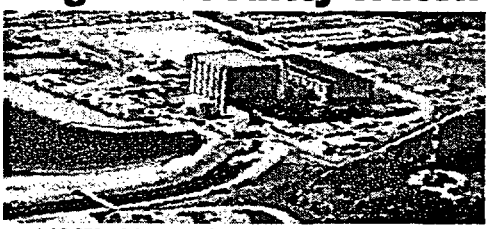
Pilgrim Security Watch



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July 17, 2003

Comments Regarding NRC's Scoping Process Environmental Impact Statement (EIS) for License Renewal of Nuclear Power Plants

Overview

The following significant issues in Appendix B to Subpart A of Part 51 need updating.

1. Postulated Accidents
   - Issue: Terrorism Needs To Be Evaluated As An Issue And Evaluated
   - Issue: Design Basis Accidents/Severe Accidents – Age Degradation Of Components – Need Site Specific Certification
   - Issue: Effects Global Warming - Coastal Erosion, Elevated Sea Levels & Increased Severity Coastal Storms Needs To Be Evaluated As An Issue
   - Emergency Planning Needs To Be Considered As An Issue

2. Waste Management
   - Issue: On-Site Spent Fuel Storage – High Level Waste
   - Issue: Low Level Waste Storage And Management

3. Human Health
   - Issue: Radiation Exposure To Public
   - Issue: Electromagnetic Fields, Chronic Effects.

4. Aquatic Ecology (for plants with once-though and cooling pond heat dissipation systems)
   - Issues: Entrainment Of Fish And Shellfish In Early Life Stages; Impringement Of Fish And Shellfish; Heat Shock) – Reassessment

The following processes, methods NRC determines "findings," need to be changed in order for there to be a reliable EIS assessment.

1. Risk Assessments – Evaluate Consequences And Correct Flaws In Calculating Accident Probabilities.

2. Findings Over-Rely On Licensee Self – Evaluation, Lack Of NRC Evaluation/Oversight And Independent Evaluation

3. Absent In Over-All "Findings" - Analysis Cost Effectiveness Of Re-Licensing And Assessment Alternatives

EIS Updates should apply to licensees which submit applications prior to end 2006

The updates scheduled to be completed by the NRC at the end of 2006 must apply to plants that have completed or submitted applications prior to the end of 2006 or whenever the license renewal review by NRC is completed.

Significant Issues Requiring Updates

1. Postulated Accidents - Issue Terrorism

Security: it is not September 10.th Nuclear reactors are on the short-list of terrorists and vulnerable to attack from air, sea and land. GE Mark 1 designed nuclear reactors, such as Pilgrim and VT Yankee, are especially vulnerable to terrorist attack.

Specifically the EIS should require that as a condition of re-licensing the licensee has in place the means to resist an attack on the reactor building, its support structures and spent fuel storage from the air, land, and water by a team of well equipped terrorists. It should be postulated that they may be far better equipped and organized than those who attacked in 9-11.

Further, the licensee must be required to pass OSRE tests, mock-attack drills that are administered by the federal government to demonstrate the adequacy of its security as a condition of continued operation.

OSRE drills should: 1) be declared less than two weeks in advance; 2) have a 100% success rate in deterring mock attackers; 3) involve real-time attack scenarios, including daytime hours and simulated outage periods; 4) involve an active role for insider mock terrorist; 5) involve mock attackers originating from multiple directions; 6) involve at least 20 mock attackers divided into several teams; 7) include the irradiated fuel pools as a target in at least one exercise; 8) allow for public input/comment; 9) repeated poor performance, should lead to immediate closure of plant until performance is improved; and

10) Allow independent observers to monitor and evaluate.

Terrorism/security should be a site specific issue. For example, the location of the reactor presents unique challenges. Pilgrim is located in America's Hometown – a symbolic location. It is "wide-open" to Cape Cod Bay – easy to approach by water. Secondary airports are close by. Woods surround the reactor and the land slopes up to private wooded property to the South. The densely packed fuel pool is high up in the main reactor building, with a flimsy roof overhead.

2. Waste Management – Issue On-site Spent fuel Storage

Table B- 1 states the following and it is contrary to 25 years of NRC and independent research.

On-site spent fuel	1	SMALL. The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or monitored retrievable storage is not available.

The waste problem has not been resolved - neither long nor short- term. Re-licensing means more waste, hazardous for thousands of years. There is no sure place to safely store it. The spent fuel has not been analyzed to resist a terrorist attack or act of insanity.

A. Long term: Yucca Mountain is not a sure thing – litigation is pending, technical and transportation issues are unresolved. Even if Yucca Mountain is licensed, it will take decades to transfer all of the nations' current waste. Re-licensing reactors will result in so much additional waste that Yucca Mountain will be filled to capacity in 2036. But there still will be 44,000 tons of nuclear waste stored at reactor sites. Plymouth, for example, will remain a dangerous and ever-growing radioactive dump – on an eroding coastline subject to increasingly severe coastal storms.

B. Interim, on site storage – low density pool storage and hardened dry casks needed before re-licensing considered: In January 2003, a study appeared in the spring issue of *Science and Global Security*, a publication of Princeton University.[1] This study confirmed 25 years of government research in concluding that spent fuel pools are particularly vulnerable to terrorist attacks and acts of malice and could generate a pool fire and corresponding contamination of thousands of square miles.[2] The *Science and Global Security* study calls for

[1] Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States by Alvarez, Beyea, Janberg, Kang, Lyman, Macfarlane, Thompson, von Hippel. Science and Global Society, 11:1-51, 2003

[2] Spent Fuel Heat up Following Loss of Water During Storage by Allan S. Benjamin et al. (Sandia National Laboratory, NUREG/CR_0649, SAND77-1371, 1979).

removal of the fuel from the densely packed pools into hardened, dry storage and placing any new fuel in a low density pool.

Example: by the end of Pilgrim's license 3, 859 radioactive assemblies will be stored in a "swimming pool" designed to hold 880. The pool, like VT Yankee's, is located on the top floor of the five-story reactor building, having no significant reinforcement structures to prevent damage from an external hazard, such as an intentional attack on the facility, and dependent for its functioning on the operation of even softer targets on site – such as the control room and switch yard.

If an attack or accident causes loss of coolant water, there will be a pool fire and a radioactive release of 10-times more high-level radioactivity than released in Chernobyl contaminating an area 3 times the size of Massachusetts.

Low density pools and hardened dry cask storage, for all but the recently unloaded fuel, are needed as a pre-condition of re-licensing to protect the public's safety until all the radioactive fuel can be removed to a safe off-site location.

3. Waste Management – Issue Low Level Waste Storage and Management

Table B states the following – emphasis added – and it is nonsense.

Low-level waste storage and disposal	1	SMALL. The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that **the radiological impacts to the environment will remain small during the term of a renewed license**. The maximum additional on-site land that may be required for low-level waste storage during the term of a renewed license and associated impacts will be small. Nonradiological impacts on air and water will be negligible. **The radiological and nonradiological environmental impacts of long-term disposal of low-level waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient low-level waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.**

The classification system for radioactive wastes makes no sense – basing the classification on how waste is generated not on how toxic or long-lived it is. Therefore, dangerous and very long-lived radionuclides are in so-called low-level radioactive wastes. Wastes need to be re-classified according to longevity and toxicity.

Currently, no new LLRW sites have been developed; those existing are environmental disasters now and therefore long range impacts from current and additional wastes are likely to create additional harm to host communities.

Assuming that no new sites develop, and knowing that there is no certainty that sites now existing will continue to accept wastes from out-of-state, current reactor site communities may well be stuck with storing LLRW wastes that continue to be generated - and become dump sites. Reactors are located near water, lakes, rivers, oceans and population centers. Because of their locations, and for additional reasons, they are not suited for waste storage. Granting license renewals, without solving the long term storage needs of both LLRW and HLW, is not acceptable.

Additionally at some reactors, including Pilgrim NPS, LLRW was allowed to be buried on site during the early years of operation. There is no assurance that, "radiological impacts to the environment will remain small during the term of a renewed license" because those wastes have not been removed and it is possible that migration and/or exposure to the population can occur before 2032. Removal of on site buried waste should be a requirement of re-licensing so that the site can re-start "fresh."

4. Decommissioning – Issue Waste Management

Table B-1 states the following and it is nonsense.

Waste management	1	SMALL. Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.

How can this be? 20 more years of operations would clearly produce more wastes of all classes. There is no guaranteed federal repository available. Even if there is a repository available in 15-20 years, there is no requirement that that the licensee has to ship all its current waste to it. Further given the transportation issues there is no ability for the licensee to ship all current waste to it, even if required. A central repository would not mean that reactor sites around the country would be cleaned out. according to the government's shipping plans, in the year 2036, when Yucca Mountain is filled to capacity, there will still be 44,000 tons of nuclear waste stored at reactor sites. that means that after 38 years of shipping high level waste through our cities and towns we will have reduced on-site storage of nuclear waste by a mere 4%.

It seems unreasonable to allow continued generation of wastes until a final solution is developed and current waste is transported to it. In the interim, safer on site storage must be required – that is low density pools secured against terrorist attack/acts of malice and secured dry casks – casks spaced beyond the

current six feet and camouflaged/protected with earth and gravel berms, as described in the *Science and Global Society* report.

5. Postulated Accidents – Issue Design Basis Accidents/Severe Accidents – Age Degradation Components – need site specific certification

Our nuclear "fleet" is old and tired. For example, Pilgrim and VT Yankee were designed when Jack Kennedy was President; they went on line when Watergate was broken into and the Godfather won the Academy Awards – a long time ago. We know that the nuclear industry's and NRC's claims that reactors like Pilgrim and VT Yankee are "like new" are bogus.

As in any other industry, the nuclear industry is experiencing problems with wear-and-tear of components and systems. The industry is now plagued with age-related deterioration of mechanisms unique to nuclear power operations. Chronic exposure to extreme radiation, heat, pressure, fatigue, and corrosive chemistry are combining to cause, for example: steam generator tube deterioration; embrittlement of metal; cracking, and erosion of components integral to the protection of the public's health and safety, such as BWR core shrouds.[3] Cracking is especially problematic with BWR components made of Type 304 stainless steel. Also both the NRC and industry have admitted that they do not have the technology to detect fine cracks and that cracks can develop to the degree that the component breaks in one cycle.

As nuclear reactors get older and are re-licensed, the chance of failure of this equipment only increases.

We understand that the NRC currently approves a 20-year extension to the original 40-year license for a nuclear plant after its owner,

> demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with §54.21(a) for license renewal have been identified and that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB [current licensing bases] such that there is an acceptable level of safety during the period of extended operation.

In theory, this sounds good. In reality, this amounts to little more than a paperwork exercise. Since the beginning of 2000, for example, numerous nuclear reactors have been forced to shut down due to equipment failures caused by aging:

[3] Boiling Water Reactor Internals Aging degradation Study NUREG/CR-5754, September, 1993

March 7, 2000: The owner reported that Nine Mile Point Unit 2 in New York had automatically shut down when the system controlling the level of water over the reactor core failed. The owner attributed the failure as "Specifically, the manual-tracking card failed to provide an output signal when the feedwater master controller was switched from automatic to manual mode of operation . . . The manual-tracking card failed due to **aging.**" *[Emphasis added]*

March 14, 2000: The owner reported that Catawba Unit 1 in South Carolina had automatically shut down due to an inadvertent electrical ground problem. The owner reported "A detailed failure analysis determined that the root cause of the connector failure was the misapplication of the connector insert insulating material which is made of neoprene. ... The neoprene insert at the failure point on the connector exhibits signs of **accelerated aging** *[emphasis added].* The inserts are hardened and there are charred deposits on the end of the inserts which are indications of electrical tracking."

March 17, 2000: The owner reported that Indian Point Unit 2 in New York had been forced to declare an emergency condition and shut down after a steam generator tube failed and resulted in approximately 19,197 gallons leaking from the reactor coolant system. The owner stated "Preliminary analysis indicates that the cause of the tube failure is primary water stress corrosion cracking (PWSCC)" [i.e., aging].

March 27, 2000: The owner reported that Catawba Unit 2 in South Carolina had automatically shut down due to an inadvertent electrical ground problem. The owner reported "A detailed failure analysis determined that the root cause of the connector failure was the misapplication of the connector insert insulating material which is made of neoprene. . . . The neoprene insert at the failure point on the connector exhibits signs of **accelerated aging** *[emphasis added].* The inserts are hardened and there are charred deposits on the end of the inserts which are indications of electrical tracking."

September 12, 2000: The owner reported that Oyster Creek in New Jersey had been forced to shut down because a system needed to provide containment integrity had failed a periodic test. The owner determined "The cause of the degradation in Secondary Containment was **age-related degradation** *[emphasis added]* of the automatic ventilation exhaust valve seals."

September 27, 2000: The NRC reported that Diablo Canyon Unit 1 in California had automatically shut down after an electrical transformer failed and interrupted the supply of electricity to the reactor coolant pumps. The NRC stated "The licensee's evaluation concluded that a center bus bar overheated at a splice joint, which caused a polyvinyl chloride boot insulator over the splice joint to smoke. Eventually, heat-induced failure of fiberglass insulation on adjacent phases resulted in phase-to-phase arcing" [i.e., aging].

February 16, 2001: The owner reported that North Anna Unit 2 in Virginia had been forced to shut down due to leakage exceeding ten gallons per minute from the reactor coolant system. The owner determined "The cause of the stem packing material failure below the lantern ring is attributed to **aging**" *[emphasis added].*

April 2, 2001: The owner reported that San Onofre Unit 3 in California automatically shut down after an electrical breaker failed and started a fire. The failed breaker was reportedly 25 years old and scheduled for inspection *next* year. The owner "will implement modifications to appropriate **preventative maintenance** *[emphasis added]* procedures to address the apparent failure causes."

March 6, 2002: At Davis Besse in Toledo Ohio, a hole in the reactor's head was discovered. This was caused by aging, licensee prioritizing money over public safety and lack of NRC oversight.

June 2003: All emergency sirens failed in Pilgrim's EPZ communities on two occasions. Entergy officials were quoted in the local press, "The existing siren system is almost 25 years old, Tarantino said. The siren system has been very good over the years, it's just aging."

Aging management programs are intended to monitor the condition of equipment and structures and implement repairs or replacements when necessary to prevent failures.

The cited aging-related failures, occurring about once every 60 days, indicate beyond reasonable doubt that the aging management programs are inadequate because they are *not* preventing equipment failures.

The NRC must ascertain the effectiveness of aging management programs -- not merely the scope of these programs -- *before* granting license extensions.

The NRC cannot continue with the generic approach to age-related degradation issues for reactor licensing extension. Our nation's reactors are not made from the same cookie-cutter. In addition, many reactor components have been identified by the GAO as counterfeit and substandard[4]. Therefore industry experience is not applicable. All the generic approach accomplishes is to effectively eliminate site-specific public participation and intervention in the re-licensing proceedings on aging issues. In turn, this approach eliminates independent experts and public review of the potential impact of age-related degradation issues from the license extension process. It removes the affected public's discovery process and their ability to scrutinize and cross-examine industry and regulatory assumptions pertaining to aging safety components and public safety within the context of an adjudicatory proceeding.

[4] GAO/RCED 91-6, Counterfeit and Substandard Parts, October 1990.

6. Human Health – Issue Radiation Exposure to Public

Table B

Radiation exposures to public (license renewal term)	1	SMALL. Radiation doses to the public will continue at current levels associated with normal operations.

Nuclear reactors release radioactivity to the air and water as part of their normal day-to-day operation. There is no safe dose of radiation. Its effects are cumulative. Many studies have demonstrated that low, constant levels of radiation exposure can cause cancer and genetic mutations.

Continuing at current levels associated with normal operations is no comfort. The footprints of radiation-linked disease can be seen, for example, in communities surrounding Pilgrim[5] – elevated rates of leukemia and thyroid cancers are two examples – and in communities around VT Yankee, documented increases in Downs Syndrome. Do we really need more radiation to add to our existing biological burden? Clearly the allowable rate of release has been too large. It must be decreased.

Allowable radiation releases: The concept of ALARA is ridiculous – we do not have suggested speed limits on our highways. The standard limit for airborne release of a chemical, for example, is a lifetime cancer incidence risk of 1 in 1,000,000. Hence to match that standard (1 in 1,000,000) the lifetime exposure to radiation should be reduced to 0.015 mrem a year. It should be noted, and taken into consideration, that there is more at stake than cancer. Reproductive disorders occur at lower levels of exposure than cancer.

Monitoring releases: There is no independent verification of how much radiation is released. As a pre-requisite to re-licensing NRC should require:

[5] References for radiation linked disease patterns around Pilgrim NPS are as follows: Clapp RW, Cobb S, Chan CK, Walker B Leukemia near Massachusetts Nuclear Power Plant, letter. Lancet 1987; 2:1324-5. Morris MS, Knorr RS, Southeastern Massachusetts Health Study 1978-1986, Massachusetts Department of Public Health, 1990. Morris MS, Knorr RS, Adult Leukemia and Proximity-Based Surrogates for Exposure to Pilgrim Plant's Nuclear Emissions, Archives of Environmental Health July/August 1996 [Vol. 51) No. 4)] Spengler JD, Keeler GJ. Feasibility of Exposure Assessment for the Pilgrim Nuclear Power Plant. Cambridge MA: Spengler Environmental Consultants, 1988 Final report to the Massachusetts Department of Public Health. Clapp RW, Thyroid Cancer/Disease Elevations in communities surrounding Pilgrim NPS, statement before the Southeastern Massachusetts Health Study Review Committee, June 1992).

- Continuous monitoring at all egress routes (e.g., stacks, vents, including the Torus Vent, cooling water outlets, pipes and other potential release points) from which the reactor may discharge radionuclides.

- Sufficient remote, effluent monitors, placed with consideration of local geography and meterorology to detect elevated radioactive emissions.

- Require real-time (i.e., instantaneous) transmission of all data from both on-site and off-site monitors to the state Department of Public Health, Emergency Management Agency and local town governments.

- Require that a reactor shall not be permitted to continue operations if the emissions from it are above the established standard.

Baseline studies: Last, the question needs to be asked, "Is the population already damaged?" Baseline studies need to be done before granting a license extension.

7. Health - Waste Management
Table B-1

Offsite radiological impacts (collective effects): The 100 year environmental dose commitment to the U.S. population from the fuel cycle, high level waste and spent fuel disposal excepted, is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20-year power reactor operating term.

US Nuclear Regulatory Commission acknowledges that 12 people are expected to die as a direct result of each commercial nuclear reactor that is re-licensed and operates for its 20-year license extension period.

According to the NRC, each re-licensing is expected to release 14,800 person-rem of radiation during its 20-year life extension. The figure includes releases from the nuclear fuel chain that supports reactor operation, as well as from the reactors themselves. The NRC calculates that this level of radiation release spread over the population will cause 12 cancer deaths per reactor. There currently are 103 commercial reactors operating in the U.S. The NRC has said it expects as many as 100 reactors to apply for license extensions; this would result in at minimum 1200 cancer deaths among the U.S. population and untold other health problems.

However, this figure grossly understates the risk.

1. The NRC only calculated likely cancer deaths, so deaths from other radiation-induced diseases and non-fatal cancers are not included in its calculations. Reproductive disorders, birth defects and disease are linked to radiation exposure and are omitted from NRC's calculations.

2. Risk assessments need to be changed. The calculations, probability, are based on a "reference man" – a healthy male, 30 years of age, weighing 170 pounds. However the effect on young children, elderly, sick and pregnant must be calculated. They are the population most at risk.

3. Accidents and non-routine radiation releases are not included in the NRC's figure, and will cause still higher casualties.

4. Additional radiation releases from the storage, transportation and disposal of high-level radioactive waste created by the reactors will cause still more deaths.

Therefore calculations have to be readjusted to determine real impact; lower allowable limits established, monitoring put in place, as described above; and an alternative assessment performed.

8. Human Health – electromagnetic fields, chronic effects.

Table B-1

Electromagnetic fields, chronic effects[5]	[4]NA	UNCERTAIN. Biological and physical studies of 60 - Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. However, because the state of the science is currently inadequate, no generic conclusion on human health impacts is possible.[5]

Precautionary principle should be followed. It states that if there is evidence of harm than action should be taken to prevent harm until proven safe.

9. Postulated Accidents – Emergency Planning Needs To Be Issue

Former FEMA director, James Lee Witt was asked by the NY Governor to evaluate emergency planning for Indian Point and concluded that, "...the current radiological response system and capabilities are not adequate to ... protect the people from an unacceptable dose of radiation in the event of a release..." His conclusions were released January 2003 and hold here.

For example the radiological emergency plan, which is annually certified by the Governor, primarily covers the 10-mile radius around each reactor. However, radioactive pollution from a release can be dispersed much further. Federal studies (CRAC-11) estimate that a core melt at Pilgrim would result in 3,000 peak early fatalities (within 20 miles) and 30,000 peak early injuries (within 65 miles)

within the first year, and 23,000 peak cancer deaths.[6] A spent fuel accident would be many times worse. Boston, for example, is 30 odd miles from both Pilgrim and Seabrook with prevailing summer winds from the South West and winter winds from the North East. However, Boston is not part of emergency planning. Experience at TMI and subsequent research has established that a "shadow evacuation" will happen, but it is not accounted for in emergency planning.

With respect to the terrorist threat and the federal government's disclosure that nuclear power plants are known targets, we need to reevaluate emergency planning at the local, state and federal level. "Reasonable assurance" can only be guaranteed for the public if plans are updated to account for a fast breaking accident of considerable consequence.

Additionally, population and traffic congestion is far different today, and will be far different over the next 30 years, than when reactors were originally licensed. S. E. Massachusetts is the fastest growing area in the Commonwealth.

10. Postulated Accidents – Effects Global Warming, Coastal Erosion & Increased Severity Coastal Storms Needs To Be Added As Issue

The EIS discusses the effects of re-licensing on the environment but does not discuss the reverse side of the coin – the effects of projected changes in the environment over the next 30 years, or so, on the reactor and its site. Evidence mounts on global warming – elevated sea levels, erosion and increased frequency and intensity of storms. Its effects need to be analyzed for each site seeking a re-license.

11. Aquatic Ecology (for plants with once-though and cooling pond heat dissipation systems) – Issues: entrainment of fish and shellfish in early life stages; impringement of fish and shellfish; heat shock) – requires reassessment

Problem: Marine life in all forms, from endangered species to essential microscopic organisms, is being harmed and killed by once-through cooling systems, used to remove waste heat at nuclear power stations. A typical once-through cooling system draws into each reactor unit more than a billion gallons of water a day, 500,000 gallons a minute. After cycling through the power generating station, the heated water is discharged at temperatures up to 25 degrees F hotter than the water into which it flows. A total of 59 out of the 103

[6] Calculation of Reactor Accident Consequences , U.S. Nuclear Power Plants (CRAC-2), Sandia National Laboratory, 1982.

U.S. reactor units rely on this system, either exclusively or in conjunction with closed cycle canals or cooling towers – Pilgrim and Seabrook are among them.

In contrast, operators using cooling towers draw in a lowered water intake of about 20,000 gallons a minute, reducing the potential for damage to marine life sucked into the nuclear plant. Cooling towers also eliminate the need to discharge large volumes of heated water into the water source and the resulting damage to the marine environment in the discharge area.

Overall Harmful Effects of the Once-Through System: The environmental impact of diverting more than a billion gallons of water per unit per day from a water source such as an ocean or estuary, heating it up, and then discharging it at temperatures up to 25 degrees F higher than the surrounding water has been shown to cause significant damage. Not only are marine animals "entrained" or "impinged" by the intake system, but billions of smaller marine organisms, essential to the food web, are also sucked into the reactor operating system and largely destroyed in this process. *Entrainment* involves the drawing in of marine life through an intake tunnel, pipe, or canal at a velocity the marine animals cannot resist. Once drawn in, they are subject to *impingement,* becoming trapped against "prevention devices" such as screens, racks, bars, and barrier nets. Larger animals may then drown or suffocate after becoming impinged.

Smaller fish and other organisms may be entrained through the entire reactor system and temperatures up to 25 degrees F hotter than the water into which it flows. Indigenous marine life suited to colder temperatures is consequently eliminated or, in the case of endemic fish, forced to move, disrupting delicately balanced ecosystems.

Moreover, the new, warmer ambient water temperatures often encourage warm-water species to colonize the artificially maintained warm-water zone. When the warm water flow is diminished or halted because of maintenance, cleaning, or repair work on the reactor, these species are often "cold-stunned;" many subsequently die of hypothermia. Species affected include endangered sea turtles, marine mammals, fish, and sea birds.

In addition, the heated water is discharged with such force that surrounding sea beds are often scoured to bare rock, leaving a virtual marine desert bereft of life on the ocean floor.

Pilgrim is located on Cape Cod Bay. Our fishing industry and coast line is at risk resulting in ecological and economic hardship. Fishermen are either restricted or prohibited from fishing. Yet, Pilgrim is allowed to essentially suck Cape Cod Bay dry. Do they have a permit for taking?

Recommendation:
Nuclear reactor sites must be held to the exact same standards as individuals and groups impacting aquatic ecology - this it not the case, now. They should be required to employ the "best technology available to minimize adverse environmental impact." Given its vastly superior efficiency, it is impossible to minimize adverse environmental impact without re-circulating the water by some type of closed cooling system - that is cooling towers or some other state-of-the art dry cooling.

Re-licensing must be contingent upon replacing once through cooling systems with cooling towers or another state-of-the-art dry cooling system that reduces water intake below the rate achieved by cooling towers and eliminates heated water discharge.

Process – Change Methods NRC Uses To Determine "Findings"

12. Risk assessments – evaluate consequences and correct flaws in calculating accident probabilities.

Nuclear plant risk assessments are really not risk assessments because potential accident consequences are not evaluated. They merely examine accident probabilities -- only half of the risk equation.

Consequences are potentially so catastrophic that they must be considered. Example: Federal studies estimate that a core melt at Pilgrim would result in 3,000 peak early fatalities (within 20 miles) and 30,000 peak early injuries (within 65 miles) within the first year, and 23,000 peak cancer deaths. A spent fuel accident would be **many** times worse. Comparable figures for VT Yankee are 7,000 peak early fatalities (within 15 miles) and 3,000 peak early injuries (within 35 miles) within the first year, and 17,000 peak cancer deaths. [7]

Moreover, the accident probability calculations are seriously flawed. They rely on assumptions that contradict actual operating experience. The risk assessments assume nuclear plants always conform to safety requirements, yet each year more than a thousand violations are reported. Plants are assumed to have no design problems even though hundreds are reported every year. Aging is assumed to result in no damage, despite evidence that aging materials killed four workers. Reactor pressure vessels are assumed to be fail-proof, even though embrittlement forced the Yankee Rowe nuclear plant to shut down. The risk assessments assume that plant workers are far less likely to make mistakes than actual operating experience demonstrates. The risk assessments consider only

[7] Calculation of Reactor Accident Consequences , U.S. Nuclear Power Plants (CRAC-2), Sandia National Laboratory, 1982.

the threat from damage to the reactor core despite the fact that irradiated fuel in the spent fuel pools represents a serious health hazard. The results from these unrealistic calculations are therefore overly optimistic. Furthermore, the NRC requires plant owners to perform the calculations, but fails to establish minimum standards for the accident probability calculations. Thus, the reported probabilities vary widely for virtually identical plant designs indicating that self-assessment is neither reliable nor accurate.

13. Monitoring Upgrades Required

See discussion, section 6.

14. Cost Effectiveness Of Re-Licensing And Alternatives Analysis

Cost Effectiveness
Nuclear power does not make economic cents. Taxpayers and ratepayers heavily subsidize the industry making our electric bills too high.

Energy Alternatives- does New England need nuclear reactors to meet its electricity demand? Natural gas and developing the state's potential for renewable energy and energy efficiency measures can meet projected increases in state demand for electricity in 2012 and beyond. By advocating to ensure Pilgrim and VT Yankee close, as originally planned, and focusing our resources on developing renewable energy production and conservation programs in the region, Massachusetts can do more than meet electricity demand – we can protect public health, prevent environmental degradation, and decrease our vulnerability to terrorist attack, while investing in technology that can help Massachusetts develop its leadership in the high tech economy.

Respectfully submitted by,

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