Back in the 1960’s I spent many months hundreds of feet under the ocean avoiding detection by the Soviets.

During this time I worked, ate, operated, maintained, and slept within 100 feet of a US Navy power reactor.

“I felt safer at that time, than I would feel now if I resided in the vicinity of Pilgrim or any reactor undergoing decommissioning controlled by Holtec with NRC’s intentional “Oversight”
Professional Background

40+ Years Nuclear Safety and Regulatory Experience
BSEE Degree and Professional Engineer
Technical Consultant to Maine Yankee, Millstone and Indian Point Chief Nuclear Officers (CNOs)
Professional consultant for San Onofre ISFSI engineering issues (Public Watchdogs)
Technical consultant to New York Attorney General
Westinghouse "Engineer of the Year"
Reactor Operator and Instructor
Identified Pilgrim Safety Issues and resolved at the request of the NRC and then, received personal violation by NRC for raising safety concerns. NRC's attempted to suppress my input.

Accepted by numerous courts as Expert Witness
Testified before United States Senate
Reasonable, Analytical and a somewhat Cynical
Safety, Regulatory and Engineering Presentation to Pilgrim NDCAP
Problem Statement

- Holtec is designing and constructing a facility to contain thousands of tons of the most toxic substance on earth and located in Plymouth, MA
- NRC reluctant to provide meaningful oversight
- Cask design and engineering are severely deficient
- No meaningful accident analysis or aging management program
- Limited unspecified and undocumented lifetime
- No capability to inspect, monitor, or repair casks/canisters
- No technology or plans exist to ever relocate high level waste
- No consideration for terror attacks
- Who is financially responsible when failure occurs?
Low Level Waste

This LLW disposal site accepts waste from States participating in a regional disposal agreement.

From NRC web site

A few hundred curies
High Level Waste

Hundreds of millions of curies
NRC’s stated Mission

United States Nuclear Regulatory Commission
Protecting People and the Environment
Public perception of NRC’s mission

- Contempt for the public
- Ignores public input
- Safety is NOT a priority
- Ensuring a continuing economic viability of the Nuclear industry is the NRC’s principal priority
- Incestuous relationship with the Nuclear Energy Institute (NEI) and the Nuclear Industry
- Disregard for the Environment
NRC’s Shortcomings

➢ Unable to identify applicable regulations
➢ Knowingly accepts fallacious information from Holtec
➢ Refuses meaningful petitions and public requests
➢ Issues exemptions from legally required codes and standards
➢ Denies public dialog
➢ Retaliates against dissenters
➢ Attempts to circumvent clear regulations (10 CFR 72.122(l))
➢ Refuses to address a date for removal of spent fuel from Pilgrim site
➢ Refuses to uphold and maintain long standing industry safety standards
➢ “Loses” FOIA requested information
➢ Refuses meaningful enforcement actions for blatant safety violations
➢ Misrepresents existence of safety analysis (page 6-36 of NUREG 2214 and FOIA request)
The current pad has seventeen (17) loaded Holtec System 100 Multi-Purpose Canisters (MPCs) each with 68 fuel assemblies (1,156 total).

A total of 4,114 spent fuel assemblies will be placed in a total of 61 casks.

All 61 casks, including the 17 loaded casks in the current ISFSI, will be moved to a new, uphill, pad now being constructed.
Fuel 1058°F
750 PSIG

MPC Pressure
30 PSIG to unknown PSIG

MPC Shell 775°F

98.6 °F

Total Heat Energy
>10,000,000 BTUs

Heat Generation
125,000 BTUs/hr

>1,000,000 R/hr

>10,000,000 BTUs
Curies in one BWR dry cask

E.4 Radionuclide Inventory

High-burnup spent fuel is placed inside a Hi-Storm cask no sooner than 10 years after being removed from the reactor. A maximum of 68 boiling-water reactor (BWR) assemblies can be loaded into a Hi-Storm cask. The inventory per cask calculated with the ORIGEN code (References E.4 and E.5) is presented in Table E.1. The analysis assumes that the spent fuel placed in Hi-Storm cask for the 30.5 meter (100-foot) deep impact accident is a 10-year-cooled high-burnup spent fuel.

Table E.1 Dry Cask Vessel Inventory: SNI, ORIGEN 50,000 MWd/MTU (10-yr-cooled)

<table>
<thead>
<tr>
<th>Nuclide</th>
<th>Bq</th>
<th>Ci</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-60</td>
<td>1.64×10^10</td>
<td>3133</td>
</tr>
<tr>
<td>Kr-85</td>
<td>2.75×10^9</td>
<td>74600</td>
</tr>
<tr>
<td>Y-90</td>
<td>3.46×10^9</td>
<td>918000</td>
</tr>
<tr>
<td>Sr-90</td>
<td>3.46×10^9</td>
<td>918000</td>
</tr>
<tr>
<td>Ba-133</td>
<td>2.92×10^9</td>
<td>7988</td>
</tr>
<tr>
<td>Cs-134</td>
<td>3.33×10^9</td>
<td>139720</td>
</tr>
<tr>
<td>Cs-137</td>
<td>3.54×10^9</td>
<td>1496000</td>
</tr>
<tr>
<td>Cs-134</td>
<td>3.68×10^9</td>
<td>1374</td>
</tr>
<tr>
<td>Cs-137</td>
<td>3.02×10^9</td>
<td>816</td>
</tr>
<tr>
<td>Pd-147</td>
<td>5.27×10^8</td>
<td>91120</td>
</tr>
<tr>
<td>Eu-154</td>
<td>4.15×10^8</td>
<td>112200</td>
</tr>
</tbody>
</table>

The nuclide inventory in Table E.1 was generated using the ORIGEN code, corresponding to an 8.8, 50 GWd/MTU, 10-year cooled high-burnup BWR spent fuel. This inventory was used to demonstrate the methodology of developing a consequence analysis. As recommended in Appendix D, specific radionuclide ORIGEN calculation should be performed for the actual spent fuel loaded inside the Hi-Storm cask.

Cobalt-60 is formed in spent fuel by activation of Ni-60 in cladding, but its most important source is in the CRUd that forms on cladding surfaces during reactor operation (References E.6 – E.8). During a 30.5 meter (100-foot) deep impact accident, the amount of Co-60 formed is 9×10^4 Bq/rod, whereas the Co-60 in CRUd can be released by spallation. Therefore, the Co-60 inventory in Table E.1 represents the CRUd inventory. The value was calculated from the Appendix D inventory of 0.72 Ci/rod for a 10+10 fuel assembly (see Table D.7). This value was assumed to be similar for the inventory used in this analysis. The value for CRUd in Table E.1 is for 64 BWR rods per assembly and 68 assemblies per cask.
Six months ago I believed removing fuel from pools was “safer” than remaining in Spent Fuel Pools (SFPs)

Never assessed risks of ISFSIs

Holtec dry casks present a major risk to the public

Terrorism considerations rejected

Dry cask storage is safer, except for Holtec casks

Will there ever be reasonable assurance of safety?
Dr. Kris Singh, CEO, Holtec International stated:

“Finally, how about fixing a crack in the MPC wall? I have stated that although it may be theoretically possible to repair a leak (or crack) in a canister, in my opinion it is not practical when one considers efficiency and radiation dose to the workers.”

Singh’s August 17,2018 White Paper
What are the Risks

➢ Casks will fail prior to any symptoms
➢ Potential for major radioactive releases
➢ Can not be repaired
➢ Cask failure will impact residents
➢ Uninhabitable land for generations
➢ Who is liable?
Major ISSUES

➢ The Biggest Risk – Holtec’s and the NRC’s negligence
➢ Canister/Cask failures are not detectable or repairable
➢ Fuel degradation can’t be detected
➢ MPC corrosion can’t be detected
➢ Terrorism not addressed
➢ No identified means to ever remove spent fuel from Plymouth
➢ Imaginary aging management program
➢ According to Holtec and the NRC positions that there is “no risk” is intentionally deceptive
➢ Nuclear waste disposal has been studied for more than 50 years and billions of $$, with no answer so:
  ○ We dump spent fuel in high population area
➢ The largest risk is the NRC’s failure to regulate and deficient design of the dry casks
➢ NRC says it is safe to keep spent fuel at Pilgrim indefinitely, despite corrosion, security threats, and dense population
➢ The unavoidable fact – Spent nuclear fuel will be dangerous for thousands of years. It may never be removed from Pilgrim
Major Issues

➢ Financial liability
➢ NRC refuses to identify applicable regulations
➢ NRC is a captive regulator
➢ Fallacious safety analysis
➢ NRC needs the nuclear industry to survive
➢ The Spent Fuel Pool, the only system for repair and removal, will be demolished
Holtec’s Engineering

- Low bidder
- Casks may last 20 years
- Can never be inspected or repaired
- Unremovable and unrepairable
- Not monitored for any type of degradation or failure in clear violation of NRC’s Maintenance Rule – 10 CFR 50.65
- Corrosion and radiation leaks are undetectable
- No accident analysis
- Potentially explosive
- No aging management capability (NUREG 2214)
➢ Susceptible to undetectable fuel and cask degradation
➢ No inspections required for aging management (NUREG 2214 AMP)
➢ No pressure, temperature or radiation monitoring
➢ No relief valves
➢ No means to measure corrosive water content
➢ Spent fuel is unable to be inspected prior to site removal
➢ According to Holtec, there has never been a cask failure
➢ Holtec is proposing new cask design to address deficiencies
11.1.1.2 Detection of Off-Normal Pressure

➢ The HI-STORM 100 System is designed to withstand the MPC off-normal internal pressure without any effects on its ability to meet its safety requirements. **There is no requirement for detection of off-normal pressure and, therefore, no monitoring is required.**

➢ **11.1.1.5 Radiological Impact of Off-Normal Pressure**
The event of off-normal pressure has no radiological impact because the confinement barrier and shielding integrity are not affected.

➢ **11.1.3.2 Detection of Leakage of One Seal in the Confinement Boundary**
The HI-STORM 100 System is designed such that **leakage of one seal in the confinement boundary is not considered a credible scenario.** Therefore, there is no requirement to detect leakage from one seal.
What are Safety incentives for Holtec/NRC?
Spent Fuel Canisters Can Never be Inspected or Repaired for example:

➢ Holtec admits to this fact
➢ Holtec’s FSAR and CoC require facility to immerse spent fuel in water---an engineering impossibility (10 CFR 72.122(l))
➢ Holtec’s procedure for cooling MPC is scientifically impossible
➢ No fuel pool or “Dry Cell” available or planned
➢ **Radiation dose rate is >1,000,000 Rads/hour** - Fatal dose to human is 1,000 Rads and would be received in less than one minute
NRC’s Aging Management Plan
NUREG 2214

Nuclear industry’s attempt to justify extended life beyond 25 years

➢ Casks will only be inspected when “Opportunistic visual inspections are performed” meaning no inspections (fix it after it breaks)

➢ NUREG discusses potential degradation caused by:
  ○ CISCC chloride-induced stress corrosion cracking
  ○ Delayed hydride cracking
  ○ Galvanic corrosion
  ○ Hydride reorientation and
  ○ Hydride-induced embrittlement
  ○ Radiation damage and radiation embrittlement
  ○ Neutron poison loss
Questions for Decision Makers

- Who makes financial and technical decisions
- Is Holtec, or its partner SNC-Lavalin, trustworthy and reliable?
- Is the NRC capable of regulating?
- What should Holtec and the NRC do to protect against the potential risks?
- What monitoring and inspection is essential to detect actual and potential cask leakage and failure?
- Who should pay for future costs?
- Has any Holtec radioactive waste cask/canister lasted for even 25 years?
- The NRC requires the ISFSI and the dry casks to be replaced every 100 years. Will it be possible to do so?
- Should dry casks be located above or below ground?
- Should they be thick-walled and protected from a hostile attack?
- What emergency planning is needed to protect the public during the years that spent nuclear fuel will be at Pilgrim? Again, who should pay?
Recommendations to NDCAP

- Demand a copy of the Current Licensing Bases
- Pressure the Commonwealth to do what it can, and work with elected officials to assure the NRC enforces its regulations, once identified
- Establish open dialog with the NRC and Holtec
- Obtain independent expertise such that NDCAP will be able to identify/resolve safety and technical issues
- Pressure the NRC to produce, and give NDCAP, a valid Risk Assessment
- Demand the NRC Chair meet with the public as was done at VY and Millstone
- Demand Holtec CEO meet with the public as was done at VY
- Demand a real Aging Management Program (AMP), not one solely dependent on undetectable failures and “opportunistic inspections”
Plymouth will have a High-Level Waste Dump until------
Non-Compliant with Regulations and common sense
Major unaddressed technical and safety issues
No provisions for repair/removal
Holtec and the NRC make ALL decisions based on Holtec’s economics
The NRC and Holtec ignore sound science
Public has no input
Residents should assure homeowners insurance coverage
Thank you for listening

As a submariner, I always felt safe. As I mentioned at the beginning, I would not feel safe having my grandchildren living next to this facility. Thank you for your time.
Why I care