place it in the cask pit. Id. at 192. In the cask pit, Plaintiffs use a dehydration system to force water out of the Multi-Purpose Canister and a welding machine to secure the lid onto the loaded Multi-Purpose Canister. Id. at 314-16. Plaintiffs store that equipment in a small shelf-like area 10 to 13 feet above the cask pit. Since the cask handling crane inside the fuel handling building cannot physically access the area where Plaintiffs keep the forced helium dehydration skid and welding machine, Plaintiffs acquired a jib crane to access that area when Plaintiffs need to perform work on the equipment. Id. at 186, 267. Mr. Campbell explained that, for example, Plaintiffs have needed to remove some components of the forced helium dehydration skid to decontaminate them, and Plaintiffs needed the jib crane to access those components. Id. at 267, 269.

Plaintiffs argue that they would not have used a jib crane in the non-breach world because they would not have needed to store drying or welding equipment in the area above the cask pit. Mr. Campbell testified that Plaintiffs would not have needed any welding equipment at all, because DOE transportation casks would have been bolted shut instead of welded. Id. at 155. Plaintiffs would not have needed a jib crane to access any drying equipment in the hard-to-reach area above the cask pit, because they would have stored any drying equipment that a DOE

[23] The parties stipulated that Plaintiffs' claim for modifications to handle and store cask lids and equipment consists of $386,674 in adequately supported costs. Id. at ¶¶ 4, 6(h).

transportation cask would require outside the fuel handling building. Phillips Dep. 156. Ms. Jodi Lynn Phillips (formerly Ms. Jodi Furr),[24] the senior engineer in charge of the dry fuel storage project before Ms. Clevenger, testified that the jib crane was installed specifically as part of the dry storage project at River Bend. During her deposition,[25] she testified:

> Q: And are there any other uses for the jib crane apart from the Dry Fuel Storage Project?
>
> A: No. It was to be installed specifically for dry fuel storage. It was not there or needed prior to dry fuel storage.

Id. She further testified that, during cask loading operations, Plaintiffs would have stored the DOE-supplied drying equipment outside the fuel handling building:

> [W]e would have . . . stored and supported [the drying equipment] outside the fuel building . . . . The cask would have been inside, but the equipment, support equipment it was believed would have come with the cask system . . . when they brought the cask, so it wouldn't have been inside the building[.]

Id. at 157.

The parties do not dispute that DOE would have provided any necessary drying equipment in the non-breach world. The parties also agree that Defendant has not described the dimensions or characteristics of the drying equipment that DOE would have provided.

Defendant appears to contend that Plaintiffs would have taken the drying equipment into the fuel handling building for "each DOE cask loading" and then removed it from the fuel handling building along with the loaded transportation cask. Mr. Brewer testified:

> Q: And it's your view that River Bend would have to move . . . any DOE-supplied drying equipment into the plant for each DOE cask loading and then out of the plant again when DOE went away, correct?
>
> A: That's correct.

Tr. 1910.

Mr. Brewer further opined that Plaintiffs would have needed to keep DOE-supplied drying equipment near the transportation cask during loading operations, so Plaintiffs would

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[24] Ms. Phillips began working at River Bend in August of 1996 as a design engineer. Phillips Dep. 23. She worked on the dry fuel storage project from 1999-2003, at which point she became an operations supervisor. Id. at 29, 35. Ms. Phillips received a bachelor of science degree in nuclear engineering at the University of Maryland and an associate's degree in nuclear technology from Arkansas Tech University. Id. at 37-38.

[25] Ms. Phillips was unavailable for trial. In lieu of hearing her testimony at trial, the parties designated the relevant portions of her deposition, which were admitted into the record. Order (May 20, 2015).

likely have stored that equipment in the same upper shelf area where they currently store their drying and welding equipment. DX 98 at 9. This would necessitate the use of a jib crane. Id. Thus, Defendant argues that Plaintiffs would have installed the jib crane even in the non-breach world.

The Court credits Mr. Campbell's testimony and Ms. Phillips' informed opinion that Plaintiffs would have kept any DOE-supplied drying equipment outside the fuel handling building in the non-breach world. At her deposition, Ms. Phillips testified that, when DOE arrived with an empty transportation cask for Plaintiffs to load in the non-breach world, DOE would bring any necessary drying equipment. Phillips Dep. 157. Plaintiffs would store this equipment outside the fuel handling building as necessary while Plaintiffs loaded the casks. Id. Then, as Mr. Brewer testified at trial, DOE would leave River Bend with the loaded storage cask and the drying equipment. Tr. 1910. This arrangement would not require Plaintiffs to install a jib crane - - which, as Ms. Phillips testified, was specifically acquired for the dry fuel storage project. Phillips Dep. 156.

Plaintiffs also purchased and installed a cask lid stand to store the lid of the Holtec Multi-Purpose Canister while the Multi-Purpose Canister is loaded with spent fuel assemblies. Mr. Campbell testified that, during loading operations in the non-breach world, Plaintiffs would have stored the transportation cask lid in one of several possible places: the upper shelf of the cask pool, the cask washdown pit, the floor between the cask washdown pit and the upper shelf of the cask pool, or outside the fuel handling building doors. Tr. 211-12. However, in the breach world, Plaintiffs needed to be able to attach a drain tube to the bottom of the Holtec Multi-Purpose Canister lid before fitting it to the top of the canister. Id. at 212-13. Mr. Campbell testified that Plaintiffs could not simply rest the Holtec lids on the upper shelf of the cask pool because they would not be able to access the bottom of the lid to perform the drain tube installation, and Plaintiffs needed "some kind of structure" to support the cask lid while they attached the drain tube. Id. at 213.

Mr. Brewer objected to this model of the non-breach world, opining that Plaintiffs have not addressed "where on the fuel building floor the cask lid would be staged during loading." DX 98 at 9. Defendant does not, however, address Plaintiffs' need to use a cask lid stand to facilitate installing a drain tube in the storage cask lid.

The Court credits Mr. Campbell's testimony that in the non-breach world, Plaintiffs would have staged the DOE-supplied transportation cask lids on the upper shelf of the cask pool, in the cask pit, or on the floor of the fuel handling building during loading operations, eliminating the need for a cask lid stand. The Court further credits Mr. Campbell's testimony that in the breach world, the cask lid stand enabled Plaintiffs to fulfill their need to stage the cask lid so as to facilitate installation of the drain tube. Defendant does not dispute that a Holtec storage cask lid must be fitted with a drain tube before it can be welded to the top of the cask.

Plaintiffs have established that they would not have installed a jib crane or a cask lid stand but for Defendant's breach of the Standard Contract. As such, they are awarded $386,674 for these activities.

Installation of Demineralized Water Lines

Plaintiffs seek $24,891 for installing permanent service lines to provide demineralized water to the fuel handling building.[26] Plaintiffs installed the demineralized water lines specifically for the dry fuel storage project because the Holtec storage casks must be cleaned before they can be stored in the ISFSI. Tr. 214. Installation of these lines began in 2004, and was completed by 2006. PX 750 at 6008-09. The service lines are stainless steel piping, 2" in diameter. Id. at 6016.

According to Mr. Campbell, once the Holtec cask is transferred to the fuel building, before the cask loading process commences, Plaintiffs must inspect the canister and wash it with demineralized water to ensure that it does not contain foreign materials. Tr. 214-15. The cleanliness of the canister is vital, as Plaintiffs are preparing to store the Holtec storage casks onsite "for a long time" and need to avoid any erosion of the canister to keep the spent fuel safely stored. Id. at 214-15. Cleaning the cask with demineralized water is also a specific requirement of the Holtec Certificate of Compliance. Id. at 214.

Defendant asserts that Plaintiffs would have installed these water lines in the non-breach world because they "also support outage functions and other work unrelated to cask loading at River Bend." Def.'s Post-Trial Br. 34. Defendant cites Mr. Brewer's testimony that regardless of the type of cask Plaintiffs are loading, "there's a benefit to having water available" for cask loading, such as cleaning up a cask before taking it inside the plant. Tr. 1835. Since Plaintiffs would have benefited from the water lines in the non-breach world, Mr. Brewer contended that the installation of these water lines was not "exclusively for dry fuel storage." Id. at 1836.

Defendant's contention that Plaintiffs would have installed these water lines in the non-breach world is mere speculation, and not borne out by the record. Plaintiffs established that they would not have installed the permanent service lines in the non-breach world because they would not have needed to employ this cleaning process for transportation casks, since DOE transportation casks would be moving "from one location to another," in contrast to dry storage casks, which need to be stored over long periods of time. Plaintiffs are awarded $24,891 for the installation of permanent service lines.

In total, the Court awards Plaintiffs $1,075,196 for site modifications to handle a dry storage cask.

[26] The parties stipulated that Plaintiffs' claim for the installation of service lines consists of $24,891 in adequately supported costs. Joint Stip. ¶¶ 4, 6(i).

Cask Loading Costs

Plaintiffs claim $5,702,669 in costs incurred to load SNF to Holtec dry fuel storage casks at River Bend. The challenged costs include $562,020 for fuel characterization[27] and $5,143,279 in preparing, packaging, and loading SNF.[28]

Fuel characterization, or fuel "sipping," tests individual fuel assemblies to determine whether the fuel is damaged or leaking excessive radioactive materials. Plaintiffs performed fuel characterization because the Holtec cask system's Certificate of Compliance required Plaintiffs to load only fuel assemblies that were intact, i.e., fuel assemblies that did not pose a risk of leaking. Id. at 108, 150-52.

Plaintiffs argue that they should recover the cost of characterizing the spent fuel that they loaded into Holtec storage casks because they will most likely have to perform fuel characterization again when they transfer their spent fuel into DOE-supplied transportation casks. Plaintiffs contend that the fuel may degrade over time, as the long-term storage of SNF in storage canisters "may or may not affect the condition of SNF in a way that would require further assessment before delivery to DOE." Id. at 1959; PX 960 at 8. Further, as Defendant has not identified the cask system it will bring to River Bend, Plaintiffs do not know what fuel characterization activities that cask system's Certificate of Compliance will require. Plaintiffs contend that in the non-breach world, they would only have to perform fuel characterization once, to load a DOE transportation cask, and should therefore recover the cost of performing fuel sipping for the Holtec system, as Plaintiffs will likely need to perform fuel sipping again when DOE picks up the spent fuel. Defendant argues that since Plaintiffs would have to perform fuel characterization in the non-breach world, they should not recover these costs.

Plaintiffs also argue that they should recover the costs of preparing, packaging, and loading spent fuel into Holtec dry fuel storage casks, as loading dry fuel storage casks is a "completely different" activity than loading DOE-supplied transportation casks. Pls.' Post-Trial Br. 46. Plaintiffs submit that they will have to incur the costs of unloading the SNF currently in Holtec storage casks and reload that SNF into DOE transportation casks in the future. Thus, Plaintiffs contend, if they are not awarded damages for loading SNF into dry fuel storage canisters now, they will ultimately bear the costs of loading their spent fuel twice: first into the Holtec dry storage canisters, and later into the DOE-supplied transportation casks.

Defendant argues that Plaintiffs would have incurred cask loading costs in the non-breach world since the Standard Contract requires the utilities to bear the costs of preparing, packaging, and loading spent fuel into DOE-supplied casks. JX 1, Art. III.A.2(a). According to Defendant, Plaintiffs should not recover these costs because, even though they would have packaged and

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[27] The parties stipulated that Plaintiffs' claim for fuel characterization consists of $562,020 in adequately supported costs, plus $2,631 in allegedly unrecoverable payroll loaders. Id. at ¶¶ 4, 6(j).

[28] The parties stipulated that Plaintiffs' claim for preparing, packaging, and loading SNF consists of $5,143,279 in adequately supported costs, plus $7,930 in allegedly unsupported costs and $46,555 in allegedly unrecoverable payroll loaders. Id. at ¶¶ 4, 6(l), 7.

loaded spent fuel in the non-breach world, Plaintiffs failed to quantify the difference in costs between loading a Holtec storage cask and loading a DOE-supplied transportation cask.

This Court will defer ruling on Plaintiffs' claim for cask loading costs at this time, as the United States Court of Appeals for the Federal Circuit is currently considering this precise legal question in System Fuels, Inc. v. United States, Nos. 2015-5094, 2015-5095 (Fed. Cir. filed Sept. 2, 2015). The issue presented in the System Fuels appeal is

> whether the United States Court of Federal Claims erred in declining to award Plaintiffs-Appellants . . . costs incurred to load seventeen dry fuel storage casks at the Grand Gulf nuclear power station ("Grand Gulf") during the period September 2005 through July 2011, which costs Plaintiffs-Appellants would not have incurred but for Defendant the United States' (the "Government") breach of the Standard Contract.

Appellants' Br. 1. "The trial court reasoned that Plaintiffs-Appellants failed to meet their burden of proof in that Plaintiffs-Appellants did not establish the projected costs to load DOE's transportation casks had DOE performed." Id. at 2. However, according to the appellants, "[t]he trial court discounted the fact that Plaintiffs-Appellants will again incur costs to repackage the SNF for loading to DOE if and when DOE performs" and "ignored that DOE's failure to identify the transportation casks (or the design of such transportation casks) that it would have provided had it performed prohibited Plaintiffs-Appellants from determining what their loading costs to DOE would have been." Id. Finally, the appellants argue, "the trial court failed to credit the fact that the activities that Plaintiffs-Appellants performed to load SNF to Holtec storage casks are different from Plaintiffs-Appellants obligation under the Standard Contract to load SNF to DOE-supplied transportation casks." Id. at 2-3.

These arguments are identical to the arguments before this Court in this matter. Just as in this case, the appellants in System Fuels argue that loading storage casks is a separate activity from loading transportation casks, that the appellants would not have incurred storage cask loading costs in the non-breach world, and that they were not required to model the cost of loading a transportation cask that DOE has not yet identified. Compare id. at 17-34, with Pls.' Post-Trial Br. 44-59. Because it appears that the outcome of System Fuels may be dispositive on the question of whether Plaintiffs may recover their dry storage cask loading costs here, including fuel characterization, the Court stays consideration of this issue pending the Federal Circuit's resolution of System Fuels.

Payroll Loaders

The Government challenges $267,289 in Entergy payroll loaders associated with Resource Codes 19 and 60.[29] Plaintiffs support their claim for payroll loaders with the trial

[29] The parties stipulated that Plaintiffs' claim for payroll loaders consists of $267,289 in adequately supported costs. Id. at ¶¶ 4, 6(m). Of this amount, $265,576 is allocable to Resource Code 19, and $1,713 is allocable to Resource Code 60. DDX 5 at 27.

testimony of Ms. Stephanie Barras.[30] As Ms. Barras testified, a loader is an amount that is added to a transaction to account for indirect costs attributable to the transaction. Tr. 440. Payroll loaders are applied using an automated software system. Id. at 437. Entergy has six resource codes for payroll loaders, numbered as follows: 2 for incentive compensation, 18 and 19 for benefits, 60 for stock options, 810 for payroll taxes, and 890 for non-productive time. Id. at 450. Resource Code 60 was introduced in 2010, as stock options had previously been captured under Resource Code 19. Id. at 495. Entergy computes and charges these payroll loaders according to generally accepted accounting principles ("GAAP") and Federal Energy Regulatory Commission ("FERC") regulations. Id. at 455.

While Resource Code 18 is associated with "current year benefits," such as medical and dental, Resource Code 19 is associated with benefits that are considered to be "nonservice year costs." Id. at 451, 487. Resource Code 19 includes costs associated with a trust fund in which Plaintiffs keep funds set aside for retired employee pensions, as well as prior period costs and non-current benefit costs, and amortized transition costs due to Entergy's implementation of different accounting standards during the claim period. Id. at 456, 487, 492; see also DX 101.

Ms. Barras explained that Resource Code 19 costs were included in Plaintiffs' claim because

> it's a cost that we're actually incurring, and . . . these are ongoing costs for the company for the life of the trust from the time we initiated it to the time we are finished paying our last bill out of it . . . . [T]he costs we are incurring today could be associated with people currently working today or people who worked 15 years ago. In the same light, 15 years from now, we'll be incurring the same types of costs for people who are working today on different activities, whether it be spent fuel or other activities. As they retire, they'll receive the benefits and they will be causing some of those costs.

Tr. 458. Resource Code 19 costs can be attributed to economic conditions, interest rates, regulations, and other similar things outside of Entergy's control. Id. at 451-52, 487-88. Entergy's increases or decreases in contributions to its trust during the period at issue would cause increases or decreases in the Resource Code 19 payroll loader rate in the future. Id. at 488-89. Variables in the trust funding due to interest rates, and gains and losses are attributed to Resource Code 19. Id. at 489.

Plaintiffs included damages associated with Resource Code 60, the payroll loader for stock options, in their damages claim because these charges are costs that they "incur as part of the company business," and they apply the indirect costs associated with labor to the correct projects consistent with Entergy's standard accounting practice. Id. at 459. Defendant challenges Resource Code 60 charges because "Entergy failed to show that it would not have

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[30] Ms. Barras is employed by Entergy Services, Inc. as manager of property accounting. Tr. 433-34. She has a bachelor of science degree in accounting from the University of New Orleans and is a certified public accountant licensed in Louisiana. Id. at 436. Ms. Barras began working for Entergy in 1996, as an entry level accountant and worked her way up to the management level. Id. at 437.

incurred these same stock option costs with DOE performance . . . ." Def.'s Post-Trial Br. 54. With regard to Resource Code 60, Ms. Barras testified that stock options are only available to certain levels of Entergy management, but she did not know whether individuals who worked on the dry fuel storage project at River Bend received stock options. Tr. 496.

The Government's damages expert, Mr. Robert Peterson,[31] challenged Plaintiffs' claim for payroll loaders in Resource Codes 19 and 60. Id. at 2117. Defendant does not challenge any other payroll loaders. Mr. Peterson posited that Resource Code 19 included costs from prior periods that became recognized when a change in the Financial Accounting Standards Board's accounting standards required Entergy to change how it accounted for pension adjustment and post-employment adjustment in its books. Id. at 2028. As this change in standards, implemented in December 1985 and December 1990, created an "enormous unfunded obligation" for Entergy, the utility was allowed to amortize this cost over a 20-year window. Id. In Mr. Peterson's view, Entergy is claiming costs allocated to Resource Code 19 that it incurred "long ago," such as costs for personnel who retired prior to the claim period of this suit, and, in his opinion, could not be connected with the dry fuel storage project. Id. at 2028-29.

The Government argues that Resource Code 19 includes costs incurred prior to the claim period, and that the charges to this resource code "fluctuate based upon factors unrelated to DOE's performance, such as changes in the economy, or in the case of the amortization, driven by changes in accounting methods." Def.'s Post-Trial Br. 51. The Government concludes that "[t]he underlying costs allocated through Resource Code 19 are not attributable to any delay in DOE performance, or even work done to mitigate such delay." Id. at 53. With regard to Resource Code 60, the Government argues that because Ms. Barras was not aware of anyone who worked on the dry fuel storage project at River Bend receiving stock options, these costs were not incurred due to the Government's breach. Tr. 496.

In Mr. Peterson's view, while the Resource Code 19 amortized expense was included over the claim period, it was "something that's disconnected from anything having to do with the work activities. It's simply a financial mechanism probably driven more by changes in the discount rate or other factors than it is having to do with anything having to do with the dry fuel storage project." Id. at 2029. Defendant further argues that because Resource Code 19 includes other post-employment benefit costs for former employees - - costs for "prior years of service" - - Entergy should have determined "which of the costs [were] associated with retired employees versus active employees." Def.'s Post-Trial Br. 53. Additionally, Defendant argues that any change in the value of pension plans was not tied to work at the plant and did not increase or decrease because of any dry fuel storage activities.

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[31] Mr. Robert Peterson was accepted by the Court as an expert in the "quantification of monetary damages." Id. at 1990. Mr. Peterson is a managing director of LitCon Group, LLC, has a bachelor of science degree in mechanical engineering from Rensselaer Polytechnic Institute and a master of business administration from the University of North Carolina at Chapel Hill. Id. at 1980-81. Mr. Peterson has more than 20 years of engineering and consulting experience and "has analyzed damages associated with delay, acceleration, disruption, changes in scope of work, productivity losses, and contract termination, among others." DX 97 App. A at 1. Mr. Peterson has "lectured on the topic of identifying and pricing damages" and has testified in several spent nuclear fuel cases. Id. at App. A at 3, App. B at 1-6.

With regard to Resource Code 60, Defendant argues that the costs associated with stock options would be included in the loader whether or not the stock option was exercised. Tr. 495. Defendant argues that at the time the stock options are issued, "Entergy's actuary estimates the expected costs of the stock options amortized over three years." Def.'s Post-Trial Br. 54. Ms. Barras testified:

> Q: At the time of the grant of the . . . stock option, Entergy's actuary would give Entergy an anticipated cost of the stock option amortized over three years, is that correct?
>
> A: From what I understand, yes.
>
> Q: And the costs associated with the stock options, whether exercised or not, would be included within the loaders you described, is that correct?
>
> A: Yes, the expense associated with that would be included.

Tr. 495. Defendant argues that because Plaintiffs cannot directly link these stock options costs with dry fuel storage costs, Plaintiffs cannot recover Resource Code 60 charges as damages.

In System Fuels, Inc. v. United States ("System Fuels IV"), the Federal Circuit held that the plaintiffs "may recover overhead costs incurred for mitigation-related work" and found that the plaintiffs could recover their capital suspense loaders.[32] 666 F.3d 1306, 1312 (Fed. Cir. 2012). The Federal Circuit noted that the plaintiffs used an internal accounting system that was FERC- and GAAP-compliant and that the trial court had "clearly erred" in finding that the plaintiffs had not proven these damages with reasonable particularity. Id. The amount of damages did not have to be "'ascertainable with absolute exactness or mathematical precision.'" Id. at 1311 (quoting Indiana Michigan Power Co., 422 F.3d at 1373). In Grand Gulf II, the COFC followed System Fuels IV and granted the plaintiffs their payroll loaders associated with Resource Codes 19 and 60. Sys. Fuels, Inc. v. United States, 120 Fed. Cl. 635, 663 (2015) ("Grand Gulf II"). The Grand Gulf II court noted that the plaintiffs had established their entitlement to these costs because they complied with GAAP. Id.; but see Sys. Fuels, Inc. v. United States, 120 Fed. Cl. 737, 758-59 (2015) ("ANO II") (awarding damages for Resource Code 19, but not Resource Code 60).

Under System Fuels IV, utilities are entitled to receive overhead costs associated with mitigation activities. 666 F.3d at 1312. The Federal Circuit found that the plaintiffs' FERC- and GAAP compliant accounting system "allocate[d] on a monthly basis the overhead associated with [mitigation activities] and charge[d] accounts for the appropriate project." Id. The Federal Circuit has also found that estimating overhead costs related to mitigation activities using "generally accepted accounting practices" was sufficient to show damages with "reasonable particularity." Id.; see also Energy Northwest III, 641 F.3d at 1309; Carolina Power & Light Co., 573 F.3d at 1276-77. The Court credits Ms. Barras' testimony that Entergy's accounting for

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[32] In this case, the parties have stipulated that if a claimed damages item is recoverable, then the associated materials loader and capital suspense loader is recoverable, with the exception of materials loaders allocated to non-inventory purchases. Joint Stip. ¶ 5.

payroll loaders was FERC- and GAAP-compliant, and accepts that these costs were properly accounted for and allocated by Entergy to the mitigation activities that were performed by Plaintiffs due to the Government's partial breach.[33] See Tr. 455. These payroll loaders should thus be considered part of the costs incurred by Plaintiffs as a result of the Government's failure to perform under the Standard Contract. The fact that Plaintiffs established these stock option costs via an actuary's estimate does not alter this result. See Indiana Michigan Power Co., 422 F.3d at 1373.

As the Court has stayed its consideration of Plaintiffs' entitlement to damages related to fuel characterization and cask loading costs pending the resolution of System Fuels, Inc. v. United States, Nos. 2015-5094, 2015-5095 (Fed. Cir. filed Sept. 2, 2015), the Court does not award Plaintiffs their claimed $49,186 for Resource Code 19 and 60 payroll loaders associated with the labor component of these costs - - $2,631 for fuel characterization and $46,555 for cask loading costs. Joint Stip. ¶¶ 6(j), 7. The Court awards Plaintiffs the remaining $218,103 in payroll loader costs.

Materials Loaders

Defendant challenges $98,548 in materials loader charges applied to two Holtec invoices: one for ancillary equipment and one for a milestone payment for the HI-TRAC transfer cask.[34] A materials loader is an overhead cost that is intended to pool costs incurred for onsite warehousing, inventory control, and other procurement functions, and to distribute them as an added cost on items drawn from onsite inventory. Tr. 2014-16. A materials loader is intended to capture costs associated mainly with two activities - - warehouse activities and "supply chain functions." Id. at 2149. Ms. Barras explained that "supply chain functions" refer to "costs that are associated with procuring inventory items, relationships with vendors, contracts and entering into those types of tasks." Id. at 464. Ms. Barras also explained that transactions associated with Entergy Resource Codes 52, 58, and 95 receive a materials loader allocation. Id. at 511; DDX 5 at 15. Resources Codes 52, 58, and 95 are associated with materials and supplies, specifically chemicals (52), consumables (58), and inventory materials and supplies (95). PX 267 at 7550.

According to Mr. Peterson, during the claim period, Holtec issued approximately 200 invoices to Entergy for services and equipment provided to River Bend, totaling approximately $20 million. Tr. 2016-17. Entergy accounted for all but two of the Holtec invoices using resource codes that do not receive additional materials loader costs. DDX 5 at 17; DX 31; DX 34. The Government objects to two invoices that Entergy recorded to Resource Code 95 - - inventory materials and supplies - - a designation that receives a materials loader.

The first materials loader charge, totaling $84,349, was assessed on an invoice from Holtec for a milestone payment for the fabrication of the HI-TRAC transfer cask. Tr. 2020-21; DX 34. Defendant argues that since the payment was actually for material arriving at the Holtec

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[33] Based upon the demeanor of the witness, the Court found Ms. Barras' testimony to be credible.

[34] The parties stipulated that Plaintiffs' claim for materials loaders consists of $98,548 in adequately supported costs. Id. at ¶¶ 4, 6(n).

cask fabricator, U.S. Tool & Die, rather than in inventory or a warehouse at River Bend, this invoice should not have been recorded to Resource Code 95, which is associated with transactions related to inventory materials and supplies. Mr. Peterson testified that the material

> wasn't anywhere near the River Bend site. It wasn't going through the River Bend warehouse. It wasn't being receipt-inspected by the River Bend personnel. It was external to the system and does not fit the description of those types of procurements to which a material loader, to my understanding, was intended to be applied or were the mechanisms through which those were to be covered.

Tr. 2020.

The second materials loader charge, totaling $14,199, was assessed on an invoice from Holtec for ancillary equipment needed for dry fuel storage at River Bend. DX 31. Mr. Peterson testified that the ancillary equipment did not go through the normal warehouse receiving process at River Bend and should not have been assigned Resource Code 95. Id. at 2022; DDX 5 at 20. While Plaintiffs do not dispute that the ancillary equipment at issue did not go through the River Bend inventory system, Plaintiffs argue that "supply chain personnel have to procure the equipment, and supply chain personnel labor are a significant component of the cost pool captured by Resource Code 095." Pls.' Post-Trial Reply 36; see also Tr. 463-64.

The two invoices at issue here reflect Plaintiffs' acquisition of a dry storage cask and related equipment from its cask vendor, Holtec. These activities fit within the definition of "supply chain functions," which are properly assigned materials loaders. Because Plaintiffs apply materials loaders in a manner that is both GAAP- and FERC-compliant, they were properly accounted for and allocated by Entergy to the mitigation activities performed due to the Government's partial breach. See System Fuels IV, 666 F.3d at 1312; Energy Northwest III, 641 F.3d at 1309; Carolina Power & Light Co., 573 F.3d at 1276-77. The Court therefore awards Plaintiffs $98,548 in materials loader costs.

Allegedly Unsupported Costs

Defendant challenges $210,444 of Plaintiffs' claim as unsupported. This amount includes $183,111 for 10 transactions missing contracts or purchase orders, and $27,333 for three transactions missing invoices. These transactions are associated with Plaintiffs' update to their USAR, performance of a new cask drop analysis, installation of redundant rigging and impact limiters, performance of the seismic analysis of the cask handling crane, modifications to the cask loading pit, and cask loading activities. The parties have stipulated that $7,930 of the total amount of allegedly unsupported costs is associated with Plaintiffs' cask loading costs, which remain unresolved due to the Court's stay.

The remaining $202,514 consists of outside vendor costs. Mr. Metcalfe testified that in preparing his report on Plaintiffs' claimed damages, he requested "invoices, checks, purchase orders, contracts, [and] other payment information for electronic payments" for any item costing $5,000 or more. Tr. 1385. Mr. Metcalfe, with the assistance of Entergy personnel, including Mr. Campbell, reviewed these documents to ensure completeness and to establish a link to DOE's breach. Id. at 1385-86, 1405. Entergy personnel assisted Mr. Metcalfe in establishing a link between DOE's breach and the incurred costs by identifying "events or activities that were

related to the spent fuel storage and . . . mitigating the impact of the breach . . . ." Id. at 1384. Mr. Metcalfe testified that the Government characterized some costs as unsupported because "in some of the earlier years not all of the supporting documents were able to be located by Entergy . . . ." Id. at 1390-91. Mr. Metcalfe was highly confident that Plaintiffs' total claimed damages are "supported to a reasonable certainty," because he either performed the cost analyses himself or directed his staff to do so and he reviewed the cost analyses with Entergy personnel. Id. at 1539.

Mr. Peterson testified that in reviewing Plaintiffs' damages claim, the binders prepared by Mr. Metcalfe and his staff, which included contracts, purchase orders, and invoices, were merely a starting point for his analysis, and that he sought "additional accounting information" in order to fill in any gaps. Id. at 2000. In order to consider a transaction to be supported, Mr. Peterson sought the contractor purchase order identifying the scope of work, the purpose for which something was procured, and the terms and conditions of the contract, and invoices to identify what services were actually performed. Id. at 2001-02. Mr. Peterson and his staff also looked to deposition testimony and the parties' stipulations when documentation was missing. Id. at 2002-03. Mr. Peterson testified that Defendant notified Plaintiffs of the missing documentation Mr. Peterson was seeking, and that while Plaintiffs were able to provide most of what he was looking for, there were "a handful of transactions" for which he did not have all of the documentation he sought. Id. at 2001. It appears that this "handful" refers to these 13 transactions that he claims are missing documentation. However, even for these 13 transactions, Mr. Peterson had project codes, resource codes, vendor names, contract or purchase order numbers, transaction dates, and transaction amounts. Id. at 2169-72. The vendors for these transactions were Enercon, Sargent & Lundy, Holtec, Citibank, and Lights Camera Action, and these transactions spanned a timeframe within the claim period, from October 2000 through December 2003.

The Court finds that Plaintiffs' damages claim was supported with a reasonable degree of certainty, because Mr. Metcalfe's opinion was based on discussions with River Bend personnel, who were able to identify what work was done in conjunction with the dry fuel storage project, and because Mr. Peterson admitted that for both the group of transactions missing contracts or purchase orders and the group of transactions missing invoices, he was provided with project codes, resource codes, vendor names, contract or purchase order numbers, transaction dates, and transaction amounts. Id. Therefore, the Court awards Plaintiffs $202,514 for these transactions.

Additional Security

Plaintiffs seek $1,644,251 in increased security costs as a result of DOE's partial breach. Because DOE did not pick up Plaintiffs' spent nuclear fuel as planned, Plaintiffs constructed an ISFSI to store their spent fuel. NRC regulations impose physical protection requirements for stored spent nuclear fuel, including fuel stored in an ISFSI. Under NRC regulations, plant licensees are required to maintain a security force to provide "high assurance that activities involving spent nuclear fuel . . . do not constitute an unreasonable risk to public health and safety," and to protect "against loss of control of the facility that could be sufficient to cause a radiation exposure" exceeding allowable levels. 10 C.F.R. § 73.51(b)(1), (3) (2001). This security force is responsible for monitoring the "Protected Area," where the spent fuel is stored, and for monitoring all detection systems, conducting surveillance, and controlling access to the protected area. Id. at § 73.51(d)(4)-(5). Plant licensees are also required to install two physical

barriers to control access to the spent fuel, one at the perimeter of the protected area and the other "offering substantial penetration resistance." Id. at § 73.51(d)(1).

Given those regulations, River Bend was required to provide physical protection for the entire Protected Area at the plant. The ISFSI must be in the Protected Area, so installation of the ISFSI necessitated Plaintiffs procuring and installing the equipment to protect the expanded Protected Area. Tr. 2210. In particular, Plaintiffs installed additional fencing, gates, a vehicle barrier system, and closed-circuit television and added armed responders and armed response positions. Id. at 2210, 2216. Plaintiffs also procured and installed a concrete security barrier to control vehicle access to the ISFSI and protect the movement of loaded casks from the fuel handling building to the ISFSI. Id. at 2218-20. Plaintiffs purchased and installed an additional bullet-resistant enclosure ("BRE") to guard the ISFSI and provide physical protection for the armed security officers. Id. at 2213.

Defendant does not contest that Plaintiffs were required to construct the BRE or challenge the $79,301 in materials costs associated with the BRE. Id. at 1472. Rather, Defendant challenges the $1,644,251 claimed by Plaintiffs for security labor costs contending that Plaintiffs' estimated costs are "unreliable and inaccurate." Def.'s Post-Trial Br. 60. Defendant argues that Plaintiffs should not recover their security labor costs because they failed to provide a proper accounting of their increased costs, instead relying on an estimate. Apparently, Plaintiffs did not retain daily shift charts and did not require Wackenhut to track the hours of the guards assigned to the BRE. As explained below, the Court is not persuaded by Defendant's argument, and finds that Plaintiffs' use of an estimate to calculate their security labor costs was reasonable. See Grand Gulf II, 120 Fed. Cl. at 663-70 (finding that the plaintiffs were entitled to the full amount of their claimed damages for security costs and that the use of an estimate approximating such costs was permissible).

The NRC requires the BRE to be manned by security personnel 24 hours per day, seven days per week. Because the River Bend security force consists of five shifts, the one new BRE post required staffing of five additional officers. Tr. 153, 2226-27, 2238-39. Since 2004, this BRE has been staffed continuously by five full-time equivalent security personnel. Mr. Metcalfe testified that the amount claimed for security labor costs was based on "an estimate of the security positions that are required for the manning of that additional bullet-resistant enclosure on a 24/7 basis in order to monitor . . . the dry fuel storage site," and that this estimate was created based on information provided by River Bend personnel. Id. at 1468. Mr. Metcalfe further explained that the cost of security labor was based on man-hours per year, both straight time and overtime, as provided to him by River Bend personnel. Id. at 1471-72.

Specifically, Mr. Metcalfe calculated that each of the new guards would work 2,340 hours per year. PDX 33 at 60. Mr. Paul Gritton,[35] the former Site Finance Manager at River Bend, testified that until 2009, the security officers at River Bend were supplied by the

[35] Mr. Gritton served as the site finance manager at River Bend from October of 2008 until October of 2014. Tr. 726-27. Mr. Gritton is currently employed at the Tennessee Valley Authority's Brown's Ferry nuclear plant, where he serves as the financial and business operations manager of the nuclear power group. Id. at 725.

Wackenhut Corporation ("Wackenhut"). Tr. 733-34. Mr. Andre James,[36] the Security Manager for River Bend through 2011, and the Contract Manager during the time that River Bend's security staff was provided by Wackenhut, testified that when the Wackenhut contract ended in mid-2009, the security officers became Entergy employees. Id. at 2231-32.

When Wackenhut sent an invoice for security work, Plaintiffs would allocate the costs in that invoice to specific project charge codes. Id. at 734-35; see also PX 806 at 0388-89. Mr. James testified that he reviewed the dollar figures that were allocated to the specific project codes for the Wackenhut security invoices and verified their accuracy. Tr. 2233. The average rates used in Mr. Metcalfe's calculations are as follows: 2004, $19.43; 2005, $20.70; 2006, $23.18; 2007, $24.03; 2008, $25.83; 2009, $23.67; 2010, $23.52. PDX 33 at 59. These averages are similar to the average rate used in other spent nuclear fuel cases. Tr. 1477; see also Grand Gulf II, 120 Fed. Cl. at 665, 669-70 (finding that an hourly wage rate of $21.23 was reasonable).

Defendant argues that Plaintiffs did not establish a litigation hold to preserve the daily security shift schedules after the filing of Plaintiffs' complaint, and that "by its own inaction, Entergy spoliated evidence that would have provided the parties information for calculating the actual security labor costs incurred by Entergy allegedly due to the addition of the ISFSI BRE." Def.'s Post-Trial Br. 61. As a remedy for such spoliation, Defendant asks the Court to deny Plaintiffs' claim for security labor costs in its entirety.

Although Mr. James testified that he was not instructed to keep copies of the shift schedule or asked to collect them as part of this lawsuit, Defendant's claim of spoliation is without merit. Mr. James testified that while a shift schedule is used to assign security personnel to a specific post, it does not necessarily indicate that a particular officer was in fact assigned to that post, since rotations could change due to unforeseen circumstances, a fact that would not be reflected in the shift schedule itself. Tr. 2258-59. Plaintiffs argue that even if the shift schedules had been used to calculate their damages claim, an estimate would still have been required because of this possibility for change. Nor did the Wackenhut invoices or Entergy's internal payroll system distinguish which officers were stationed at the BRE at any given time. Id. at 801. Mr. Gritton testified that he "wouldn't have been able to tell from invoices or even once they were in-house, I wouldn't have been able to tell from our systems and from the invoices who was in what BRE . . . ." Id.

Spoliation "'refers to the destruction or material alteration of evidence or to the failure to preserve property for another's use as evidence in pending or reasonably foreseeable litigation.'" Micron Tech., Inc. v. Rambus, Inc., 645 F.3d 1311, 1320 (Fed. Cir. 2011) (quoting Silvestri v. Gen. Motors Corp., 271 F.3d 583, 590 (4th Cir. 2001)).

Spoliation requires that this Court draw an adverse inference when:

> evidence has been destroyed and "(1) . . . the party having control over the evidence had an obligation to preserve it at the time it was destroyed; (2) . . . the records were destroyed with a culpable state of mind; and (3) . . . the destroyed

[36] Mr. James is currently employed by Entergy Operations, Inc. as the security manager of the Waterford Steam Electric Generating Station, Unit 3, where he has worked since 2013. Id. at 2192. Mr. James was the security manager at River Bend from 2002-2011. Id. at 2194.

evidence was relevant to the party's claim or defense such that a reasonable trier of fact could find that it would support that claim or defense."

Jandreau v. Nicholson, 492 F.3d 1372, 1375 (Fed. Cir. 2007) (quoting Residential Funding Corp. v. DeGeorge Fin. Corp., 306 F.3d 99, 107 (2d Cir. 2002)) (omissions in original). The Federal Circuit has not defined the level of culpability required to find that spoliation has occurred, and the Court of Federal Claims is split between requiring a showing of bad faith or merely showing that the party responsible for destroying evidence was blameworthy. Chapman Law Firm, LPA v. United States, 113 Fed. Cl. 555, 610 (2013). Where bad faith is not required, "purposeful, willful, or intentional conduct," as well as negligence, have formed the basis of spoliation sanctions. Lab. Corp. of Am. v. United States, 108 Fed. Cl. 549, 560 (2012) (quoting United Med. Supply Co., Inc. v. United States, 77 Fed. Cl. 257, 266-67 (2007)). However, the intent of the spoliating party "is relevant only in that it informs [] the court's analysis of what, if any, sanctions should be imposed." Chapman Law Firm, 113 Fed. Cl. at 610-11.

Here, Defendant seeks to prevent this Court from considering Plaintiffs' claim for costs associated with an increase in Plaintiffs' security force as a result of Plaintiffs' failure to preserve the daily shift schedules. The Court finds that Defendant has not established that Plaintiffs had an obligation to preserve these schedules or destroyed these schedules "with a culpable state of mind." Neither the Protective Order nor the E-Mail Preservation Order issued in this case imposed on the parties any preservation or retention requirements applicable to the shift schedules. See Order Nov. 8, 2004 (Protective Order); Order Nov. 8, 2004 (E-Mail Preservation Order).

Defendant has not provided any evidence that Plaintiffs acted purposefully, willfully, intentionally, or negligently in failing to preserve the daily shift schedules. Nor has Defendant provided any evidence that the schedules were destroyed. Rather, it appears that Plaintiffs, following their normal business practice, failed to keep the schedules. Mr. James credibly testified that he was not "required to retain shift schedules under any applicable regulation or plant policies." Tr. 2284. Mr. James also testified that there were no NRC or state regulations requiring Entergy to track the work locations of individual officers, though he agreed that nothing precluded Entergy from doing so. Id. at 2285. Although Plaintiffs should have placed a litigation hold and maintained these schedules for purposes of trial, their failure to do so does not rise to the level of spoliation or warrant the sanction of excluding all evidence on security labor costs.

Defendant further argues that Plaintiffs' estimated security labor costs are unreliable and inaccurate. Defendant first argues that Plaintiffs overstated their calculation of the hours per year that were needed to man the BRE during the 2004-09 period when Entergy contracted with Wackenhut to supply security labor. Defendant contends that security labor costs should be calculated based on the "bare hours needed to staff the BRE." Id. at 2316. Since the BRE must be manned 24 hours per day, 365 days a year, with shift work requiring an additional hour per day, the hours needed to man the BRE in Defendant's view would equate to 9,125 hours per year. Plaintiffs, on the other hand, contend that security labor costs should be calculated based on its reasonably estimated cost of hiring five additional employees. Plaintiffs submit that five employees working 40 hours per week, 52 weeks per year (2,080 hours per year) straight time and 260 hours per year overtime, minus an adjustment of 325 hours per year equates to 11,375 hours per year. PDX 33 at 60. Defendant has not established that Plaintiffs overestimated the

number of hours per year necessary for five employees to staff the BRE. The annual number of hours worked reasonably includes overtime, and adequately reflects Plaintiffs' labor costs.

Defendant also argues that Plaintiffs' estimate used an inflated average labor rate because supervisory personnel were included in the pool of officers whose wage rates were used to determine the average wage rate. Mr. Peterson testified that the inclusion of supervisory personnel resulted in an overstatement in the hourly rates used in Plaintiffs' estimate from 2004 through 2009, when Wackenhut hourly rates were used to calculate the estimate. Mr. Peterson asserted that there was "a miscommunication between the parties, in terms of what was to be included," and that the wage rate associated with River Bend's use of an outside security force was blended to include a higher rate for supervisors that "might . . . periodically have some type of fill-in" for guards assigned to man the BRE. Tr. 2313-14. Mr. Peterson opined that this was "irregular," and "would be more [of] an as-needed basis; the exception, not the rule." Id. at 2314. Defendant's argument is unpersuasive. The Court finds that Mr. Metcalfe calculated the estimated labor rate based on evidence provided to him by Messrs. James and Gritton. Mr. James credibly testified that supervisors' duties increased with the addition of the ISFSI post. Id. at 2245. Specifically, Mr. James testified that a supervisor had to perform an inspection of every post at least once per shift, including an inspection of the equipment the security officer was guarding. Id. In addition, Mr. James testified that supervisors sometimes man security posts, including when officers are sick, during shift rotations, and during officers' meal breaks and restroom breaks. Id. Mr. James also testified that he has seen supervisors take over entire 12-hour shifts. Id. Given the integration of the supervisory staff into the security labor force, the Court finds that it was reasonable for Plaintiffs to determine average yearly wage rates consisting of both supervisory and non-supervisory wages.

Finally, Defendant argues that Plaintiffs' estimate used an inflated number of working hours for its 2010 estimate, when Entergy switched to an in-house security force, because Plaintiffs included a "loader" for nonproductive time. Defendant contends that if the nonproductive loader is included in the claimed hourly rate, the number of hours worked should be reduced so that only active time, time spent manning the BRE, is reflected. Mr. James testified that the total number of hours worked included "nonproductive" hours, like training and vacation time. Id. at 2246. Mr. Peterson testified that these nonproductive hours were already accounted for in the wage rate that Plaintiffs use. Id. at 2315-16. Thus, according to Mr. Peterson, Plaintiffs account for nonproductive hours twice - - once in calculating the average wage rate, and once in calculating the number of hours worked per year. Id. Defendant has not established that Plaintiffs counted nonproductive hours twice. The full time employees' salaries reasonably included pay for nonproductive hours such as training and vacation, and the estimates of wages paid for annual employee hours adequately reflect Plaintiffs' labor costs.

Plaintiffs have proven their increased security labor costs with reasonable certainty. Damages "need not be 'ascertainable with absolute exactness or mathematical precision . . . .'" Indiana Michigan Power Co., 422 F.3d at 1373 (quoting San Carlos Irrigation & Drainage Dist., 111 F.3d at 1563). Therefore, this Court awards Plaintiffs their additional security costs in the amount of $1,644,251.

Precedent Precludes Awarding Plaintiffs Part 171 Generic NRC Fees

Plaintiffs claim $1,586,586 in fees assessed by the NRC under 10 C.F.R. Part 171 ("Part 171"). The NRC "has long recovered a substantial portion of its operating budget through fees levied on those that it regulates." PX 870 at 5. The NRC uses two categories of fees - - fees for specific benefits it provides to licensees, which fall under 10 C.F.R. Part 170, and since 1986, annual fees under 10 C.F.R. Part 171 to recover other generic costs. Id. Site-specific fees are license and inspection fees charged directly to the applicant or licensee involved and include fees associated with the review of applications for new licenses, the review of renewal applications, the review of license amendment requests, and inspections of licensees. 10 C.F.R. § 170.12 (2014).

In 1991, Congress passed the Omnibus Budget Reconciliation Act of 1990 ("OBRA-90"), requiring the NRC to recover 100% of its annual budget through fees assessed to license applicants and license holders, less amounts appropriated from the Nuclear Waste Fund. PX 870 at 5. OBRA-90 also required the NRC to establish a schedule of annual charges that "fairly and equitably" allocated the total annual amount among licensees and had "a reasonable relationship to the cost of providing regulatory services," "to the maximum extent practicable." Id.; 42 U.S.C. § 2214(c)(3) (2012).

In 1999, the NRC established a new fee under Part 171, the Spent Fuel Storage/Reactor Decommissioning Fee ("SFS/RD fee"). PX 870 at 7. Prior to 1999,

> the NRC charged an annual generic fee to all licensees operating nuclear reactors to cover the NRC's general expenses related to wet storage and nuclear plant decommissioning. Before 1999, the NRC also charged a separate annual generic fee to all licensees with dry storage facilities to cover the NRC's generic expenses related to dry storage. The 1999 rule change eliminated the separate generic fees for (1) dry storage, and (2) wet storage and decommissioning, and created a new annual Spent Fuel Storage/Reactor Decommissioning ("SFS/RD") fee, which covered the NRC's generic costs related to both dry storage and wet storage as well as decommissioning. Specifically, the annual SFS/RD fee covered "the costs of the NRC's generic and other research activities directly related to reactor decommissioning and spent fuel storage (both [wet and dry] storage options), and other safety, environmental, and safeguards activities directly related to reactor decommissioning and spent fuel storage."
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> * * *
>
> The 1999 rule change combined the previously separate categories for wet storage and dry storage, and covered the NRC's generic wet-storage costs with a single SFS/RD fee that applied to all licensees with either wet storage or dry storage on site.

Consol. Edison Co. of N.Y., Inc. v. Entergy Nuclear Indian Point 2, LLC, 676 F.3d 1331, 1338 (Fed. Cir. 2012) (internal citation omitted). In the proposed rulemaking, the NRC observed that the existing policy raised the following concerns about the equitable allocation of generic fees:

> (a) [t]he fee structure could create a disincentive for licensees to pursue dry storage; (b) [t]he fairness of assessing multiple annual fees if a licensee holds multiple [dry storage] licenses for different designs; and (c) [n]ot all affected licensees are being assessed the costs of NRC's generic decommissioning activities.

Revision of Fee Schedules; 100% Fee Recovery, FY 1999, 64 Fed. Reg. 15,876, 15,881 (Apr. 1, 1999).

During the notice-and-comment rulemaking process, one commenter observed that a fee change would have been unnecessary had DOE honored its obligations under the Standard Contract. The NRC responded in the Final Rule:

> The NRC recognizes that sites will be required to continue to store spent fuel onsite until another solution becomes available. The fact that DOE has not taken possession of the spent fuel does not relieve NRC of the OBRA-90 [Omnibus Budget Reconciliation Act of 1990] requirement to recover approximately 100 percent of its budget authority through fees, including those costs associated with generic spent fuel storage activities . . . . The current policy has raised concerns that the fee structure could create a disincentive for licensees to pursue dry storage. The spent fuel storage/reactor decommissioning annual fee will give equivalent fee treatment to both storage options [wet storage and dry storage].

Revision of Fee Schedules; 100% Fee Recovery, FY 1999, 64 Fed. Reg. 31,448, 31,455 (June 10, 1995).

Plaintiffs proffered Mr. Jesse Funches[37] to provide an expert opinion to support their claim for NRC fees. Mr. Funches was admitted as an expert in NRC annual fee assessment, including the Spent Fuel Storage/Reactor Decommissioning Fee ("SFS/RD fee") adopted in 1999. Tr. 862-63. Mr. Funches opined that because DOE did not begin accepting fuel in accordance with the Standard Contract, the majority of utilities would eventually require additional storage, and "therefore the NRC's generic activities for reactor spent fuel pool storage and dry spent fuel storage would benefit all power reactors . . . ." PX 870 at 7. Therefore, the NRC concluded that its "costs associated with generic spent fuel storage activities should be included in the cost of providing services to all power reactors." Id. Mr. Funches indicated that the NRC would not have been complying with OBRA-90 if it had changed the fee structure in

[37] Mr. Funches joined the NRC in 1978, as an advisor to Commissioner John Ahearne and continued this role when Mr. Ahearne was appointed Chairman, providing advice on budgetary and other financial and administrative matters. PX 870 at 3. From 1997 until 2007, Mr. Funches served as Chief Financial Officer ("CFO") of the NRC and reported directly to the NRC Chairman. Id. at 4; Tr. 846-47. Mr. Funches also was the Director of Planning and Program Analysis Staff in both the NRC's Office of Nuclear Reactor Regulation and the Office of Nuclear Materials and Safeguards, as well as serving as the Deputy Controller of the NRC. PX 870 at 4. Mr. Funches "was assigned the lead responsibility for developing the first 10 CFR Part 170 and 10 CFR Part 171 fee rules" to implement the new OBRA-90 requirements. Id.

the non-breach world, because most reactors would not have needed dry fuel storage had DOE picked up the spent nuclear fuel. Id. at 8; Tr. 929-33.

In providing this opinion, Mr. Funches relied on several documents:

- Excerpts of the March 1995 Congressional testimony of former NRC Chairman Ivan Selin concerning the assessment of annual fees. PX 864;

- A February 2, 1998 memorandum from NRC Secretary John Hoyle to NRC Chairman Shirley Ann Jackson and NRC Commissioner Edward McGaffigan, Jr. ("Feb 1998 Memorandum"), on which Mr. Funches was copied. DX 9;

- Mr. Funches' February 27, 1998 "Policy Issue" memorandum to the NRC Commissioners ("Sec'y 98-034"), which requests that the Commissioners consider whether to use rebaselining or a percent change as the methodology for calculating fiscal year 1998 annual fees. DX 10;

- A March 9, 1998 Staff Requirements Memorandum ("SRM") from NRC Secretary Mr. Hoyle to Mr. Funches and Executive Director for Operations, L. Joseph Callan (COMSAJ-98-001).[38] JX 3;

- Mr. Funches' November 5, 1998 "Policy Issue" memorandum to the NRC Commissioners ("Sec'y 98-260"), which included the October 1998 Spent Fuel Storage and Decommissioning Study.[39] DX 14;

- Commissioner Merrifield's December 4, 1998 Comments on Sec'y 98-260 (FY 1999 Fee Rulemaking). JX 4;

- Commissioner McGaffigan's December 14, 1998 Comments on Sec'y 98-260 (FY 1999 Fee Rulemaking). Id.;

- A February 2, 1999 SRM - - drafted in response to Sec'y 98-260 - - from NRC Secretary Annette Vietti-Cook to Mr. Funches and General Counsel Karen Cyr, with all five Commissioners copied on the memorandum. PX 868;

- The 10 C.F.R. Parts 170 and 171 June 1999 final fee rule, containing a comment from a nuclear utility about the SFS/RD fee and the NRC's response. PX 969.

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[38] A SRM reflects a Commission decision that requests the NRC staff to perform a specified task. Tr. 875.

[39] In October 1998, in response to the Commission's request, Mr. Funches' staff provided a Spent Fuel Storage and Decommissioning Fee Study, which recommended the establishment of the Spent Fuel Storage/Reactor Decommissioning Fee. PX 870 at 7.

Plaintiffs assert that DOE's breach was a "substantial causal factor" of the NRC's decision to change the fee rule in 1999, arguing that many utilities were required to implement dry fuel storage, which had previously been utilized by only a few utilities. In Consolidated Edison, the Federal Circuit held that the plaintiffs had not provided sufficient evidence to prove this theory of causation, based upon the NRC's public statements in its proposed and final rulemaking and the comments of NRC Commissioners Merrifield and McGaffigan in internal NRC memoranda accompanying their votes on the 1999 fee rule change. 676 F.3d at 1338-40. The court reasoned that although the NRC briefly acknowledged DOE's breach in the final rulemaking, "the only public statements in the record that were made on behalf of the NRC express a concern over the fairness of the generic fee assessment, and do not establish any direct link between DOE's breach and the 1999 rule change." Id. at 1339. In the final rulemaking, the NRC addressed the DOE breach as follows:

> The NRC recognizes that sites will be required to continue to store spent fuel onsite until another solution becomes available. The fact that DOE has not taken possession of the spent fuel does not relieve NRC of the OBRA-90 requirement to recover approximately 100 percent of its budget authority through fees, including those costs associated with generic spent fuel storage activities.

Revision of Fee Schedules; 100 % Fee Recovery, FY 1999, 64 Fed. Reg. 31,448, 31,455 (June 10, 1995).

The Consolidated Edison court found that NRC Commissioner Merrifield's memorandum accompanying his vote on the fee change was insufficient to prove causation. In relevant part, Commissioner Merrifield commented:

> [I]t is unfortunate that the federal government has not provided for permanent disposal of high-level waste. Because of the delay in the DOE high-level waste repository program, I believe the Commission should seek legislation for FY2000 to amend the Nuclear Waste Policy Act so that generic costs associated with the NRC's spent fuel storage activities can be derived from the Nuclear Waste Fund.

676 F.3d at 1339 (internal citation omitted) (alteration in original). The court reasoned that Commissioner Merrifield's comments simply mirrored the NRC's objective to facilitate equitable fee treatment that would not penalize licensees for the fuel storage option utilized, and concluded that his comment on amending the NWPA did not directly link the DOE's breach to the fee change. Id.

Consistent with Consolidated Edison, in order to recover NRC fees in the instant action, Plaintiffs must establish a direct link between DOE's breach and the 1999 rule change. However, the evidence proffered by Mr. Funches in the instant case was similar to that previously analyzed by the Federal Circuit in Consolidated Edison and found to be insufficient. The internal NRC documents in evidence in the instant action - - specifically, Sec'y 98-304, the February 1998 memorandum, and the March 1998 SRM - - emphasized the NRC's need to change the fee structure in order to address concerns about unequal fee treatment creating a disincentive to use dry fuel storage, but did not expressly attribute the need to change the fee structure to DOE's breach of the Standard Contract. See, e.g., DX 10 at 4 (noting the "possible disincentive for licensees to pursue spent fuel storage under Part 72 versus spent fuel storage

under Part 50"); DX 9 at 2 (recommending that the CFO "be directed to ensure that the fee policy gives equal treatment" to both dry and wet storage); JX 3 (directing NRC staff to revise the Part 171 fee rule to give "equivalent fee treatment" to both wet and dry storage). Other NRC documents, Sec'y 98-260 and the October 1998 Spent Fuel Storage and Decommissioning Study, also contained similar reasoning about eliminating a potential disincentive to use dry storage. See DX 14 at 9 (noting concerns about the creation of a disincentive to pursue dry storage and the fairness of assessing multiple fees for licensees with multiple ISFSI licenses); Id. Attach. 2 at 1 (stating that staff were directed to "revise 10 CFR Part 171 to provide equivalent annual fee treatment to both wet storage . . . and dry storage").

In the Spent Fuel Storage and Decommissioning Fee Study, Mr. Funches' team ultimately recommended the adoption of an SFS/RD fee to eliminate any disincentive to use dry fuel storage, and secondarily recommended that, in the long term, the NRC seek an amendment to the Nuclear Waste Policy Act allowing the recovery of increased regulatory costs from the Nuclear Waste Fund. Id. at i-ii. The Commission responded to these recommendations in the February 2, 1999 SRM, informing Mr. Funches and General Counsel Karen Cyr that the rule imposing the SFS/RD fee could be issued for public comment, and requesting that the study team brief the Commission on the advisability of amending the NWPA.

Therefore, the NRC internal documents supporting Mr. Funches' testimony connect the fee change to the NRC's commitment to eliminate any disincentive to store dry fuel, echoing the NRC's public statements in the Federal Register, which the Federal Circuit in Consolidated Edison held were insufficient to prove causation.

While a member of Congress questioning Chairman Selin linked the need to build ISFSIs to DOE's breach, Chairman Selin did not affirm that sentiment in his March 3, 1995 testimony before the House Subcommittee on Energy and Water Development. When asked by subcommittee Chairman John Myers:

> Since utilities are being forced to build these ISFSI facilities because DOE has been unable to take possession of spent fuel, why doesn't the NRC include these costs in the budget request to be derived from the Nuclear Waste Fund?

Chairman Selin responded:

> We do not include the costs for independent spent fuel storage installations at commercial reactor sites in the part of the budget appropriated from the Nuclear Waste Fund (NWF) because we understand such funding is not authorized at present under the Nuclear Waste Policy Act, as amended. This Act gave DOE responsibility to administer the fund and specified the purposes of expenditures from it. In particular, section 302 of the NWPA, which established the [Nuclear Waste Fund], indicates that expenditures from the [Nuclear Waste Fund] are for purposes of radioactive waste disposal activities under certain provisions of the NWPA . . . . An [ISFSI] licensed to and operated by utilities would not appear to fall within the purview of this definition.

PX 864 at 1213-14. This testimony mirrored the sentiments of NRC Commissioner Merrifield in his memorandum accompanying his vote sheet, which the Consolidated Energy court held was insufficient to prove causation. JX 4.

The testimony of Mr. Funches did not cure this evidentiary deficit. The Court qualified Mr. Funches as an expert in NRC annual fee assessment, including the SFS/RD fee, due to his extensive experience working for the NRC and his involvement in the formulation of the SFS/RD fee. Mr. Funches opined that as a result of "DOE's not picking up the fuel," the SFS/RD fee "followed the principle of allocating the costs [of the breach] fairly and equitably to those licenses that would benefit." Tr. 1046.

While Mr. Funches' testimony regarding the allocation of the fee is an appropriate expert opinion under FRE 702, based upon his specialized financial knowledge, his testimony about why the Commission imposed the fee in the first place was in essence factual, and based more upon his personal knowledge of DOE's breach and his understanding that the fee change was predicated on that breach. Id. at 905-07. However, the record does not support a factual finding that Mr. Funches had, or was privy to, the knowledge of why the Commission voted to impose this fee:

- Mr. Funches was not one of the five NRC Commissioners who voted for the SFS/RD fee. Id. at 952, 968-69.[40]

- Mr. Funches did not have authority to speak on behalf of the NRC when he testified at trial. Id. at 954.

- Mr. Funches could not recall any specific meetings or conversations he had with the Commissioners in which any Commissioner stated that DOE's delay caused utilities to implement dry storage or that this delay was the reason the Commissioners voted for the SFS/RD fee. Id. at 975-76.

- Mr. Funches was never directed to look at revising the Part 171 fee structure because of DOE's delay in accepting spent nuclear fuel. Id. at 1006.

- Mr. Funches acknowledged that no contemporaneous NRC document links the potential disincentive to implement dry fuel storage under the pre-SFS/RD fee structure to DOE's delay, and no document or public statement of the NRC explicitly links its 1999 fee rule change to DOE's delay. Id. at 1041-42.

- Leading up to the 1999 fee change, there was discourse within the NRC about the DOE's breach and the resulting increase in dry fuel storage and the associated costs. Id. at 930; PX 864 at 1213-14; DX 10 at 4; DX 14 Attach. 2 at 1-4.

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[40] NRC rules are issued by a five-person Commission, including the NRC Chairman. 42 U.S.C. § 5841(a)(1) (2012). The Commission members are appointed by the President and confirmed by the United States Senate. Id. at § 5841(b)(1). Mr. Funches testified that he never served as a Commissioner or as Chairman. Tr. 952, 967.

- The nuclear industry's increased use of ISFSIs - - resulting from DOE's breach - - and the associated costs were of concern to the NRC while it considered changing its existing fee structure. PX 864 at 1213-14; DX 14 Attach. 2 at 4.

- The Commission considered the option of diverting funds from the Nuclear Waste Fund to recover costs associated with increased dry fuel storage. JX 4.

- The NRC chose to modify 10 C.F.R. Part 171 fees, or annual fees, instead of licensee-specific fees because the NRC recognized that eventually most licensees in the industry would be using dry fuel storage due to the absence of a federal facility as a result of DOE's breach. Tr. 1028-31.

The Consolidated Edison court emphasized the absence of an NRC-issued public statement in the Federal Register identifying DOE's breach as the cause for the fee change. The court stated:

> [Plaintiff] has failed to show that the 1999 rule change was the result of DOE's breach. The NRC's public statements do not suggest that the 1999 changes were the result of DOE's breach . . . . [T]he only public statements in the record that were made on behalf of the NRC . . . do not establish any direct link between DOE's breach and the 1999 rule change.

Consolidated Edison, 676 F.3d at 1338-39. Mr. Funches' testimony, although informed by his experience as the NRC's CFO and his awareness of the impact DOE's well-known delay had on the regulatory climate, does not meet the stringent legal requirement for causation established in Consolidated Edison - - that the NRC itself attribute DOE's breach as the reason for implementing the 1999 SFS/RD fee.[41] Nor did Mr. Funches recall any NRC member making such an explicit statement. However, Mr. Funches provided detailed and extensive testimony regarding the portion of the SFS/RD fee attributable to dry spent fuel storage, which the Court would credit if there had been a causation finding.

Mr. Metcalfe's attempt to find the "correct economic answer" to explain why the NRC changed its fee structure cannot on its own form a basis to award Plaintiffs NRC fees under Consolidated Edison. See Tr. 1519-20. Mr. Metcalfe based his testimony on the belief that it would not have made sense "from an economics standpoint" for the NRC to have considered recouping its additional regulatory costs from the Nuclear Waste Fund if these costs were not related to DOE's delay in accepting spent nuclear fuel. Id. at 1503. However, in Consolidated Edison, the Federal Circuit expressly rejected the trial court's finding that Commissioner

[41] Consolidated Edison's requirement that the public record on the rulemaking contain an express statement directly linking DOE's breach and the fee change imposes a heavy causation burden on the non-breaching party. Factors which inform an agency's exercise of discretion in rulemaking are deliberative and not readily susceptible to probing by the litigation process. The published federal rulemaking process - - notice and comment - - while transparent, is not an ideal vehicle for assessing whether a partial breach of contract by a fellow government agency was the driving force behind a fee change.

Merrifield's comment that the NRC should seek legislation to amend the NWPA to allow the NRC to recoup its generic spent fuel storage costs from the Nuclear Waste Fund, "'confim[ed] the existence of a direct link between DOE's breach and the NRC's 1999 fee change.'" Consolidated Edison Co., 676 F.3d at 1339 (quoting Consol. Edison Co. of N.Y., Inc. v. United States, 92 Fed. Cl. 466, 515 (2010), aff'd in part, reversed in part sub nom. Consol. Edison Co. of N.Y., Inc. v. Entergy Nuclear Indian Point 2, LLC, 676 F.3d 1331 (Fed. Cir. 2012)). In light of Consolidated Edison, Mr. Metcalfe's similar suggestion would be "insufficient as a matter of law to demonstrate that the new NRC rules were the result of the government breach." Id. Therefore, the Court denies Plaintiffs' claimed $1,586,586 in NRC Part 171 fees.

The Court Awards Plaintiffs the Remainder of Their Claimed Damages

With the exceptions of the categories discussed above, the Government concedes that the remainder of Plaintiffs' damages incurred in implementing dry fuel storage was caused by the Government's breach of the Standard Contract.

In the non-breach world, Plaintiffs would not have had to store their spent fuel on site. It is uncontroverted that had DOE performed, Plaintiffs would not have been required to store spent fuel on an ISFSI in Holtec canisters. The Court credits the testimony of Messrs. Rives and Metcalfe and Ms. Clevenger that River Bend would not have implemented dry storage activities had DOE performed. The Court finds that Plaintiffs' remaining claimed and uncontested damages were reasonably foreseeable to the Government at the time of contracting, were caused by the breach, and were shown with reasonable certainty. See Indiana Michigan Power Co., 422 F.3d at 1373 (citing Energy Capital Corp., 302 F.3d at 1320). Therefore, Plaintiffs are entitled to damages for these mitigation efforts in the amount of $35,980,339.

Conclusion

Of the $13,707,636 contested by Defendant, the Court awards Plaintiffs the following damages:

Site Modifications to Handle a Heavy Load	$3,122,653
Site Modifications to Handle a Dry Storage Cask	$1,075,196
Payroll Loader Costs	$218,103
Materials Loader Costs	$98,548
Allegedly Unsupported Costs	$202,514
Additional Security Costs	$1,644,251
Total	$6,361,265

The Court also awards Plaintiffs their uncontested damages in the amount of $35,980,339. In total, the Court awards Plaintiffs $42,341,604 in damages. Pursuant to Rule

54(b), there being no just reason for delay, the Clerk is directed to enter partial judgment for Plaintiffs in this amount.

This Court's adjudication of Plaintiffs' claim for damages resulting from cask loading activities, including fuel characterization and preparation, packaging, and loading costs, is stayed pending the Federal Circuit's resolution of System Fuels, Inc. v. United States, Nos. 2015-5094, 2015-5095 (Fed. Cir. filed Sept. 2, 2015). The parties shall file a Notice to the Court upon the issuance of the Federal Circuit's decision in System Fuels.

s/Mary Ellen Coster Williams
MARY ELLEN COSTER WILLIAMS
Judge