PILGRIM WATCH TESTIMONY IN FAVOR OF S. 1798:
AN ACT ESTABLISHING FUNDING TO PROVIDE MONEYS FOR POSTCLOSURE ACTIVITIES AT NUCLEAR POWER STATIONS

Pilgrim Watch ("PW") is a non-profit citizens' organization that serves the public interest on issues regarding the Pilgrim Nuclear Power Station specifically and on nuclear power in general. The organization is located at 148 Washington Street, Duxbury, Massachusetts, 02332. Its membership extends throughout the Commonwealth.

OVERVIEW

We ask your support for *An Act establishing funding to provide moneys for postclosure activities at nuclear power stations, presented by Senator Daniel A. Wolf.* (Attachment A) The purpose of the Act is insure that, after Pilgrim shuts down, there will be money available for a complete and timely decommissioning of the Pilgrim site, or any commercial reactor in the Commonwealth, to protect the economic interests of the Commonwealth. The Act would require Pilgrim, and any other commercial nuclear reactor in the Commonwealth, to pay an annual $25,000,000 post-closure funding fee. The fee will be placed in a trust fund in the office of the State Treasurer. After Pilgrim, or any other commercial nuclear reactor in the Commonwealth, has been completely decommissioned, any excess in the fund will be returned to the plant owner, with interest.

As of December 31, 2004, Pilgrim had $896.42 million dollars in its Decommissioning Trust Fund (DTF). In 2014 Entergy told the NRC that the estimated cost to decommission Vermont Yankee, a smaller Entergy-owned nuclear power station, would be more than $1.243 billion.

There is no rational reason that it will cost less to decommission Pilgrim. To the contrary, there is ample reason to expect that, in 2014 dollars, decommissioning Pilgrim will cost at least $100 million more than Entergy's Vermont Yankee estimate, and there is reason to fear that the cost could be half a billion dollars more.

The bottom line is that Pilgrim's decommissioning fund now contains <u>at least half a billion, and perhaps more than a billion, dollars less than will be needed</u> to decommission the Pilgrim site.

The goal of the Act is to insure that Pilgrim will be properly decommissioned, and that money deposited by Entergy into the Commonwealth's trust fund, and not Massachusetts tax-payers, will pay for the decommissioning that the Act requires.

If there is not enough money, what will happen?

1. Citizens will be stuck paying the difference. Pilgrim's owner is a limited liability company. There are no other guaranteed assets to pay for cleanup costs if it runs out of money for decommissioning. Connecticut ratepayers had to pay a $480 million shortfall for cleanup of CT Yankee. A similar shortfall at Vermont Yankee is likely to result from the discovery of strontium and tritium contamination. There are tritium leaks at Pilgrim.
2. Entergy may "raid" whatever it has in its decommissioning fund to meet expenses that have nothing to do with cleaning-up Pilgrim. Entergy's Vermont DTF is inadequate to decommission Vermont Yankee. Even so, Entergy wants to use the Vermont Yankee's DTF to pay $600,000 in local taxes; to pay security costs to guard the spent fuel on site through 2050's; to pay for the transfer of the spent fuel from the pool to dry casks; and to pay for worker retirement costs. Massachusetts must assume that Entergy will try to do the same thing with respect to Pilgrim's DTF fund, and to do so will further diminish a fund that is already insufficient.
3. If Entergy runs out of money and Massachusetts is left holding the bag, there unavoidably will be a temptation to do less to decommission and cleanup to save taxpayer money.
4. Without enough money to decommission, Entergy will put its Pilgrim reactor into "SAFSTOR"- mothball it in place – for 60 years. Decommissioning will not even start until about 2092. During "SAFSTOR," workers with specific knowledge of spills and other specific problems will have retired, the workforce is reduced to a skeleton crew; offsite emergency planning is eliminated; and contributions to the state for environmental monitoring likely are eliminated too.
5. Entergy refused to guarantee Vermont that Entergy would be financially responsible for decommissioning after Vermont Yankee's planned SAFSTOR period. Massachusetts should expect that Entergy will similarly refuse to guarantee financial responsibility for cleaning-up Pilgrim.

DISCUSSION

This testimony relies on publicly available information, principally four Entergy documents: Entergy's Preliminary Decommissioning Cost Analysis For The Pilgrim Nuclear Power Station, 2008[1]; Entergy's 2008 Decommissioning Cost Analysis For the Vermont Yankee Nuclear Power Station[2]; Entergy's December 19, 2014 Vermont Yankee Post Shutdown Decommissioning Activities Report[3]; Entergy's 2014 Decommissioning Funding Status Report for Pilgrim and Vermont Yankee, released by the NRC on March 30, 2015. [4] Note that all of these documents can be accessed through the NRC's website using the NRC's ML number.

An analysis of these reports shows that, as of today, **Pilgrim is at least $500 million dollars short** of having the funds that will be required to fully and safely decommission Pilgrim. Even though Entergy expects its decommissioning fund to grow in the future, Entergy's own projections show that the expected growth will not close the gap; and there is no rational basis for the Commonwealth to assume otherwise.

Absent the Postclosure Trust Fund this Act would establish, there is an unacceptably high risk, indeed a likelihood - that the Commonwealth will be stuck with hundreds of millions of dollars in decommissioning costs - costs that properly belong to and should be paid by Entergy.

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[1] NRC Document ML082170672 - Report, E11-5690-003, "Preliminary Decommissioning Cost Analysis for the Pilgrim Nuclear Power Station," prepared by TLG Services Inc., Bridgewater, Connecticut, July 2008. ("Pilgrim 2008 Cost Analysis")

[2] NRC Document ML080430658 – Report, E11-1559-002, "Decommissioning Cost Analysis for the Vermont Yankee Nuclear Power Station," prepared by TLG Services Inc, Bridgewater, Connecticut, January 2007 and submitted to the NRC on February 8, 2008, ("Vermont Yankee 2007 Cost Analysis")

[3] Vermont Yankee Post Shutdown Decommissioning Activities Report dated December 19, 2014, NRC Document ML14357A110. ("Vermont Yankee 2014 PSDAR").
This NEC document includes both a "Shutdown Decommissioning Activities Report (BVY 14-078, Docket No. 50-271) dated 12/2/2014 and a Site Specific Decommissioning Cost Estimate (Document E11-18685-001, Rev. 0) dated December 16, 2014.

[4] NRC Document ML15092A141 - 2014 Decommissioning Funding Status Report -- Entergy Nuclear Operations, Inc, ENOC-15-00005, March 30, 2015. ("Entergy 2014 Decommissioning Fund Report"), See particularly the following attachments to this report: Attachment 5. Entergy Nuclear Operations, Inc. Status of Decommissioning Funding - Vermont Yankee; Attachment 6. Entergy Nuclear Operations, Inc. Calculation of Minimum Amount - Vermont Yankee; Attachment 7. Entergy Nuclear Operations, Inc. Status of Decommissioning Funding – Pilgrim; Attachment 8. Entergy Nuclear Operations, Inc. Calculation of Minimum Amount – Pilgrim; and Attachment 16. Entergy Nuclear Operations, Inc. Minimum Financial Assurance Calculation Worksheets, Vermont (pg., 4), Pilgrim (pg.,5)

I. What Expenses Does "Decommissioning" Cover?

Entergy will argue that this Act to establish a decommissioning trust fund is an unnecessary burden**.** They will point to NRC's 2015 Decommissioning Report on the status of Pilgrim's fund as of December 31, 2014 that found Pilgrim's Decommissioning Trust Fund (DTF) sufficient but it cannot be relied upon.

What Entergy will ignore is that that the NRC, Entergy and S.1798 define "decommissioning" differently and include different expenses under that term; and that even Entergy admits that the Pilgrim DTF required by the NRC is not enough to accomplish what Entergy calls decommissioning.

A. The NRC

The Nuclear Regulatory Commission defines decommissioning narrowly, and its DTF requirements are based on a generic out-of-date decommissioning cost formula and unrealistic assumptions about cost inflation and financial market performance. The NRC formula also ignores both the costs of spent fuel management after a plant stops generating electricity, and those costs of removing subsurface contamination.

According to the NRC's rule, 10 C.F.R. 50.2, "*Decommission* means to remove a facility or site safely from service and reduce residual radioactivity to a level that permits—

(1) Release of the property for unrestricted use and termination of the license; or

(2) Release of the property under restricted conditions and termination of the license.

The NRC's Glossary says that "Decommissioning" is

> The process of safely closing a nuclear power plant (or other facility where nuclear materials are handled) to retire it from service after its useful life has ended. This process primarily involves decontaminating the facility to reduce residual radioactivity and then releasing the property for unrestricted or (under certain conditions) restricted use. This often includes dismantling the facility or dedicating it to other purposes. Decommissioning begins after the nuclear fuel, coolant, and radioactive waste are removed.[5]

[5] www.nrc.gov: Home > NRC Library > Basic References > Glossary

The NRC requires nuclear power station owners/operators to establish a "decommissioning fund" that is invested in stocks and bonds, and is supposed to grow sufficiently to cover the costs of decommissioning (as defined by the NRC) at some point in the future after the reactor shuts down. So long as the total amount in the fund is more than the NRC's formula-based "minimum financial assurance," the NRC assumes that it will be sufficient.

The size of the NRC-required fund is determined using a *pro forma* generic decommissioning formula. The formula is not site-specific; it simply asks the size and type of reactor of the reactor (BWR or PWR) to determine a base amount, and then applies an escalation factor based on the Department of Labor regional data for labor and energy costs. See 10 C.F.R 50.75(b) and (c), and the Entergy 2014 Decommissioning Fund Report.

NRC is virtually alone among nuclear regulatory authorities in adhering to pro-forma generic cost estimates. For example, Canada adopted site-specific methodology. The inaccuracy of generic cost formulas is borne out of the International Atomic Energy Agency's estimate that such a formula can only provide accuracy within 30%-50% of the actual cost. Financial Aspects of Decommissioning, IAEA-TECDOC-1476, at 13 (2005)[6]

Ignoring site-specific costs and conditions is not the only flaw in the NRC's DTF calculation. Other major flaws include that it ignores site contamination, and makes unrealistic assumptions about the extent to which the fund and decommissioning costs will grow.

a. Site contamination: The presence of subsurface site contamination will greatly increase the cost of decommissioning and site restoration. . Decommissioning costs at Yankee Rowe reactor in Western Massachusetts ballooned from an "initial estimate of $120 million to more than $750 million, in large part the result of the spread of groundwater contamination, some readings of elevated tritium in aquifer systems as deep as 300 feet.[7]" Connecticut ratepayers had to pay a $480 million shortfall for cleanup of CT Yankee[8]. A similar shortfall at Vermont Yankee is likely to result from, for example, the discovery of strontium and tritium contamination. Currently,

[6] Available at :www-pub.iaea.org/MTCD/publications/PDF/te_1476_web.pdf
[7] Briefing on Decommissioning Funding, at 25, (February 23, 2010), NRC Electronic Library ADAMS Accession NO. ML100610257
[8] Id

monitoring wells show tritium leaks at Pilgrim. The source of the tritium remains unknown; a broken pipe, seismic gaps in buildings are suspected.

b. Fund Growth and Decommissioning Cost Inflation. The NRC's decommissioning funding program assumes financial investments will consistently produce 5% profit each year and that construction costs will increase conveniently by only 3% a year. Therefore profits will always exceed cost increases and the fund will continue to grow. Neither assumption is valid.

   i. Real Growth Rate: NRC 10 CFR 50.75 (e)(ii) requires a licensee's DTF to meet a 2% real growth rate; and NRC and industry incorrectly assume that investment markets will provide a constant 2% annual real growth above inflation. For example, over the 100 year period from 1910 to 2009 annualized real growth in the Dow Jones Industrial Average amounted to only 1.76%.[9] NRC staff conducted several analogous analyses and also concluded that the market has experienced several decades long periods in which real growth fell below 2%. *See NRC Requests Plans from 18 Nuclear Power Plants to Address Apparent Decommissioning Funding Assurance Shortfalls,* No. 09-112 (ML091700104). The recent relative recovery of decommissioning funds after the economic crisis does not prove the viability of the funding assumption; the recent market crisis showed that large market events occur and it is difficult to predict them. Sufficiency of funds cannot be based on assumed constant market predictions. The consequence of missing the mark can lengthen the time a contaminated site remains in Plymouth and a shift of costs to the state and taxpayers.

   ii. Inflation: The NRC assumes that the cost to decommission will increase only by 3% annually. However, even Entergy acknowledges that a small error in its own 3% to 3.5% current assumption can dramatically alter decommissioning costs in future decades, and that even a 0.5% underestimation of decommissioning costs will lead to a 20%-25% shortfall

[9] Data available at: http://www.measuringworth.com/index.phpi

when a plant is decommissioned.[10] Entergy's estimated costs to decommission Vermont Yankee increased by 70% between 2007 and 2014. According to the founder of the Entergy subsidiary that makes all of Entergy's cost estimates, any change in the assumption about growth of costs greatly compound errors in initial "site-specific" estimates of decommissioning costs which at their best can only predict costs within 20%.[11]

iii. Any error in either the assumed fund growth rate or the assumed inflation rate will magnify any error in the other, and likely will leave the fund far short of what is needed and require the states to shoulder a significant part of the costs.

c. The Government Accounting Office (GAO): A 2012 GAO report, "Nuclear Regulation: NRC's Oversight of Nuclear Power Reactors[12]' examined NRC's estimates of decommissioning. The report concluded that that the NRC is inaccurately estimating the costs of decommissioning and inadequately ensuring that owners are financially planning for the eventual shutdown of these plants. The key findings of the GAO report included:

- The NRC decommissioning funding formula may be outdated since it was last updated in 1988 and is based on two studies published in 1978 and 1980 that used technology cost and other information available at that time.
- NRC's evaluation of licensees' funding arrangements was not rigorous enough to ensure that decommissioning funds would be adequate.
- The NRC had not established criteria for taking action if it determines that a licensee is not accumulating adequate decommissioning funds.
- The NRC relies on licensees' reports of decommissioning fund balances without verifying these balances Every two years, licensees are required to report the status of their decommissioning accounts.

[10] Entergy New Orleans, Inc., Annual Report 2009, Form 10 K, at 47 (February 26, 2010)
[11] See Thomas S. LaGuardia, *The Decommissioning Handbook*, ASME Press (2004), at 3-86
[12] A copy of the GAO report can be found HERE.

For present purposes, perhaps the most important things to remember about the NRC's definition and use of the word "decommissioning," and the NRC's-required "decommissioning fund," are that

- NRC "decommissioning" does not include "spent fuel management, site restoration, and other costs not related to decommissioning…,"[13]
- NRC DTF calculations do not include any costs of management or site restoration when determining how much money should be in the required "decommissioning" fund, and
- The entire NRC DTF calculation is a completely unreliable basis for determining what decommissioning will really cost.

A simple example will suffice. According to Entergy, the NRC's 2014 Decommissioning Trust Fund minimal Financial Assurance Estimate for Pilgrim was $628,139,915.00; for Vermont Yankee it was 622,775,764.[14] These NRC requirements fall far short of even Entergy's decommissioning cost estimates.

The NRC's $622.8 million 2014 "minimum financial assurance" for Vermont Yankee estimate is about one-half of the $1.24 billion that Entergy in 2014 estimated would be the cost to decommission Vermont Yankee. The NRC's $628.1 million 2014 "minimum financial assurance" for Pilgrim is about $300 million less than what Entergy in 2008 estimated it would cost to decommission Pilgrim if Pilgrim had shut down when its then-original license expired in 2012.

[13] NRC Proposed Director's Decision, NRC Electronic Library, ADAMS, Accession No. ML15040A169, March 27, 2015, p. 5
[14] Decommissioning Funding Status Report.

B. Entergy

The basic difference between the NRC's and Entergy's estimates of decommissioning costs is that Entergy uses the word "decommission" to include not only what the NRC calls "decommissioning" (Entergy calls this "License Termination" [15]) but also "Spent Fuel Management," and "Site Restoration." See Entergy's Pilgrim 2008 Cost Analysis,[16] its "Vermont Yankee 2007 Cost Analysis")[17] and its 2014 Vermont Yankee PSDAR,[18]

The following tables from, respectively, page 27 of Pilgrim's 2008 Preliminary Decommissioning Cost Analysis and page 9 of Entergy's 2014 Vermont Yankee PSDAR show Entergy's three categories and what estimated costs Entergy then said that each category includes. A comparison of the two shows that what Entergy plans to do in connection with decommissioning Vermont Yankee is essentially the same as its plans for Pilgrim. The table from Pilgrim's 2008 Preliminary Cost Analysis includes an overall total. This table from Entergy's 2014 Vermont Yankee PSDAR does not (although adding the three column totals yields an overall total of $ 1,242,711,000); Table 6.2 of Entergy's 2014 Vermont Yankee PSDAR says that the total 2014 estimated cost is The Vermont Yankee overall total is $1,242,712,000, i.e., about $1.243 billion.

[15] "The cost elements are assigned to one of three subcategories: NRC License Termination (radiological remediation), Spent Fuel Management, and Site Restoration. The subcategory "NRC License Termination" is used to accumulate costs that are consistent with "decommissioning" as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). Vermont Yankee PSDAR, p. *xviii* .

[16] Pilgrim 2008 Cost Analysis, 56

[17] Vermont Yankee 2007 Cost Analysis, xvii

[18] Vermont Yankee 2014 PSDAR, 9

TABLE 2
Pilgrim Nuclear Power Station
Summary of Major Cost Contributors
(Thousands, 2007 dollars)

	License Termination	Spent Fuel Management	Site Restoration	Total
Decontamination	20 831	0	0	20,831
Removal	76,730	2,783	17;969	97,482
Waste Packaging	10,069	12	0	10,081
Transportation	'9,732	338	0	10,071
Waste Disposal	61,331	1,377	0	62,708
Waste Conditioning (Off-Site)	48,678	0	0	48,678
Program Management	225,787	164,840	15,357	405,984
Property Taxes	0	0	0	0
Insurance	4,853	16,977	0	21.8
Spent Fuel Management	0	125,401	0	125,401
Regulatory Fees	10,704	0	0	10,704
Energy	13,227	. 3,356	. 271	16,853
Other	67,858	13,615	2,322	83,796
Total	549,800	328,701	35,918	914,419

Table 2
[Vermont Yankee Nuclear Power Station]
Decommissioning Cost Summary
(Thousands of 2014 Dollars)

Decommissioning Periods	License Termination	Spent Fuel Management	Site Restoration
Planning and Preparations	$119,981	$23,068	na
Dormancy w/Wet Fuel Storage	$45,746	$217,244	na
Dormancy w/Dry Fuel Storage	$137,229	$128,035	na
Dormancy w/No Fuel Storage	$54,016	na	na
Site Reactivation	$43,277	na	$578
Decommissioning Preparation	$36,283	na	$456
Large Component Removal	$141,032	na	$25
Plant Systems Removal and Building Remediation	$208,167	na	$4,118
License Termination	$30,668	na	na
Site Restoration	$823	na	$51,968
Total	$817,219	$368,347	$57,145

Several things about these Entergy estimates should be noted.

First, Pilgrim Nuclear Power Station and Vermont Yankee Nuclear Power Station are essentially identical. Both are General Electric Mark I Boiling Water Reactors, and were constructed and originally licensed at about the same time. The only significant difference between the two is that Vermont Yankee is slightly smaller than Pilgrim.

Second, Entergy's Vermont Yankee 2007 Cost Analysis and its Pilgrim 2008 Cost Analysis make clear that there is no rational basis for the Commonwealth to assume that the post-closure activity costs of Pilgrim will be less than Entergy's 2014 estimated $1.243 billion cost of decommissioning Vermont Yankee. Rather, there is every reason to assume that the post-closure costs at Pilgrim will be significantly more, for a number of reasons.

a. The Vermont Yankee 2007 Cost Analysis and the Pilgrim 2008 Cost Analysis were both prepared by the same Entergy subsidiary, TLG Services Inc., at essentially the same time. Based on the same decommissioning scenario – decommissioning after sixty years of SAFSTOR with the assumption that DOE would begin to accept spent fuel in 2017 and that all spent fuel would be removed from the site by 2014 - the Pilgrim 2008 Cost Estimate was $914 million. The Vermont Yankee Cost Estimate, for the smaller plant, was about $728 million.

b. By 2014, Entergy's estimated cost to decommission Vermont Yankee had increased by over $500 million. There is no reason to assume that the almost $200 million *larger* Pilgrim 2008 Cost Estimate would not have increased by at least as much by 2014, bringing any current estimated cost at Pilgrim to over $1.3 billion.

c. The Pilgrim 2008 Cost Estimate assumed that Pilgrim would have generated a total of 3,594 spent fuel assemblies when its then-current license expired in 2012. If Pilgrim continues to operate until its renewed license expires in 2032, it will generate, and have to deal with, about 4950 – 1350 more than the 2008 Pilgrim and more than 100 more than the 2014 Vermont Yankee estimate. Since Pilgrim's operations will generate 25% more

spent fuel assemblies than were considered in the 201Vermont Yankee estimate, it seems highly likely that Pilgrim's Spent Fuel Management costs will be about 25% (about $1 million) more than Entergy's Vermont Yankee spent fuel management costs.

d. Entergy's "Site Restoration" cost estimates included nothing to remove contaminated soil; and Entergy has no plans to do what a real environmental clean-up would require. Rather, Entergy's estimated "Site Restoration" costs include essentially nothing more than dismantling and removing above-ground structures, as the Pilgrim 2008 Cost Analysis makes clear: "Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to the local grade." (p 22)

> "Only existing site structures were considered in the dismantling cost. The electrical switchyard was assumed to remain after Pilgrim was decommissioned in support of the regional transmission and distribution system. The intake and discharge canals were abandoned. The large underground tunnels between the cooling water intake and turbine building and discharge structure were assumed to be isolated, backfilled, and abandoned in place Site utility and service piping were also abandoned. Electrical manholes were backfilled with suitable earthen material. Asphalt surfaces in the immediate vicinity of site buildings were broken up and the material used for fill, as required. The site access road remained in place." (pp 16-17).

The "site restoration" costs that Entergy included in its Vermont Yankee cost estimates similarly assumed that there would be essentially no removal of contaminated soil. [20]

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[20] "After the decommissioning process is complete, site restoration activities will result in structures being removed from the site and the site being backfilled, graded and landscaped as needed. Vermont Yankee 2104 PDSAR, 32

"Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are assumed to be removed to a nominal depth of three feet and backfilled to conform to local grade." Vermont Yankee 2014 PDSAR, Document E11-1685, Sec. 3, p 18

Third, there is no reason to assume that Entergy actually will use any money beyond what may be in the Pilgrim decommissioning fund for decommissioning. Several years ago Entergy said that it then planned partially to "fund the expenditures for license termination and spent fuel management … from proceeds from spent fuel litigation against the Department of Entergy (DOE)." (Pilgrim 2008 Cost Analysis, 1). However, Entergy has not made, and cannot be expected to make, a binding commitment actually to do so; the Vermont Attorney General has been very clear that there is no Entergy guarantee that any federal reimbursements would be used for decommissioning. Beyond that, it is impossible to guess when and how much Entergy might eventually receive as the result of any future litigation, or that any amounts that Entergy receives will be sufficient.

More important, any such DOE litigation cannot provide Entergy the money it will need for "license termination and spent fuel management;" rather, litigation can only reimburse Entergy for what it has already spent. Unless Entergy has first have found other funds, and actually paid for, "license termination and spent fuel management," there will be no "proceeds from spent fuel litigation."

We recognize that Pilgrim's License Condition J4 says that "Entergy Nuclear shall have access to a contingency fund of not less than fifty million dollars ($50m)." However, that fund is earmarked first "for payment, if needed, of Pilgrim operating and maintenance expenses, the cost to transition to decommissioning status in the event of a decision to permanently shut down the unit, and decommissioning costs." As far as decommissioning itself is concerned, the License Condition only allows Entergy to "use any remainder of the $50 m contingency fund that has not been used to safely operate and maintain the plant to support the safe and prompt decommissioning of the plant." Even if the entire contingency fund were available for "safe and prompt decommissioning," it would provide less than 10% of the additional money needed.

"Following license termination, the estimate accounts for 18 months of Site Restoration activities. This includes building demolition, excavation of below grade services, and limited restoration of the site." *Id.*, Sec. 4, p. 2

The bottom line is clear – to protect its citizens, the Commonwealth must assume that the cost (in current dollars) of decommissioning Pilgrim, even to the limited degree proposed by Entergy, will be at least $1.4 billion; and that Entergy will not be able, or willing, to pick up that large an expense. If, as was the case in Connecticut and Vermont fears may be the case at Vermont Yankee also, the Pilgrim site is contaminated, the costs could easily approach $2 billion. See pp, 18-19 below.

S. 1798.

The Act, S. 1798, is intended to ensure that there will be enough money available to do everything that is necessary fully to decommission and decontaminate the Pilgrim site - so that the site can be used for any beneficial purpose desired by the Commonwealth or the Town of Plymouth.

Accordingly the Act defines "decommissioning" and "postclosure activities" to include closing and decontaminating a nuclear power station and nuclear power site, including dismantling the facility, removing all nuclear fuel, coolant and nuclear waste from the site, job training, site and environmental cleanup, and off-site emergency planning.

Unlike Entergy's Pilgrim 2008 Cost Estimate and its Vermont Yankee 2007 Cost Analysis and 2014 PSDAR, the Act includes the costs of important post-closure activities that are essential to protect the Commonwealth's interests - such as moving nuclear waste and spent fuel waste off site, emergency planning, job training, and – perhaps most important – cleaning up the Pilgrim site so that it can safely be used by future generations. For both Pilgrim and Vermont Yankee, the only planned "site restoration activities" were to dismantle above-ground structures. Entergy's cost estimates include nothing to remove contaminated soil.[21] Entergy does not plan to do what a real environmental clean-up would require.

[21] "Site Restoration" is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to the local grade. p 22

II. Pilgrim's Decommissioning Fund Is Inadequate

Entergy's 2014 Decommissioning Funding Status Report said that its current Pilgrim decommissioning balance was $896.42 million,[22] and projected that the Pilgrim decommissioning fund balance will grow to $1.266 billion by 2032 and $1.360 after the next seven years of the decommissioning period. This increase will not even begin to close the present gap between the likely decommissioning cost and the amount of money in the decommissioning fund. Assuming only a 2% rate of inflation, Entergy's 2008 estimated Pilgrim decommissioning coat of $914 million would increase to about $1.5 billion in 2032, and the more likely current (2014) cost of $1.4 billion will increase to about $2 billion.

If, as Entergy now plans, the Pilgrim reactor is put into SAFSTOR for sixty years (until 2092) the likely amount needed then (again assuming only 2% annual inflation) will be at least $4.5 billion (based on Entergy's $914 million 2008 estimate), and more likely about $6.5 billion (based on current likely costs of $1.4 billion).

There is no guarantee that the Pilgrim decommissioning fund will contain this much when decommissioning likely begins in 2092. In Vermont, Entergy made it very clear that it offers no guarantee that it will pay decommissioning costs after the SAFSTOR period.[23]

"Only existing site structures were considered in the dismantling cost. The electrical switchyard was assumed to remain after Pilgrim was decommissioned in support of the regional transmission and distribution system. The intake and discharge canals were abandoned. The large underground tunnels between the cooling water intake and turbine building and discharge structure were assumed to be isolated, backfilled, and abandoned in place Site utility and service piping were also abandoned. Electrical manholes were backfilled with suitable earthen material. Asphalt surfaces in the immediate vicinity of site buildings were broken up and the material used for fill, as required. The site access road remained in place." Entergy 2008 plan, pp 16-17.

[22] The current fund balance is hundreds of millions dollars less than any realistic estimate of what it would now cost to decommission Pilgrim. However, the current size of the fund confirms the total inadequacy of what the NRC requires.

[23] Vermont Yankee's Decommissioning As An Example of Nationwide Failures of Decommissioning Regulation, Comments Submitted to the NRC March 23, 2015 Re: Entergy Nuclear Operations, Inc., Vermont Yankee Nuclear Power Station Post-Shutdown Decommissioning Activities Report Prepared By: Fairewinds Energy Education Corp., Burlington, VT 05401, Exhibit 4, 21-22.

Entergy does not believe it has any responsibilities after the 60-year SAFSTOR period is over according to Dave Gram of the Associated Press[24], who quoted Entergy Vice President Mike Twomey during a legislative committee hearing on February 12, 2015.

> An Entergy Corp. official said Wednesday the company is offering no guarantees it will pay to decommission its retired Vermont Yankee nuclear power plant if the job's still not done by the end of a 60-year period.
> Entergy Vice President Michael Twomey told members of two Vermont legislative committees that if decommissioning isn't done by the end of the period, known in the nuclear industry as "SAFSTOR," he expects there would be litigation, with the state and Entergy taking different positions.
> "There would probably be quite a bit of litigation about that," Twomey told a joint hearing of the House and Senate Natural Resource.

Massachusetts cannot expect that Entergy will guarantee to pay Pilgrim's decommissioning costs.

Entergy has also said that the taxpayers will be the ones at risk if the Entergy subsidiaries that own or operate Pilgrim are not able to pay decommissioning expenditures. Entergy told the Vermont Public Service Board that the former owners of the Vermont Yankee nuclear plant and their ratepayers are unlikely to be required to pay any shortfalls in decommissioning funds, and that the NRC has on several occasions said that the burden of paying any such shortfalls would fall on taxpayers.[25]

In attempting to assure the Vermont Public Service Board that the former owners of the Vermont Yankee nuclear plant and their ratepayers are unlikely to be required to pay any shortfalls in decommissioning funds, Entergy has noted that the NRC has on several occasions said that the burden of paying any such shortfalls would fall on taxpayers:

> NRC regulations do not specifically address the potential liability of other parties in the event that the licensed owner is unable to provide the funds required for decommissioning. In the past, the NRC indicated that any failure of the licensed owner to meet its decommissioning funding obligations would result in a

[24] Entergy: No guarantee it will pay costs to close Vermont Yankee if work extends past 60 years, Associated press (February 11, 2015) http://www.foxbusiness.com/markets/2015/02/11/entergy-no-guarantee-it-will-pay-costs-to-close-vermont-yankee-if-work-extends/

[25] Synapse: Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Plants, Exhibit 5, 26-27.

> burden on taxpayers -- presumably in the form of a publicly funded cleanup. See, e.g., SECY-94-280 (Nov. 18, 1984), at 4. ("Such action would either increase the potential risk to public health and safety of the decommissioning process or would shift the burden of decommissioning funding from ratepayers to taxpayers.") (emphasis added); 61 Fed. Reg.15427, 15428 (Apr. 8, 1996)("The liability of the licensee to provide funding for decommissioning may adversely affect protection of the public health and safety. Also, a lack of decommissioning funds is a financial risk to taxpayers (i.e., if the licensee cannot pay for decommissioning, taxpayers would ultimately pay the bill.

It is up to the Massachusetts legislature to do what is necessary to insure that Massachusetts taxpayers will not have to do so. Other than enriching Entergy, there is no reason that the tax-paying Massachusetts public should have to pay the price if Pilgrim's owner comes up short on what they should do safely to close, decommission and decontaminate plants here**.** The goal of this ACT is to protect the public by requiring Entergy to pay into a Post-Closure Trust Fund.

III. It Is Important to Enact the Post-Closure Trust Fund Bill.

1. **The Post-Closure Trust Fund reduces the otherwise unavoidable and significant risk that taxpayers or ratepayers will have to pay for claims and costs resulting from a nuclear reactor in the Commonwealth.**

Pilgrim does not have, and will not have, enough money in its decommissioning fund to pay for decommissioning as defined by Entergy or for the postclosure activities required by the Act. The fund is now <u>at least one-half billion dollars short</u> – and if any significant portion of the site must be decontaminated, the shortage (even in current dollars) could be twice that.

Entergy as a whole is facing a more than five billion dollar decommissioning shortfall. In the Northeast, Energy owns 7 nuclear power plants: Indian Point Units 1, 2 and 3; Palisades, Vermont Yankee, Fitzpatrick and Pilgrim. Between 2006 and 2008, Entergy's TLG Services, Inc. subsidiary estimated that the costs of decommissioning these plants would be between $4.9 and $5.8 billion.[26] Entergy's Vermont Yankee estimate increased by about 70%

[26] Supplemental Comments Submitted by the State of New York, NRC Doc. ML 103350167, pp 5, A-3 and A-4.

between 2007 ($728 million) and 2014 ($1.23 billion). It seems fair to assume that the costs of decommissioning the other six Northeast plants will have increased similarly, resulting in a 2014 estimated cost for the seven of between $8.3 and $9.8 billion. By comparison, in 2014 Entergy's decommissioning funds for those seven plants, in the aggregate, totaled only about $4.3 billion. (Decommissioning Status Report)

It is hardly surprising that Entergy has arranged its corporate structure so that no other part of Entergy will be liable for any of the liabilities of any of subsidiaries that own any of these plants. Neither is it surprising that Entergy refused to guarantee that it would pay the Vermont Yankee decommissioning costs after the sixty year SAFSTOR period.

Vermont Yankee closed early for economic reasons; it could not compete with natural gas and wind in today's market electricity economy. The same factors impact Pilgrim. Regardless of when Pilgrim closes, Massachusetts cannot assume that Entergy will pay, or even will be able to pay for Pilgrim's decommissioning.

2. **The Post-Closure Trust Fund reduces the risk that taxpayers or ratepayers will have to pay for unexpected decommissioning costs.**

Previous decommissioning experience shows that unexpected decommissioning costs cannot be ignored. Both Connecticut Yankee and Vermont Yankee are significantly more contaminated than any decommissioning estimates expected.

The utilities that owned Connecticut Yankee had originally set aside a Decommissioning Fund of $410 Million for decommissioning Connecticut Yankee, a process that began in 1998.[27] The cost of decommissioning CY climbed to $938 Million by November 2006's estimate due to Strontium 90 (Sr 90) that had contaminated the water table surrounding the plant and was discovered well after the decommissioning process began.[28] The contamination problems at

[27] (*Hartford Current, November 12,2005 http://www.courant.com/news/local/hccynukemess.artnov12,0,6222764.story?col l=hc-headlines-home*)

[28] The PSDAR is available at http://www.connyankee.com/assets/pdfs/Document1.PDF; the Haddam Neck Plant License Termination Plan, Rev. 4, is available at NRC ADAMS Accession No. ML063390404.

Connecticut Yankee were not reflected in the "generic" estimate, as they were unknown to the owners prior to shutdown. These costs have been passed on to Connecticut's ratepayers.

The State of Vermont recent announced that Strontium-90, a bone seeker, has been discovered in Vermont Yankee monitoring wells. Titanium contamination was revealed in 2009 and 2010, but the extent of contamination is not yet known. See http://www.beyondnuclear.org/nuclear-decommissioning-costs/

Pilgrim has had a history of releases, culminating in blowing its filters in 1982 causing contamination both on and offsite. Pilgrim did not have any onsite monitoring wells until November 2007. At that time only (4) were installed, generally located between the reactor and the shoreline. Today there are 22 wells. Neither the licensee nor the state knows the source of the tritium that has been found in well samples. The onsite monitoring wells do not provide a reliable indicator to base an assumption that site contamination is not significant. Also there is persistent community discussion of burial of waste onsite in Entergy's property off the Pilgrim Access Road.

At this point in time the extent of potential site contamination at Pilgrim is simply not known; and the costs of cleaning up all site contamination cannot be estimated. That said, the over $500 million decommissioning cost increase that subsurface contamination caused at Connecticut Yankee demonstrates that unexpected decommissioning costs cannot be ignored.

3. **The Post-Closure Trust Fund is especially important because Pilgrim's owner is a limited liability corporation (LLC).**

Pilgrim is an LLC **w**ith no significant assets beyond a single power plant – a plant that will have negative value when Pilgrim stops generating electricity. Because Entergy chose this LLC structure, it hopes to enjoy all the benefits of Pilgrim's profits, while at the same time avoiding Pilgrim's responsibilities and liabilities.[29]

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[29] Synapse: Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Plants, Exhibit 5. See pp 2, 30-31

> Over the last ten years, the ownership of an increasing number of nuclear power plants has been transferred to a relatively small number of very large corporations. These large corporations have adopted business structures that create separate limited liability subsidiaries for each nuclear plant, and in a number of instances, separate operating and ownership entities that provide additional liability buffers between the nuclear plant and its ultimate owners. The limited liability structures being utilized are effective mechanisms for transferring profits to the parent/owner while avoiding tax payments. They also provide a financial shield for the parent/owner if an accident, equipment failure, safety upgrade, or unusual maintenance need at one particular plant creates a large, unanticipated cost. The parent/owner can walk away, by declaring bankruptcy for that separate entity, without jeopardizing its other nuclear and non-nuclear investments.
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> As mentioned earlier in this Report, the multiple layers of subsidiaries, including LLCs, that have been created by parent corporations in the nuclear industry are a cause of serious concern. Even if a court concludes that the liability of the subsidiary that actually operates the nuclear plant should be extended to business structures above it (for example, if under capitalization and profit distributions have left the subsidiary unable to cover the costs of unanticipated repairs or security improvements and the subsidiary decides to cease operations), the ability of the court to find a senior business entity with sufficient capital could be complicated by multiple layers of subsidiaries and LLCs.
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> Given that the presumption in every state and federal statute is for the limitation of corporate liability, the burden is always on the party trying to extend that liability to show that the law, facts, and public policy all support violating the statutory presumption. Courts, in general, are reluctant to pierce the corporate veil and extend liability; when multiple corporations are involved, that reluctance only increases.

Massachusetts cannot take the risk of millions of dollars of taxpayer expense if Pilgrim defaults on its decommissioning obligations.

This act will reduce significantly that risk. The Act requires Entergy to pay into the fund while Pilgrim is still operating and has resources. It avoids the situation where a LLC faces a decommissioning shortfall and there are insufficient assets to pay for the true decommissioning cost of the facility. With no way for these costs to be recovered from the LLC, these shortfalls will ultimately be borne by the citizens of the state in which the LLC is located - for many years after the reactor has stopped generating electricity. The State of Massachusetts, New York and

Vermont noted that multiple layers of limited-liability corporations stand between Pilgrim, Fitzpatrick, and Vermont Yankee and its corporate parent[30].

4. **The Post-Closure Trust Fund is critical to the timetable for decommissioning the plant**.

Entergy plans to mothball Vermont Yankee for the next sixty years, a process referred to as SAFSTOR, and only after that to start decommissioning. Its plan for Pilgrim appears to be the same.

The interest of the Commonwealth, and those of the towns surrounding Pilgrim, would be far better served if decommissioning began as soon as possible after Pilgrim stops generating electricity, so that the property can be used for other taxable purposes, and so that workers with institutional knowledge of the history of spills and releases are there to properly direct cleanup. Another advantage of prompt decommissioning is that the influx of decommissioning workers over ten or so years immediately following shut-down will provide money to the host community to act as a cushion for its transition to the loss of income from an operating reactor.

An inadequate decommissioning fund effectively insures that there will be no accelerated decommissioning timetable – Entergy will delay decommissioning as long as possible in the hope that its decommissioning fund will grow enough to cover as much of the cost as possible.

5. **The Post-Closure Trust Fund hedges against the owner of the reactor, Entergy in the case of Pilgrim, using the decommissioning fund as a "cookie jar."**

The current decommissioning fund does not have enough money to pay, for example, the post-shutdown costs of security at the plant or spent fuel management. Entergy has a history of tapping into the fund.

Before tapping into the fund, Entergy would have to get permission from NRC, but such permission does not seem hard to obtain. In 2009, Entergy at Vermont Yankee asked the NRC

[30] Commonwealth of Massachusetts Office of the Attorney General Letter to William Dean Director NRR, NRC, October 20, 2014

for permission to draw $219 million from the fund to move and store the fuel in dry casks. The NRC approved the plan the following year; and Entergy plans to file a renewed request this year.

As part of the agreement pursuant to which Entergy bought the Palisades nuclear power station in 2007, both the seller and Entergy raided the Palisades decommissioning fund. Around $100 million went into the seller's pockets, another about $100 million into Entergy's, and about $100 million was refunded to ratepayers – likely to justify the raid or to quite dissent. One result is that the Palisades fund now has less than even the NRC minimum, and even that minimum contains little or nothing to resolve contamination resulting from Palisade's decades of radioactive leaks.

It could hardly be more obvious that taking money out of a decommissioning the fund reduces the amount of available, reduces any potential growth of the fund, puts the taxpayers at increased risk, and delays cleanup.

6. The Post-Closure Trust Fund is hardly unfair to Entergy. If Entergy, for example, has put away sufficient funds to decommission Pilgrim, then it will get back the monies that they put into the Trust Fund. Owners of industries and homeowners must pay to clean-up the messes that they make; nuclear reactors should be no different.

7. **A Post-Closure Trust Fund is not pre-empted.** Under existing Supreme Court precedent, an analysis of whether a state law is pre-empted requires a consideration of both the purpose and effect of the state law in question. Any state law grounded in radiological safety concerns or that has a "direct and substantial" effect on the safety of nuclear plant "construction and operation," falls within the field exclusively occupied by the NRC and therefore preempted. A state's economic interests are not. . This bill is NOT focused on radiological safety but instead exercises the state's authority to protect itself based on economic considerations. (Attachment B)

Respectfully submitted,

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May 1, 2015

ATTACHMENT A: S.1798

An Act establishing funding to provide moneys for postclosure activities at nuclear power stations.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. Chapter 10 of the General Laws, as appearing in the 2012 Official Edition, is hereby amended by inserting after section 74 the following new section:-

Section 75. Funding To Provide Moneys For Postclosure Activities At Nuclear Power Stations

(a) The purposes of this section include the following:

1. To encourage the productive use of a site once a nuclear power station on the site ceases to generate electricity.

2. To diminish any negative impacts to the commonwealth from having unavailable for long periods a site that is well-suited and situated for other beneficial activities.

3. To reduce the risk that taxpayers, ratepayers, or utilities will experience adverse claims or costs resulting from a shortage of available funds for postclosure activities at a nuclear power station.

(b) Definitions. For the purposes of this section the following words shall have the following meanings:-

“Affiliate”, shall mean any business which directly or indirectly controls or is controlled by or is under direct or indirect common control with another business, including, but without limitation, any business with whom a business is merged or consolidated, or which purchases all or substantially all of the assets of a business.

“Decommissioning”, shall mean closing and decontaminating a nuclear power station and nuclear power site, including dismantling the facility, removing all nuclear fuel, coolant and nuclear waste from the site, releasing the site for unrestricted use, and terminating the license.

Safestor is not decommissioning for the purposes of this section.

"Nuclear power station", shall mean any commercial facility that uses or used nuclear fuel to generate electric power.

"Postclosure", shall mean the period beginning when a nuclear power station has ceased generating electric power and ending when the nuclear power station and station site have been completely decommissioned.

"Postclosure activities", mean all activities at or in connection with a nuclear power station and station site during postclosure, including, but not limited to, moving spent nuclear fuel into dry casks, job training, site and environmental cleanup, off-site emergency planning, safestor, and decommissioning.

(c) There is hereby established an annual postclosure funding fee of $25,000,000 on each nuclear power station in the commonwealth.

1. The fee shall be assessed on the owner(s) or affiliate(s) of each nuclear power station on March 1 of each year and shall be paid to the state treasurer.

2. Assessment of the fee shall cease if, after notice and an opportunity to be heard, the executive office of energy and environmental affairs issues an order finding that all postclosure activities have been completed.

(d) There shall be established and set up on the books of the commonwealth a postclosure trust fund for each nuclear power station.

1. All revenues received by the state treasurer under this section from an owner or affiliate of a nuclear power station shall be deposited into the station's trust fund.

2. Each trust fund shall be administered by the state treasurer. All balances in the fund at the end of the fiscal year shall be carried forward. Interest earned shall remain in the fund.

(e) Moneys from a trust fund created under this section shall be disbursed only in accordance with this subsection.

1. The disbursement will pay for one or more postclosure activities completed at a nuclear power station site. If the disbursement is for a postclosure activity at the station that is part of decommissioning, all moneys otherwise set aside to pay for the activity, including moneys contained in a decommissioning trust fund established under federal law, must be exhausted before any disbursement from the trust fund.

2. On issuance of authorization from the executive office of energy and environmental affairs stating the amount to be disbursed and the completed postclosure activities to which the amount applies, the state treasurer shall disburse such amount to the entity or person named in said authorization.

(f) The executive office of energy and environmental affairs shall not issue authorization under subsection

(e) except on receipt of (i) an affidavit or declaration, executed by an entity or person responsible for completing the relevant postclosure activity at a nuclear power station under the

pains and penalties of perjury, identifying any completed postclosure activity with respect to which any disbursement is requested and setting forth facts establishing that each such activity has been completed and all costs incurred by the nuclear power station owner with respect to each such activity and (ii) verification of the facts in the affidavit or declaration by the executive office of energy and environmental affairs or another appropriate state agency.

1. The secretary of energy and environmental affairs shall determine the appropriate form, content, and supporting information necessary for such affidavit or declaration.

2. Any moneys disbursed under this subsection in reliance on a false certification to the secretary of energy and environmental affairs may be recovered from the entity or person receiving the disbursement, with interest, through an action by the attorney general. Any such false certification is a false statement or claim under section 5B of chapter 12 of the General Laws.

(g) The balance of a nuclear power station's trust fund under this section, including the interest that may have accumulated within the fund, shall be returned to the owner(s) or affiliate(s) of the nuclear power station on issuance by the executive office of energy and environmental affairs, after notice and opportunity for hearing, of an order finding that all postclosure activities at the station have been completed.

SECTION 2. This act shall take effect on January 1, 2016.

ATTACHMENT B: PRE-EMPTION

STATE REGULATION OF NUCLEAR POWER PLANTS

A. The Nuclear Regulatory Commission and the Atomic Energy Act (AEA)

The AEA was first enacted in 1946 to govern the development and regulation of atomic energy in the United States. (42 U.S.C. §§ 2011 et seq.). It was amended in 1959 to add section 42 U.S.C. § 2021, which addresses cooperation between the federal and state governments over the regulation of nuclear materials: all states are expressly permitted to regulate activities for purposes *other* than the protection against radiation hazards. (42 U.S.C. § 2021(k)).

The NRC has the sole authority to establish nuclear safety regulations, but a state may regulate activities *for purposes other than protection against radiation hazards,* e.g., a state may decide how nuclear generation fits into the state's overall energy and land use plan, and may regulate a nuclear power plant to address its own economic concerns.

Relevant Provisions of the AEA:

1. Section 271, 42 U.S.C. § 2018 – "Nothing in this chapter shall be construed to affect the authority or regulations of any Federal, State or local agency with respect to the *generation, sale, or transmission of electric power* ..."

2. Section 274, 42 U.S.C. § 2021, part of 1959 amendments to the AEA – "Nothing in this section shall be construed to affect the authority of any State or local agency to regulate activities *for purposes other than protection against radiation hazards*"

B. What is preemption?

The legal doctrine of preemption is grounded in the constitutional principle that federal law takes precedence over inconsistent state law. The "Supremacy Clause" of the Constitution provides that a federal law may, under certain circumstances, render a state law unenforceable.

The AEA has explicit language dividing federal and state responsibility regarding nuclear power regulation and has been interpreted by the Supreme Court to preempt the entire field of "nuclear safety." The federal government's areas of regulatory concern are national security, public health, and nuclear safety, in which no significant role is contemplated for state regulation.

Under existing Supreme Court precedent, an analysis of whether a state law is pre-empted requires a consideration of both the purpose and effect of the state law in question. Any state law

grounded in radiological safety concerns, that has a "direct and substantial" effect on the safety of nuclear plant "construction and operation," or that actually conflicts with federal law and thus makes it impossible for a party to comply with both the federal and the state law, falls within the field exclusively occupied by the NRC and is therefore preempted. See *Pacific Gas & Electric v. State Energy Res. Cons. & Develop. Commission*, 461 US 190, 216 (1983); and *English v. Gen. Electric Co.*, 496 U.S. 72, 78-79 (1990).

Supreme Court precedent is also clear that a state or local law whose rational is grounded in economic purposes "lies outside the occupied field of nuclear safety regulation." *Pacific Gas & Electric*, 461 U.S. at 216.

C. Supreme Court Rulings.

1. Pacific Gas & Electric v. State Energy Res. Cons. & Develop. Commission, 461 US 190 (1983):

In *PG&E*, a 1976 California law imposed a moratorium on the certification of new nuclear plants until "there has been developed and... approved ... a demonstrated technology or means for the disposal of high-level nuclear waste." This moratorium was justified by the state based on the economic impacts of the failure to find a "solution" to spent nuclear fuel storage and disposal.

The Supreme Court stated, "The federal government maintains complete control of the safety and "nuclear" aspects of energy generation; the states exercise their traditional authority over the need for additional generating capacity, the type of generating facilities to be licensed, land use, ratemaking, and the like." (461 U.S. at 211-12). "There are both safety and economic aspects to the nuclear waste issue." (461 U.S. at 197). "The [NRC]...does not purport to exercise its authority based on economic considerations... Congress intended the States to continue to make these judgments." (461 U.S. at 207-208).

2. *Silkwood v. Kerr-McGee*, 464 U.S. 238 (1984):

The Supreme Court determined that Congress, in enacting both the Atomic Energy Act and the Price-Anderson Act, a statute which provided a scheme for liability in the case of a nuclear disaster, did not intend to prohibit the states from awarding otherwise available state remedies to individuals injured by radiological contamination. The Court recognized that "there is a tension between the conclusion that safety regulation is the exclusive concern of the federal law and the conclusion that a state may nonetheless award damages based on its own law of liability" (464 U.S. at256) and resolved this "tension" in favor of state law.

3. English v. General Elec. Co., 496 U.S. 72 (1990):

In *English*, a whistleblower laboratory technician complained to GE's management and to the Federal Government about several perceived violations of nuclear-safety standards at the facility, including the failure of her co-workers to clean up radioactive spills in the laboratory,

and sued at the state level for the intentional infliction of emotional distress. The Supreme Court found that English's was not preempted, since the state tort law at issue was not motivated by safety concerns and since the claim's actual effect on the nuclear safety decisions made by those who build and run nuclear facilities is not sufficiently direct and substantial. (at 78-90).

D. Other decisions relating to state and local laws regulating nuclear power:

1. Pennsylvania v. Lockheed Martin, 684 F. Supp. 2d 564 (M.D. Penn. 2010):

"If state statute was enacted with the purpose of protecting against radiation hazards, or if state regulation directly affected radiological safety regardless of the regulation's purposes, it is preempted by the AEA. However, where nuclear safety is not directly affected by the state statute, it is preempted only if there is an irreconcilable conflict between the federal and state standards or where the imposition of a state standard in a damages action would frustrate the objectives of the federal law, or where there is some direct and substantial affect on the decisions made by those who build or operate nuclear facilities concerning radiological safety levels."

2. Kerr-McGee Chemical Corp v. City of West Chicago, 914 F. 2d 820 (7th Cir. 1990)

The city required Kerr-McGee to comply with municipal ordinances, including dust control and erosion regulations, in constructing a disposal cell for radioactive material. The court held that the City Code was completely "radiation neutral," and not preempted.

3. Illinois v. Kerr-McGee Chem. Corp., 677 F.2d 571 (7th Cir. 1982).

The city argued that these certain conditions at a nuclear facility (open pits filled with refuse; broken glass; sagging roofing; fallen walls; animal refuse) constituted a public nuisance and rendered the buildings "unsafe structures" in violation of city ordinances. The court upheld the city ordinances as radiation-neutral and not preempted.

4. Entergy Nuclear Vermont Yankee, LLC v. Shumlin, 43 ELR 20201 (2nd Cir. 2013)

The U.S. Court of Appeals recently ruled that the Vermont Legislature is federally preempted from shutting down the plant. The judges agreed that the Legislature was chiefly motivated by concerns of radiological safety when it created two laws aimed at regulating Vermont Yankee. The Vermont Attorney General is currently deciding whether to appeal this decision to the Supreme Court.

5. Conn. Coal. Against Millstone v. Conn. Siting Council (*Conn. Coalition*), 942 A.2d 345 (Conn. 2008).

The Connecticut Supreme Court found preemption because Connecticut's Siting Counsel sought to regulate dry cask storage of spent fuel in a way that could directly conflict with federal requirements (942 A.2d at 350). The court also found, based on *Silkwood* and *English*, found that nuclear safety was *not* a field that Congress intended the federal government to occupy exclusively.