Senate Committee on Ways and Means, Chairs
Senator Michael Rodrigues
Representative Aaron Michlewitz
Via Email
Michael.Rodrigues@masenate.gov
Aaron.M.Michlewitz@mahouse.gov

Testimony in Favor of S.1507 (Senator O'Connor), An Act Relative to Monitoring Dry Casks of Spent Nuclear Fuel

I am Mary Lampert-director Pilgrim Watch a public interest group focused on safety concerns regarding Pilgrim Station; co-chair Town of Duxbury's Nuclear Advisory Committee; member of the Commonwealth's Nuclear Decommissioning Advisory Panel, appointed by the Senate President.

Dry cask storage is safer than pool storage but it is not without risk. We know from NRC documents, statements made by the maker of Pilgrim's casks, and from vulnerability studies performed for the Massachusetts Attorney General that:

- Pilgrim has 61 dry casks onsite containing all the spent nuclear fuel since it opened in 1972. Each cask contains 68 spent fuel assemblies that contain 1/3 to ½ the Cesium-137 released at Chernobyl.
- Holtec's thin (0.5") stainless steel canisters may crack within 30 years; the canisters of spent nuclear fuel are made of thin metal. All metal corrodes espcially in a marine environment.
- No current and approved technology exists to throughly inspect, repair or replace leaking or cracked canisters. The assumption by industry and the federal regulator has been an off-site storage solution will develop before there is a problem. But there is no offsite storage available and Plymouth likely will house the spent fel for decades, if not indefinitely.
- The casks are vulnerable to a terrorist attack by weapons available today on the internet and can penetrate a cask shot from offsite. The casks are visible from the street and located less than a football field's distance from the public road with no barrier or screening. All that is missing is a bullseye on each cask.The terrorist threat in the United States and world

is increacing, not decreacing. The Mass Attorney General's expert, Dr. Gordon Thompson, testified to these facts. Please see Attachment A.

- Holtec's limited plan to monitor the casks means that we will only know after the fact that a cask has leaked radiation. The industry and federal plan is to monitor only one cask, and the same cask, every five years beginning in 2034 when the first cask is 20 years old. The cask chosen to monitor can be at Pilgrim or at a "comparable" other site. Please see Attachment B.
- Monitoring would provide advance warning of potential problems so that we would know before, and not after, the fact about problems inside the canister or that a cask had leaked. It would give a heads up for the public to be advised to either shelter or evacuate.
- Holtec's profit from decommissioning Pilgrim will be hundreds of millions of dollars. It can well afford to pay the relatively small expenses to protect us. After all Holtec brought no money to decommission Pilgrim. It is spending our money-the Decommissioning Trust Fund. A fund established by ratepayers in 1972 and neither BECO, Entergy, nor Holtec put a dime into it. Monitoring is simple and cheap technology. Today private homes are monitored for a very small sum so that owners can check and adjust the thermostat from afar.

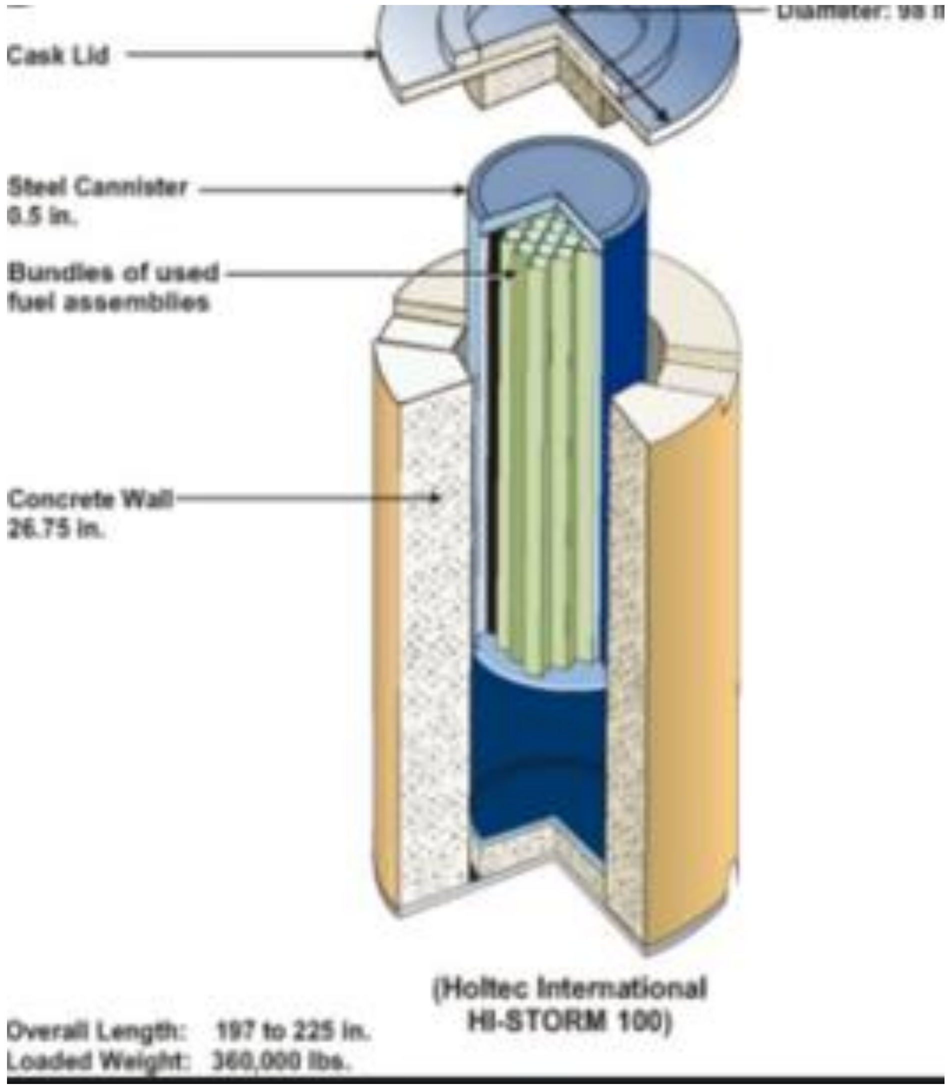
Attached is more lengthy testimony. If you have any questions or want more information and references, please contact me.

Mary Lampert
148 Washington Street
Duxbury, MA 02332
Tel. 781.934.0389/ Email mary.lampert@comcast.net

Appendix A

Pilgrim's Dry Cask Hotlec Hi-Storm-100

Vulnerable to terrorist attack and corrosion



Steel Corrodes. Concrete corrodes.

Each of the sixty-one dry casks contains 1/3-1/2 Cesium-137 Released at Chernobyl that could cause significant contamination to the state if breached.

Security

Rocky Hill Road a football field's distance away-sitting ducks

Independent Expert Security Analysis

Holtec in its April 2, 2020 Pilgrim *Nuclear Power Station, Physical Security Plan Revision and License Amendment Request to Incorporate Additional Independent Spent Fuel Storage Installation* described its security modifications associated with the proposed license amendment. These included: new security systems for lighting, intruder detection systems, protected area boundary fencing, access control systems, telecommunications equipment, a vehicle barrier system, and a central alarm station. Although details were omitted for safeguard reasons,[1] none of these appear to address an attack on the dry casks of spent nuclear fuel from outside the protected area.

The following table, prepared by Dr. Gordon Thompson for the Massachusetts Attorney General,[2] summarizes available means of attack.

[1] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20141L057 Attachment 1, pg.,4

[2]The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Vulnerability of Pilgrim's Spent Fuel Pool - Risks and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants, Gordon Thompson, May 25, 2006

Mode of Attack	CHARACTERISTICS	PRESENT DEFENSE
Commando-style by land	• Could involve heavy weapons/sophisticated tactics • Attack requiring substantial planning and resources	Alarms, fences, lightly-armed guards, with offsite backup
Commando-style by water	• Could involve heavy weapons/sophisticated tactics • Could target intake canal • Attack may be planned to coordinate • with a land attack	500 yard no entry zone – marked by buoys – simply, "no trespassing" signs Periodic Coast Guard surveillance by boat or plane
Land-vehicle bomb	• Readily obtainable • Highly destructive if detonated at target	Vehicle barriers at entry points to Protected Area
Anti-tank missile	• Readily obtainable around world to those with ideological grievances • Highly destructive at point of impact	None if missile is launched from offsite
Commercial aircraft	• More difficult to obtain than pre-9/11 • Can destroy larger, softer targets	None
Explosive-laden smaller aircraft	• Readily attainable • Can destroy smaller, harder targets	None

Drones, an added threat: Drones pose a number of security concerns for ISFSI security. Payload drones could deliver explosives to attackers onsite. But, the main concern is that drones could enhance tactical advantage. For example, drones could distract the security guard force during a ground attack, slowing their response or causing them to be mispositioned to the advantage of the attackers; and drones could target the security cameras, motion sensors, etc. to mask ground attackers. The timelines for security force personnel to deploy and prevent attackers from successfully sabotaging key equipment are short. Anything that prevents timely and proper response by the guard force could be a problem.

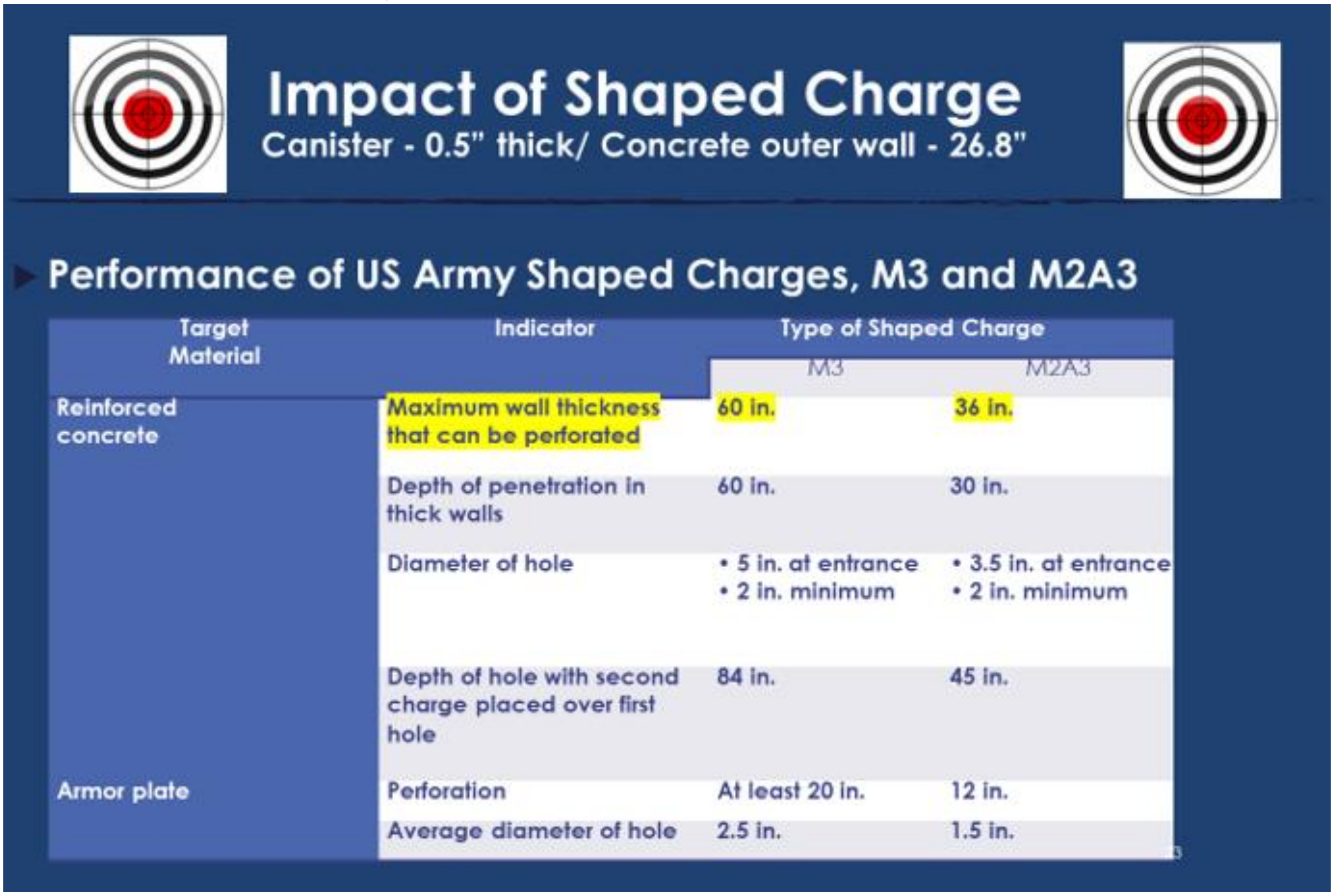
Impact of Shaped Charge

Dr. Gordon Thompson also analyzed the impact of a shaped charge as one potential instrument of attack.[3] The analysis shows that the cylindrical wall of the canister is about 1/2 inch (1.3 cm) thick, and could be readily penetrated by available weapons. The spent fuel assemblies inside

[3] Gordon R. Thompson, *Environmental Impacts of Storing Spent Nuclear Fuel and High- Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Waste Confidence Decision and Environmental Impact Determination* (Cambridge, Massachusetts: Institute for Resource and Security Studies, 6 February 2009). Tables also in Declaration of 1 August 2013 by Gordon R. Thompson: Comments on the US Nuclear Regulatory Commission's Draft Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a US Mark I Boiling Water Reactor.

the canister are composed of long, narrow tubes made of flammable zirconium alloy, inside which uranium oxide fuel pellets are stacked. The walls of the tubes (the fuel cladding) are about 0.023 inch (0.6 mm) thick.

Four of Dr. Thompson's slides, showing the impact of a shaped charge and atmospheric releases from different attack scenerios, are below.



Target Material	Indicator	Type of Shaped Charge	
		M3	M2A3
Reinforced concrete	Maximum wall thickness that can be perforated	60 in.	36 in.
	Depth of penetration in thick walls	60 in.	30 in.
	Diameter of hole	• 5 in. at entrance • 2 in. minimum	• 3.5 in. at entrance • 2 in. minimum
	Depth of hole with second charge placed over first hole	84 in.	45 in.
Armor plate	Perforation	At least 20 in.	12 in.
	Average diameter of hole	2.5 in.	1.5 in.

Notes: (a) Data are from: Army, 1967, pp 13-15 and page 100. (b) The M2A3 charge has a mass of 12 lb., a maximum diameter of 7 in, and a total length of 15 in including the standoff ring. (c) The M3 charge has a mass of 30 lb., a maximum diameter of 9 in, a charge length of 15.5 in, and a standoff pedestal 15 in long[4]

[4] Ibid.

Atmospheric Releases from Attack Scenarios

In one type of release, gases and small particles are swept out of the MPC during a blowdown of gases in the MPC through a comparatively small hole. That release would expose a person downwind to a comparatively small inhalation dose.

In the second type of release, air would enter and leave the MPC through one or more holes, and the zirconium alloy cladding of the spent fuel would be ignited by use of incendiary material. That release could include a large amount of cesium-137 that would cause significant radiological harm at distances of tens of km downwind. An attacking group seeking to maximize the impact of its attack would clearly prefer the second type of release.

Types of Atmospheric Releases from Attack

Type of Event	Module Behavior	Relevant Instruments and Modes of Attack	Characteristics of Atmospheric Release
Type I: Vaporization	• Entire module is vaporized	•Module is within The fireball of a nuclear-weapon explosion	• Radioactive content of module is lofted into the atmosphere and amplifies fallout from nuclear explosion
Type II: Rupture and Dispersal (Large)	• MPC and overpack are broken open • Fuel is dislodged from MPC and broken apart • Some ignition of zircaloy fuel cladding may occur, without sustained combustion	• Aerial bombing • Artillery, rockets, etc. • Effects of blast etc. outside the fireball of a nuclear weapon explosion	• Solid pieces of various sizes are scattered in vicinity • Gases and small particles form an aerial plume that travels downwind • Some release of volatile species (esp. cesium-137) if incendiary effects occur

Types of Atmospheric Releases from Attack

Type III: Rupture and Dispersal (Small)	• MPC and overpack are ruptured but retain basic shape • Fuel is damaged but most rods retain basic shape • No combustion inside MPC	• Vehicle bomb • Impact by commercial aircraft • Perforation by shaped charge	• Scattering and plume formation as for Type II event, but involving smaller amounts of material • Little release of volatile species
Type IV: Rupture and Combustion	• MPC is ruptured, allowing air ingress and egress • Zircaloy fuel cladding is ignited and combustion propagates within the MPC	• Missiles with tandem warheads • Close-up use of shaped charges and incendiary devices • Thermic lance • Removal of overpack lid	• Scattering and plume formation as for Type III event • Substantial release of volatile species, exceeding amounts for Type II release

26

One scenario for an atmospheric release from a dry cask would involve mechanically creating a comparatively small hole in the canister. This could be the result, for example, of the air blast produced by a nearby explosion, or by the impact of an aircraft or missile. If the force was sufficient to puncture the canister, it would also shake the spent fuel assemblies and damage their cladding. A hole with an equivalent diameter of 2.3 mm, radioactive gases and particles released would result in an inhalation dose (CEDE) of 6.3 rem to a person 900 m downwind from the release. Most of that dose would be attributable to release of two-millionths (1.9E-06) of the MPC's inventory of radioisotopes in the "fines" category.

Another scenario for an atmospheric release would involve the creation of one or more holes in a canister, with a size and position that allows ingress and egress of air. In addition, the scenario would involve the ignition of incendiary material inside the canister, causing ignition and sustained burning of the zirconium alloy cladding of the spent fuel. Heat produced by burning of the cladding would release volatile radioactive material to the atmosphere. Heat from combustion of cladding would be ample to raise the temperature of adjacent fuel pellets to well above the boiling point of cesium.

Potential for Release from a Cask and Consequences: Dr. Thompson observed that casks are not robust in terms of its ability to withstand penetration by weapons available to sub-national groups. A typical cask would contain 1.3 MCi of cesium-137, about half to one-third the total amount of cesium-137 released during the Chernobyl reactor accident of 1986. Most of the offsite radiation exposure from the Chernobyl accident was due to cesium-137. **Thus, a fire inside an ISFSI module, as described in the preceding paragraph, could cause significant radiological harm.**

Appendix B- Monitoring

Chairs & Members – MEMO Joint Committee Public Health
State House
Via Email
Jo.Comerford@masenate.gov
Marjorie.Decker@mahouse.gov

RE: Testimony in Favor of S.1507 (Senator O'Connor), An Act Relative to Monitoring Dry Casks of Spent Nuclear Fuel; H 2254 (Reps. Cutler & LaNatra), An Act to Add Section 5K(I) To Section 5K of Chapter 111-

MEMO spent fuel dry cask monitoring

Mary Lampert on behalf of the Town of Duxbury Nuclear Advisory Committee and Pilgrim Watch appreciated the opportunity to provide testimony in favor of the bills June 22, 2021. During the hearing, I was asked to provide additional information on Pilgrim's spent fuel dry cask monitoring plan.

Holtec's Inspection Plan for its HI-STORM 100 Dry Cask System

Pilgrim's dry cask system are Holtec HI-STORM 100's. NRC approved Holtec's HI-STORM 100 dry cask system for use in 2000. Pilgrim is subject to its provisions. The original Certificate approving the casks has some provisions dealing with monitoring and inspection. It was due to expire in 2020; and Holtec submitted a renewal application in 2020.[5] 10 CFR 72.240(b) provides that, because Holtec filed the renewal, the existing Certificate of Compliance (CoC) will not expire until the NRC has made a final determination on the still-pending renewal application.

Holtec's original Certificate of Compliance assumed that:

> The HI-STORM 100 is a completely passive system with appropriate margins of safety; therefore, it is not necessary to deploy any instrumentation to monitor the cask in the storage mode. At the option of the user temperature elements may be utilized to monitor air temperature in the HI-STORM overpack exit vents in lieu of routinely inspecting the ducts for blockage." (1,2,2,3,4 Instrumentation); and,
>
> Because of their passive nature, the HI-STORM 100 system requires minimal maintenance over its lifetime. No personal maintenance program is required." (1.2.2.3.5 Maintenance Technique)

The Certificate of Compliance (CoC) requires surveillance of the passive heat removal system (air inlet and outlet vents) by either monitoring the inlet and outlet vent temperatures or performing a visual inspection daily to ensure that the vents are not blocked. Pilgrim has elected to perform daily visual inspections to ensure the air inlet and outlet vents do not become blocked and the passive heat removal system remains operable. It does not monitor vent temperatures.

It requires some inspection of the casks, e.g., welds, before the casks are filled with spent nuclear fuel, but not later.

Holtec's renewal application proposed limited aging management inspection of exterior surface of one filled cask and overpack. **The first inspection is to be conducted** at the spent fuel storage area (Independent Spent Fuel Storage Installation, ISFSI) **in 2034,** 20 years after the Hi-Storm 100 system was placed in service at the site. The canister external inspection (typically using a borescope) and overpack internal **inspections may be of a cask at Pilgrim, but it also may be performed on a cask at another "reasonably comparable" site. All future inspections will occur with a 5- year frequency (+/- 1.25 years) starting from the baseline date, preferably using the same canister.** At best, only one of Pilgrim's casks will ever be inspected.

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[5] The publicly available version is in NRC's Electronic Library, Accession number ML20049A083. NRC's website is not user friendly. Therefore, I have attached the document and placed in Appendix 1 relevant portions from the document. See pages 108,134,135,137; The overpack inspection is discussed on pgs., 138-140.

For your convenience, I snipped the relevant portions from Holtec's application for documentation. It is in Appendix A.

We **expect that NRC will approve** the application. It is highly unlikely to require a more conservative Aging Management Program. For example, the Rancho Seco Nuclear Plant was allowed a 10 year inspection interval, according to an attached email from NRC's Neil Sheehan. (Appendix B)

Pilgrim's Dry Cask Monitoring - Today to 2034 – Holtec's plan to start inspecting casks in 2034 is far from sufficient. Between now and that date, the situation is even worse.

- There are no monitors installed on the casks to measure heat, helium (to provide early warning) and radiation.
- Visual inspection of the air inlet and outlet vents provides no information about the condition of either the canisters or overpacks.
- Thermoluminescent dosimeters (TLDs) will be placed around the ISFSI (cask storage pad). TLDs only provide an average figure, can only read to a maximum threshold, that is, like a film badge they can only read so high, and do not read high or low alpha and beta. We asked Holtec to provide a map showing where the TLD's were located and the schedule for reading the TLD's. Holtec did not respond.
- The NRC will look only at the physical condition of the exterior of the casks, and storage pad.[6]

Holtec's original Certificate of Compliance and proposed inspection plan take no account of the fact that the cask system is composed of (stainless steel and concrete) corrode, especially in environments like Pilgrim's (salty marine environment, humidity, fluctuating temperature, storage near roads salted due to icing).

The federal government and Holtec are aware of this. For example:

> DOE prioritized in a 2019 Gap analysis studying welded canister-atmospheric corrosion. It said that "Three main parameters have been shown to affect stress corrosion cracking (SCC): environment (salt content, salt stability, humidity, and temperature); material (stainless steel (SS) 304/304L is used in dry storage canisters); and loading (high tensile stresses in weld

[6]The NRC's inspection guidance for ISFSI activities is in the following documents: NUREG-1927, Revision 1, "Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel" see section B (NRC Electronic Library ADAMS Accession No. ML16179A148) and
NUREG-2214, "Managing Aging Processes in Storage (MAPS) Report", July 2019 (NRC Electronic Library ADAMS Accession No. ML19214A111).

zones could support through-wall SCC). Surface samples from canisters at several different sites indicated soluble salt deposition" [7]

NRC, too, has long been aware of aging and localized corrosion of welded stainless steel canisters located close to the ocean. NUREG 2214, Managing Aging Processes says that: "…operational experience with nuclear reactors that were located close to an open ocean or bay has shown that pitting corrosion, crevice corrosion, and chloride-induced stress-corrosion-cracking (CISCC) can occur in welded stainless steel components as a result of atmospheric deposition and deliquescence of chloride-containing salts. Laboratory and natural exposure tests suggest that CISCC can occur with sufficient surface chloride concentrations and that, with those concentrations of chloride, crack propagation rates can be of engineering significance for welded stainless steel canisters during the period of extended operation."[8]

A 2013 Holtec Technical Bulletin (HTB-020) admits that Stress Corrosion Cracking (SCC) is present in all spent fuel canisters.[9] The same bulletin goes on to say that "Holtec International has developed a canister design," a double walled cask (DWC), "that provides much greater protection against potential SCC," and "assures absolute protection against release caused by SCC (stress corrosion cracking) in harsh marine environments during extended storage."

All if Pilgrim's spent fuel canisters will be in a harsh marine environment throughout the many years they will remain at Pilgrim. None of the canisters at Pilgrim are double-walled.

Holtec's decision, and NRC's approval of that decision, not to require monitoring ignores the ever-present potential of manufacturing defects and sabotage from weapons, readily available, capable of penetrating casks.

We encourage the Joint Committee to vote favorably on the bills that would give the Commonwealth better ability to protect the public. The bill's provisions would provide real-time data from each of the 62 casks to MDPH measuring heat, helium and radiation, not simply data from a single cask, here or at another site, once every 5 years after 2034. NRC's and Holtec's proposed inspection and monitoring system clearly are insufficient.

Thank you for your consideration. If you have any other questions or want more documentation, please get in touch. I would be happy to come to Boston, if that would be helpful.

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[7] SAND2019-15479R Gap Analysis to Guide DOE R&D in Supporting Extended Storage and Transportation of Spent Nuclear Fuel: An FY2019 Assessment – Final Dec 2019 https://www.osti.gov/servlets/purl/1592862

[8] NUREG 2214-July 2019 Managing Aging Processes (MAPS,) 6-4 ,NRC Electronic Library, Accession No. ML19214A111

[9] https://holtec.files.wordpress.com/2018/06/htb-020-holtec-dwc.pdf

Mary Lampert
Town of Duxbury Nuclear Advisory Committee, co-chair
Pilgrim Watch, director
NDCAP, member
148 Washington Street
Duxbury MA 02332
Tel. 781.934.0389
Email: mary.lampert@comcast.net

Appendices

Appendix A: HI-STORM 100 LICENSE RENEWAL APPLICATION, 01/31/21) (NUREG 1927) NRC ELECTRONIC LIBRARY ACCESSION NO. ML 16179A148

Pg., 108

C.2 Baseline Inspections

Baseline inspections are the first AMP inspections conducted at an ISFSI site at the approximate time the ISFSI enters the period of extended storage (i.e., 20 years after the first HI-STORM 100 system was placed in service). The baseline inspection for the site meets the criteria defined in the AMPs in Appendix A. This first (baseline) inspection should occur within 365 days of the 20th anniversary of the initial overpack loading at the site or within 365 days of the issuance of the renewed license, whichever is later. All future inspections will occur with a 5 year frequency (+/- 1.25 years) starting from the baseline date. This schedule applies to the canister external inspection, overpack internal inspections, and groundwater monitoring for the HI-STORM 100U.

Attachment 2 to Holtec Letter 5014890-Table 9.A.1-1 MPC AMP (Multipurpose Canister Aging Management Program) Pg., 134

The inspection shall be performed on one canister at each site that uses the HI-STORM 100 System. Note that if a site has more than one type of canister (for example, MPC-68 and MPC-68Ms), only one canister needs to be inspected. The selection criteria for choosing the canister to inspect should consider the following:

- EPRI Susceptibility Criteria (Technical Report 3002005371)
- Canister Age
- Canister with Lowest Heat Load
- Canister with specific previously identified manufacturing deviation

Alternatively, a site may choose to take credit for an inspection done at a different site, as long as the inspection can be shown to have been performed on a reasonably comparable or bounding canister based on the same criteria listed above.

Attachment 2 to Holtec Letter 5014890-Table 9.A.1-1 Overpack AMP. Pg., 135

The inspection shall be performed by a qualified individual on one canister at a site at a frequency of 5 years (+/- 1.25 years). The first inspection should occur within 365 days of the 20th anniversary of initial overpack loading at the site or within 365 days of the issuance of the renewed license, whichever is later. It is recommended that the same canister be used for each inspection to allow for the best continued monitoring and trending.

It is recommended that sites schedule the MPC inspection concurrently with the Overpack Interior Inspection for ALARA purposes.

Pg., 139

The internal inspection shall be performed on one overpack at each site at a frequency of 5 years (+/- 1.25 years). The first inspection should occur within 365 days of the 20th anniversary of initial overpack loading at the site or within 365 days of the issuance of the renewed license, whichever is later. For ALARA reasons, it is recommended that the site use the overpack that contains the MPC used for the MPC AMP.

Alternatively, a site may choose to take credit for an internal inspection done at a different site, as long as the inspection can be shown to have been performed on a reasonably comparable or bounding canister based on the same criteria listed above.

Appendix B- NRC Email RE; Pilgrim's Monitoring

From: Sheehan, Neil <Neil.Sheehan@nrc.gov>
Sent: Friday, March 6, 2020 11:39 AM
To: Mary Lampert <mary.lampert@comcast.net>
Subject: Re: NRC dry cask inspections onsite?

Mary,

Holtec has proposed an inspection frequency of 5 years (+/-1.25 years) for the HI-STORM 100 renewal. We have received the renewal application but have not accepted it. The publicly available version is in ML20049A083 and the part about the inspection frequency is on page A-3. HI-STORM 100 CoC (certificate of compliance) renewal application ADAMS package: ML20049A081 …. We did have a recommendation of 5 years for inspection frequency in the Example AMP in NUREG-1927 Revision 1 (see page B-5). At the time, we had limited information on inspection results. Since the publication of NUREG 1927 Revision 1, we have seen the results of several inspections and have better information on the potential for and the possible crack growth rates for chloride-induced stress corrosion cracking (CISCC). Some renewals (e.g., Rancho Seco) have proposed 10-year inspection intervals and we have determined that an inspection frequency of 10 years is adequate.

I hope this helps.

Neil Sheehan
NRC Public Affairs
(610) 337-5331

Appendix C - Holtec Certificate of Compliance & NRC Inspection- Links

05/04/00 - Certificate of Compliance Package to Holtec (HI-STORM 100)
Accession Number: ML003711779

Date Released: Thursday, August 9, 2007
Package Contents

The following links on this page are to Adobe Portable Document Format (PDF) files. To obtain a free viewer for displaying this format, see our Plugins, Viewers, and Other Tools.

- ML003711885 - 05/04/00 - Ltr. to K.P. Singh, Holtec International from E.W. Brach, Director, SFPO/NMSS Subject: Certificate of Compliance for the Holtec International HI-STORM 100 Cask System Enclosures: 1. CoC No. 1014 2. Safety Evaluation Report (2 page(s), 5/4/2000)
- ML003711932 - 05/04/00 - Certificate of Compliance No. 72-1014 Holtec International - HI-STORM 100 Cask System Attachments: 1. Appendix A 2. Appendix B (88 page(s), 5/4/2000)
- ML003711865 - 05/04/00 - Safety Evaluation Report for Holtec Internations HI-STORM 100 Cask System (103 page(s), 5/4/2000)

Holtec Hi-Storm Amendments-general licensees, such as Pilgrim, can choose from any of the approved design amendments. The licensee submits '"Cask Registration Letters" to the NRC indicating which amendment any particular cask was loaded to.

A0 – ML003711779
A1 – ML022000176
A2 – ML051580446
A3 – ML071500314
A4 – ML080110418
A5 – ML082030116
A6 – ML092300151
A7 – ML093620049
A8, R1 – ML16041A233
A9, R1 – ML19156A104
A10 – ML19156A068
A11 – ML19106A164
A12 – ML19155A318

Appendix 3- NRC Email RE; Pilgrim's Monitoring

From: Sheehan, Neil <Neil.Sheehan@nrc.gov>
Sent: Friday, March 6, 2020 11:39 AM
To: Mary Lampert <mary.lampert@comcast.net>
Subject: Re: NRC dry cask inspections onsite?

Mary,

Holtec has proposed an inspection frequency of 5 years (+/-1.25 years) for the HI-STORM 100 renewal. We have received the renewal application but have not accepted it. The publicly available version is in ML20049A083 and the part about the inspection frequency is on page A-3. HI-STORM 100 CoC (certificate of compliance) renewal application ADAMS package: ML20049A081 …. We did have a recommendation of 5 years for inspection frequency in the Example AMP in NUREG-1927 Revision 1 (see page B-5). At the time, we had limited information on inspection results. Since the publication of NUREG 1927 Revision 1, we have seen the results of several inspections and have better information on the potential for and the possible crack growth rates for chloride-induced stress corrosion cracking (CISCC). Some renewals (e.g., Rancho Seco) have proposed 10-year inspection intervals and we have determined that an inspection frequency of 10 years is adequate.

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Neil Sheehan
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(610) 337-5331