

September 26, 2006

Mr. Michael R. Kansler  
President  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

SUBJECT: ISSUANCE OF ENVIRONMENTAL SCOPING SUMMARY REPORT  
ASSOCIATED WITH THE STAFF'S REVIEW OF THE APPLICATION BY  
ENTERGY NUCLEAR OPERATIONS, INC., FOR RENEWAL OF THE  
OPERATING LICENSE FOR PILGRIM NUCLEAR POWER STATION  
(TAC NO. MC9676 )

Dear Mr. Kansler:

The U.S. Nuclear Regulatory Commission (NRC) conducted a scoping process, from April 14, 2006 through June 16, 2006, to determine the scope of the NRC staff's environmental review of the application for renewal of the operating license for the Pilgrim Nuclear Power Station (Pilgrim). As part of the scoping process, the NRC staff held two public environmental scoping meetings in Plymouth, MA on May 17, 2006, to solicit public input regarding the scope of the review. The scoping process is the first step in the development of a plant-specific supplement to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)," for Pilgrim.

The NRC staff has prepared the enclosed environmental scoping summary report identifying comments received at the May 17, 2006, license renewal environmental scoping meetings, by letter and e-mail. In accordance with 10 CFR 51.29(b), all participants to the scoping process will be provided with a copy of the scoping summary report. The transcripts of the meetings can be found as an attachment to the meeting summary. The meeting summary is available for public inspection in the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at <http://www.nrc.gov/reading-rm/adams/web-based.html>. The accession number for the meeting summary is ML061700055. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the NRC's PDR reference staff by telephone at 1-800-397-4209, or 301-415- 4737, or by e-mail at [pdr@nrc.gov](mailto:pdr@nrc.gov).

M. Kansler

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The next step in the environmental review process is the issuance of a draft supplement to the GEIS scheduled for December 8, 2006. Notice of the availability of the draft supplement to the GEIS and the procedures for providing comments will be published in an upcoming *Federal Register* notice. If there are any questions concerning this matter, please have your representative contact me at (301) 415-1878.

Sincerely,

**/RA/**

Rani Franovich, Branch Chief  
Environmental Branch B  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-293

Enclosure:  
As stated

cc w/encl: See next page

M. Kansler

-2-

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NAME	King/Edmonds	CJacobs	AWilamson	SUttal NLO w/changes	R.Franovich w/comments
DATE	08/09/06	08/09/06	08/09/06	09/19/06	09/26/06

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Letter to M. Kansler, dated September 28, 2006

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**Environmental Impact Statement  
Scoping Process**

**Summary Report**

**Pilgrim Nuclear Power Station  
Plymouth, Massachusetts**

**August 2006**



**U.S. Nuclear Regulatory Commission  
Rockville, Maryland**

## Introduction

On January 27, 2006, the Nuclear Regulatory Commission (NRC) received an application from Entergy Nuclear Operations, Inc. (Entergy) dated January 25, 2006, for renewal of the operating license of Pilgrim Nuclear Power Station (PNPS). PNPS is located in Plymouth, Massachusetts. As part of the application, Entergy submitted an environmental report (ER) prepared in accordance with the requirements of 10 CFR Part 51. 10 CFR Part 51 contains the NRC requirements for implementing the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations promulgated by the Council on Environmental Quality (CEQ). 10 CFR 51.53 outlines requirements for preparation and submittal of environmental reports to the NRC.

51.53(c)(3) was based upon the findings documented in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants," (GEIS). The GEIS, in which the staff identified and evaluated the environmental impacts associated with license renewal, was first issued as a draft for public comment. The staff received input from Federal and State agencies, public organizations, and private citizens before developing the final document. As a result of the assessments in the GEIS, a number of impacts were determined to be small and to be generic to all nuclear power plants. These were designated as Category 1 impacts. An applicant for license renewal may adopt the conclusions contained in the GEIS for Category 1 impacts, absent new and significant information that may cause the conclusions to fall outside those of the GEIS. Category 2 impacts are those impacts that have been determined to be plant-specific and are required to be evaluated in the applicant's ER.

The Commission determined that the NRC does not have a role in energy planning decision-making for existing plants, which should be left to State regulators and utility officials. Therefore, an applicant for license renewal need not provide an analysis of the need for power, or the economic costs and economic benefits of the proposed action. Additionally, the Commission determined that the ER need not discuss any aspect of storage of spent fuel for the facility that is within the scope of the generic determination in 10 CFR 51.23(a) and in accordance with 10 CFR 51.23(b). This determination was based on the Nuclear Waste Policy Act of 1982 and the Commission's Waste Confidence Rule, 10 CFR 51.23.

On April 14, 2006, the NRC published a Notice of Intent in the *Federal Register* (71 FR 19554), to notify the public of the staff's intent to prepare a plant-specific supplement to the GEIS regarding the renewal application for the PNPS operating license. The plant-specific supplement to the GEIS will be prepared in accordance with NEPA, CEQ guidelines, and 10 CFR Part 51. As outlined by NEPA, the NRC initiated the scoping process with the issuance of the *Federal Register* Notice. The NRC invited the applicant, Federal, State, local, and tribal government agencies, local organizations, and individuals to participate in the scoping process by providing oral comments at the scheduled public meetings and/or submitting written suggestions and comments no later than June 16, 2006. The scoping process included two public scoping meetings, which were held at the Radisson Hotel Plymouth Harbor Ballroom, 180 Water Street, Plymouth, Massachusetts, on May 17, 2006. The NRC issued press releases and distributed flyers locally. Approximately 160 people attended the meetings. Both sessions began with NRC staff members providing a brief overview of the license renewal process and the NEPA process. Following the NRC's prepared statements, the meetings were open for public comments. Thirty-three (33) attendees provided either oral comments or written

statements that were recorded and transcribed by a certified court reporter. The transcripts of the meetings can be found as an attachment to the meeting summary, which was issued on July 13, 2006. The meeting summary is available for public inspection in the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at <http://www.nrc.gov/reading-rm/adams/web-based.html>. The meeting summary and all written scoping comments can be found in ADAMS at Accession Nos. ML061700040 and ML062400368, respectively. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the NRC's Public Document Room Reference staff by telephone at 1-800-397-4209, or 301-415-4737, or by e-mail at [pdr@nrc.gov](mailto:pdr@nrc.gov).

The scoping process provides an opportunity for public participation to identify issues to be addressed in the plant-specific supplement to the GEIS and highlight public concerns and issues. The Notice of Intent identified the following objectives of the scoping process:

- Define the proposed action
- Determine the scope of the supplement to the GEIS and identify significant issues to be analyzed in depth
- Identify and eliminate peripheral issues
- Identify any environmental assessments and other environmental impact statements being prepared that are related to the supplement to the GEIS
- Identify other environmental review and consultation requirements
- Indicate the schedule for preparation of the supplement to the GEIS
- Identify any cooperating agencies
- Describe how the supplement to the GEIS will be prepared

At the conclusion of the scoping period, the NRC staff and its contractor reviewed the transcripts and all written material received, and identified individual comments. Eight (8) letters, emails, or documents containing comments also were received during the scoping period. All comments and suggestions received orally during the scoping meetings or in writing were considered. Each set of comments from a given commenter was given a unique alpha identifier (Commenter ID letter), allowing each set of comments from a commenter to be traced back to the transcript, letter, or email in which the comments were submitted. Several commenters submitted comments through multiple sources (e.g., letter and afternoon or evening scoping meetings).

Comments were consolidated and categorized according to the topic within the proposed supplement to the GEIS or according to the general topic if outside the scope of the GEIS. Comments with similar specific objectives were combined to capture the common essential issues that had been raised in the source comments. Once comments were grouped according to subject area, the staff and contractor determined the appropriate action for each comment.

Table 1 identifies the individuals providing comments and the Commenter ID letter associated with each person's set(s) of comments. The Commenter ID letter is preceded by PNPS (short for Pilgrim Nuclear Power Station). For oral comments, the individuals are listed in the order in which they spoke at the public meeting.

**TABLE 1 - Individuals Providing Comments During Scoping Comment Period**

<b>Commenter ID</b>	<b>Commenter</b>	<b>Affiliation (If Stated)</b>	<b>Comment Source</b>
PNPS-A	Mary Lampert	Town of Duxbury Nuclear Advisory Committee	Afternoon Scoping Meeting
PNPS-B	Keith Maxwell	Local Resident	Afternoon Scoping Meeting
PNPS-C	Corwne Young	District Representative for Congressman Bill Delahunt	Afternoon Scoping Meeting
PNPS-D	Mark Sylvia	Town Manager, Plymouth	Afternoon Scoping Meeting
PNPS-E	Alba Thompson	Citizen, Plymouth	Afternoon Scoping Meeting
PNPS-F	Joyce McMahon	Massachusetts Affordable Reliable Electricity Alliance (AREA)	Afternoon Scoping Meeting
PNPS-G	Pine du Bois	Jones River Watershed Association	Afternoon Scoping Meeting
PNPS-H	Robert Ruddock	Associated Industries in Massachusetts (AIM)	Afternoon Scoping Meeting
PNPS-I	Jim O'Connell	Citizen, Chatham	Afternoon Scoping Meeting
PNPS-J	Frank Collins	Precinct Six Town Meeting Member	Afternoon Scoping Meeting
PNPS-K	Rick Anderson	Carpenters Local 624	Afternoon Scoping Meeting
PNPS-L	Andre Martecchini	Selectman from the Town of Duxbury	Evening Scoping Meeting
PNPS-M	Mary Lampert	Mass PIRG	Evening Scoping Meeting
PNPS-N	Mary Lampert	Pilgrim Watch	Evening Scoping Meeting
PNPS-O	Mary Ellen Burns	Town Meeting Representative, Precinct 13, W. Plymouth	Evening Scoping Meeting
PNPS-P	Jeff Berger	Chairman, Nuclear Matters Committee of Plymouth	Evening Scoping Meeting
PNPS-Q	Becky Chin	Vice Chairman, Duxbury Nuclear Advisory Committee	Evening Scoping Meeting
PNPS-R	Peter Curley	Local Resident	Evening Scoping Meeting
PNPS-S	Joyce Mahon	Communications Director, Mass AREA	Evening Scoping Meeting
PNPS-T	Arthur Powers	Local Resident	Evening Scoping Meeting
PNPS-U	Leonard Curcuru	Local Resident, Mass AREA Member	Evening Scoping Meeting
PNPS-V	William Stone	Local Resident	Evening Scoping Meeting
PNPS-X	Sandra Woods	Local Resident	Evening Scoping Meeting
PNPS-Y	Janet Humes	Local Resident	Evening Scoping Meeting
PNPS-Z	Bob Smith	Local Resident	Evening Scoping Meeting
PNPS-AA	Jerry Benezra	Local Resident	Evening Scoping Meeting
PNPA-AB	Tom Belcher		Written Comments



PNPS-AC	Mary Lampert	Pilgrim Watch	Written Comments
<b>Commenter ID</b>	<b>Commenter</b>	<b>Affiliation (If Stated)</b>	<b>Comment Source</b>
PNPS-AD	Frank Gorkey	Energy Advocate, MASS PIRG	Written Comments
PNPS-AE	Sheila Hollis	Attorney for Town of Plymouth	Written Comments
PNPS-AF	Rebecca Chin	Vice-Chairman, Duxbury Nuclear Advisory Committee	Written Comments
PNPS-AG	Elizabeth Huggins	EPA Director, Office of Environmental Review	Written Comments
PNPS-AH	Diane Curran	Harmon, Curran Spielberg & Eisenberg, LLP; For the Office of the Massachusetts Attorney General	Written Comments

The comments and suggestions received as part of the scoping process are documented in this section, and the disposition of each comment is discussed. Comments are grouped by category. The categories are as follows:

1. Comments Concerning License Renewal and Its Processes
2. Comments in Support of License Renewal
3. Comments in Opposition to License Renewal
4. Comments Concerning Water Quality
5. Comments Concerning Aquatic Ecology
6. Comments Concerning Socioeconomic Impacts
7. Comments Concerning Human Health
8. Comments Concerning Uranium Fuel Cycle and Waste Management
9. Comments Concerning Postulated Accidents
10. Comments Concerning Alternative Energy Sources
11. Comments Concerning Monitoring Programs
12. Comments Outside the Scope of License Renewal: Emergency Preparedness and Planning, Security and Terrorism, Operational Safety, Aging Management, Energy Costs, and Energy Needs

Each comment is summarized in the following pages. For reference, the unique identifier for each comment (Commenter ID letter listed in Table 1 plus the comment number) is provided. In those cases where no new environmental information was provided by the commenter, no further evaluation will be performed.

The preparation of the plant-specific supplement to the GEIS (which is the SEIS) will take into account all the relevant issues raised during the scoping process. The SEIS will address both Category 1 and 2 issues, along with any new information identified as a result of scoping. The SEIS will rely on conclusions supported by information in the GEIS for Category 1 issues, and will include the analysis of Category 2 issues and any new and significant information. The draft plant-specific supplement to the GEIS will be made available for public comment. The comment period will offer the next opportunity for the applicant, interested Federal, State, and local government agencies, local organizations, and members of the public to provide input to the NRC's environmental review process. The comments received on the draft SEIS will be considered in the preparation of the final SEIS. The final SEIS, along with the staff's Safety Evaluation Report (SER), NRC Region I inspections, and independent review by the Advisory

Committee on Reactor Safeguards, will provide basis for the NRC's decision on the Entergy license renewal application.

## Public Scoping Meeting Comments and Responses

### 1. Comments Concerning License Renewal and Its Processes

**Comment:** We filed a notice of intent to participate in this process on May 12th, my purpose really today is to just further emphasize to the public and for the record that we will be actively participating in this process ... We feel that this is an important part of the overall relicensing process, we are here certainly to represent the citizens of Plymouth, certainly their concerns and, at the same time, open that meaningful dialogue to make sure that any of those issues are addressed in this process. (PNPS-D)

**Comment:** So what we are saying to you, when you are dealing with your regulations and that sea of paper, remember what we really are, people who think of themselves as living with a business that, in some way, threatens them unless run very ably. The Nuclear Regulatory Commission has never denied a license to any nuclear plant that wanted an extension, we are not under any illusions about what happens here today or what happens here tonight. We think you will extend that plant, but what we are saying is do it with all safety and other precautions, thinking always of the people who live here, the people who work here, the people who are going to be born here.

And always, when that impact statement comes out, will you remember it is very important, at that time, to have had some public hearings and public meetings so that we may know what it is you have found and not found? (PNPS-E)

**Comment:** We appreciate your holding this hearing for the public to be able to provide input on the environmental review you will be conducting in considering relicensing Pilgrim, the public deserves a strong voice in decision of whether to extend the license or not. (PNPS-M)

**Comment:** The reason I'm speaking is because, like one of the previous speakers, I know a little bit about what's happening China. Like that previous speaker, I happen to be pro nuclear, I happen to believe that there should be a nuclear power plant here in Plymouth. But one of the things that happens every time I come back through immigration and they say welcome home, I'm not embarrassed to say I always get this chill in my spine and occasionally, depending on how long I've been out, I get this little tear in my eye, but what's making me speak tonight is because one of the differences between us and China is the process that I anticipate we are going to have here. (PNPS-AA)

**Response:** *The NRC has established an open process to permit all members of the public to participate in the environmental scoping process. Comments can be provided to the NRC in person, by mail, and by e-mail. NRC has elected to conduct public meetings during the scoping process to ensure that interested parties have an additional opportunity to gain access to information about the project and the process in order to effectively participate. In addition, further opportunity will be provided to the public to provide comments on the Draft SEIS once it is published later this year. These comments are general in nature and do not provide new and significant information. Therefore, the comments will not be evaluated further.*

**Comment:** I am very, very concerned now about this process and I think we all should be. And this should not turn out to be a referendum on whether we are pro nuclear or anti nuclear, whether we are pro plant or not plant, I think everybody can agree on one thing, we want to have the safest possible plant. And if it's dollars versus that, and that's what it comes down to, then

that's really where the rubber is going to hit the road in this, the rubber is going to hit the road in hoping that this agency is going to do the best that they can to make sure that we and our children are protected to the maximum amount and that they are going to have a process that's going to allow us all to participate and allow us all to test the hypotheses that they are working on. (PNPS-AA)

**Comment:** While many of these considerations were taken into account at the time of the original licensing, relicensing is a time to consider the advancements in nuclear plant technologies, safety issues, evacuation scenarios, long-term health impacts, and other science and technology advancements that provide us with information and concerns that were not fully appreciated thirty years ago. (PNPS-AE)

**Comment:** Our expectation is that the NRC's EIS will assess environmental impacts and reasonable alternative courses of action related to the substantive issues regulated by the NRC under the Atomic Energy Act and NRC regulations. These include matters such as safety, radionuclide discharges or emissions to the environment, waste management, and others. (PNPS-AG)

**Comment:** And you know, the community, while there is a lot of support for the plant, the community demands, and expects and should get due diligence and proper attention to public health and safety. (PNPS-C)

**Comment:** For relicensing, for scoping, the congressman's office does request and urge that you do include rigorous, new safeguards for public health and safety, particular to ground water, potentially new wells and air protections for any potential new and significant radiation exposure, and also meteorological upgrades, potentially. All of these should be included in your scope, the analysis rigorous, de novo is the term the congressman likes to use. He recognizes that these all come at a cost, but the failure to detect any new or significant concerns is too high of a cost. (PNPS-C)

**Response:** *As part of the environmental review process, the NRC evaluates site-specific data provided by the applicant, other Federal Agencies, State agencies, tribal and local governments, as well as information from members of the public. In addition, the NRC performs independent reviews of the plant-specific environmental impacts of license renewal in accordance with the National Environmental Policy Act (NEPA) and the NRC's requirements in 10 CFR Part 51. The following technical areas are commonly included in the review: land use, ground and surface water use, ground and surface water quality, air quality, aquatic resources, terrestrial resources, threatened and endangered species, radiological impacts, socioeconomic factors, environmental justice issues, historical and archaeological resources, related Federal project activities, postulated accidents, uranium fuel cycle and solid waste management, decommissioning, alternatives to license renewal, and irreversible or irretrievable resource commitments. Other areas may be included as a result of information obtained during the NRC staff's review or from public comments during or following meetings that are held in the vicinity of the nuclear power reactor.*

**Comment:** We request that the Massachusetts Public Interest Research Group (MASSPIRG) be recorded in support of comments submitted to the NRC by Pilgrim Watch on June 12th and 14th on issues that should be included in the environmental review, on a site specific basis, of Pilgrim Nuclear Power Station's application to extend operations. The subjects include but are not limited to: security; spent fuel pool accidents; health impacts; monitoring; marine impacts; low level radioactive waste (LLRW) storage, 2012-2032; buried waste on-site; emergency

planning as it relates to the Severe Accident Mitigation Analysis; and adding a filter to the Direct Torus Vent System. (PNPS-AD)

**Comment:** By unanimous vote, June 14, 2006, the Town of Duxbury Nuclear Advisory Committee, requested that it be noted that we support comments submitted to the NRC by Pilgrim Watch on June 12 and 14th on issues that should be included in the environmental review, on a site specific basis, of Pilgrim Nuclear Power Station's application to extend operations. These include but are not limited to: security; spent fuel pool accidents; health impact; monitoring; marine impact; low level radioactive (LLRW) waste storage, 2012-2032; buried waste on-site; emergency planning as it relates to the Severe Accident Mitigation Analysis, and adding a filter to the Direct Torus Vent System. (PNPS-AF)

**Response:** *The comments are noted. The comments submitted by Pilgrim Watch on June 12th and 14th have been reviewed and are included in this scoping report. The issues raised by Pilgrim Watch will be reviewed, evaluated, and incorporated, if appropriate, in the SEIS.*

**Comment:** ... I hear something that concerns me, and that concerns me as to the process, as it applies to what we are seeing in all of the initial material we are seeing.

Now let me repeat one more time I want to see the plant continue, I am in favor of nuclear energy, but I'm also in favor of making sure that if we have the oldest plant, that we have the safest and best plant. And if people are going to be so out of touch with what's happening today, then I'm concerned for the view that this agency is going to have in prognosticating what's going to happen in the next 10 to 20 years. And I suspect that everybody out here, whether you are pro nuclear or not, whether you are pro plant or not, has that same feeling, that we have to have a fair process with issues that are not predetermined by some national policy but are going to say that we are going to live here with the safest possible plant, and that we are going to have an open hearing and we are going to have an opportunity to test all these hypotheses.

And then hopefully we'll be one of those situations where there will be interventions so that we can have people test the type of comments I heard here tonight about the ability of us to get out of here safely on one road. Keep in mind, to the east we have the ocean, to the west we have 24 miles of Miles Standish State Forest. Somebody might want to take a look at that map. We have, to the south, we have a bridge, even with our governor's new fly over, which is a problem, and we know, by the way, don't we, that the plume goes north. That means everybody is going north with the plume so, as a practical matter, you are right. (PNPS-AA)

**Comment:** So, as much as I am pro nuclear, I am also pro a process that is fair and that is a level playing field. The reason I'm speaking tonight is because I happen to have some knowledge about the roads in Plymouth, as do most of the people here.

We have four major north/south roads, out of which one of them is Rte. 3 and the other three are inadequate. One of them is a road that is primarily gravel, for a large part of it, and is impassible, that's the one nearest the hospital. I know, from talking to people in the town, that there are problems that with that road, as it gets closer to the hospital. We have Rte. 3A which, as we know, is very well traveled, but is also one lane, and we have another private street, which now runs into the Shops at 5.

There is nobody in Plymouth, there is nobody in Massachusetts who goes through Plymouth who would believe that we could have an evacuation and the reason I'm speaking tonight is because when I hear a question and the question is in terms of a fast moving event, and I see our facilitator, who I have a great deal of respect for because of the last time he was here, turns

to the person at the NRC, who I assume is the most knowledgeable, and that person says there is no problem, then we are not only not in the same town, we are not in the same state, we are not in the same country and, to lapse into the vernacular, we are not on the same planet.

So what I'm concerned about, and I understand, I understand fully that tonight we are talking about environmental issues, but I want to talk about a process issue and my process issue is that if they are as sure about everything else that is in the preliminary statement as they are about that statement, then we have a problem, and all of us, whether we are pro nuclear or not. And believe me, I want to see this plant stay, I understand what it means for the city, I understand what it means for energy, I understand all those issues because, without going into a resume, I'm involved in a company that's involved in energy on a global level, in fairly big numbers. So what I want to say is that I think we really need to be concerned about this process. (PNPS-AA)

**Response:** *The environmental review process associated with license renewal includes a detailed review of an applicant's license renewal application to determine the environmental effects of operating the nuclear power facility for an additional 20 years. However, as part of this process, some issues are precluded from consideration under the environmental review process. One of these issues is emergency preparedness. The Commission considered the need for a review of emergency planning issues in the context of license renewal during its rulemaking proceedings on 10 CFR Part 54, which included public notice and comment. Requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to facilities with renewed licenses. Through its standards and required exercises, the Commission reviews existing emergency preparedness plans throughout the life of any facility, keeping up with changing demographics and other site-related factors. Therefore, the Commission has determined that there is no need for a special review of emergency planning issues in the context of an environmental review for license renewal. The comments are noted. Emergency planning is addressed under the current operating license. Although a topic may not be within the scope of review for license renewal, the NRC is always concerned with protecting health and safety. Any matter potentially affecting safety can be addressed under processes currently available for an existing operating license absent a license renewal application. The comments provide no new information, and are not within the scope of license renewal under 10 CFR Part 51 and Part 54. Therefore, they will not be evaluated further.*

**Comment:** I do want the Nuclear Regulatory Commission to come off of the regulations and the constant din of those regulations. I know that's your work and I know that has to guide you, and I'm grateful that you have it, but there is a humanitarian and social context for those of us who live here and I would like you to understand what that really is.

We are 103 square miles, we are America's home town. We are 76,000 people, we are not the little town that we were, nor are we the naive little town that we were when that nuclear plant opened in 1972. The whole nation is not that naive, a great deal has happened since that time, a great many years, over 30, have elapsed since that time, so we are not today what we used to be, we are not tomorrow what we used to be. I want you to understand, for those of us who live here and, in my case, I was born here, I want you to know we do not see ourselves living in the boondocks, nor do we see ourselves as victims, we see ourselves as a vigorous and ongoing community with a wonderful potential, and we insist that anything that lives with us in our town add to that potential. Technologically, we have come a long, long way, and I must say that the record of Entergy with the nuclear plant has been a good one, certainly much better than Boston Edison ever hoped to have, and you know that, Nuclear Regulatory Commission, because it was you that fined them again, and again and again for accidents and other deviations from your



regulations, with one of the worse and greatest of the fines ever applied to a nuclear plant. We don't want that ever to happen again. (PNPS-E)

**Response:** *The comment is in regard to license renewal and its processes in general. The Commission has established a process, by rule, for the environmental and safety reviews to be conducted to review a license renewal application. The development of the Commission's regulations governing the license renewal process was subject to public review and comment. The comment will not be evaluated further.*

**Comment:** When an EIS is prepared, NEPA requires the NRC to “disclose the significant health, socioeconomic and cumulative consequences of the environmental impact of a proposed action.” The CEQ defines cumulative impacts as: “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” *Baltimore Gas and Electric Co. v. Natural Resources Defense Council*, 462 U.S. 87, 106-7 (1983), citing Council on Environmental Quality (“CEQ”) regulations at 40 CFR §§1508.7 and 1508.8. (PNPS-AC)

**Response:** *This comment concerns the general license renewal process. During the plant-specific environmental review of PNPS, the potential for cumulative impacts will be evaluated. Cumulative impacts will be addressed in Chapter 4.8 of the SEIS.*

**Comment:** Why do they relicenses a plant for 20 years, can't they relicenses for 8, 10, or even 12 years and re-review the licenses again after that period? 20 years is a long time and a lot at the plant and in our world could change in 20 years or by 2032. (PNPS-AB)

**Response:** *The comment refers to why the NRC allows up to 20 additional years of operation for the license renewal term. In the Final Rulemaking for 10 CFR Part 51 and 54 (56 FR 64964), the Commission decided to limit the maximum period of extended operation under the renewed license to 20 years beyond the expiration of the existing operating license. The Commission believes that 20 years is an adequate period of time to validate and reassess, if necessary, the understanding of the effects of aging and how they can be effectively managed. In addition, the exact number of years a nuclear power facility operates in the license renewal term is decided upon by entities such as State regulatory agencies and the owners of the facility. The comment provides no new information, and therefore, it will not be evaluated further.*

**Comment:** Based on the seriousness of environmental impacts, we ask the commission to broaden the scope of its environmental review to include radiation and waste accumulation and to require major improvements in Pilgrim's cooling system. (PNPS-M)

**Comment:** The Pilgrim Plant causes environmental damage in three primary ways, radioactive releases, the accumulation of dangerous waste and the high impact water cooling system. Of these, only the water cooling system is getting any attention by the commission during the review process. If the NRC decides to relicense Pilgrim, we will have 20 more years of damage to the health of ecosystems, species and humans. (PNPS-M)

**Response:** *Human health issues were evaluated in the GEIS and were determined to be Category 1 issues. The GEIS evaluated radiation exposures to the public for all plants including Pilgrim, and concluded that the impact was small. During the plant-specific environmental review of Pilgrim, the NRC will determine whether there is any new and significant information bearing on the previous analysis in the GEIS. Waste management systems and practices will be*

*described in Chapter 2 of the SEIS. Radiation as it impacts human health will be addressed in Chapter 4 of the SEIS. Waste Accumulation is a Category 1 issue and will not be addressed further. PNPS's cooling system issues will be reviewed and discussed in Chapter 2.*

## **2. Comments In Support of License Renewal**

**Comment:** Plants like Pilgrim and nuclear power plants are a stopgap piece of addressing the issue. Nuclear power and nuclear power plants for everyone in this room, environmentalists, industrialists, people in the public sector, it is now a must, it is mandatory. And when we talk about equity, Pilgrim Nuclear Power Station, as a piece of equity, is indispensable. It's indispensable for your town, it's indispensable for the environment, it's indispensable for business. No one in this room, in the future, will be able to live without nuclear power. Wind and some of the other alternative energies will be part of it. Mankind is going to change in the next generation or two, it's in the cards, that's just the way it's going to be.

Now, when it comes to equity, environmental equity, we all recognize today, also includes money and financial impacts, impacts on businesses destroyed by the changing environment, whatever. The for-profit utilities have to invest in the infrastructure. In the case of environmental assessment and analysis for the NRC, its systems, structures and components, investigating in long term fuel storage, whether it's Yucca Mountain, or regional or site storage, but for the for profit companies, they do need to address proper investment in the system, structures and components because this is not just a 20 year license extension.

... Global warming, nuclear power, is going to become much, much more a governmental issue, the NRC is going to have for hire outside. The NRC is going to have so much work in the next generation or two, it's indispensable, and people in Duxbury or Plymouth, don't worry about your habitats and your rivers. Unless we get this situation turned around and we keep plants, like nuclear power in Plymouth, on line, you won't have to worry about your fisheries because they are going to be part of the greater ocean, and this is no joke.

... Initially, I never believed this information, but there is so much data now, the government is on board, the world community is on board, Pilgrim is part of it. We need Pilgrim on line, we need to reduce our CO2 global warming issues and Massachusetts is a hi tech state, hopefully it can get involved. Well, let me tell you, when the fire department has to come out and start pumping your cellar out, and the ocean is moving up towards Main Street, you will be involved.

... Entergy has done a fantastic job. I worked at Pilgrim at one time when it was being operated by the Boston Edison Company and I can guarantee you that when Boston Edison ran it as a single nuclear power plant, as part of a fossil fleet, they didn't really know what they were doing, Entergy does. Entergy is a world class nuclear organization with the expertise to address issues and make the investments to keep Pilgrim going for a long time. We should all appreciate Entergy being here and Pilgrim staying on line, even distractors that have historically been here from the towns surrounding, they have provided a valuable input when Boston Edison was poorly managing the plant. (PNPS-B)

**Comment:** Clearly nuclear power today is an important part of our nation's energy mix. For Pilgrim, specifically, for the region, it's a significant energy source, it provides high paying, you know, good jobs and revenues for the communities. All this being said, the plant gets a green light, and we know the NRC takes very seriously public comments today and those that will be provided in the future. (PNPS-C)



**Comment:** Also, from an environmental standpoint, Pilgrim doesn't require any potentially environmentally perilous actions, such as drilling wells, sending tankers across the oceans loaded with fossil fuel cargos, nor laying pipelines over land or under sea to get fuel for this plant, nor does it require the taking of tens of thousands of acres of land to erect wind turbines for similar electrical output ... Mass AREA has weighed all the environmental, economic and energy supply traits of Pilgrim, particularly its high NRC safety rating, and concluded that the Pilgrim Nuclear Power Plant is vital to the region, state and local community for its environmentally sound operations, its economic contribution to the local community through the provision of jobs and purchase of goods and services and its provision of reliable and low cost electricity. Mass AREA encourages the NRC to grant Entergy's Pilgrim station an extension of its license so that it continues to safely operate for an additional 20 years. (PNPS-F)

**Comment:** More importantly, the electricity that Pilgrim supplies is created without generating any greenhouse gas emissions and, therefore, it does not contribute to global warming. (PNPS-F)

**Comment:** While Mass AREA's mission is broad and focused to include new electric generation in the form of renewable energy sources, developing natural gas supplies and encouraging energy efficiency and conservation, Mass AREA and its members fully support the relicensing of the Pilgrim Nuclear Power Plant. Given this pending electricity supply problem, we must keep Pilgrim station in operation as, on a typical day, it provides seven to nine percent of the Commonwealth's electricity. Without it, Massachusetts and the region, as a whole, could face power supply shortages, including rolling blackouts, a lot sooner than the prediction of two years from now. (PNPS-F)

**Comment:** We are a supporter of maintaining the generation capacity that we have here in our state and in our region. (PNPS-H)

**Comment:** Additionally, the environmental analysis in the ERG should include the plant's value, on a positive basis, to the overall environmental context of our state, and I mean that in terms of as the previous speaker was talking about, its positive impacts on the reduction or the non contribution to greenhouse gasses and to the other pollutants that may come from fossil fuel plants, and so we will elaborate on those two aspects.

But we would urge the commission to be very thorough in addressing the off site, if you will, positive environmental and socioeconomic values of this plant. Make no mistake about it, AIM is a supporter of the relicensing of this facility, as well as the relicensing of other nuclear plants in the region, as well as the expansion of the outputs of some of these plants, as appropriate by the operators and the needs of our region. (PNPS-H)

**Comment:** We or I'm here to point out to the NRC that my experience with Entergy, as stewards of the environment, has been a very positive one. (PNPS-I)

**Comment:** They are good stewards of the economy. Excuse me, not good stewards of the economy, good stewards of the environment. (PNPS-I)

**Comment:** I was familiar with the Greenwood Estate where the power plant is built, I watched the power plant under construction and I've been comfortable with it since. (PNPS-J)

**Comment:** I'm comfortable with, I haven't seen any adverse environmental impact in the period that I've watched the plant in operation. There are times that there have been fish kills of herring, I have also seen herring crowd into the corner of the harbor and I have seen significantly more

of the herring die there from lack of oxygen than I've seen at the plant, albeit I've never seen all the herring that may have been killed at the plant. (PNPS-J)

**Comment:** But the bottom line is, for the Town of Plymouth, that we are dependent upon the revenues that are produced by the plant and perhaps as much so now as any time in the past. I'm in favor of the relicensing of the plant and the sooner it happens, the happier I'll be. (PNPS-J)

**Comment:** And just to give you a personal perspective, I have worked at this plant and I can tell you that the difference between the way this plant was maintained when Boston Edison was here and the way Entergy maintains this plant is like night and day, and I'll just give you a specific example of Entergy's commitment. Following the most recent refueling outage, Entergy is developing specific site specific training to reduce injury, injuries during refuel outages and maintenance.

And just I, I just don't want to, I just want to just make a point that the economic benefit of relicensing this plant cannot be overstated, and I appreciate being part of this opportunity and this process and urge the NRC to renew this license for the economic vitality of this town. (PNPS-K)

**Comment:** Very briefly tonight, it is my intent to express to the NRC support for the renewal of the license of the Pilgrim Nuclear Power Station. It is my opinion, as well as the opinion of a significant number of residents, to whom I have spoken, both within my precinct as well as within the general Plymouth population, that the renewal of the license would indeed be in the best interest of the community of Plymouth. (PNPS-O)

**Comment:** Yeah, they are not going to have Yucca Mountain for storage until the rest of the country says not in my backyard, so let's give them a chance over here. What do they want to do with their spent rods? Well I've heard the idea of let's put it in cement. Okay, that sounds good, that's acceptable, let them do it. So what if it's in your backyard? It's got to go somewhere. If everybody says not in my backyard, what's going to happen? We are going to have blackouts, we are not going to have warm houses, we are not going to have schools because there is no tax dollars, we are not going to have jobs. (PNPS-T)

**Comment:** We are worried about this plant over here, what about the growth over here, just off Commerce Way, with all those new stores they are going to put in, with all those thousands of cars that are going to go there every day, burning up gasoline, burning up oil, burning up gas into the atmosphere with the greenhouse? So think about what you are doing here. They have a viable plant here that is producing energy that we need. Back in 1979 and the early '80s, the general manager of General Electric says we have to look at nuclear, that's the way to go. (PNPS-T)

**Comment:** So my point is this and I would like to support the Pilgrim Power Plant for the following reasons, one, we need their electricity. Two, it's going to help the residents of the Town of Plymouth with their taxes and the surrounding town also are going to benefit from it because they are going to have 700 jobs over there, paying salaries, and they are going to spend the money in their surrounding towns. (PNPS-T)

**Comment:** What bothers me is, as a taxpayer in this town, we all know what's happening, our taxes are going up and we want to get rid of one of the better taxpayers we have in town. They are willing to work with us on taxes, it's an important factor, right? (PNPS-T)

**Comment:** ...as far as the environmental impact, I would just like to say that it's been, from what I've seen, it's been overwhelmingly positive. Otherwise, I would move to a different area, and I just see the abundance of wildlife in 1,500 acres of buffer zone around the plant, and I see really good fishing at the discharge, it's the best fishing around, and the air quality is excellent, and the water quality is excellent and the ground water is excellent, and I would just like to see that continue. (PNPS-U)

**Comment:** I don't believe that 700 employees and their families would live in this town if they thought that their children and they were going to all get cancer, so I think we have to look at that. (PNPS-V)

**Comment:** And I am in favor of the relicensing of Pilgrim, personally. Mine is, for the most part, for economic reasons. (PNPS-X)

**Response:** *The comments are noted. The comments are supportive of license renewal at PNPS, and are general in nature. The comments provide no new information. Therefore, the comments will not be evaluated further.*

### **3. Comments In Opposition to License Renewal**

**Comment:** Plymouth has been lucky, during the last 40 years that the Pilgrim Plant has been generating electricity, 20 more years, Plymouth is pushing its luck. There has been no Chernobyl in Plymouth, America's hometown. Every day, for the next 20 years, this threat will exist, all for the sake of over priced electricity. So what is going to happen to Plymouth in the next 384 years, if it's still here, if we continue on pursuing this disastrous approach to producing electricity? (PNPS-Z)

**Comment:** The NRC should be trying to figure out how to solve the problem that has been created by the operation of the Pilgrim Power Plant over the previous 40 years, not relicensing it for the next 20 years. (PNPS-Z)

**Response:** *The comments are noted. The comments oppose license renewal at PNPS, but do not provide new information. Therefore, these comments will not be evaluated further in the SEIS.*

**Comment:** Well if we take a look at Chernobyl and what happened there when that nuclear reactor melted down, 125,000 people died and 3.5 million people became ill, 400,000 people had to permanently leave their homes, half a million people were exposed to dangerous levels of radioactivity. As of 2010, it is expected there will be 8,000 to 10,000 cases of thyroid cancer as a result of this catastrophe. The total cost of the damages is predicted to exceed \$358 billion, the food chains in Europe, the former Soviet Union and the earth are permanently contaminated with radioactivity from this event for the next million years. The Nuclear Regulatory Commission would argue that this monumental catastrophe was caused by a flawed design of the reactor, it could never happen in the United States, but previous to Chernobyl, we had Three Mile Island and there was almost a meltdown there, with our finely tuned and developed design. (PNPS-Z)

**Response:** *With respect to a Chernobyl-type accident at a U.S. nuclear power plant, U.S. reactors have different plant designs, larger shutdown margins, robust containment structures, and operational controls to protect them against the combination of errors that led to the accident at Chernobyl. Although the NRC has always acknowledged the possibility of major accidents, its regulatory requirements provide adequate protection, subject to continuing vigilance, including review of new information that may suggest weaknesses. Assessments in*

*light of Chernobyl have indicated that the causes of the accident have been adequately dealt with in the design of U.S. commercial reactors. The comments oppose license renewal at PNPS, but do not provide new information. Therefore, these comments will not be evaluated further in the SEIS.*

#### **4. Comments Concerning Water Quality**

**Comment:** Given the plant's coastal location, the importance of the coastal waters to the region's economy, and the use of the coastal water for recreational purposes, it is essential to confirm that Pilgrim will not violate applicable water quality standards during the renewal period and jeopardize aquatic life or the health of those using the waters. (PNPS-AE)

**Comment:** This plant has been over here for 20 years, the water had been coming, the water has been going, and there has got to be a heck of a lot more water in that ocean out there than what they are putting out every day to filter it out. (PNPS-T)

**Response:** *The comments are related to water quality issues. Water quality, water use, and other water issues were evaluated in the GEIS and determined to be Category 1 issues. The comments provide no new and significant information on water quality; therefore, the comments will not be evaluated further. Water quality will be discussed in Chapters 2 and 4 of the SEIS.*

**Comment:** Marine impact is a huge area and it doesn't make any sense to say, well, let's not consider it because they have made an application to EPA for their water discharge permit, which is overdue, so, hence, they can rely on 1996 data that they have provided and got a permit back then. We are talking about 2012. It would be like myself saying, you know, I've applied for a license to drive so, therefore, I have the right to drive and nobody should question me, so that doesn't make any sense. (PNPS-A)

**Comment:** In the ER, Entergy claims to be in "continued compliance with applicable [Clean Water Act "CWA"] standards." Entergy states that the plant received water quality certifications from the relevant Massachusetts authorities in the early 1970s (as set forth in Attachment A to the ER) and the National Pollutant Discharge Elimination System ("NPDES") permit for Pilgrim reflects continued compliance with relevant CWA standards, excerpts of which are also included in Attachment A. The NPDES permit included in Attachment A, however, appears to have expired in 1996. While Entergy states elsewhere in the ER that EPA Region I, the NPDES permitting authority for Massachusetts, is reviewing an Entergy application for renewal of the NPDES permit with respect to Pilgrim (see ER, Chapter 4.2.5), Entergy should be required to provide further evidence (besides excerpts from Attachment A) documenting its alleged continued compliance with the CWA standards and/or the conclusions of EPA Region I regarding the plant's continued compliance with appropriate CWA standards. (PNPS-AE)

**Comment:** EPA is currently reviewing Entergy's application for issuance of its NPDES permit. While we encourage the NRC to fully analyze the issues described in this letter in its EIS for the twin purposes of satisfying NEPA and supporting appropriate licensing decisions under the Atomic Energy Act and NRC regulations, the EIS should not draw conclusions regarding whether changes to the plant operations or existing NPDES permit conditions would be necessary or appropriate to satisfy the Clean Water Act, as responsibility for those determinations rests with the EPA. (PNPS-AG)

**Response:** *The comments are noted. The NRC does not have authority over matters concerning discharge permits or compliance with the Clean Water Act. To operate PNPS, NRC regulations require Entergy to comply with the Clean Water Act and its associated requirements*

*imposed by the USEPA, Region I, as part of the NPDES permit. The SEIS will evaluate the impacts related to impingement and entrainment of organisms, discharges to the aquatic environment, the thermal plume, and other potential or actual aquatic impacts. In addition, the status of PNPS's NPDES permit application will be discussed in Chapters 2 and 4 of the SEIS.*

**Comment:** In the past, Pilgrim Station has needed to dredge the areas in front of its cooling water intake to prevent siltation from interfering with plant operations. The dredged material must then be disposed of or used in an appropriate way. There have been issues, however, regarding contamination of that dredged material, presumably as a result of the plant's wastewater discharges. While these issues were resolved for past dredging, it would be appropriate for the EIS to assess whether the facility will have future dredging needs and what environmental issues would be associated with any such dredging. The U.S. Army Corps of Engineers and EPA are both likely to have information on this topic in their files. (PNPS-AG)

**Response:** *The comment is noted. The impacts of dredging will be evaluated and incorporated, as appropriate, in Chapters 2 and/or 4 of the SEIS.*

**Comment:** There are no monitoring wells to test for radioactive contaminated water flowing off-site. The water on-site is not used for drinking; therefore the facility is not required by regulation to have monitoring wells.

However radioactive waste is buried on site and leaks from buried pipes and tanks and from other components can leak into the ground and migrate, as occurred at Braidwood and other sites discussed in Pilgrim Watch's Motion to Intervene. Absent monitoring wells, there is no reasonable assurance that radioactive material will not, or has not, migrated into Cape Cod Bay, Duxbury Bay, Kingston Bay and/or Plymouth Bay. Pilgrim's original Environmental Impact Statement makes it clear that wells must be placed along the shoreline of Cape Cod Bay.

Surface topography is such that drainage from the Station is seaward and surface water will not leave the property otherwise. Subsurface water follows the surface topography, resulting in overall movement of water toward the Bay.

Also they should be placed at any other appropriate on-site locations [such as property along and off the Access Road] to protect workers, inadvertent intruders and prevent buried radionuclides from being uncovered and airborne and affecting the neighborhood. (PNPS-AC)

**Comment:** The potential for tritium leaks at the Pilgrim plant poses a unique hazard to the public health of the residents if the Town and neighboring areas because the Town and its neighbor, Carver, Massachusetts, rely almost totally on the Plymouth-Carver aquifer (the "Aquifer") for drinking water, and the Aquifer partially supplies neighboring communities as well. The Aquifer covers approximately 140 square miles in area with an estimated 500 billion gallons of potable water. Composed of saturated glacial sand and gravel, the Aquifer ranges in depth from 20 feet to over 200 feet. The Aquifer is designated by the Environmental Protection Agency as a "Sole Source Aquifer" - that is, one which provides at least fifty percent of the water supply given to a community - it is the second largest Aquifer in Massachusetts and one of only 70 Sole Source Aquifers in the United States.

Of course, while the Aquifer has large reserves, it is not a closed system. The Aquifer is recharged through the natural seepage of precipitation, septic system discharges, and agricultural water. Accordingly, any leakage of tritiated water from the Pilgrim plant into the groundwater could infiltrate the Aquifer, and thereby contaminate the drinking water supplies for



the Town as well as for the heavy agricultural use of the Aquifer, with potentially serious health implications for those consuming the water or the farm products grown with it.

The Aging Management Plan for Pilgrim provides that underground pipes and tanks will be inspected when excavated during maintenance and that a focused inspection will be performed within ten years unless an opportunistic inspection occurs within this period. However, in light of the increasing frequency of leakage events at analogous nuclear plants in recent years, a more frequent and thorough inspection of all components that contain radioactive water at the Pilgrim plant is warranted to avoid the risk of leakages going undetected and to better safeguard the public health of the residents of the Town and neighboring areas. (PNPS-AE)

**Comment:** A number of leaks in recent years from underground pipes and tanks releasing tritiated water from spent fuel pools into the groundwater gives rise to concerns about the potential for the similar release of radioactive materials at the Pilgrim plant. Leaks from a spent fuel pool are not uncommon. Indeed, there were leaks reported from three nuclear power plants in 2005. The Indian Point plant in New York (also owned by Entergy) experienced a tritium leakage into groundwater likely due to a crack in the spent fuel pool concrete support. The Braidwood nuclear power station in Illinois also has leaking tritium and its owners, Exelon Nuclear, recently agreed to a court order to force it to begin clean-up. The NRC also was informed that the spent fuel pool at the Connecticut Yankee plant in Haddam, Connecticut was leaking into the ground at the rate of several gallons per day. Other instances of groundwater contamination have been reported at nuclear facilities in Arizona, California, and Florida. The NRC itself has acknowledged the severity of the problem associated with tritium contamination of groundwater associated with equipment degradation and is assessing what changes, if any, are needed to the agency's rules and regulations to better protect the public health and safety. (PNPS-AE)

**Comment:** Older plants, such as Pilgrim, are more likely to experience corrosion and leakage problems that can result in the release of amounts of radioactive materials into the groundwater. Exposure to radiation from any such leaks represents a threat to human health and it is a violation of NRC regulations. Adequate inspection and monitoring of systems and components that carry radioactive water should be a critical part of Pilgrim's Aging Management Plan to minimize the likelihood of leakage and associated danger to the safety and welfare of the public. (PNPS-AE)

**Response:** *Although NRC regulations require licensees to make surveys, as necessary, to evaluate the potential hazard of radioactive material released in order to assess doses to members of the public and workers, recent discoveries of releases at other plants indicate that undetected leakage to groundwater from facility structures, systems, or components can occur resulting in unmonitored and unassessed exposure pathways to members of the public.*

*The NRC has identified several instances of unintended tritium releases, and all available information shows no threat to the public. Nonetheless, the NRC is inspecting each of these events to identify the cause, verify the impact on public health and safety, and review licensee plans to remediate the event. The NRC also established a lessons learned task force to address inadvertent, unmonitored liquid radioactive releases from U.S. commercial nuclear power plants. This task force reviewed previous incidents to identify lessons learned from these events and determine what, if any, changes are needed to the regulatory program. Detailed information and updates on these liquid releases can be found on the NRC public website at <http://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.htm>. These comments provide no new and significant information and, therefore, will not be evaluated further.*

## 5. Comments Concerning Aquatic Ecology

**Comment:** And also, I would hope that you and EPA DEP would work together to come up with a number of how many fish, what is it, per acre, can be damaged, as opposed to a more general statement of what is or is not acceptable. (PNPS-A)

**Comment:** EPA recommends that the EIS use documented impacts to the marine environment from the thirty-four years that Pilgrim Station has been in operation to evaluate the direct, indirect, and cumulative impacts associated with the requested twenty year license extension. (PNPS-AG)

**Comment:** It also affects the plant life in the sea that supports nursery habitats. We are seeing, through Kingston, Duxbury, Plymouth bays, that our eel grass beds are vanishing. We don't necessarily know the reason why and we are not in a position to blame the nuclear power station, but I can say that those kinds of impacts are real, are logical and should be looked at and addressed with a great deal of diligence, especially in view of what Mary was saying before. (PNPS-G)

**Comment:** I'm sure the NRC doesn't know, if they are not from this area, but most of the people in the room do know that there is a northeast fishing crisis going on, the fishermen cannot go fishing, there is no cod, there is no haddock, there is no flounder out there.

And this has nothing to do with the nuclear power plant, it has to do with the management of the species but, anyway, we thought we would try and develop the means to replace the fish in the oceans, to allow the fishermen to go fishing for more than 50, or 48 or 30 days a year, which is what they are at right now. (PNPS-I)

**Comment:** And when they proposed the building of the plant, Boston Edison funded a study and it was funded by Boston Edison and carried out by the Division of Marine Fisheries, and they studied what impact the warmer water had on lobsters for a period of three years before the plant opening and probably about three years after it opened, and the conclusion of that study was that lobsters came in a little earlier in the spring and stayed there a little later in the fall, with the warm water. (PNPS-J)

**Comment:** The area of marine and environmental concerns, the Town of Duxbury and I know the Town of Plymouth, we have a thriving, and aquaculture and marine fisheries business going on, and not to mention the recreational sailing, and fishing and everything. We are very concerned. As we see today, we've had to close the bay, up and down the coast, because of the flooding and rain. What is the effect of the heat of the discharge that's being dumped into the bay? How does that effect our environment for our marine industries? (PNPS-L)

**Response:** *The comments are related to aquatic ecology. Aquatic ecology issues will be discussed in Chapters 2 and 4 of the SEIS.*

**Comment:** To identify species of interest, the EIS should determine the presence of particular species within general proximity of the project location. The EIS should include species for which Essential Fish Habitat under the Magnuson-Stevens Act is listed near the proposed project location. The EIS should cross-reference this list with NOAA's ECOMON and MARMAP datasets with information from stations around the project area. A final list of species of interest should be developed in consultation with EPA, NMFS, and Massachusetts Department of Marine Fisheries.

The EIS should also assess any potential impacts to endangered species from Pilgrims Station's operations. (PNPS-AG)

**Comment:** The EIS should address relevant issues under other applicable laws, such as compliance with the Endangered Species Act, the essential fish habitat provisions of the Magnuson-Stevens Act, and the Coastal Zone Management Act. (PNPS-AG)

**Response:** *In order to determine the potential species of interest to be evaluated in the SEIS, the NRC has consulted with the US Environmental Protection Agency (USEPA), US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and Massachusetts Department of Marine Fisheries (MA DMF). These agencies have provided information on specific species of interest that should be addressed in the impact assessment. Regarding the essential fish habitat provisions of the Magnuson-Stevens Act, NRC has consulted with the Habitat Protection Division of the NMFS. Based on discussions with the NMFS and review of the databases described in the comment, a list of species to be addressed in the analysis will be developed and discussed in the Essential Fish Habitat Assessment and in Chapter 4 of the SEIS.*

*Regarding endangered species, the NRC has consulted with the US FWS and the NMFS-Protection Resources Division regarding potential impacts to terrestrial and aquatic species. The results of this assessment will be reported in a Biological Assessment (as required by Chapter 7 of the Endangered Species Act) and in Chapter 4 of the SEIS.*

*To evaluate the effects of the proposed action as it relates to the Coastal Zone Management Act, the NRC has consulted with the Massachusetts Office of Coastal Zone Management (MA CZM). The analysis of PNPS's Coastal Zone Management Federal Consistency Certification will be addressed in Chapters 2 and 4 of the SEIS.*

**Comment:** Other issues were mitigation, adding, you know, fish to the bay to make up for those that happen to get chopped up in the system, do they breed with native stock? Does that make a difference? (PNPS-A)

**Comment:** Evaluation of the effectiveness of various mitigation strategies needs to be performed with stakeholder input. Stocking: We understand that Entergy has contracted with a Cape Cod company to provide substitute stock into Cape Cod Bay. However, we understand that these are a different genetic grouping and that they do not breed with the native stocks. If this is the case, then this method does not solve the problem. An analysis of this issue is required. (PNPS-AC)

**Comment:** The applicant supports an on-going winter flounder hatchery study and claims that the hatchery activities for winter flounder are providing stock enhancement that can be relied upon as an effective form of mitigation for entrainment losses of the wild winter flounder population. If this remains a reasonably feasible option for Pilgrim Station, the EIS should explore this issue more fully. At present, we are not aware of convincing evidence that the stocked fish survive to reproduce in these habitats. Moreover, there has not been a study of the potential impacts of hatchery-related fish on the native population. The genetic and behavioral implications should also be studied in order to determine if this hatchery is a true mitigation mechanism for winter flounder or simply another ecological disturbance. (PNPS-AG)

**Comment:** Entergy, the owners of the plant, is also involved in a number of valuable environmental initiatives, perhaps one of the most interesting is that they did a great deal of study in the waters of Cape Cod and the indigenous fish populations. That result, excuse me, that resulted in their working with Llenoco, a fish hatchery in Chatham, down on the Cape,



which every year hatches, rears and releases 25,000 winter flounder into Plymouth Harbor for the benefit of the state and the local fishing industry. Entergy also contributes a large amount of money, in the form of grants, to several local environmental groups working with aquatic and other environmental issues. (PNPS-F)

**Comment:** One of the previous speakers concerns was that the fish that were added back, she was wondering whether they were normal and we find, and seven years of experience has proven, that they are normal, just like the every day fish, the young of the native fish that are out there now. Not only did we find that they were normal but we found out that they flourish out there ... And I'm again oversimplifying but we found that now that we found we can do it, we can also do it with cod and we can do it with haddock. In other words, we are on the verge of actually being able to make a difference and we are doing this because Entergy actually helped us, they supported us and helped us build this pilot facility for their own reasons, I'm sure. (PNPS-I)

**Response:** *The comments are related to mitigation of potential impacts to winter flounder populations through the addition of hatchery-reared fish to the local population. This issue will be discussed in Chapter 4 of the SEIS.*

**Comment:** As far as impingement goes, fish that are smacked against the grate and then removed, have they been permanently damaged so that they do not have a survival affect, has that been studied? Would we be better off having a grate at the mouth of the canal that might decrease the number of fish impinged or increase their survivorability and, at the same time, have a security effect by catching any explosive that a bad guy wanted to put up the intake canal? (PNPS-A)

**Comment:** And I think you should look carefully at a memo prepared by Jerry Szal, S-Z-A-L, of the DEP, specifically on the marine effect of Pilgrim on our environment, the once through cooling system. In it, he mentions some very important items. One is it appropriate to average the temperature discharge or is it more important to be required to have an instantaneous discharge so the maximum number is always adhered to? (PNPS-A)

**Comment:** And I think that what Mary Lampert said about adjusting the screening and the intake makes a lot of sense in term of trying to mitigate further the ongoing damage in the intake structure to those populations. (PNPS-G)

**Comment:** Impingement: Because impinged fish from the intake screens are shunted back into the intake, there is a concern that these fish, weakened from impingement, will simply be re-impinged. Permitting and resource agencies should consider requiring an assessment of re-impingement rates to select species of concern. These studies should also assess the need to re-locate the discharge point for impinged fish in order to minimize re-impingement. (PNPS-AC)

**Comment:** Discharge Effects Thermal Discharge: Discharge temperature is now averaged over an hour; instantaneous measurement should be required.

Thermal backwash: In summary, during a thermal backwash, about 155,000 gpm of heated water (F) is sent into the intake embayment for a period of about 1.5-2 hrs. Studies to evaluate potential impacts of the thermal backwash have not been performed to the knowledge of DEP's Gerry Szal. °>105 (PNPS-AC)

**Comment:** Wet Land refurbishment or other unrelated environmental measure: These measures are all well and good but do not address the issue at hand. See following attachment, Marine Attachment Pilgrim Nuclear Power Station: review of intake and discharge effects to

finfish - Technical Memorandum For The Record, Gerald M. Szal [Department Environmental Protection, MA.], August 30, 2005. (PNPS-AC)

**Comment:** Pilgrim Station operations have resulted in a range of impacts to marine life in Cape Cod Bay. Because the facility annually entrains large quantities of fish eggs and larvae and impinges large quantities of juvenile and adult fish, we recommend that the EIS pay particular attention to this impact of the plant's cooling system, especially with respect to winter flounder, Atlantic cod, and rainbow smelt. Winter flounder is a species of particular interest due to its commercial, recreational and ecological importance. Estimated of winter flounder age -3 adult equivalent losses due to entrainment and impingement as reported by Pilgrim in annual monitoring reports have ranged from <1% of the Cape Cod Bay population to almost 30% of the population annually. Entrainment and impingement losses of Atlantic cod and rainbow smelt are of particular concern as well. Atlantic cod have historically supported a large commercial fishery in New England, but their numbers have declined to the point that commercial fishing for this species has almost been completely eliminated in Massachusetts Bay. The EIS should discuss entrainment and impingement losses of Atlantic cod at Pilgrim Station within the context of a collapsed commercial fishery. Pilgrim Station also impinges rainbow smelt, whose numbers have plummeted due to problems such as the loss of spawning habitat. It is our understanding that Rainbow smelt are now being studied for potential listing as a threatened or endangered species under the Endangered Species Act. The entrainment and impingement losses of this species at Pilgrim Station should be assessed within that context. (PNPS-AG)

**Comment:** Pilgrim station currently controls macro-fouling by periodically re-routing heated condenser cooling water back through the system and out through each intake embayment separately. This process, called thermal backwashing, is performed about four to five times per year at full thermal load and three to four times per year at 50% thermal load. Backwashing both sides of each condenser can take up to four hours within one day and the temperature may reach as high as 120F. EPA encourages the NRC to include an evaluation of the impacts of the thermal backwash on aquatic organisms in the EIS. (PNPS-AG)

**Comment:** It should also be noted that two fish kill events resulting from gas bubble disease occurred in the Station's discharge canal during the 1970's. Subsequently, Pilgrim was required to install a barrier net in the discharge canal to prevent fish from entering and residing there. However, in 1996 Pilgrim was allowed to remove the net because no significant fish kill events had occurred for some time. There also have been no documented large fish kill events since the net was removed. Nevertheless, there is a risk that a large year class of menhaden, for example, will detect the thermal plume of Pilgrim Station and possibly take residence in the plume or canal. This would once again subject fish to gas bubble disease. The EIS should consider options for preventing this impact when a strong year class is projected, including the possibility of requiring that Pilgrim Station deploy a barrier net during appropriate periods to reduce impacts and implement a biological surveillance program to effectively determine when the impact minimization measures should be triggered. (PNPS-AG)

**Comment:** EPA is concerned about repeated impingement events at Pilgrim Station. Historic data for Pilgrim shows high impingement numbers for several fish species including Atlantic silversides, Atlantic menhaden, blueback herring, grubby, alewife, Atlantic cod, and rainbow smelt. The majority of rainbow smelt impinged at Pilgrim Station are believed to have originated from the nearby Jones River population. However, without quantitative evaluation of the size of the Jones River population, it is not possible to fully assess the impact of Pilgrim Station. The EIS should assess the potential impacts of impingement on all native fish species affected, as well as provide a discussion of potential measures that can be taken to reduce these impacts. (PNPS-AG)

**Comment:** This EIS should assess Pilgrim Station's current fish return system and document any problems with it. We currently recognize at least three shortcomings of the current fish return system that contribute to an increase on impingement mortality at Pilgrim. First, chlorinated service water from the intake is de-chlorinated and used to spray fish and debris from screens. There have been several documented occasions when the de-chlorination system failed to operate correctly and fish were subjected to a chlorinated salt-water spray. Second, the screens are normally only rotated once every 8- hour shift, thereby increasing the length of time that fish are held against the screens. Third, fish are returned back to the intake embayment of the Station, about 100 yards upstream of the intake structure, which may result in high re-impinging rates.

In response to these three issues, we believe the EIS should discuss the benefits of installing a chlorine measuring and malfunction system, evaluate the feasibility of continuous screen rotation and assess re-impingement rates and whether there may be a more appropriate relocation point for the fish return. In addition, the EIS should evaluate other options for improving the fish return system to minimize impingement mortality. (PNPS-AG)

**Comment:** The EIS should discuss reasonable alternative ways to reduce impingement, impingement mortality, entrainment and thermal discharges at the Pilgrim Station. Specifically, EPA supports thorough evaluation of (1) alternative protection technologies including substratum intake structure, various screening technologies (including wedgewire screens, fine-mesh barrier nets or screens (e.g., "Gunderbooms")), cooling towers, variable speed pumps, and fish return system upgrades; (2) alternative operational schemes including seasonal flow restrictions, continuous screen operation, scheduling plant outages to minimize environmental impacts and the installation of a chlorine measuring and malfunction notification system; and (3) potential mitigation measures. In assessing these alternatives, the EIS should not only evaluate their environmental ramifications, but should also address the nuclear power plant safety implications of the alternatives. (PNPS-AG)

**Comment:** The EIS should also assess the effects of the thermal plume on the marine environment, including effects on water quality and marine organisms. This analysis should consider possible acute and chronic effects to marine organisms, such as causing mortality, habitat avoidance, interrupted spawning, or increased predation of threats, based on an evaluation of the temperatures at which effects on health and behavior of the relevant organisms may occur. Possible ecological effects should be considered (e.g., has warm water attracted non-native species that drive out the native species). Effects on the benthic community, including physical effects from scouring by the discharge, should also be addressed. Adverse benthic effects have been documented in the past, primarily from scouring, over an area of one to two acres. (PNPS-AG)

**Comment:** Pilgrim Station discharges a maximum of 510 million gallons per day (MGD) of heated non-contact condenser cooling water to Cape Cod Bay. Pilgrim's current National Pollutant Discharge Elimination System (NPDES) permit specifies a maximum daily temperature limit of 102F. The EIS should assess the scope of the thermal plume across the tidal cycle in terms of area and depth of the water body impacted, the amount of heat added to the water (in British Thermal Units) and the extent to which the discharge alters ambient water temperatures. (PNPS-AG)

**Comment:** Several other fish species, besides winter flounder, also suffer substantial entrainment losses at the Pilgrim facility. These include cunner, mackerel, menhaden, Atlantic cod and Atlantic herring. The EIS should assess the potential impacts of entrainment on all the

native fish species affected, along with means to reduce these impacts, including the use of the alternate cooling water intake system technologies discussed below. (PNPS-AG)

**Comment:** In addition, we recommend that the EIS explore alternative modes of operation that would avoid and minimize environmental impacts associated with the current mode of operation. These impacts include effects on water quality and marine life from the facility's pollutant discharges (e.g., any discharges of heat, chemicals, radionuclides, etc.) and withdrawals of water from Cape Cod Bay for cooling. (PNPS-AG)

**Comment:** There is apparently significant influence by the plant on the bay area, people that are familiar with the area do say that it is relatively barren. The problem that results from that and the raising of the temperature is that there are various impacts on the ecosystem that we are seeing today, for instance, in the ongoing concern about red tide. If our bay temperature rises, like, for instance, Mt. Hope Bay where Brayton Point, the Cole Power Station, has significantly raised the temperature of the bay, there is a lot of changing of the population to fish, the aquatic life in the system. We lose fish, like sturgeon, we lose the larger fish that we ourselves depend on for our survival and begin to have problems with algae, we begin to have problems with low oxygen levels. (PNPS-G)

**Comment:** We believe that you have to do much, much, much more examination of the impact of the heated water going into the bay than has been done and you have to do much, much more than have a hatchery for winter flounder. (PNPS-G)

**Comment:** Finally, the Pilgrim Plant's cooling system causes significant damage to the environment of Cape Cod Bay. Pilgrim uses a once through cooling system, taking in nearly one half billion gallons of water a day and setting it into the bay at 25 or more degrees hotter.

An additional 20 years of operations at Pilgrim, using this cooling system, could kill billions of aquatic plants and animals, this cooling system also violates Chapter 316B of the Federal Clean Water Act which requires the plant to use the best available technology to minimize environmental impact.

We believe that the plant must be held to the highest standards under the Clean Water Act and a closed cycle cooling system should be installed as soon as possible, and certainly before the license extension is granted. (PNPS-M)

**Comment:** Thermal discharge temperature is now averaged, there should be a cap and required instantaneous measurement. (PNPS-N)

**Comment:** The second comment from DEP was because impinged fish from the intake screens are shunted back into the intake, there is concern that these fish, weakened from impingement, will simply be reimpinged. Permitting the resource, permitting resource agencies should consider requiring an assessment of reimpingement rates to select species of concern. These studies should also assess the need to relocate the discharge point for impinged fish in order to minimize reimpingement. (PNPS-N)

**Response:** *The comments, in general, express concern regarding the impacts on aquatic organisms resulting from operation of the existing PNPS once-through cooling system. To operate PNPS, NRC Regulations require Entergy to comply with the Clean Water Act and its associated requirements imposed by USEPA, Region I, as part of the NPDES permit. The SEIS will evaluate the impacts related to impingement and entrainment of organisms, discharges to the aquatic environment, the thermal plume, and other potential or actual aquatic impacts.*

*Additionally, a brief discussion of potential mitigation measures to limit impingement and entrainment impacts will be presented in Chapter 4 of the SEIS.*

**Comment:** Marine impact can not be assessed at present because definite numbers have not been set on what constitutes "significant impact." A yardstick has to be firmly established for each species (plant and animal) with appropriate federal, state and independent partners and rationales provided to the public.

For example: There appear to be many methods used to determine impact, each with drawbacks. It must be determined before going forward with the re-licensing process what methods provide the most reliable estimates of impact, with a detailed rationale; a requirement that these methods are followed by the licensee unless better methods are established and independently approved.

We understand that no policy statement regarding losses on a square mile basis has been issued by any state or federal agency. NRC must in its review process determine what percent loss is a significant detriment to any population [figure depending on population], with a detailed rationale. (PNPS-AC)

**Response:** *This comment relates to aquatic ecology and the determination of significant impact. The NRC developed a three-level standard of significance (Small, Moderate, Large) for assessing environmental issues. These levels of significance were established using the Council of Environmental Quality's regulations (40 CFR 1508.27) to systematically evaluate the consequences of likely environmental impacts of renewing the operating license for a nuclear power plant for an additional 20 years. Significance indicates the importance of likely environmental impacts and is determined by considering two variables: context and intensity. Context is the geographic, biophysical and social context in which the effects will occur, or the in the case of license renewal, the environment surrounding the facility. Intensity refers to the severity of the impact.*

**Comment:** Winter Flounder: DEP's Gerry Szal recommended that resource agencies, in concert with the permitting agencies, should consider further evaluation of the intake effects to winter flounder. If effects are found to be substantial, these agencies should determine what steps need to be taken to reduce the impacts of the facility on the winter flounder population. (PNPS-AC)

**Comment:** Intake Effects Entrainment: Winter Flounder - methods used by Entergy to determine impact.

1. Equivalent adult method: "researchers conducting this work have assumed an otter trawl efficiency of 50%, but the actual efficiency may be much lower (or higher), which would alter the number of fish in the study area per square mile and the apparent impact. Second, entrainment sampling results are quite variable. Third, it is difficult to determine the accuracy, and therefore, the applicability, of the survival matrix used in estimating equivalent adults."

Whether or not these levels of impact are a "significant" detriment to the population, and will result in slowing the return to much higher population densities, is currently unknown and a policy statement regarding losses on a square mile basis has not been issued by any of the state or federal agencies. EPA Region 1 has stated in the past that population impacts of 5% or greater are typically of concern. However, to DEP's Gerry Szal's knowledge, the geographic bounds of this particular population have not been agreed upon by state or federal agencies.



2. 2nd method - estimate the percentage of the total larval population passing in front of the facility that is entrained.

3. The third method used by the facility to evaluate impact was the RAMAS (Risk Analysis Management Alternative System; Ferson, 1993) winter flounder model. It was used from 1999-2001 to further evaluate the effects of the facility on the Cape Cod Bay winter flounder population. Results suggested that stock reductions from 2.3 to 5.2% might occur as the direct result of entrainment at the facility.

It should be determined and agreed upon by NRC, appropriate state agencies and independent analysts what method or methods actually provide accurate information needed to assess impact. (PNPS-AC)

**Comment:** Rainbow Smelt: "Brad Chase, DMF (pers. comm. to G. Szal, August 29, 2005) estimates that there has been a sharp decline in the rainbow smelt population in the Jones River since the time when the Lawton, et al. (1990), studies were conducted. Unfortunately, without a quantitative evaluation of the rainbow smelt population size in the Jones River, Mr. Chase felt it was not possible to assess the potential impact of Pilgrim's impingement events on the Jones River smelt population." Until studies performed by the state and the Jones River Watershed Association, we should not finalize a re-licensing decision. (PNPS-AC)

**Comment:** In addition, the Town is concerned about the economic impact of an accident, as well as routine operations at the plant, on commercial fisheries in the area. The local population of winter flounder, in particular, is of significant concern because it provides an important commercial fishery and because the area around the plant serves as spawning, nursery, and feeding grounds for the species. A moderate or severe accident at the plant would have a deleterious effect on the flounder population, and therefore commercial fishery in the region. While the ER concludes that plant operations "have not had a significant effect on local and regional populations of fish and shellfish," (ER, Chapter 2.2.5) the Town submits that additional evaluation of the intake effects to winter flounder are warranted to assess accurately the long-term implications on this species of continued operations at Pilgrim during the renewal period. (PNPS-AE)

**Comment:** In the past, Entergy has used the following three methods to evaluate the Station's entrainment impacts to the local winter flounder population: (1) the "equivalent adult" method; (2) estimating the percentage of the total larval population passing by the facility that is entrained; and (3) the RAMAS (Risk Analysis Management Alternative System: winter flounder model. We believe these three methods, and others as appropriate, should be discussed in the EIS based on coordination with the EPA and other interested state and federal agencies. In coordination with EPA and other interested resource agencies, the EIS should include an analysis of the accuracy and applicability of these methods. (PNPS-AG)

**Comment:** What we have learned, over time, and I was trained as a psychologist, I was not trained as an environmentalist, so we had a lot of learning to do and what we learned, over time, was that the importance of the Jones River, as the largest river in Cape Cod Bay, relates to the larger Gulf of Maine ecosystem, and the Gulf of Maine is one of those very few and rare systems in the world, globally, that provide us with all of our ocean fish. What we are learning is that if the Jones River's fish populations are lost, then the Gulf of Maine health is impacted. (PNPS-G)

**Comment:** The Jones River, being the largest river in Cape Cod Bay, is important to the ecosystem, not only to itself, but to the bay and to the entire Gulf of Maine. What we have noticed in the Jones River is that the fish are diminishing and while it is true that Pilgrim and

Entergy have contributed to our work, that contribution has not overcome what we believe is a growing lessening of the populations of fish, particularly herring and smelt, in the system. Herring and smelt have both a history of entrainment at the plant. (PNPS-G)

**Comment:** DEP stated that the resource agencies, in concert with the permitting agencies, should consider further evaluation of the intake effects to winter flounder. If effects are found to be substantial, these agencies should determine what steps should be taken next. They particularly pointed out that winter flounder that is dumped in from a Chatham laboratory, that we heard from this afternoon, that these are fish that go in, but they are different, genetically, and they don't breed with the current stock. (PNPS-G)

**Comment:** Rainbow smelt, as you heard today, they are considering putting on the endangered species list because of their low numbers in the Jones River Watershed. There should be a policy statement regarding losses on a square mile basis, this has not been done by any federal agency and, if you don't have a real standard, then what are you doing? Also, there appear to be many methods used to determine impact, each with drawbacks. What methods would provide the most reliable results? This should be clearly stated in the analysis provided. (PNPS-N)

**Response:** *The comments are related to the potential impacts of continued operation of the plant on winter flounder, rainbow smelt, and other aquatic species populations. Assessment of these species, in addition to other aquatic organisms, will be presented in Chapters 2 and 4 of the SEIS.*

## **6. Comments Concerning Socioeconomic Impacts**

**Comment:** When the plant came on line in 1972, it was equal in value to all the other assessed property in the Town of Plymouth, so it effectively halved our tax rate. We were the next town, that was South of Boston, that was probably going to experience some strong growth and, coupled by our large land area, 103 square miles, and relatively cheap land prices, and dirt cheap real estate prices, the savings that, at that time, the Boston Edison Plant brought us was soon surpassed by the demands of the burgeoning population on the infrastructure ... We built new elementary schools, new high schools, new middle schools, a lot of roads were developed, some at the expense of developers and often they were maintained at the expense of the town. We're in a position now that we are dependent on the town for a significant portion of our tax, the plant, rather, for a significant portion of our tax revenue. (PNPS-J)

**Response:** *The comment is related to the socioeconomic impacts specific to PNPS. Socioeconomic impacts such as taxes, employment, and land use are Category 2 issues. These issues will be addressed in Chapters 2 and 4 of the SEIS.*

**Comment:** Speaking of work, Pilgrim is also an important source of jobs, there is more than 700 permanent, full time employees, most of whom live in Plymouth and the surrounding communities. Indeed, Pilgrim supports the local economy to the tune of \$135 million a year in local economic activity. (PNPS-F)

**Response:** *The comment is noted. Socioeconomic issues specific to the plant are Category 2 issues and will be discussed in Chapter 4 of the SEIS.*

**Comment:** The Town was founded in 1620 by the Pilgrims escaping religious persecution in England and is known as "America's Hometown." As such, the Town is the cornerstone of American freedom and values. Every year thousands of visitors come to the Town to visit not only Plymouth Rock, but also the other historical sites in and around the Plymouth area.

Typically, tourists travel not only to the Town, but also to Boston or out to Cape Cod and other coastal areas. In 2003, for example, travel expenditures for Plymouth County were \$353 million (excluding payroll, state tax and local tax receipts), with the Town receiving a significant portion of those amounts. The contribution of tourism to the health of the local economy, therefore, is central. (PNPS-AE)

**Response:** *The comment is related to socioeconomic impacts, specifically tourism, recreation, or historic appeal. Public services involving tourism and recreation were evaluated in the GEIS and were determined to be Category 1 issues. Historic and archaeological resources and socioeconomic issues were evaluated in the GEIS and were determined to be Category 2 issues and will be addressed in Chapters 2 and 4 of the SEIS, as appropriate.*

**Comment:** The total population within a 50-mile radius of PNPS was estimated by Entergy for the year 2032 by combining total resident population projections with transient population data from Massachusetts and Rhode Island...

The region is expected to add 465,000 people by 2030. The region will be aging with a dramatic spike in the over 55 population. The largest population increases are expected in urban centers such as Boston and Cambridge and in a half-dozen suburban towns, such as Plymouth and Weymouth with very large housing developments on the horizon. (MAPC Metro Future projections brief #1)

According to the report the area south of Boston is expected to grow faster in population and jobs than any other section of Greater Boston through the year 2030. Jobs are important because they factor into projecting the transient population.

Communities south of Boston will grow 13%. Plymouth is expected to add the most, about 10,000 residents - a population jump over 20%.

The population is expanding because there is more open land and large projects are planned in Plymouth and on the Weymouth Navel Air Station land ---located just off Route 3, the evacuation route for Duxbury and Marshfield. (PNPS-AC)

**Response:** *Socioeconomic issues, including demographics, that are considered to be Category 2 issues, will be addressed as appropriate in Chapters 2 and 4 of the SEIS.*

## **7. Comments Concerning Human Health**

**Comment:** We hope you will also be looking at the new information, since '72, of health impacts in our communities. There has been a case controlled study of adult leukemia, there has been review that has been done of the cancer, of the Massachusetts Cancer Registry, since it started in '82, showing a consistent rise in thyroid and leukemia cancers in the seven towns that the meteorological '82 study said would be most likely to be impacted. And also, you would consider, in your health analysis, the projected demographic changes, from 2012 forward, of a one in three people in this area over 55 and tie that to the BEIR VII which indicates that older and very young people are more susceptible to damage. (PNPS-A)

**Comment:** ...there is new and significant information supporting our contention that twenty additional years of "normal" operations will be harmful to public health. Pilgrim releases radiation as part of its standard operations. Radiation-linked diseases are documented in communities around Pilgrim. This fact and projected demographic data indicate that this population will be at an increased risk. The National Academy of Sciences (NAS) latest report on low-dose radiation



risk, Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2 (June, 2005) concluded that no amount of radiation is safe. The documented radionuclide releases from Pilgrim in the past have long half-lives and bio-accumulate in the environment. We submit that if the Applicant disputes a causal link between the radiation released by Pilgrim and the cancers seen in its neighboring towns, the current systems in place to monitor releases are inadequate and must be improved. We further submit that if the NRC or State disputes elevated radiation-linked diseases rates or a causal connection that they have not taken into account the unreliability of Pilgrim's monitoring data and reports.

Mitigation ER must consider if Pilgrim is allowed to continue operations:

- Reduction of allowable radioactive emissions into our air and water so that the biological impact is no greater than that allowed from the releases from a chemical plant licensed today and allowable dose reduced to be in synch with current scientific knowledge on the effects of low-dose radiation on health, National Academy of Sciences' Biological Effects of Ionizing Radiation, BEIR VII report.
- Verification of releases by combination radiation and weather monitors – computer linked to state and local authorities – at all points where radiation is released from Pilgrim and at appropriate off-site locations in the seven most impacted towns and on Cape Cod. (PNPS-AC)

**Comment:** The National Academies Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, the National Research Council, published Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2 in 2005. Drawing upon new data in both epidemiologic and experimental research, they concluded that no amount of radiation is safe. There is a linear no threshold response to radiation, and exposure to low levels of radiation is approximately three-times more dangerous than previously thought. BEIR VII: Health Risks from Exposure to Low Levels of Ionizing Radiation, Report in Brief, June 2005. Therefore it is not surprising that radiation-linked disease rates are higher than expected in communities exposed to Pilgrim's past releases.

A summary of cancer deaths estimated at NRC's permissible dose release is provided in the BEIR VII Report. The report shows the number of cancer cases and deaths expected to result in 100,000 persons (with an age distribution similar to that of the entire U.S. population) exposed to 100mSv per year over a 70 year lifetime. On average, assuming a sex and age distribution similar to that of the entire U.S. population, the BEIR VII lifetime risk model predicts approximately one individual in 100 persons would be expected to develop cancer (solid cancer or leukemia) and approximately one in 175 would be expected to die from cancer from a the permissible dose of 100 mSv.

Lower doses would produce proportionately lower risks. For example one in 1000 would develop cancer from an exposure to 10 mSv. This new report validates concerns raised by us and helps explain the radiation-linked disease observed near Pilgrim NPS. When the standards were set by the NRC for permissible release of off-site radiation, low levels of radiation were considered harmless. However, the BEIR VII report now reveals that any exposure is potentially dangerous. Therefore it is not surprising that radiation-linked disease rates are higher than expected in communities exposed to Pilgrim's past radiological releases.

This new information is particularly relevant to the issue of re-licensing Pilgrim because twenty additional years of exposure will harm an already damaged population. Both BEIR VII and previous nuclear worker studies show that the health effects of radiation are cumulative. Effects

of Radiation and Chemical Exposures on Cancer Mortality Among Rocketdyne Workers: A Review of Three Cohort Studies. Morgenstern, H and Ritz, B., Journal: Occupational Medicine: State of the Art Reviews, Vol. 16, No. 2, April-June 2001, pages 219-238. And as shown previously, there is a growing and aging population in the area immediately surrounding the plant. This population has already been harmed by the effects of radiation from Pilgrim and as a result is more susceptible to even permissible levels of off-site radiation. An additional twenty years of operations would put a group that is already damaged at further risk. (PNPS-AC)

**Comment:** In its Final Environmental Impact Statement, the 1972 owners of Pilgrim stated in the Summary of Environmental Impacts and Effects, Chapter 5-c. that, "The effluents from the facility, if operated as described by the Applicant and in accordance with the technical specifications and rules and regulations of the Commission, will not endanger the public health or the natural environs of the station." Final Environmental Impact Statement, Pilgrim Nuclear Power Station, Boston Edison Company, Docket 50-293, 5-c, p. iii, US Atomic Energy Commission Division of Radiological and Environmental Protection, (May 1972). In its current Application, Appendix E, Applicant states "Very low levels of radioactivity may be released in plant effluents if they meet the limits specified in NRC's regulations. These releases are closely monitored and evaluated for compliance with the NRC restrictions in accordance with the PNPS Offsite Dose Calculation Manual." ER Appendix E.3.2.3.1. Essentially the same was stated regarding solid and gaseous releases. Therefore the assumption is that there will be no danger to public health from routine releases since they will be monitored and will not exceed federal limits. However, despite this confidence written into the Application, we bring forward new and significant information that demonstrates that there has already been documented radiation linked disease in the communities near PNPS. In addition, a recent report was published by the National Academy of Sciences that demonstrates that there is no safe dose of radiation for humans. (PNPS-AC)

**Comment:** Epidemiological studies of cancer rates in the communities around Pilgrim show an increase of radiation-linked disease that can be attributed to past operations of the plant.

The demographics of the population immediately surrounding the plant, including its age and geographical distribution, make this population more susceptible to more radiation-linked damage than was contemplated when the plant was licensed.

If Pilgrim is allowed to continue operations this should only be allowed under the following conditions so that public health would be better protected.

- Reduction of allowable radioactive emissions into our air and water so that the biological impact is no greater than that allowed from the releases from a chemical plant licensed today and limits that are in synch with BEIR VII.
- Verification of releases by radiation and weather monitors computer linked to state and local authorities at all points where radiation is released from Pilgrim and at appropriate off-site locations - appropriate sites chosen by meteorological analyses. (PNPS-AC)

**Comment:** Health Impact: Projected age distributions will affect the expected health impact to the population from radiation exposure – both routine and above routine. This must be analyzed – the licensee's filing failed to do so.

By 2030, (1) in (3) people will be over the age of 55, compared to 1 in 5 now.

We know from new research that radiation affects the most vulnerable – the young and the old. This makes intuitive sense – for example, the older we get, the more vulnerable we become and this is borne out by research. (PNPS-AC)

**Comment:** The population directly abutting Pilgrim is increasing substantially and the population is older and thus more susceptible to radiation damage. Changing demographics in communities impacted by Pilgrim are such that the dose effect on the population will be far greater than originally anticipated when the plant was licensed – a larger/denser population and older population.

When Pilgrim was licensed and built in 1972, its location was in an area that was remote and undeveloped. The population around the plant has changed drastically in the last 30 years, and this aging plant is now located in the fastest growing region in Massachusetts. In Pilgrim's backyard, Pine Hills, the largest housing development in New England, is under construction. The build-out includes 2,877 homes on 3,060 acres, and Pine Hills, Inc. is actively trying to acquire more land to build in this area. The distance from Pilgrim to Pine Hills is < 3 ½ miles. The current Pine Hills household size is 1.95 people per building. Based on these numbers, there will soon be 5,850 people living just a few miles from this nuclear plant.

The region is expected to add 465,000 people by 2030 and this group will be aging with a dramatic spike in the over 55 population. The largest population increases are expected in urban centers such as Boston and Cambridge and in a half-dozen suburban towns, such as Plymouth and Weymouth which have very large housing developments on the horizon. The Boston Metropolitan Area Planning Council Report on Population and Employment Projections 2010 - 2030, [http://www.mapc.org/2006 projections.html](http://www.mapc.org/2006%20projections.html). The methodology used by MAPC is described in the report. (see Exhibit F-1). According to the report the area south of Boston is expected to grow faster in population and jobs than any other section of Greater Boston through the year 2030. Communities south of Boston will grow 13% and Plymouth is expected to add the most, about 10,000 residents a population jump of over 20%. By 2030, 1 in 3 people will be over the age of 55, compared to 1 in 5 now. This is relevant to any analysis of health impacts, as studies have shown an increased sensitivity to low levels of ionizing radiation in older populations. Greater Sensitivity to Ionizing Radiation At Older Age: follow-up of workers at Oak Ridge National Laboratory through 1990. Richardson, D.B. and Wing, S. Int. J. Epidemiol., 1999, 28:428-436; The Hanford Data: Issues of Age at Exposure and Dose. Stewart, A.M., Kneale, G.W., PSR Quarterly Vol. 3, No.3 (Sept. 1993) 3:101-111; and Leukaemia near nuclear power plant in Massachusetts, Richard Clapp, Sidney Cobb, C K Chan, Bailus Walker, 924 , Lancet, 1987. (PNPS-AC)

**Comment:** There is new information since Pilgrim began operations in 1972 that shows increases in radiation-linked diseases in the communities around Pilgrim. The increases were in part attributed to operating with defective fuel; operating without the off-gas treatment system in the first years; poor management and practices culminating in the releases in June 1982 that coincided with weather conditions that held the releases over the area. Southeastern Massachusetts Health Study 1978-1986, Morris, Martha and Knorr, Robert, Commonwealth of Massachusetts Executive office of Human Services, Department of Public Health, 1990 and Meteorological Analysis of Radiation Releases For the Coastal Areas of The State of Massachusetts For June 3rd to June 20th, 1982, William T. Land. (PNPS-AC)

**Comment:** The cancers found in the communities around the power station initially were studied by Dr. Sidney Cobb and Dr. Richard Clapp and their results were published in a peer reviewed journal in 1987. They included elevated rates of Myelogenous Leukemia – a type of cancer most likely to be triggered by exposure to radiation. This led to a case- control study

carried out by the Massachusetts Department of Public Health that showed a four fold increase in adult Leukemia between 1978 and 1983. The report stated "a dose-response relationship was observed in that the relative risk of leukemia increased as the potential for exposure to plant emissions also increased." (PNPS-AC)

**Comment:** The Southeastern Massachusetts Health Study was conducted, peer -reviewed, and made public during the Dukakis Administration. However, there was a complete about face in November 1990 when Governor Weld took office that has continued through successive Massachusetts Republican Administrations. December 1990, Governor Weld sent his Executive Secretary to accompany Pilgrim's Vice President, Ralph Bird, and Pilgrim's Health Physicist, Tom Sowden, to visit Massachusetts' Interim Commissioner of Public Health, David Mulligan. At that meeting Pilgrim presented their "wish list" and obviously they had the Governor's blessing. Pilgrim, the implicated industry, would be allowed to appoint a second peer review panel to re-review the Southeastern Massachusetts Health Study; and, until the industry's peer review panel decided whether the study was credible all the study's recommendations would be put on hold. The second peer review panel could find nothing wrong with the study's methodology. The re-review panel stated clearly in their report, Review of the Southeastern Massachusetts Health Study by Hoffman, Lyon, Masse, Pastides, Sandler, Trichopoulos, submitted to the Commissioner of Public Health, October 1992 in the Executive Summary that, "The [original SMHS] study team adhered to generally accepted epidemiologic principles..." and "the findings of the SMHS cannot be readily dismissed on the basis of methodology errors or proven biases..." But somehow they just couldn't believe it - given Pilgrim's emissions. However for emissions data, the re-review committee relied on data collected and provided by Pilgrim - not surprisingly it indicated that Pilgrim hardly emitted any radiation - and one offsite monitor located in South Boston, well outside the EPZ and outside the geographic area likely to pick up routine emissions.

The story gets worse. Massachusetts Department of Public Health allowed Pilgrim, the implicated industry, to provide all the sound bites, press releases and public announcements about the re-reviews' findings and refused to let their employees, who conducted the original study, speak to the press. No subsequent studies have been performed. MDPH has chosen to protect the industry's health over the public's health. Once again, we see political science used to re-write real science on behalf of industry. At the May 17, 2006 NRC Public Environmental Scoping Meeting, an NRC official stated that they had visited MDPH and were told by MDPH's Suzanne Condon and the department that there were no negative impacts from PNPS's operations. Our message to you is that MDPH's statements are politically-driven and have little to no resemblance to fact.

Evidence of radiation-linked disease continued. In a statement before the Southeastern Massachusetts Health Study Review Committee [June 26, 1992] Dr. Richard W. Clapp, the founder and former director of the Massachusetts Cancer Registry and Professor of Environmental Health at Boston University School of Public Health, presented a graphical assessment of the pattern of leukemia and thyroid cancer in the towns closest to Pilgrim during the period 1982-1989. Analysis of 1974-1989 Massachusetts Cancer Registry for Leukemia & Thyroid Cancer, Dr. Richard Clapp, DSc, MPH (2006), personal communication.

The incidence of leukemia peaked in 1982 and subsequently declined until 1986. Then there was a second, smaller peak in 1987 and 1988 while declined in 1989. The number of cases exceeded the number expected in 1982-85 and 1987-88. The second graph depicts the pattern of thyroid cancer in the same set of towns. It shows a peak in the years 1987-1988. These patterns of cancer incidence are consistent with the predicted health effects of the radiation released in the early 1980s.



The graph shows the predicted health effects. A statistically significant increase in childhood leukemia was noted in communities near Pilgrim, too. Although Massachusetts Department of Public Health recommended a state sponsored case controlled childhood leukemia study, it was not done.

The Massachusetts Cancer Registry also shows, for the years 1998-2002, a continuing increase of leukemia and thyroid cancer in the towns around PNPS. Specifically, there were 83 cases of leukemia reported to the Massachusetts Cancer Registry (MCR), where 72.9 would have been expected based on statewide rates. This results in a Standardized Incidence Ratio (SIR) of 114 (95% conf. int. = 91-143). In addition, there was excess thyroid cancer in these same towns for the same time period. The thyroid cancer SIR was 122 (95% conf. int. = 96-155). In other words, leukemia was 14% elevated over the statewide rate and thyroid cancer was 22% elevated. Neither of these calculations were statistically significantly elevated by the usual convention ( $P < .05$ ), but there were more cases than expected nevertheless. This means there is a continuing excess of these two radiation-related cancers in the population, as there was in the 1980s. Analysis of 1998-2002 Massachusetts Cancer Registry for Leukemia & Thyroid Cancer, Dr. Richard Clapp, 2006, personal communication.

Prostate cancer and multiple myeloma, both radiation-linked diseases, are also elevated and statistically significant for the years 1998-2002 in the seven towns most likely to be impacted near Pilgrim (Carver, Duxbury, Kingston, Marshfield, Pembroke, Plymouth, and Plympton). Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2 (2006). Occupational Radiation Studies, Chapter 8, National Academies Press, 2006. Specifically, data from the Massachusetts Cancer Registry indicates 613 cases of prostate cancer vs. 513.5 expected, SIR=119 (95% C.I.=110-129); multiple myeloma: 47 cases vs. 31.7 expected, SIR=148 (95% C.I.=108-198). Analysis of 1998-2002 Massachusetts Cancer Registry for Leukemia & Thyroid Cancer, Dr. Richard Clapp, 2006, personal communication. (PNPS-AC)

**Comment:** The population of the Town is approximately 14,000 families, with tens of thousands of children who would be highly vulnerable to a radioactive leak or other event which could expose them to radioactive material above federally acceptable levels. In addition, there is a sizable retirement community, many members of which also would be vulnerable to overexposure to radioactive material. (PNPS-AE)

**Comment:** Given that the population in and around the Town has increased dramatically in the last 30 years, the radiological dose effect on the population will be far more significant than originally anticipated. When the plant was built in the 1970s, Plymouth was a quiet rural community with a small population that grew seasonally with tourism. Today, Plymouth's year-round population has more than tripled and it has become a year-round "city." Pilgrim now is located in the fastest growing region of Massachusetts, which raises considerable implications for postulated radiological dose effects. (PNPS-AE)

**Comment:** We have heard various studies have been performed and I would like to make sure that the scope does take into account an examination of various studies of cancer. I know I have anecdotally seen, in Duxbury, people with breast cancer, with various types of cancers, that I'm not sure, and I don't know the answer, and I'm not accusing anyone of anything, but I would like to make sure that if there is any evidence that does link health effects from radiation to these various cancers, that that be studied and, if there is obviously a causal effect, that, to me, would be grounds for not relicensing the plant. (PNPS-L)

**Comment:** We urge the NRC to consider, in depth, all the significant environmental impacts which we believe are grounds for denying the relicense of the plant. The National Academy of

Sciences BEIR VII report, biological effects of ionizing radiation, June, 2005, stated that there is no safe dose of radiation. Pilgrim emits radiation daily and these radiation releases have been linked to increased rates of leukemia and thyroid cancers in the towns around Pilgrim. (PNPS-M)

**Comment:** Another piece of new information is the BEIR VII report which found exposure to low level radiation at least three times more damaging than heretofore thought. Also, we have, as new information, the demographic changes projected from 2012 to 2032 of a one out of three being over 55 and older people are susceptible to radiation damage than younger. Also, the BEIR VII report pointed out the synergistic effect of radiation with other toxins, each magnifying the other's mischief, if you will, and no one can doubt the fact that, between 2012 and 2032, there will be more, not less, pollution. (PNPS-N)

**Comment:** Health is another issue that should be considered on a site specific basis, again because of new and significant information. There have been studies of health damage in this community, there were studies done by Dr. Sidney Cobb and Dr. Richard Clapp in the '70s, there was a case controlled leukemia study showing a fourfold increase the closer you lived or worked to Pilgrim. Then there has been a statistical or simply significant increase in thyroid cancer and leukemia in all seven impacted communities because both Pembroke and Plympton are effected by the sea breeze effect and get these emissions. (PNPS-N)

**Comment:** We do need to find out whether there is any statistically significant amount of radiation in the communities surrounding this plant and we need to find out whether there is any relationship between that and incidents of cancer that are statistically significant in being higher than should normally be expected. I have a certain kind of cancer and so do the four people that live next to me on my street, we need to find out why. I'm not casting dispersions on the plant or suggesting that it's cause, that it's the cause of this, but we do need to find out what the cause is. (PNPS-P)

**Comment:** I heard a lot about thyroid cancer, ...and I would be interested to see if, on those studies, they also did genetic studies ...I wonder how much of it is genetic and how much of it is environmental too, so I would like to see, on those studies, if they also followed that up with genetics too. (PNPS-X)

**Comment:** I'm interested in what kind of epidemiological studies have been conducted on cancer rates related specifically to Pilgrim, as well as other areas with nuclear plants, and I'm hoping somebody can help distribute that information. (PNPS-Y)

**Response:** *The comments are related to human health issues. Human health issues were evaluated in the GEIS and were determined to be Category 1 issues. The GEIS evaluated radiation exposures to the public for all plants including PNPS, and concluded that the impact was small. During the plant-specific environmental review of PNPS, the NRC will determine whether there is any new and significant information bearing on the previous analysis in the GEIS. The information provided by the comments will be reviewed as part of that search. Human health effects from radiation exposure due to operation of the plant during the renewal period will be addressed in Chapter 2 and 4 of the SEIS. In addition, evaluation of new studies and analyses of the health effects of radiation exposure is an ongoing effort at the NRC.*

*In spring 2006, the National Research Council of the National Academies published, "Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII Phase 2." A prepublication version of the report was made public in June 2005. The major conclusion of the report is that current scientific evidence is consistent with the hypothesis that there is a linear, no threshold*

*dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment. None of the findings in the BEIR VII report warrant changes to the NRC regulations. The BEIR VII report does not say there is no safe level of exposure to radiation; it does not address "safe versus not safe." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that the risk increases with exposure and exposure rate. It does conclude that the risk of cancer induction at the dose levels in the NRC's and EPA's radiation standards is very small. Similar conclusions have been made in all of the associated BEIR reports since 1972 (BEIR I, III, and V); the BEIR VII report does not constitute new and significant information.*

## **8. Comment Concerning Uranium Fuel Cycle and Waste Management**

**Comment:** The other item, of course, is waste, that supposedly it's off the table but I think, quite clearly, you cannot have a severe accident mitigation analysis without including what could happen by accident, and accidents can happen, to the spent fuel pool. That seems like a logical place to pull the issue of spent waste, high level waste, into the SAMA, and I hope also that you would consider and analyze buried waste that was allowed to be buried on site until 1981. I assume that when it was allowed to be buried, there was an assumption and analyses of the time that it would remain stable, until the license ended in 2012 and decommissioning would begin. What will another 20 years do to it? Will it remain stable for another 20 years? Do you even know what is buried there, what the packaging is, etcetera? There should be a complete inventory of what's there, curies, volume, packaging, a map where it is and whether the six feet of soil is still over it, and whether you would recommend, for mitigation, monitoring wells so we can see whether it is going into the bay, which is the only other place it can go because of the topography. (PNPS-A)

**Comment:** According to Entergy, the facility will run out of space in its spent fuel pool by 2012 and there are no prospects for off-site storage in the foreseeable future. The ER states simply and cryptically with respect to spent fuel storage during the 20-year renewal period: "[t]he spent fuel assemblies are then stored for a period of time in the spent fuel pool in the reactor building and may later be transferred to dry storage, if needed, at an onsite interim spent fuel storage installation provided necessary regulatory approvals are obtained. Thus, a significant amount of "hot" spent fuel will remain in the spent fuel pool at Pilgrim, which represents a long-term risk to the Town that is not adequately addressed in the license renewal application. (PNPS-AE)

**Comment:** On-site storage of spent fuel assemblies which, already densely [packed in the cooling pool, will be increased by fifty percent during the renewal period. The spent fuel will remain on-site longer than was anticipated and is more vulnerable than previously known to accidental fires and malicious attacks. The Pilgrim plant operator recently has stated that "[the plant] will run out of space in 2012. This was never intended to be a repository for any length of time." Accordingly, the ER should address the likely impacts of on-site storage in the years to come. (PNPS-AE)

**Comment:** Even if present plans for establishing a federal waste repository at Yucca Mountain move forward on schedule, that facility would reach maximum capacity long before a relicensed Pilgrim stops generating its waste. Plant owners and the NRC need to have a clear and safe plan for storage of radioactive waste before the extension is granted. (PNPS-M)

**Comment:** Over 1.2 million pounds of high level radioactive nuclear waste is stored on site at the Pilgrim Plant, this waste poses a risk to the health of humans and ecosystems for centuries to come, but there are currently no clear disposal options outside of the state. (PNPS-M)

**Comment:** ...on spent fuel, that this should be considered in this relicensing process because there is significant new information which is the standard, the new information that is significant is that excluding spent fuel from the review was based on a feeling there would be off site options. However, we know there are no off site options in any period of time that we will be talking about in the license extension. (PNPS-N)

**Comment:** The Waste Confidence Act, which exists and was the underpinning of why spent fuel is not looked at, does not hold water, so the new information is Yucca is not going to happen any time soon, reprocessing is not going to happen any time soon, nor is the Gashuti Indian Tribe place going to happen any time soon, so we'll be here. Therefore, we must be told beforehand what the options will be for safer storage. The Town of Duxbury, on two occasions, has stated that we want safer interim storage, meaning low density pool storage, and secured, hardened dry cast storage until there is an off site option. (PNPS-N)

**Comment:** The radioactive waste problem was another issue which the nuclear energy industry would have to solve in the future. When the plant was originally commissioned, we were promised that this was a problem that would be resolved. This problem has not been solved, the radioactive waste produced by Pilgrim sits on the site of the plant and will continue to increase in quantity for another 20 years if the plant is relicensed. Maybe it could be shipped to Yucca Mountain in Nevada where it would have to remain safely contained for over a million years. Take a trip to Las Vegas and ask the officials there if they have faith in the nuclear industry. (PNPS-Z)

**Response:** *Onsite storage of spent nuclear fuel is a Category 1 issue. The safety and environmental effects of long-term storage of spent fuel onsite have been evaluated by the NRC and, as set forth in the Waste Confidence Rule (10 CFR 51.23), the NRC generically determined that such storage could be accomplished without significant environmental impact. In the Waste Confidence Rule, the Commission determined that spent fuel can be stored onsite for at least 30 years beyond the plants life, including license renewal. At or before the end of that period, the fuel would be moved to a permanent repository. The GEIS, NUREG-1437 is based upon the assumption that storage of the spent fuel onsite is not permanent. The plant-specific supplement to the GEIS that will be prepared regarding license renewal for PNPS will be based on the same assumption.*

**Comment:** In 2008, North Carolina has stated they will not be taking waste from Massachusetts. We are not a member of any compact state. There was a determination that we were not going to be a low level radioactive waste site, so what would the future be, having both high level waste and low level waste, which isn't necessarily low in toxicity or longevity, on site? What should we be doing for that? (PNPS-A)

**Comment:** Waste containers and forms will not last as long as some waste remains hazardous. Therefore, we want to know what Entergy's plans are for storing LLRW; monitoring the releases; and what are the "acceptable" public radiation exposures and health risks. (PNPS-AC)

**Comment:** LLRW should be looked at on a site specific basis because of new and significant information since Pilgrim's initial license, 1972.



- Pilgrim had off site options in 1972 and reasonably expected them to continue. Not so, now. Barnwell S.C. announced that it will close to Massachusetts generators June 20, 2008.
- Massachusetts is not a member of any compact; in order to join Massachusetts would have to agree to be a host community; Massachusetts indicated clearly in the mid 1990's that it would not be a host community.
- Texas may open, no guarantees, and if it does open there is no assurance that non-Texas Compact members will be able to send their waste there and if allowed whether fees would be prohibitive. The Massachusetts Department of Public Health Radiation Control stated, "As a result of the above, on July 1, 2008 Massachusetts generators will have no treatment option other than decay on site unless Texas opens a new LLRW site for Class B and C wastes. Texas has not decided yet whether non Texas compact members may use their site."
- Terrorism or acts of malice were not considered a threat in 1972. Not so, post 9/11 - nuclear facilities/materials are known to be attractive targets.
- Pilgrim is located on Cape Cod Bay and the property slopes towards the Bay so that any leaking contaminants from waste storage facilities will flow towards and eventually into the Bay. There are no monitoring wells lining the shoreline.
- The undisputed recognition of global warming is new and brings with it increased severity of coastal storms, erosion, and increased sea levels. Hence this must be factored into on-site waste storage options.
- PNPS is located on the coast -- a salt corrosive environment on concrete and waste packaging must be analyzed.

Storage of LLRW is important for our community's health and safety because there is nothing low level about the waste. Waste is characterized "high" or "low" depending on where it comes from, how it is generated, not according to its' toxicity and longevity. Our community's health has been compromised by radiation exposure – discussed above.

We deserve to know what the LLRW storage plans are before the application is decided; so that the re-licensing decision does not prejudge any LLRW storage decision. (PNPS-AC)

**Comment:** The Licensee's filing discusses Low Level Radioactive Waste in Appendix E, Applicant's Environmental Report Operating Renewal Stage Pilgrim Nuclear Power Station, Chapter, 3.23. The discussion covers a brief overview of what they do with waste now. The application makes one mention of low level radioactive waste which does not bear on the subject- Applicant's Environmental Report 6.4.2 "land required to dispose of spent nuclear fuel and low-level radioactive wastes generated as a result of plant operations." What is not discussed, but needs to be analyzed, is what Entergy plans to do with LLRW from 2012-2032. (PNPS-AC)

**Comment:** The environmental impacts of so-called "low level" radioactive waste storage, 2012-2032, should be analyzed in a site specific SEIS. Because: there is no guarantee that off site options will exist after June, 2008; Pilgrim's coastal location is not suitable for waste storage - a salt corrosive environment; increased intensity and frequency of storms predicted for the future; topography is such that contaminants that have leaked will migrate/flow towards and perhaps

into Cape Cod Bay; the threat of terrorism. All of these factors could work together to increase the probability that stored nuclear wastes could contaminate the environment and endanger public health and safety. (PNPS-AC)

**Response:** *The comments are related to the environmental impacts associated with the uranium fuel cycle and Low Level Radioactive Waste Management (LLRW), which were evaluated in the GEIS and determined to be Category 1 issues. The GEIS evaluated impacts associated with the uranium fuel cycle and LLRW management for all plants including PNPS, and determined that the impact was small. During the plant-specific environmental review of PNPS, the NRC will determine whether or not there is any new and significant information bearing on the previous analysis in the GEIS.*

**Comment:** The Aging Management Program does not include an analysis of the potential contamination from buried waste on site. We understand that until 1981 so-called low-level radioactive waste was allowed to be buried at reactor sites. We asked the NRC if Pilgrim buried waste on site up until that date and were informed by Cliff Anderson that they did not. However, there have been persistent rumors that waste indeed had been buried on site and we request that this be investigated.

Cliff Anderson, Branch Chief, USNRC, Region I, May 31, 2006 sent to us the following email.

The licensee for the Pilgrim station did not conduct any burials of radioactive material prior to 1981 in accordance with the former NRC regulation 10 CFR 20.304, which governed such burials at that time. Notwithstanding, the Pilgrim station did conduct an "alternate disposal" under 10 CFR 20.302 (now cited as 10 CFR 20.2002). That disposal option was requested per 10 CFR 20.302 in a letter, dated January 15, 1993, from Boston Edison Company, and consisted of onsite disposal (i.e., burial) of soil that contained residual contamination from several events. (The events are described in licensee event reports (LERs) 77-29, 82-19 and 88-26.) The licensed material covered by the request included 79,000 cubic feet of excavated construction soil that contained a total radionuclide inventory of 0.636 millicuries of cobalt-60 and Cesium-137. The NRC staff approved the request by letter dated May 4, 1993, with the provision that the NRC Safety Evaluation (SE), enclosed with the May 4, 1993 letter, be permanently incorporated in the Offsite Dose Calculation Manual.

The NRC SE concluded the maximum dose from the disposal area would be less than 0.1 millirem/year during the year of disposal; and that doses during subsequent years through the time of site decommissioning would be less than 0.01 mrem/year. The total dose was well within the staff's guideline of 1 millirem per year, and is a small fraction of the 300 millirem received annually by a member of the public from natural background sources of radioactivity.

The location of the LLRW and the burial method are described in the NRC SE enclosed with the May 4, 1993 letter. The NRC found the disposal location acceptable because of its distance from wetlands and Cape Cod Bay, and because any surface runoff would be entirely within the Pilgrim owner controlled area. We are forwarding the NRC SE to you by regular mail (USPS). The results of NRC inspection of this area were described in NRC Integrated Inspection Report 1999-01, which also will be forwarded by USPS mail.

The onsite spill and burial information is maintained in the licensee's 10 CFR50.75(g) file in accordance with regulatory requirements. Such residual contamination is acceptable per the rule and, as noted above, the public dose consequences are negligible in comparison with the dose from natural background radiation.

Pilgrim Watch has not received the NRC SE or the NRC Integrated Inspection Report 1999-01. These documents should be reviewed by the ER and made public. Regarding the material buried referred to by Cliff Anderson we assume that when permission was granted to bury the waste that it was assumed that decommissioning would occur in 2012 and the contamination would be cleaned up; so-called "low-level" waste was indeed low level in its health impact; and the Radiological Environmental Monitoring Program would detect off site contamination at levels of concern. However these assumptions are no longer tenable if the application is approved.

Cliff Anderson ignored the burial onsite of contaminated materials from the 1987-1990 repairs for which we believe there is no official record; these burials are well known. Those burials must be responsibly dealt with - monitored and remediated, not continue to be ignored for an additional 30 years.

Decommissioning, if the application is approved, will not begin until 2032 or later. We assume that the licensee and NRC determined that burying waste on site would not harm the environment based on a definite time frame – a 40 year license. What would happen after 60 years was not considered nor analyzed. It needs to be to provide reasonable assurance that public health and safety will not be negatively impacted. For example erosion of the top soil will be affected by the passage of time, increasing frequency and severity of coastal storms; and the topography of the site that slants down into Cape Cod Bay. Migration of contaminants underground is currently not monitored. Migration of contaminants from so-called low level waste has happened at other sites - for example, at Barnwell SC, TVA, Hanford and Starmet. Hence there is no reason to believe that the same could not happen here. (PNPS-AC)

**Response:** *The comment is related to the environmental impacts associated with Low Level Radioactive Waste Management (LLRW), which were evaluated in the GEIS and determined to be Category 1 issues. As part of the environmental review of PNPS, the NRC will determine whether or not there is any new and significant information bearing on the previous analysis in the GEIS. This determination will include a review and evaluation of this comment submitted during the scoping period.*

## **9. Comments Concerning Postulated Accidents**

**Comment:** We know assessments, number one, are low and, more importantly, we know that a piece of property, like a business, the businesses on Court Street, are not only the value of the bricks and the roof but the value of a business. The value of this area involves its tourist appeal, historical value, etcetera, etcetera, and none of those inputs have been put into the model in the SAMA. (PNPS-A)

**Comment:** For the SAMA, I hope that you will look at mitigation means to diminish the effect on the public. I think somehow, in reading it, and I don't mean to, you know, sound flip, but it seems to be more mitigating the damage to the licensee's pocketbook. That you would look, for example, in the economic damage, that they only seem to consider, they have put, they have two buckets, farm wells and non-farm, but they don't differentiate for business, for example, and what you see there is a determination of valuation based on assessed value, in a county, divided by the population. (PNPS-A)

**Comment:** The Town also would lose travel expenditures associated with travelers on their way to Cape Cod, Nantucket, and Martha's Vineyard; travel through Plymouth County is necessary to

reach those destinations. Travel to those areas clearly would be restricted in the event of a severe accident at Pilgrim (taking into account that winds often blow toward Cape Cod at the islands), reducing travel expenditures not only in the Town but also in surrounding areas. The loss of economic infrastructure and tourism should be considered in the SAMA analysis to ensure that "realistic" mitigation alternatives are explored, taking such factors into account. (PNPS-AE)

**Comment:** The economic model used in the SAMA analysis does not take into account the loss of economic activity in the Town as an economic cost of a moderate or severe accident at Pilgrim. The tourism sector is critically important to the economic vitality of the Town and Plymouth County. A multitude of historical sites (e.g., Plymouth Rock, the Mayflower, Plymouth Plantation) are located in close proximity to Pilgrim and attract thousands of visitors to the area. Assuming appropriate clean-up and decontamination of these sites, it is unlikely that tourism would ever fully recover after a severe accident, which would be devastating for the Town's economy. (PNPS-AE)

**Response:** *The comments are related to the impacts of postulated accidents, including design basis and severe accidents. The environmental impacts of design basis accidents is located in Chapter 5 of the GEIS, which contains a detailed discussion of the possible environmental effects of postulated accidents, including socioeconomic impacts. The Commission concluded that consideration of design basis and severe accidents are Category 1 issues. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. The applicant provided a severe accident mitigation alternatives (SAMA) analysis as part of the license renewal application for PNPS. The NRC staff's review of the SAMA analysis will be discussed in Chapter 5 and Appendix G of the plant-specific SEIS for PNPS.*

**Comment:** Adding a filter to the direct Torus vent system, they come up with that it would cost \$3 million and it would only reduce the amount of radiation released by half but, somehow, it's not worthwhile. And so I think that that really speaks to the community and I hope it speaks to you that the emphasis does not seem to be on mitigating effect public health, safety and property, but rather to protect their own wallets. (PNPS-A)

**Comment:** The Direct Torus Vent System (DTVS) was installed because it was recognized that there was something like a 90% probability of that containment failing. In order to protect the Mark I containment from a total rupture it was determined necessary to vent any high pressure buildup. The DTVS does not have a filter; therefore unfiltered material will be vented into the neighborhoods. The DTVS provides reason to add additional monitoring to better assess what was released after its use. (PNPS-AC)

**Comment:** The faulty SAMA analysis used by Entergy in the Environmental Report caused it to wrongly dismiss mitigation alternatives such as adding a filter to the Direct Torus Vent.

The purpose of a SAMA review is to ensure that any plant changes that have a potential for significantly improving severe accident safety performance are identified and addressed. Duke Energy Corp., *supra* at 5. For its SAMA analysis, the Pilgrim Environmental Report explains that, "A cost benefit analysis was performed on each of the remaining SAMA candidates. If the implementation cost of a SAMA candidate was determined to be greater than the potential benefit (i.e. there was a negative net value) the SAMA candidate was considered not to be cost beneficial and was not retained as a potential enhancement. . . . "The benefit of implementing a SAMA candidate was estimated in terms of averted consequences." One example of how a poorly performed SAMA analysis can lead to erroneous conclusions is the ER's look at the costs and benefits of installing a Direct Torus Vent filter at Pilgrim.



The Direct Torus Vent System (DTVS) is a method to relieve the high pressure which is generated during a severe accident. In 1986, Harold Denton, then the NRC's top safety official, told an industry trade group that the "Mark I containment, especially being smaller with lower design pressure, in spite of the suppression pool, if you look at the WASH 1400 safety study, you'll find something like a 90% probability of that containment failing." Hazards of Boiling Water Reactors in the United States, Paul Gunter, Nuclear Information Resource Service, Washington, D.C. (March 1996). In order to protect the Mark I containment from a total rupture it was determined necessary to vent a high pressure buildup. As a result, an industry workgroup designed and installed the "Direct Torus Vent System" at all Mark I reactors, including Pilgrim. Operated from the control room, the vent is a reinforced pipe installed in the torus and designed to release radioactive high pressure steam generated in a severe accident by allowing the unfiltered release directly to the atmosphere through the 300 foot vent stack. Use of the vent discharges steam and radioactive material directly to the atmosphere bypassing the standby gas treatment system (SBGTS) filters normally used to process releases via the containment ventilation pathway. There is no radiation monitor on the pipe and valves that comprise the DTV line. William J. Raymond, Senior Resident Inspector, Pilgrim Nuclear Power Station, USNRC, Region I, Branch 5, email correspondence, May 11, 2006.

In response to a question posed by the Town of Plymouth at a public meeting on June 21, 1990 about the decontamination factors for the torus pool of various isotopes, the NRC spokesperson responded that, "Except for the noble gases (consisting of the isotopes of Xenon and Krypton), which are not retained in the pool to any significant degree, the suppression pool is highly effective in scrubbing out and retaining particulate and volatile fission products. Calculations as well as tests indicate that the suppression pool would be expected to have a realistic decontamination factor (DF) for particulate and volatile fission products of about 100, depending upon the accident sequence and the temperature of the water. This means that about 1% of the particulate and volatile radioactivity entering the pool would be released to the atmosphere, and about 99% would be retained within the pool." Although the NRC spokesman appeared to dismiss this as a trivial release, Dr. Frank von Hippel analyzed the applicant's response and stated that there is an internal contradiction in what we are being told. "The NRC believes that the release from a severe core-melt accident would be reduced [by the suppression pool] by a factor of one hundred. This is considerably more optimistic than estimated in the NRC's first study on the subject. WASH-1400, The Reactor Safety Study, WASH-1400 (1975). Also known as The Rasmussen Report. Also, the contention is that the reduction by a filtration system would have zero benefit. Here the contenders seem to be assuming that a factor of one hundred equals 100%. That is false. Even a release of on the order of 1 percent of the core's radioactive iodine and cesium would be a very severe event." Frank Von Hippel, Program of Science and Global Security, Princeton University, e-mail correspondence, March, 19, 2006.

In its Environmental Report, Entergy analyzes the benefits of installing a filter to the torus vent in the course of reviewing possible severe accident mitigation alternatives. The Pilgrim ER states, "Filtered Vent: This analysis case was used to evaluate the change in plant risk from installing a filtered containment vent to provide fission product scrubbing. A bounding analysis was performed by reducing the successful torus venting accident progression source terms by a factor of 2 to reflect the additional filtered capability. Reducing the releases from the vent path resulted in no benefit. This analysis case was used to model the benefit of phase II SAMAs 2 and 19." (E.2-5). The Report then states, "Basis for Conclusion: Successful torus venting accident progressions source terms are reduced by a factor of 2 to reflect the additional filtered capability. The cost of implementing SAMA at Peach Bottom was estimated to be \$3 million. Therefore this SAMA is not cost effective for [Pilgrim]." (E.2-24). (emphasis added) In other words, as they show in Table E.2-1, Entergy has determined that in return for a cost of \$3,000,000.00, there will be no (0.00%) benefit to public health and safety.

It is not clear to Petitioners how it is possible to find zero (0.00%) benefit from installing a filter that would reduce by a factor of two the radioactive venting to the public in the case of a severe accident. Unfiltered venting has been judged unsafe by all regulatory agencies outside the United States. David C. Dixon, Pilgrim Direct Torus Vent System, Presentation to Massachusetts Joint Committee on Energy (February 27, 1990). In its analysis of several risk contributors to Core Damage Frequency in Chapter E.1, the disposition of those events in Table E.1-3 frequently included "venting via DTV path to reduce containment pressure." In other words, a filter in the torus vent could reduce the impact in many possible severe accidents. The only conclusion to draw from the outcome of the DTV filter SAMA analysis is that, as discussed above, Entergy has used the MACCS2 code to downplay the health and economic costs of severe accidents and used the Probabilistic Safety Analysis (PSA) model to make the benefits of mitigation appear to be zero.

We respectfully request the ER to include a review of Entergy's analysis. In addition we request the studies that NRC is currently depending to support NRC's assertion that the release from a severe core melt accident would be reduced by a factor of one hundred. This is considerably more optimistic than estimated in NRC's first study on the subject (WASH-1400, 1975). Last, if the NRC agrees with Entergy's analysis that a filter's benefit is not worth the cost to present to the public both NRC's and Entergy's complete calculations and supporting studies. (PNPS-AC)

**Comment:** My comments tonight are on the direct Torus vent system that Pilgrim, as a Mark One boiling water reactor, was built with a faulty containment system and, in order to protect that containment from total rupture, it was determined it was necessary to vent any high pressure build up.

So the result was the direct Torus vent system was installed at Pilgrim, as well as all Mark One reactors, this system is an extension of the containment ventilation system installed as a plant upgrade in the 1980s, but it bypasses the standby gas treatment system filters normally used to process releases via the containment ventilation pathway. Operated from the control room, the vent is a reinforced pipe installed in the Torus and designed to release radioactive, high pressure steam generated in a severe accident by allowing the unfiltered release directly to the atmosphere through a 300 foot vent stack. There is no radiation monitor on the pipe and valves that compromise the direct Torus vent line. So venting can result in a significant radioactive release, even a release on the order of one percent of the core's radioactive iodine and cesium would be a very severe event. Reactor operators now have the option, by direct action, to expose the public and the environment to unknown amounts of harmful radiation in order to save containment. The purpose of the containment is to provide a barrier between the lethal radiation inside the reactor and the public.

As a result of the GE design deficiency, the original idea for a passive containment system has been dangerously compromised and given over to human control with all its associated risks of error and technical failure. We want indirect venting, that is allowing the steamer air to escape only after it's passed through filters. The wet well pool will not scrub out or eliminate highly radioactive fission products. Unfiltered venting has been judged unsafe by all regulatory agencies outside the United States, the only advantage of direct venting is saving money for the industry at the expense of the population. (PNPS-Q)

**Comment:** The EPA has an acceptable standard for exposure but, in the real world, there is no safe level of exposure to radiation. Under the severe accident mitigation analysis, Pilgrim's application stated that a filter would reduce by half the amount of radiation that would be released in an accident. I think half is a major benefit for public health and safety. The consequences should be calculated and compared with the cost of the filtration system and



mitigation should be focused on the protection of public health, safety and the regional economy, not a cost benefit for a multi billion dollar industry trying to save dollars. (PNPS-Q)

**Comment:** The Pilgrim site is located on the western shore of Cape Cod Bay in the Town of Plymouth, Plymouth County, Massachusetts (the "Town"). As such, the Town is in direct proximity to any nuclear incidents that may occur. With a current estimated population of approximately 59,000, an incident at Pilgrim that emits radioactive material could have devastating impacts on the health of the Town residents. In addition, the Town economy is heavily reliant on tourism. Any nuclear incident would deal a severe blow to tourism and the related economy for the years to come and have a potentially ruinous effect on the local economy. Thus, the Town urges the Commission to fully review all aspects of the Pilgrim plant to assure that the citizens of Plymouth and surrounding areas are fully protected from negative or dangerous environmental impacts associated with the plant's relicensing. (PNPS-AE)

**Response:** *The comments are related to the impacts of design basis accidents and severe accidents. The impacts of design basis accidents and severe accidents were evaluated in the GEIS and determined to be small for all plants; therefore, they are Category 1 issues. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. During the plant-specific environmental review of PNPS, the NRC will determine whether there is any new and significant information bearing on the previous analysis in the GEIS. Chapter 5.1.2 of the plant-specific SEIS for PNPS will address severe accidents. The applicant provided a severe accident mitigation alternatives (SAMA) analysis as part of the license renewal application for PNPS. The NRC staff's review of the SAMA analysis will be discussed in Chapter 5 and Appendix G of the plant-specific SEIS for PNPS.*

**Comment:** The Environmental Report included in Entergy's license renewal application sets forth a flawed SAMA analysis that misstates the consequences of a severe accident at Pilgrim. Specifically, the SAMA analysis uses inaccurate input data that underestimated the economic consequences of severe accidents at the plant. (PNPS-AE)

**Response:** *The comment is related to the severe accident mitigation alternatives analysis. This analysis will be discussed in Chapter 5 and Appendix G of the SEIS.*

**Comment:** ...the National Academy of Sciences' study on the vulnerability of spent fuel storage and they stated, unequivocally, that reactors designed like Pilgrim, Mark One BWRs, that have the pool high up in the attic, if you will, of the reactor building, are the most vulnerable to loss of water, whether by accident or attack, and there would be a consequence, fire, in a dense pool that could not be put out and could contaminate 500 miles. Therefore, for at least these two pieces of new and significant information, it should be considered. (PNPS-AC)

**Comment:** The SAMA analysis fails to address the environmental impacts of the on-site storage of spent fuel assemblies which will be significantly increased during the renewal period; it does not contemplate a severe accident in the spent fuel pool, but should. (PNPS-AE)

**Comment:** The ER should address the risk of an accidental spent fuel fire at the plant. The risk of fire is increased because the spent fuel is densely packed in "high-density" storage racks. In the event that water in the fuel pool were lost (due to an intentional attack on the plant, for example), cooling of the fuel assemblies would be inhibited and the assemblies could ignite rapidly and spread within the pool, leading to a significant atmospheric release of radioactive isotopes with great threat to public health and the environment. (PNPS-AE)

**Comment:** The Attorney General seeks consideration in the Supplemental GEIS of the environmental impacts of a severe accident in the Pilgrim fuel pool, including accidents caused by equipment failures, natural disasters, and intentional malicious acts. The Attorney General also seeks consideration of a reasonable array of alternatives for avoiding or mitigating the impacts of a severe pool fire, including combined low-density pool storage and dry storage of spent fuel. (PNPS-AH)

**Comment:** The Environmental Report is inadequate because it fails to address the environmental impacts of the on-site storage of spent fuel assemblies which, already densely packed in the cooling pool, will be increased by fifty percent during the renewal period. A severe accident in the spent fuel pool should have been considered in Applicant's SAMA review just as accidents involving other aspects of the uranium fuel cycle were. Applicant has included other accidents involving the Uranium Fuel Cycle in its SAMA analysis demonstrating it agrees that these are within the Scope of these proceedings. In addition, new information shows spent fuel will remain on-site longer than was anticipated and is more vulnerable than previously known to accidental fires and acts of malice and insanity. The ER should address Severe Accident Mitigation Alternatives that would substantially reduce the risks and the consequences associated with on-site spent fuel storage.

Mitigation strategies include: requiring low density pool storage and secured (hardened) dry cask storage. These measures are requested by the Massachusetts Attorney General in his petition to intervene and by the Town of Duxbury at Annual Town Meeting, 2005 and 2004. Other strategies were analyzed by Dr. Gordon Thompson and found not to be effective. Reconfiguring the assemblies in the pool will yield a small reduction in risk; however it will do no good if there is partial drainage of water or if debris blocks air flow in a drained pool. The National Academy of Sciences recommended installing a spray cooling system and specified that the system must be capable of operation even when the pool is drained (which would result in high radiation fields and limit worker access to the pool) and the pool or overlying building, including equipment attached to the roof or walls, are severely damaged." NAS Safety and Security Report, *supra* at 6 and 57. This is unlikely to be achievable at Pilgrim and once ignition had occurred, spraying water into the pool would feed the fire through the exothermic steam-zirconium reaction. A massive and probably impractical flow of water would be needed to overcome the effect. Doing nothing, as is the present situation, must be weighed against the consequences.

The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene includes a report on the potential consequences of a spent fuel pool fire at Pilgrim by Jan Beyea, PhD., May 25, 2006...

Beyea stated that, "releases lower than 10% of the Cesium-137 inventory, even releases too low to justify remediation, could have costs associated with loss in property value in the range of 10 to 100 billion dollars (Beyea, page 8)..."

Beyea notes that the cancer estimates ... are lower limits, because they only include cancers from Cesium-137. This approximation ignores shorter isotopes in the fresh fuel in the pool, especially Cesium-134 (Benjamin 2003), page 11. Beyea goes on to say that, "Releases from Pilgrim headed initially out to sea will remain tightly concentrated due to turbulence until winds blow the puffs back over land (Zagar et al.), (Angevine et al., 2006). This can lead to hot spots of radioactivity in unexpected locations (Angevine et al. 2004). Beyea, p.11. Therefore dismissing radiation blowing out to sea is inappropriate. Reduction of turbulence on transport from Pilgrim across the water to Boston should also be studied, according to Beyea's analysis. The program CALPUFF (Scire et al. 2000) has the capability to account for reduced turbulence over ocean

water and could be used in sensitivity studies to see how important the phenomenon is at Pilgrim...

It is assumed that an area exists around the "main portion" of plume, where potential property buyers would be concerned about residual risk. (The main portion of the plume is defined as the area where remediation or demolition takes place.) Outside the main plume, contamination would still be measurable. Lack of trust in statements by government would translate into loss in property values. All things being equal, persons would wish to live as far away from contaminated areas as possible.

A spent fuel accident is conservatively estimated to cost from \$105 to \$488 billion dollars and result in 8,000 – 24,000 latent cancers from exposure to Cesium-137. Exposure to other radionuclides and other resultant diseases, reproductive disorders and birth defects will up the toll.

Currently casks cost about 1 to 2 million dollars per cask. Pilgrim has approximately 440 tons of fuel on-site which would cost about \$71 million dollars to place into dry cask storage. In addition, the licensee will incur the costs of moving the fuel out of the pool as it fills anyway, and will ultimately need to put the fuel in dry casks for transfer to a long term repository when one becomes available. The probability of a spent fuel fire increases yearly with the increase in spent fuel densely packed in the pool, and with the risk of ever more sophisticated acts of terrorism increasing. A rough cost/benefit look at moving spent fuel into secured dry cask storage shows that this mitigation makes economic sense. Although in its ER, Entergy has made vague statements about transferring spent fuel assemblies to dry cask storage in the future, it has not outlined how and when this will happen. In a statement to Cape Cod Times, Pilgrim spokesman David Tarantino has stated that Entergy plans to move assemblies out of the spent fuel pools to dry casks only on an as-needed basis, to free up space in the pool for newer spent fuel. This, and the application's silence on the issue of future spent fuel storage, make clear that Entergy has no intention of reconfiguring its pool to low density storage in the future. It also makes it unlikely that the plant will take the initiative to store spent fuel in secured dry cask storage as soon as possible. It is up to the NRC assure that the public's interests are protected and the vote of the Town of Duxbury that re-licensing be opposed unless Safer storage of spent radioactive fuel rods is required until all spent rods are moved off site - low density pool storage and hardened dispersed dry cask storage.

A plant-specific assessment of the vulnerability of the spent fuel pool to fires caused by accident or acts of malice is mandated by the NEPA requirement to consider all of the environmental impacts of the re-licensing and by the 9th Circuit Court's decision. In addition, NRC Regulations (10 CFR 51.53(c) (ii) (L)) call for consideration of severe accident mitigation alternatives on a plant specific basis if the plant has not already done so. The spent fuel pool, although a Category 1 issue for the purposes of normal operations, should have been included in the Category 2 SAMA analysis of severe accidents in the Applicant's Environmental Report. There is also new information since the Generic Environmental Impact Statement was prepared that demonstrates the spent fuel is likely to remain on-site longer than anticipated, and is more vulnerable to fires than had been known.

Also, it is irrelevant whether the Applicant would have decided on mitigation or not. It is the analysis, or "hard look" that is required by NEPA. "While NEPA does not require agencies to select particular options, it is intended to 'foster both informed decision-making and informed public participation, and thus to ensure the agency does not act upon incomplete information, only to regret its decision after it is too late to correct' (citing Louisiana Energy Services (Claiborne Enrichment Center), CLI-98-3, 47 NRC 77, 88 (1998))." . . . "if 'further analysis' is

called for, that in itself is a valid and meaningful remedy under NEPA.” Duke Energy Corp., supra at 13. ...

Given the catastrophic impact to human health and the environment if the spent fuel pool experiences loss of water due to accident or terrorist attack, and the benefit that could be achieved at a relatively reasonable cost to the plant operator, mitigation of the existing vulnerability should at least be considered before the license is renewed. (PNPS-AC)

**Response:** *Onsite storage of spent nuclear fuel including spent fuel pool accidents is a Category 1 issue. The NRC staff’s review of the SAMA analyses will be discussed in Chapter 5 and Appendix G of the SEIS. These comments provide no new and significant information and, therefore, will not be evaluated further.*

**Comment:** First item. We know that realistic plume modeling assumptions and wind weather data are key to forecasting and implementing appropriate and effective emergency response plants and to assess damage afterwards. We hope you will look and compare, for this particular site, whether Class A models or Class B models would be the most appropriate way to detect plume dispersion and whether to compare multiple meteorological towers, appropriately located in sites in the community, would give a more accurate picture, in our coastal environment with a varied terrain, than relying simply on the tower on site. (PNPS-A)

**Comment:** Multidimensional plume dispersion models, Class B Models; and multiple meteorological towers placed in the seven surrounding towns impacted by the sea breeze effect that were identified by Dr. J.D. Spengler [Carver, Duxbury, Kingston, Pembroke, Plymouth, Plympton] and towers located appropriately on Cape Cod in consideration of the site specific meteorological analysis of Cape Cod performed for the Commonwealth by Dr. Bruce Eagan.

Realistic modeling assumptions and meteorological data are the key to forecasting and implementing appropriate and effective emergency response plans and assessing damage afterwards.

Currently, Pilgrim uses Class A plume transport models and relies on weather information from their onsite meteorological tower. Neither provides accurate data.

The Class A plume models used incorrectly assumes a steady-state, straight-line plume transport; although actual wind and weather conditions are variable and complex affected by sea and lake breezes, terrain, location/clustering of buildings, and variable precipitation.

Pilgrim should use complex Class B models now and from 2012-2032 if the license is extended.

The on-site Met Tower only tells us what the wind direction is on site but not what happens to the plume as it travels offsite. Therefore Pilgrim should use data from multiple weather stations now and from 2012-2032, if the license is extended. (PNPS-AC)

**Response:** *These comments raise questions regarding the adequacy of various input data and assumptions (i.e. meteorological data) used in the MACCS2 offsite consequence analysis. The MACCS2 analysis will be addressed in Chapter 5 of the SEIS.*

**Comment:** Pilgrim is located on the coast and the wind is highly variable due to the Sea Breeze Effect, terrain, buildings, and variation in precipitation/fog patches. Therefore planning must be for the entire radius – not simply for those inside one imaginary “relatively narrow plume.” (PNPS-AC)

**Comment:** In light of NRC and EPA's Guidance about the use of refined variable trajectory modeling techniques to provide for more realistic, accurate modeling predictions and site specific meteorological studies demonstrating the complexity of weather at this site. Pilgrim should update to Class B models and multiple weather stations. (PNPS-AC)

**Comment:** A straight line Gaussian model is not applicable here and the applicant should not rely on weather input data simply from that obtained onsite. By relying on the steady-state, straight –line Gaussian model to construct a “key hole” planners are likely to make the wrong call - send citizens into a plume; tell folks to stay put when should evacuate; or tell them to evacuate when should shelter. Class B models must be required if a license extension is granted for 2012-2032. Computerized combination weather-radiation monitors are readily available and also must be required. (PNPS-AC)

**Comment:** The meteorological input to the modeling tool used by Entergy to characterize weather conditions, and therefore the radiological consequences from a severe accident at the Pilgrim plant, are inaccurate.

While Pilgrim's Meteorological Monitoring System currently meets applicable Commission requirements, the ER's straight-line Gaussian plume model to estimate the location and magnitude of predicted radionuclide concentrations and resultant doses received from a postulated plant accident is inappropriate for the Pilgrim station. With the Gaussian plume model, the speed and direction of prospectively lethal clouds are determined by the initial wind speed and the direction at the time of release and do not account for variable atmospheric conditions, whether in time or in space. Further, the model does not consider terrain effects, which can significantly affect wind patterns and dispersion/ Variable wind conditions over time and space, likely in the coastal, hilly terrain are surrounding the Town, makes the resultant predictions of the movement of lethal airborne materials based on just onsite meteorological data, with simplistic straight line air quality dispersion models, severely unreliable for evacuation planning purposes. (PNPS-AE)

**Response:** *Emergency planning decisions at Pilgrim would be based on the Pilgrim Emergency Plan. 10 CFR Part 50.47 requires that the Emergency Plan provide adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition. The Pilgrim Emergency Plan, including meteorological and dose projection capabilities, has been reviewed by the NRC and found to meet all regulatory requirements. The comments provide no new and significant information, and are not within the scope of license renewal under 10 CFR Part 51 and Part 54. Therefore, they will not be evaluated further.*

**Comment:** The assumptions in the models used by the applicant and the input data put into those models do not provide credible conclusions regarding emergency response outcomes in a severe accident. Nor is there reasonable assurance that the assumptions used by FEMA in this area have any credibility. The MACCS2 emergency planning model requires the user to input the time when notification is given to emergency response officials to initiate protective actions for the surrounding population; the time at which evacuation begins after notification is received; and the effective evacuation speed. However, the model assumes that the population is out of danger once crossing the 10-mile boundary. This will not be true in a severe accident such as a core melt and/or a spent fuel pool accident that leads to a zirconium fire. Safety and Security of Commercial Spent Nuclear Fuel Storage Public Report, National Academy of Sciences, 3 (April, 2005).



In addition, the model does not consider those who cannot evacuate and must shelter. Protective actions involve both evacuation and sheltering. Under some circumstances evacuation will not be possible for all or a portion of the affected population. The elderly often require transportation assistance because they are infirm, cannot drive themselves or have only one car per household that may not be available in an emergency.

The applicant's evacuation time input data is from, Pilgrim Station Evacuation Time Estimates and Traffic Management Plan Update, Revision 5, (November 1998). However later data is available. KLD prepared a later report for Entergy, Pilgrim Nuclear Power Station Development of Evacuation Time Estimates, KLD TR-382, Revision 6, (October 2004). The newer KLD study relies on newer census data and newer roadway geometric data. The most recent data available should be used as source material to get the most accurate estimates.

Many of the assumptions and study estimates in the applicant's source, Pilgrim Station Evacuation Time Estimates and Traffic Management Plan Update, Revision 5, (November 1998) are faulty. For example, voluntary evacuation from within the EPZ was estimated to be 50% within a 2-5 mile ring around the reactor, excluding the "key-hole;" and 25% in the annular ring between the 5-mile boundary of the circle and the 10-mile EPZ boundary. Shadow evacuation was not considered. Special Events, such as the July 4th celebration, were not considered. Evacuation time estimates for the EPZ was performed for, "Off-season mid-week, mid-day in good weather; and summer mid-week, mid-day, good weather." Using the above false assumptions, the study describes unrealistically low evacuation time estimates. Clearly there is no guarantee that an accident will not occur on holidays, during the commuter rush hour, on summer week-ends, or in bad weather. Emergency planning and a severe accident analysis should assume the worst case scenario. (PNPS-AC)

**Response:** *The commenter raises questions regarding the adequacy of various input data and assumptions used in the MACCS2 offsite consequence analysis, including: estimated times to notify emergency response officials and to initiate and complete evacuation, the portion of the population that does not evacuate, the impacts of a "shadow evacuation" in which persons outside the evacuation zone voluntarily evacuate, and the impact of transient population. The MACCS2 analysis will be addressed in Chapter 5 of the SEIS.*

*The commenter also states that the severe accident analysis should assume the worst case scenario. The staff disagrees. As stated in the Commission's Policy Statement on Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities, PRA evaluations in support of regulatory decisions should be as realistic as practicable. Similarly, the Regulatory Analysis Guidelines of the NRC call for the use of best estimate values. Reliance on best estimate rather than worst case assumptions in the SAMA analysis is consistent with this guidance.*

**Comment:** The sea breeze phenomena are observed at the Pilgrim site. A sea breeze is a localized wind that blows from the sea to the land. It is caused by the temperature difference when the sea surface is colder than the adjacent land. Therefore, it usually occurs on relatively calm, sunny, spring and summer days. Depending on topography, intensity of solar heating and pressure gradients, a sea breeze front can penetrate inland from 1(.5 miles) to 15 km (9 miles). It can occur throughout the year but it occurs most frequently during the spring and summer months. On average Pilgrim experiences about 45 sea breeze days during these two seasons.

Typically onshore component commences about 10:00 AM and can persist to about 4 PM. The wind direction changes during the day veering from the north around through the southeast quadrant by late afternoon. The intensity of the sea breeze can be measured by the wind speed



and distance of inland penetration. The intensity of the sea breeze circulation depends upon solar radiation (which is influenced by cloud cover), sea water temperature, and strength of the gradient wind flow. The intensity and effective inland penetration of the sea breeze front in the near environment of the Pilgrim site are not well characterized. (PNPS-AC)

**Comment:** Coast line orientation and topography strongly influence wind patterns (the frequency, direction, and strength of onshore winds). Predominantly in the summer and spring, a sea breeze onshore component is observed along the Massachusetts coast. The dominant sea breeze components are east and east-southeast for Boston-Logan, easterly for Plymouth, northeast and east-northeast for the Canal site, and east and east-southeast for the Pilgrim plant. This finding suggests that the wind speed and direction at one coastal site would not be used as a surrogate for other coastal sites. (PNPS-AC)

**Comment:** The meteorological sites available provide limited ability to fully characterize or model the sea breeze circulation in the vicinity of the Pilgrim Nuclear Power Plant.

Physical modeling of coastal sea breeze circulation patterns is limited by both the number of meteorological sites in the vicinity of the Pilgrim Plant and the number of parameters monitored.

William T. Land, Meteorological Analysis of Radiation Releases For the Coastal Areas of the State of Massachusetts for June 3rd to June 20th 1982 A listing of probable causes resulting in radiation concentration within the microclimate would include (in order of importance):

1. ONSHORE WINDS: Winds from the east and north moving radiation back toward the land away from the coast.
2. WIDESPREAD RAINFALL; Rain which could keep radiation in the lower stratosphere and washout radiation into the ecosystems, food chain and water supplies.
3. COOL DESCENDING AIR; Air which would prohibit radiation from lifting into high altitude winds which would in turn carry the contaminants at the 18,000 foot level safely out to sea.
4. AIR POLLUTION: Pollution which would give added nuclei for radiation to adhere to thereby increasing its ability to stay at lower stratospheric levels.
5. FOG: Fog which would give additional hygroscopic nuclei for both pollution and radiation to coalesce upon.
6. AIR STAGNATION: Stagnation with little or no wind, haze and temperature inversions which in turn have the ability to trap radiation close to the surface. (PNPS-AC)

**Comment:** Winds along the coast of Massachusetts, and therefore the Town, are significantly affected by the sea breeze effect, which is critically important in estimating contaminant exposures in coastal areas. During moderate to strong wind conditions, such as those associated with coastal storms, approaching warm fronts, or after the passage of cold fronts, the wind direction throughout the region should be fairly uniform as would be depicted from one of Entergy's meteorological towers. However, abrupt wind direction shifts and wind speed changes can occur during the passage of such large-scale weather systems throughout the region. When wind speed starts to get lighter (e.g., below 5-10 mph), and depending upon the time of day and season, the terrain also will affect regional wind patterns in a more pronounced manner. During the spring and summer months whenever day-to-day large-scale regional weather influences are absent (storms and fronts), strong temperature contrasts between the warmer land and the

colder Cape Cod Bay can result in sea breeze conditions on sunny, fair weather days. At times, sea breeze influences can penetrate miles inland. Weaker land breezes also can occur during other times, particularly at night, when the land surface is colder than the water body surface. Shifting wind patterns (including temporary stagnations, recirculation, and wind flow reversals) can occur during these daily sea and land breeze conditions, and can persist for several hours. Any shifting wind pattern away from Pilgrim could produce a different plume trajectory (and resultant concentrations and radiological doses at specific locations) than what the application depicts. (PNPS-AE)

**Response:** *These comments raise questions regarding the adequacy of various input data and assumptions (i.e. meteorological data) used in the MACCS2 offsite consequence analysis. The MACCS2 analysis will be addressed in Chapter 5 of the SEIS.*

## 10. Comments Concerning Alternative Energy Sources

**Comment:** ...wind power, solar power, fuel, gas, gas fuel, as far as bringing it into Fall River, bringing it into Boston Harbor, all of these things are not something that anybody wants to have...The fact is that we have to have alternative energy and if nuclear is not the safest, then I think we have to find out what's better and, as we have proposed just about everything, we have had situations that have caused us to get more and more limited. I don't think we can protect ourselves from just about anything that we are dealing with. (PNPS-V)

**Comment:** And I think that when we are talking about fossil fuels, we have to consider that there is a risk in everything, there is a risk in everything in our environment. (PNPS-V)

**Comment:** We have gone from the point where we were heating our homes with firewood, and we went to coal, we didn't like that, we went to oil. We are now into the nuclear age and, as far as its concerned, I would just like to know and I think perhaps people from some of the, some of the people who are providing studies is what are the alternatives? (PNPS-V)

**Comment:** Let's have a wind farm out in Nantucket Sound, you are not going to have any problems there. There is no NRC to oversee a wind farm because there is no problem with a wind farm as serious as the problem that exists with the radioactive substances that we are using today in these reactors. (PNPS-Z)

**Response:** *The comments are related to the environmental impacts of alternatives to license renewal at PNPS. The GEIS included a discussion of alternative energy sources. Environmental impacts associated with various reasonable alternatives to renewal of the PNPS operating license will be evaluated in Chapter 8 of the SEIS.*

## 11. Comments Concerning Monitoring Programs

**Comment:** I hope, in that, you will also be looking at the necessity in the future, and actually now, for better monitoring to assess whether the current environmental monitoring program reports are reliable and accurate, whether, instead, we need to include more sampling to have another look at where control and indicator stations are placed and also to consider, in the future, whether it's appropriate to have the licensee get the samples, and have their own labs analyze the samples and to provide the reports, whether a system would better protect health and public safety, for 2012-2032, what would you advise? (PNPS-A)

**Comment:** High School Monitoring Project - This system consists of radiological and meteorological monitoring systems at each of seven high schools [3 in Plymouth; 1 each in

Carver, Kingston, Duxbury and Marshfield]. These on-line monitoring stations are connected by modem to each other and to MDPH.

Deficiencies:

- This program was initiated by the Governor's Council on Radiation Protection solely as a teaching device for the students, not as a monitoring device to protect public health and safety. They recognized that this important job could not be left to a changing collection of teachers, students or janitors, working part-time and not trained technicians.
- It is overly optimistic to assume that the schools are all coincidentally placed in the most favorable locations in regard to population density and meteorological conditions.
- The High School monitors, like the Sage, have poor sensitivity to low energy gamma and beta. To be protective of public health they should measure gamma, beta and alpha radiation, at both the high and low energy levels. For example Iodine-125 is at the 60 KeV and most iodine's are less than 100 KeV.
- Calibration and testing of equipment is not adequately and consistently performed.  
(PNPS-AC)

**Comment:** The ER must analyze the accuracy and reliability of Pilgrim's monitoring and reporting in order to accurately assess what impact Pilgrim actually has had on the environment and is likely to have in the future.

We contend that in order to have any reasonable assurance that public health and safety will be protected 2012-2032, the following changes in the monitoring program must occur.

Environmental monitoring program must be changed as follows:

- Control stations actually placed outside the area of Pilgrim's influence - outside Emergency Planning Zone [EPZ] communities;
- Number and type of samples expanded;
- Split samples provided to an independent source;
- Analysis and reports performed by an independent laboratory, not one owned by the applicant;
- Monitoring wells installed to test for groundwater contamination and migration placed onsite, especially along the edge of Cape Cod Bay. Monitoring air emissions modified to include:
- Off-site releases - upgrade equipment by installing combination weather/ radiation detection and measurement devices, fix-mounted to provide real-time measurements, placed in appropriate locations as determined by a site-specific meteorological study;
- On-site monitors upgraded.

Multidimensional plume dispersion models, Class B Models; and multiple meteorological towers placed in the seven surrounding towns [Carver, Duxbury, Kingston, Pembroke, Plymouth, and

Plympton] and on Cape Cod according to site specific meteorological analysis performed, for example, for the Commonwealth by Dr. J.D. Spengler and Dr. Bruce Eagan. (PNPS-AC)

**Comment:** Radiation detectors are located at exit points from the plant to measure gaseous radioactive effluents. These detectors monitor the gross gamma radiation of gaseous effluents as they pass by. These readings are monitored and recorded in the control room, and when the radiation level approaches release limits, either the effluents can be diverted to another system for further processing, or the power level of the reactor can be reduced in order to reduce the amounts of radioactivity produced. The radiation detectors are sensitive only to the total amount of radiation impinging on them, they don't differentiate between one isotope and another, since there are substantial assumptions regarding short half-lives of isotopes entering the systems. One fundamental limitation to measuring gamma radiation levels exiting the plant ventilation systems is that a small perturbation in the total amount of radiation detected, since the decay rate is so much lower compared to short half-life isotopes. In this way, a leak of long half-life isotope could go undetected by a radiation detector. The use of chemical and gamma spectrographic analysis is designed to augment the stack radiation monitoring program. (PNPS-AC)

**Comment:** Periodic sampling and analysis techniques are employed to determine the relative abundance of various isotopes that are being released. This is very important since the biological action and possible impact is quite different for different isotopes. The way this is carried out is that radioactive effluent is sampled by systems that employ filters and charcoal to draw air through them. After a given period of time, the contents of the filters and charcoal are analyzed by measuring the radioactive decay rate as a function of disintegration energy. Since isotopes decay by emitting radiation of characteristic energies, the amount of a given isotope present in the sample can be estimated by the magnitude of the number of disintegrations at characteristic energies. The uncertainties associated with this method are that in general isotopes emit a spectrum of radiation frequencies, and in a case where there are a large number of unknown isotopes present in the sample, the energy peaks can overlap for different species and it may not be possible to assay many isotopes with any accuracy. Another problem that can occur is that the efficiency of the charcoal absorber is strongly a function of relative humidity, so in cases of high humidity, the amount of a given isotope present in the charcoal may not at all reflect the concentrations in the sampled effluent. Detectors used to perform these measurements have non-uniform responses to different energy peaks, and calibration of these sensitive instruments should be conducted frequently. Finally, the raw measurements from these instruments are entered into equations to estimate actual release rates, so the associated uncertainties may be quite high. (PNPS-AC)

**Comment:** Off-site monitors to measure airborne emission of radionuclides from Pilgrim include: the Sage System consisting of 14 real-time monitors installed on the edge of Pilgrim's property; thermoluminescent dosimeters (TLD's) placed in locations 0 to >15 km from Pilgrim; real-time monitors placed in a few schools for the sole purpose of educating students.

#### Sage System [Computerized "Ring" Monitors] – Deficiencies

- The Sage System does not provide any significant protection to the citizens of Southeastern Massachusetts. The "NRC Draft Report For Comment On Findings On Issues Of Offsite Emergency preparedness For the Pilgrim Nuclear Power Station [NUREG-1438], issued May 1991, expressly noted that MDPH installed this system, "even though fixed offsite monitors are no longer endorsed by the NRC..."[ page 2-159].

- Under the agreement with Boston Edison Company [BECO], the previous licensee, the monitors were installed less than a quarter of a mile from the plant. Yet, the NRC has found that monitors closer than 1000 meters [about 2/3 of a mile] would provably provide inaccurate readings in the event of an accident.
- The agreement included 22 potential monitoring sites, but only 14 have been installed. Again this is contrary to NRC research on real time monitoring, which concluded that using as few as 14 monitors would grossly underestimate the radiation from narrow emission plumes.
- The monitors are only in a small quadrant behind the plant. Therefore, there is no effective monitoring in the directions of Scituate, Marshfield, Duxbury, Kingston, or much of Plymouth [including the Gurnet, Saquish neck at the end of Duxbury r Beach.
- There are no monitors on Cape Cod. The Cape is across open water -- nothing to break up a plume.
- The placement of the Sage monitors effectively ignores the results of wind analysis done by the Harvard School of Public health, under the direction of Dr. J.D. Spengler and Dr. G.J. Keeler, May 12, 1988 that described the variability of coastal winds and that the sea breeze effect brought winds inland > 10 miles. Also a true ring of monitors is feasible. At Seabrook NPS, the Citizens Monitoring Network is installing monitors on buoys at sea.
- The Sage monitors do not measure high and low let alpha and beta radiation.
- The placement of the Sage monitors effectively ignores the results of wind analysis done by the Harvard School of Public health, under the direction of Dr. J.D. Spengler and Dr. G.J. Keeler, May 12, 1988 that described the variability of coastal winds and that the sea breeze effect brought winds inland > 10 miles. Also a true ring of monitors is feasible. At Seabrook NPS, the Citizens Monitoring Network is installing monitors on buoys at sea.
- The Sage System lacks software to make sense out of the computer data arriving at Massachusetts Department of Public Health [MDPH]. The data has not been systematically graphed, charted or reported to the public. (PNPS-AC)

**Comment:** Plutonium historically have been found in Duxbury Bay sediment samples; Entergy has attributed the Plutonium to either weapons testing, cross-contamination from their lab's glassware or simply lost the sample.

It seems far more likely that the plutonium is from Pilgrim which is visible from Duxbury - rather than from a Chinese bomb launched thousands of miles away. It would be coincidental if the beaker used to test the sample at Entergy's own lab just happened to be improperly cleaned and just happened to be contaminated with Plutonium. It seems coincidental that the next years' plutonium sample happened to get lost. This is one reason Petitioners believe that the Applicant should not be responsible for its own environmental testing – the samples should be sent to an independent lab. (PNPS-AC)

**Comment:** Beginning in July 2002 Pilgrim began to use Entergy's J.A. Fitzpatrick Environmental Laboratory for analysis of environmental samples. Petitioners contend, and are prepared to demonstrate to the ASLB, that results can vary considerably depending on who



analyzes the data and reports the findings. A clear conflict of interest is present when the applicant's own company both analyzes the data and reports the results. (PNPS-AC)

**Comment:** The Radiological Environmental Monitoring Program reports can not be relied upon to produce accurate data. The Applicant collects the samples to determine Pilgrim's radiological impact on the general public. The "control stations" are too close to the reactor; in actuality, they are indicator stations. Fewer sample media and numbers now are taken than before; fewer are required. Since July 2002, the Applicant's own laboratory analyzes the samples for radioactivity. Reports for the NRC and public are prepared by the Applicant, Entergy. Finally high deposition of radiation found is attributed by Entergy to sources other than Pilgrim. (PNPS-AC)

**Comment:** The environmental sampling media collected in the vicinity of PNPS and at distant locations included air particulate filters, charcoal cartridges, seawater, shellfish, Irish moss, American lobster, fishes, sediment, milk, cranberries, vegetation, and animal forage."

The sampling locations are divided into two classes, indicator and control. Indicator locations are those that are expected to show effects from Pilgrim operations. The REMP states that while the indicator locations are typically within a few kilometers of the plant, the control stations should be located so as to be outside the influence of Pilgrim Station. However, many control stations are too close to Pilgrim - within sight of the reactor and within the official Emergency Planning Zone Communities, [10 miles or 16 kilometers]. In reality they are indicator stations. If radiation is above expected in a sample collected from a "control station" it is attributed to weapons fallout, not Pilgrim. Also the location of the "control stations" ignores the fact that radioactive particulates released to the air from the stack, will be carried by the wind some distance and deposited some distance from the reactor site –in the control locations. (PNPS-AC)

**Comment:** Milk, a key indicator, is no longer sampled. Prior to 2000, milk samples were obtained from an indicator station, Plymouth County Farm, and from a control station located in Whitman. Plymouth County Farm stopped milking cows and since that time Entergy has claimed that they could not identify any additional milk animals within 5 kilometers [3.1 miles] of Pilgrim. Petitioners contend that milk samples > 5 kilometers could be indicator stations. Additionally there are farms nearby. Plymouth Plantation is about 3 and ½ miles from Pilgrim and has a farm with lactating cows and goats. The oldest operating dairy farm in the Northeast is located in Duxbury. Entergy's claim that Plymouth Plantation can not provide sufficient milk has not been proven. Exactly how much is required, at minimum, for each test? We request this information to verify with independent laboratories. (PNPS-AC)

**Comment:** In regard to terrestrial sampling, routine collection and analysis of soil samples was discontinued; instead they claim that if air sampling showed an early indication of any potential deposition of radioactivity, follow-up soil sampling could be performed on an as-needed basis. However, this assumes that the air monitoring is reliable and accurate.

In the area of marine sampling, the following changes were made.

- A sample of the surface layer of sediment is collected, as opposed to specialized depth-incremental sampling to 30 cm and subdividing cores into 2 cm increments.
- Standard LLD levels of about 150 to 180 pCi/kg were established for sediment, as opposed to the specialized LLDs of 50 pCi/kg.
- Specialized analysis of sediment for plutonium isotopes was removed.

- Sampling of Irish moss, shellfish, and fish was rescheduled to a semiannual period, as opposed to a specialized quarterly sampling interval.
- Analysis of only the edible portions of shellfish (mussels and clams), as opposed to specialized additional analysis of the shell portions.
- Standard LLD levels of 130 to 260 pCVkg were established for edible portions of shellfish, as opposed to specialized LLDs of 5 pCVkg.

Petitioners contend that what was discontinued has resulted in the loss of important data that is required, "to assess the impact of Pilgrim Station on the environment and on the general public." And what was discontinued appears to be connected to elevations of radioisotopes in the environment found in previous years. (PNPS-AC)

**Comment:** I believe we have very, very little data monitoring radiation in the area. There may be occasional radiation monitors at the plant but, for instance, in Duxbury, we don't have any radiation detectors, so I think I hear people say that even during, if we had any kind of an event, it would be very important for us to know where, if there is a radiation release, where is it going and is it in fact in Duxbury, or is it in Carver or is it in Plymouth? So I think, as one of the mitigation things that I would like to very strongly request, is that radiation monitors be put throughout the area, and many of them. And it would be, I think, in Pilgrim's interest to have that because if, as I think they claim, that radiation is not being disseminated around, that would certainly prove their point. If there is nothing being measured, then that's great for all of us to know. (PNPS-L)

**Comment:** And third, in assessing health, you would look at, as BEIR VII said, to bioaccumulation and the cumulative effect of health impact by looking at what is documented in the REMP's of how much radiation has been released, and also pay special attention to what was stated by Mass. Department of Public Health in a public meeting that Senator Kerry held, that there is no reason, I can provide the exact quote later, no reason to trust what the licensee has put into their reports of what has been emitted and "they have emitted far too much than they should have" including, for example, transgeneric elements such as neptunium. (PNPS-A)

**Comment:** The effects of radiation exposure are cumulative. Some types of nuclear power plant emissions stay radioactive for a long time and, because they can enter biological food chains, those materials can accumulate in the environment and adversely affect public health. "If radioactive emissions persist for years, decades or even centuries within the environment, then even modest reductions in annual discharges may not be sufficient to prevent an environmental build up of those materials over time." Estimates of Environmental Accumulations of radioactivity Resulting from Routine Operation of New England Nuclear Power Plants (1973-84), Dr. Richard W. England, Mr. Eric Mitchell, p.4, A Report of the Nuclear Emission Research Project, Whittemore School of Business and Economics, University of New Hampshire, Durham, N.H., August 1987.

It is known for example that the following radionuclides have been released from Pilgrim into neighboring communities: plutonium 239 (half life 24,400 years); neptunium 236 or 237 (half life ranging from 120,000 years -2.1 million years); cesium 137 (half life 30.2 years); strontium 90 (half life 28.5 years); tritium (half life 12.3 years), and xenon (half life 9.17 hours). Xenon transforms after its emission into cesium 135, which persists almost indefinitely in the environment. Examples of previous releases have been reported in the Annual Radiological Environmental Monitoring Program Reports [REMP]. These releases include substances that will

remain active in the local environment for the foreseeable future and should be taken into account when actual on-going doses to the public are evaluated. (PNPS-AC)

**Comment:** We would like to submit that if Applicant, NRC or current MDPH spokespersons dispute a causal link between the radiation released by Pilgrim and the cancers seen in its neighboring towns, the current systems in place to monitor releases are inadequate and must be improved if re-licensing is to be considered. The Comments to the Southeastern Massachusetts Leukemia Study made by Dr. Richard Clapp illustrate this point: I would like to reiterate a point that Drs. Knorr and Morris [Massachusetts Department of Public Health epidemiologists, authors of the Southeastern Massachusetts Health Study] made to you in one of their memoranda, e.g., that the emissions data provided by the utility are not reliable. I have had numerous discussions with individuals in the Department of Public health as well as colleagues who previously worked in a job monitoring worker exposure to Pilgrim contractors in the mid-1970's. From these discussions, I am convinced that the actual emissions were considerably worse than what has appeared in public documents and has been available to researchers to date. In particular, there were transuranic isotopes released that should never have been emitted to the general environment." Richard C. Clapp, MPH,Sc,D., Statement before the Southeastern Massachusetts health Study Review Committee, (June 26, 1992). In the years since that statement was made, the quality of the environmental monitoring by Pilgrim has, if anything, decreased. (PNPS-AC)

**Comment:** The public can not be required to prove a causal link between the radiation released and the statistically significant increase in cancers if there is no effective monitoring system in place to measure those releases nor can the Applicant claim that a causal link does not exist.

As stated previously, the system in place to monitor off-site radiological releases at Pilgrim is inadequate. Although there are documented increases in radiation-linked cancers in the communities around the plant, this aging plant does not use monitors which would allow state or federal authorities to confidently measure radiation releases. Some of the deficiencies of the monitoring system currently used by Pilgrim are described in the following section, as well as needed improvements that need to be made to the Pilgrim environmental monitoring program. (PNPS-AC)

**Comment:** Pilgrim began operations in 1972 with defective fuel. The Massachusetts Department of Public Health's Southeastern Massachusetts Health Study 1978-1986 stated, "Pilgrim, which began operations in 1972, had a history of emissions during the 1970s that were above currently acceptable EPA guidelines as a result of a fuel rod problem." Southeastern Massachusetts Health Study 1978-1986, Morris M.S., Knorr R.S., Executive Summary, Massachusetts Department of Health (October, 1990).

In the March 2005 and April 2006 Pilgrim SALP (Systematic Assessment of License Performance, performed by the NRC) Reports, NRC Resident Inspector, William Raymond, stated that Pilgrim operated in 2004 and 2005 with defective radioactive fuel – that is, fuel with perforated cladding. We do not have information one way or another whether defective fuel was used in other previous years. Fuel cladding provides the first barrier to prevent radiation from getting out and harming workers and the public. Degraded fuel is an on going issue for the industry. NRC Commissioner Merrifield has admitted nearly 1/3 reactors now have failed fuel, and the trend is increasing, not decreasing. Briefing on Nuclear Fuel Performance, Transcript, p.4, (February 24, 2005), <http://www.nrc.gov>.

Use of degraded fuel will increase exposure to both the public and workers. For example, according to the NRC, "a plant operating with 0.125 percent pin-hole fuel cladding defects showed a general five-fold increase in whole-body radiation exposure rates in some areas of the

plant when compared to a sister plant with high-integrity fuel (<0.01 percent leaks). Around certain plant systems the degraded fuel may elevate radiation exposure rates even more.” United States Nuclear Regulatory Commission, Information Notice No. 87-39, Control Of Hot Particle Contamination At Nuclear plants, (August 21, 1987). (PNPS-AC)

**Comment:** If radioactivity is discovered that could be attributed to Pilgrim, the response is to attribute the contamination to other sources and/or request NRC to change the monitoring requirements.

Example, Milk: Milk historically showed elevated levels of contamination. However as mentioned above milk is no longer tested, although lactating animals are available in the area at Plymouth Plantation approximately less than 5 miles away and at a dairy farm in Duxbury, within the Emergency Planning Zone.

Previously milk was tested in farms near Pilgrim and at a control station in Whitman, 22 miles away. The Radiological Environmental Monitoring Program Report (REMP) for 1980 noted that, at the farms around Pilgrim, “the measured average concentration of both Cesium-137 and Sr-90 were respectively 10,000 and 1,000,000 times in excess of the concentrations expected to be present...” and went on to say that this “is unquestionably due to atmosphere testing.” The effort to blame the increase on “atmosphere fallout” ignores a critical fact – no similar increase was experienced at the control station in Whitman.

The 1982 REMP report stated that the highest mean value occurred at the Kings Residence, located < 5 miles from Pilgrim, in late June 1982. There were concentrations greater than 1,000,000 times in excess of the concentration expected. The report, written by Tom Sowden [who continues to work in this area at PNPS] stated,

It is not uncommon to find marked increase of Cs-137 associated with the cow’s pregnancy, and this was most likely the cause.

However the large animal expert at Tufts Veterinarian School was of a different opinion. He stated that,

Cows normally do not lactate during pregnancy. And, an animal can not produce Cs-137 on their own. It (Cs-137) must be introduced into the cows system from an environmental source. The cow would have to ingest it in some way.” (PNPS-AC)

**Comment:** TLD’s - Thermoluminescent dosimeters placed in offsite locations ranging from 1 km (.6 miles) to > 15 km (9.3 miles) to measure gamma radiation levels. These devices are passive in as much as they must be in place for a period of time [3 months] and then brought back to the laboratory to determine the amount of radiation the device received at that location for that period of time.

#### Deficiencies TLD’s

- TLD’s provide only an average figure, and increases of potential significance can be masked by lower than average readings during other parts of the month. Biological impact occurs on a daily basis.

- TLD's can only read to a maximum threshold, that is, like a film badge they can only read so high.
- TLD's do not read high or low let alpha and beta.
- Dr. Hoffman, at Penn State, did an analysis of TLD's and concluded they provided poor sensitivity to Zenon 133. He said it took about 85 hours at maximum concentration before anything showed up and that even then the amount was underestimated by a factor of around 20. (PNPS-AC)

**Comment:** Entergy states that "[v]ery low levels of radioactivity may be released in plant effluents if they meet the limits specified by NRC's regulations. These releases are closely monitored and evaluated for compliance with the NRC restrictions in accordance with the PNPS Offsite Dose Calculation Model." This implies that there will be no danger to public health from routine releases since they will be monitored and will not exceed federal limits. However, the system in place to monitor radiological releases at Pilgrim is inadequate and could result in a health hazards to residents in the Town and neighboring areas. (PNPS-AE)

**Comment:** These communities are also downwind from the Camel Electric Plant and there has been significant pesticide use in the agriculture. So, we have been exposed and will continue to be exposed to a multiplicity of toxins that will work together. Also, no one denied the fact that 1982, when Pilgrim had a severe accident of blowing its filters, that that damaging effect is still here. Many of what never should been released radionuclides, with long half lives, are still in our environment. (PNPS-N)

**Response:** *The comments relate to monitoring of radiological effluents at Pilgrim. As required by NRC regulations, the amounts of radioactive isotopes released from Pilgrim in liquid and gaseous effluents are constantly monitored and recorded by Entergy. The meteorological conditions at the site also are constantly monitored and recorded. Health physics experts from NRC's Region I office routinely inspect these monitoring programs to ensure that they are being properly implemented. All of this information is fed into calculational models that estimate the amount of radiation dose a member of the public might receive. The calculational models are in the ODCM and have been reviewed and approved by the NRC. These models include estimates of dose from internally deposited radioactive isotopes as well as direct radiation exposure. In addition, Entergy conducts an environmental radiological monitoring program in the area around Pilgrim. This program has also been reviewed and approved by the NRC and is inspected by the health physics experts from NRC's Region I office. In addition, changes to the program, such as the decision to suspend milk sampling because a large enough sample size is not available, are also reviewed by the NRC as part of the inspection program. The environmental radiological monitoring program samples and measures the amount of radioactive isotopes in the air, water, soil, agricultural products, shoreline sediments, and aquatic biota and measures direct radiation from the plant using thermoluminescent dosimeters (TLDs). The NRC finds the use of TLDs for the purpose of routine monitoring around nuclear power plants to be acceptable. This program confirms that the levels of radioactive isotopes in the environment that are predicted by the computer dose models. This program will also identify any radionuclides that may be accumulating in the environment around Pilgrim.*

*Licensees also must participate in an interlaboratory comparison program, which provides an independent check of the accuracy and precision of environmental measurements. The quality assurance laboratories for J.A. Fitzpatrick Laboratory are Analytics, Incorporated in Atlanta, Georgia, and the U.S. Department of Commerce's National Institute of Standards and*



*Technology in Gaithersburg, Maryland. Also, the Massachusetts Department of Public Health conducts an environmental radiological monitoring program around Pilgrim.*

*As part of the review of the license renewal application for Pilgrim, the NRC will review the annual radiological effluent reports and the annual environmental radiological monitoring reports for the last several years at Pilgrim. All of these reports are available to the public on the NRC's ADAMS document retrieval system. The NRC will also review information from the Commonwealth's monitoring program.*

*While Pilgrim may have experienced significant fuel defects and released transuranic radioisotopes earlier in plant operation, NRC believes that the recent effluent reports are the best source of information to help estimate the amount of each type and total amount of radioactive materials that will be released from the plant during the license renewal period. Chapters 2 and 4 of the SEIS will address NRC's assessment of the radiological effluents and impacts that are expected during the license renewal period.*

**Comment:** The EIS should also catalogue other (i.e., non-thermal) pollutant discharges by Pilgrim Station and assess their environmental effects. These other pollutants may include chlorine or other biocides, copper, radionuclide, metals, or other contaminants. Again, EPA has information on some of these pollutants in its NPDES permit files, but the NRC could update this information as needed and likely has more information regarding radionuclides or better access to such information than EPA does. (PNPS-AG)

**Response:** *The National Pollutant Discharge Elimination System (NPDES) permit, which is issued by EPA, designates the chemicals, such as biocides and metals, and the amounts of those chemicals that are allowed to be released by Pilgrim. NRC will review the NPDES permit as part of its evaluation of the potential environmental impacts of license renewal for the purposes of NEPA. These impacts will be discussed in Chapters 2 and 4 of the SEIS. In addition, Chapters 2 and 4 of the SEIS will include NRC's assessment of radiological effluents and impacts that are expected during the license renewal period.*

## **12. Comments Outside the Scope of License Renewal**

### **12.a Comments Concerning Emergency Preparedness and Planning**

**Comment:** Federal Guidance dating back to the 1970's supports the need for Class B models and multiple meteorological towers properly placed throughout this area.

1) Since the 1970s, the NRC has historically documented all of these advanced modeling technique concepts and potential need for multiple meteorological towers especially in coastal site regions.

2) In January 1983 NRC Guidance suggested that changes in on-site meteorological monitoring systems would be warranted if they have not provided a reliable indication of monitoring conditions that are representative within the 10-mile plume exposure EPZ.

3) EPA's latest Guideline on Air Quality Models (Federal Register November 9, 2005) state in Chapter 7.2.8 Inhomogeneous Local Winds that,

In many parts of the United States, the ground is neither flat nor is the ground cover (or land use) uniform. These geographical variations can generate local winds and circulations, and modify the prevailing ambient winds and circulations. Geographic effects are most apparent

when the ambient winds are light or calm. In general these geographically induced wind circulation effects are named after the source location of the winds, e.g., lake and sea breezes, and mountain and valley winds. In very rugged hilly or mountainous terrain, along coastlines, or near large land use variations, the characterization of the winds is a balance of various forces, such that the assumptions of steady-state straight-line transport both in time and space are inappropriate (*italics added*).

EPA goes on to say that

In the special cases described, refined variable trajectory air quality models can be applied on a case-by-case basis for air quality estimates for such complex non-steady-state meteorological conditions.

This EPA Guideline also references an EPA 2000 report, Meteorological Monitoring Guidance for Regulatory Model Applications, EPA-454/R-99-005, February 2000. Chapter 3.4 of this guidance for Coastal Locations, discusses the need for multiple inland meteorological monitoring sites, with the monitored parameters dictated by the data input needs of particular air quality models.

EPA concludes that a report prepared for NRC provides a detailed discussion of considerations for conducting meteorological measurement programs at coastal sites. (PNPS-AC)

**Comment:** Managing an event – making the proper emergency call - requires first grappling with what has happened. Plans assume and regulations require [50.47 (b)(9)], that data regarding the status of plant conditions, radiological release and weather are reliable, accurate and timely – they are not at Pilgrim NPS.

The state is dependent on the licensee's reports and accuracy of the licensee's equipment. As described in Chapter VI, radiation monitors and weather equipment is not computer linked to the state and local authorities from all points that radiation is released from Pilgrim and from appropriate off-site locations. Local communities are dependent on the state's interpretation of the licensee's accident reports of what is happening and how it may affect the population. The state sends a team to take samples and sends those samples back to state labs for analysis. However that takes time – too much time.

The ER must recognize that planning is hopeless without upgrading the reactor's monitors, as described in Chapter VI and computer link those monitors to the state and local authorities. A similar recommendation was made by James Witt in his analysis of Indian Point. (PNPS-AC)

**Comment:** Site Specific met studies specifically stated that Pilgrim's on-site meteorological monitoring systems do not provide reliable indication of monitoring conditions that are representative within the 10-mile plume exposure EPZ. (PNPS-AC)

**Comment:** The license renewal application fails to provide for adequate meteorological monitoring. One of the ways through which emergency authorities determine what areas should be evacuated in case of an emergency is by measuring wind direction and speed. However, the only two places where Entergy proposed to measure these during the renewal period are on its property, at the plant. This may yield inaccurate judgments concerning the plume trajectory of radioactive contaminants. The proposed monitoring could lead to official decisions about evacuation and sheltering in place that would be flawed and dangerous. (PNPS-AE)

**Comment:** Additional regional meteorological monitoring stations should be installed and included as part of Entergy's emergency planning program during the renewal period to allow for improved life, real-time monitoring of geographic variations in wind fields. Moreover, Entergy should be required to upgrade its straight-line air quality models with a more advanced variable trajectory models that can use either single station or multiple station meteorological data. These modifications should be given significant consideration, particularly considering the rapidly growing regional population. Understanding and planning for potential consequences of postulated (and realistic) accident release scenarios in a technically accurate and reliable manner can serve as a useful emergency planning and forecasting tool, as well as a "hindcasting" tool, that is, what radiological doses did actually occur at various geographic locations in the event of an accident. (PNPS-AE)

**Comment:** There is an environmentally related Achilles' Heel instituted for Plymouth and the towns surrounding Plymouth and that Achilles' Heel is caused by the NRC's current regulations. Here is the problem, under your regulations, Entergy's Pilgrim Nuclear Power Plant is told to monitor winds only from within the grounds of the plant, no meteorological monitoring is required anywhere else.

Consequently, should there be a serious accident at Pilgrim, which results in the emission of a dangerous, high radioactive plume, your required monitoring will only tell emergency officials where the wind is blowing at the plant, not where the plume is actually going. Plymouth is a coastal community. Particularly, in the summer, Plymouth may experiences sea breezes, cold fronts, warm fronts, occluded fronts and other variations in wind speed and direction. (PNPS-P)

**Comment:** A member of our committee, Richard Rothstein, is a certified consulting meteorologist with over three decades of power and industrial consulting experience, ... His findings, under the auspices of the Nuclear Matters Committee, make it abundantly clear that your monitoring tells officials nothing about where a dangerous radioactive plume is actually going. Your monitoring only says where the plume came from and we already know that. If emergency officials within the EPZ assume that a radioactive plume will travel in a straight line from the plant, and if they make life or death decisions based on that wrong assumption, they could easily send thousands of Plymouth residents, Duxbury residents and residents from surrounding towns directly into the path of a radioactive cloud, jeopardizing their health and their lives. (PNPS-P)

**Comment:** I believe you have said that, in the case of a serious accident at Pilgrim, you intend to send people into the field to monitor the plume's movement, that will not work. In an age of cell phones, text massaging and the Internet, news of a severe problem at Pilgrim will reach most Plymouth almost instantly and that means gridlock. NRC representatives dispatched to conduct field monitoring will be hopelessly stuck in traffic, like the rest of us.

There is one and only one way to ensure that emergency officials have accurate, real time information about the direction and speed of winds within the EPZ, information on which they can reliably base life or death decisions concerning evacuation or sheltering in place, that is by requiring that Entergy create, construct and deploy a complete, effective, acceptable system of real time meteorological monitoring stations throughout the EPZ, coupled with current state of the art air quality models for reliable dose prediction. Anything less means emergency officials will have to make life or death decisions based on information that is, in the very simplest terms, garbage.

If you relicense this plant without requiring Entergy to do that, you are not only failing to account for Plymouth's environment in monitoring the flow of radioactive plumes but, infinitely worse, you are possibly imperiling the lives of thousands of innocent people. (PNPS-P)

**Response:** *These comments relate to the models, meteorological data, and other related input parameters that are used in emergency response planning and assessment. The NRC considered the need for a review of emergency planning issues in the context of license renewal during its rulemaking proceedings on 10 CFR Part 54. Requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to plants with renewed licenses. Through its standards and required exercises, the Commission reviews existing emergency preparedness plans throughout the life of any plant, keeping up with changing modeling protocols, and other site-related factors. Therefore, the Commission has determined that there is no need for a special review of emergency planning issues in the context of an environmental review for license renewal. The comments are noted. However, the comments are not within the scope of license renewal under 10 CFR Part 51 and Part 54. Therefore, they will not be evaluated further.*

**Comment:** By 2030, 1 in 3 people will be over the age of 55, compared to 1 in 5 now. That has an impact on health (increased susceptibility to harm from radiation exposure, routine and above routine) and transportation (increasing the number of transportation dependent).

According to the report, all projections are based on current trends and are projected to continue to 2030, the time frame under consideration. The methodology used by MAPC is described in the report...

The route for Duxbury and Marshfield to their Reception Center, Braintree High School, requires passing through the towns of Pembroke, Hanover, Norwell, Hingham, Weymouth and Braintree. The populations in the towns that feed on to Route 3 can be expected to evacuate also – the shadow evacuation. Route 3 was completed in 1963. It was designed to carry 76,000 cars daily but now handles about 140,000 on the stretch approaching the Braintree split – en route to Braintree High School. A widening project would add a third lane from Weymouth to Duxbury, if ever begun and completed 2012-2032; however with population projections from 2010 forward – the area really will not be better off. (Patriot Ledger March 7, 2005).

Plymouth – Pine Hills: The largest housing development in New England, build- out includes 2,877 homes on 3,060 acres. The distance from PNPS to Pine Hills is < 3 ½ miles from PNPS. The current Pine Hills household size is 1.95 people per building. Based on these numbers, the build-out population will be 5, 850. As of 01/01/06, 967 homes have been built, over 5 years. Therefore, the Town of Plymouth (Lee Hartman, Town of Plymouth) expects the Pine Hills to be substantially completed within the next 10 to 15 years with a total population of 5,850, not including transients. We contend that this fact alone says clearly that there will be a sizeable town within a town, adjacent to Pilgrim NPS; and it speaks against re-licensing Pilgrim NPS. (PNPS-AC)

**Response:** *This comment relates to changing demographics of Plymouth and the surrounding region and its potential impact on emergency preparedness and evacuation. As noted in previous comment responses, requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to facilities with renewed licenses. The NRC's environmental review is confined to environmental matters relevant to extended plant*

*operation. The comments are noted, but are not within the scope of license renewal under 10 CFR Part 51 and Part 54. Therefore, they will not be evaluated further.*

**Comment:** Biennial Emergency Response Exercises are conducted by the Department of Homeland Security/Federal Emergency Management Agency to assess the level of State and local preparedness in responding to a radiological emergency in the 10-mile Emergency Planning Zone (EPZ). However this is the agency that was described by the Senate Chair of Homeland Security as "...being in shambles and beyond repair, and that it should be abolished." It is doubtful that the ER can with a straight face place credence in FEMA's past assessments to allow confidence that emergency planning can provide "reasonable assurance" from 2012-2032?

The ER must recognize that the results of previous exercises tell nothing about the adequacy of planning. For example: exercises have not been realistic, none have provided no-notice or occurred during non-duty hours or been based upon a scenario involving a fast breaking release of radiation that results in the contamination of a significant portion of the 10-mile emergency planning zone and the 50-mile ingestion pathway zone. Exercises have not covered a variety of conditions: inclement weather; different seasons; holidays; grid lock on primary transportation routes; terrorism scenarios; and scenarios that assess stress on limited emergency resources and personnel – such as testing a scenario involving multiple attacks in the region i.e. attacks on electrical transmission lines or a regional electrical blackout. Exercises have never been based upon a scenario in which significant self-evacuation, or "shadow evacuation," occurs beyond the 10-mile radius and as far away as 50 miles; despite the fact that academic research and the experience at Three Mile Island demonstrate there will be significant shadow evacuation outside of the 10-mile zone. Exercises have not taken into consideration a large number of people, who have been injured and contaminated, requiring treatment and decontamination. Exercise have not assessed how long it takes various emergency officials to travel to state and local emergency operations centers; and what happens if EOCs are transferred during the accident out of the community to a more distant location. With these shortcomings, and the above list are simply highlights, how can the ER find planning adequate now to provide confidence that it will provide reasonable assurance from 2012-2032? (PNPS-AC)

**Response:** *Emergency preparedness is an ongoing process at all plants, including PNPS. 10 CFR 50 requires to each nuclear plant to have an approved emergency plan that is revised and updated periodically. Licensees are required to frequently test the effectiveness of the plans by conducting emergency response exercises. During these exercises, which often include the participation of various federal, state, and local government agencies, the NRC assesses each licensee's ability to protect the public. Emergency planning is addressed under the current operating license and is outside the scope of the environmental analysis for license renewal.*

**Comment:** KI has been offered to communities within the 10-mile Emergency Planning Zone. The applicant opposed its distribution. The state basically cooperated with the applicant. For example: MDPH provided little public education; stalled KI pre-distribution to Cape Cod despite state legislation that authorized distribution and town requests for KI; refused to stockpile Reception Centers – with the incredible excuse that it would encourage too many people to go to the Reception Centers; and wrote to HHS opposing the Bioterrorism Act, 2002, a federal provision to stockpile KI out to 20 miles. We ask the ER to analyze the consequences of MA's ineffective KI pre-distribution program in a severe accident.

Factor into the analysis, for example, the following:

- The American Thyroid Association recommends that: Potassium iodide should be made available to populations living within 200 miles of a nuclear power plant and should be



“pre-distributed” to households within 50 miles of a plant. Massachusetts Medical Society advised that KI be provided to all Massachusetts residents.

- U.S. Nuclear Regulatory Commission, NUREG/CR 1433 showed that for children, the following dangers may occur from the inhalation of nuclear materials after a massive core-melt atmospheric accident (like Chernobyl). Also note that the estimates are conservative in that they do not take into account the vast quantities of iodine now stored in spent fuel pools from recently unloaded reactor cores that would be released in a worst case accident scenario.

Chernobyl: NRC’s NUREG-1623 points out that radioactive iodide can travel hundreds of miles on the winds. An increase in cancer caused by Chernobyl was detected in Belarus, Russia and Ukraine. Notably, this increase, seen in areas more than 150 miles from the site, continues to this day and primarily affects children who were 0-14 years old at the time of the accident the vast majority of the thyroid cancers were diagnosed among those living more than 31 miles from the site. The 2001 figures were 11,000 thyroid cancers at 31 miles. (PNPS-AC)

**Response:** *The NRC staff has an ongoing program for determining the adequacy of offsite emergency plans, and is supported in that role by the Federal Emergency Management Agency (FEMA). Each nuclear plant must have an approved emergency plan in accordance with 10 CFR Part 50. Drills and exercises are conducted periodically to verify the adequacy of the plans. If a problem is identified, it is resolved under the current operating license. The Commission issued a Final Rule on potassium iodide in the Federal Register on January 19, 2001 (66 FR 5427). The NRC will not require use of potassium iodide by the general public because the NRC believes that current emergency planning and protective measures--evacuation and sheltering--are adequate and protective of public health and safety. However, the NRC recognizes the supplemental value of potassium iodide and the prerogative of the States to decide the appropriateness of the use of potassium iodide by its citizens. At this time, the NRC has made potassium iodide available to states that wish to include thyroid prophylaxis in their range of public protective actions to be implemented in the event of a serious accident at a nuclear power plant that would be accompanied by a release of radioactive iodine. The Commonwealth of Massachusetts allows for persons living within the 10-mile emergency planning zone to obtain one free KI tablet for each member of their household by calling the Massachusetts Department of Public Health Radiation Control Program at 617-427-2944.*

*However, emergency planning is not within the scope of the environmental analysis for license renewal as set forth in 10 CFR Part 51. The comments provide no new information relating to license renewal and, therefore, will not be evaluated further in the context of the environmental review.*

**Comment:** So, you see, emergency planning can come in, under the SAMA, for discussion and I think it would be important for you to look at such factors as sheltering, which is one of the responses in evacuation, is not considered. Shadow evacuation is not considered. (PNPS-A)

**Comment:** ...and none of those inputs have been put into the model in the SAMA. The same for emergency planning, they just consider two elements, one is evacuation delay time and another one is how long it will take to cross the ten mile EPC border.

The assumptions under both are not accurate. You notice, for example, how long evacuations take, they use a KLD evacuation time estimate that is not the latest time estimate, one came out a couple of years ago, and the assumptions in the KLD are really not applicable for what will happen in real life.

For time estimates, they look at and consider the worst, the longest time it would take to evacuate would be in the winter, when an extra hour for shoveling would be required, as opposed to looking at an attempt evacuation on July 4th, in a summer weekend, etcetera, etcetera. So what they seem to have done, and this will be in a written report, is to take the best case for themselves, put it into the inputs to come out with a very diminished effect. (PNPS-A)

**Comment:** The applicant asserts that even in a severe accident current emergency plans will minimize consequences – perhaps “minimize” but they do not say to what extent. The point is that plans must provide “reasonable assurance” and that was not demonstrated by the applicant and must be investigated in the ER. (PNPS-AC)

**Comment:** This serves to provide false assurance that emergency planning works in a now overly congested area but it does not pass the sniff test.

NUREG 0654, Supp. 3, “The guidance in this document...emphasizes that the preferred initial action to protect the public from a severe reactor accident is to evacuate immediately about 2 miles in all directions from the plant and about 5 miles downwind from the plant, unless conditions make evacuation dangerous. Persons in the remainder of the plume exposure pathway emergency planning zone (EPZ) should be directed to go indoors and listen to the Emergency Alert Stations while the situation is further assessed.”

The Town of Duxbury recognized the absurdity of this guidance and voted against the policy at Annual Town Meeting, 2006. Duxbury recognized that:

Sandia National Laboratory, Calculation of Reactor Accident Consequences U.S. Nuclear Power Plants (CRAC-2), set the peak 1st year fatal radius for Pilgrim at 20 miles and the peak injury radius at 65 miles.

The National Academy of Sciences, Safety and Security of Commercial Spent Nuclear Fuel Storage, Public Report, April 2005 stated, “Such (zirconium cladding) fires would create thermal plumes that could potentially transport radioactive aerosols hundreds of miles downwind under appropriate atmospheric conditions.”

The “shadow evacuation” is well-established and folks well outside the 10-mile EPZ, not to mention the 2-mile ring/5 mile downwind section, will evacuate; and they will hear about the accident rapidly due to cell phones and today’s capability of rapid communication. (PNPS-AC)

**Comment:** The Applicant discusses evacuation delay times and speeds and by making false assumptions manages to concoct unrealistic short delay times and fast evacuation speeds. At public meetings on re-licensing Duxbury, Plymouth Selectmen and numerous residents have stated unequivocally that timely and effective evacuation is not possible now, and will not be in the future. In contrast, the applicant appears to start with a conclusion that emergency planning will provide reasonable assurance and then works backwards to support that conclusion. We know that evacuation is not the only protective action; sheltering is not discussed, along with other important planning issues – such as reception centers, medical facilities, tests. The ER is responsible for evaluating the applicants Severe Accident Mitigation Analysis. Whether or not emergency plans and response infrastructure can provide reasonable assurance 2012-32 clearly is part of such an analysis; hence a site specific analysis of emergency planning capability is thereby required. Both the NRC staff and Commission are looking to upgrade planning for a severe accident and that fact alone speaks to the need for the ER to take a hard look at all aspects of planning, here. (PNPS-AC)

**Comment:** NRC requires emergency planning only for those within the “plume exposure” pathway – 10 mile radius. The choice of this radius was based in part on NRC’s analysis indicating that in a severe accident, dose rates high enough to cause early fatalities from acute radiation syndrome would be confined to about 10 miles. However dose rates outside this region, though on average not high enough to cause early fatalities could be high enough to cause significant risk of cancer unless effective measures were taken. NRC’s emergency planning was not designed to limit such exposures in the event of “worst core melt consequences” for which the protection goal is that “immediate life threatening doses would generally not occur outside that zone.”

The public, on the other hand, views “reasonable assurance” differently – that is protected from harm, not simply immediate death, protected from all the other health effects from radiation exposure. (PNPS-AC)

**Comment:** The Environmental Report states “The worst case for Pilgrim is during the winter, under adverse weather conditions, since snow removal can add up to an hour and a half to evacuation time. The radius of the Emergency Planning Zone is 10 miles. Assuming that the net movement of the entire population is 10 miles, the time required for evacuation ranges from 3 hours 35 minutes to 6 hours 30 minutes, and the average speed in clear weather to 1.54 miles/hour under adverse weather conditions. The average evacuation speed is 2.17 miles/hour, or 0.97 meter/second.” And “A sensitivity case that assumes a lower evacuation speed of 0.69 meter/second was considered in this study to evaluate consequence uncertainties in evacuation speed.” Application ER, E.1.5.2.7.

However, to arrive at this number, the applicant falsely assumes that in a severe accident harmful levels of radiation (and thus evacuation) will not extend beyond 10 miles. The Sandia National Laboratory CRAC-2 core melt consequence analysis for Pilgrim conservatively stated that the 1st year peak fatal radius was 20 miles and the 1st year peak injury radius was 65 miles. Calculation of Reactor Accident Consequences, U.S. Nuclear Power Plants (CRAC-2), Sandia National Laboratory (1982). The National Academy of Sciences has stated that a spent fuel pool accident that led to zirconium cladding fires “... would create thermal plumes that could potentially transport radioactive aerosols hundreds of miles downwind under appropriate atmospheric conditions” The Safety and Security of Commercial Spent Nuclear Fuel Storage Public Report, National Academy of Sciences, April 2005, p.50. Therefore, in a severe accident, evacuations will have to go well beyond 10 miles to protect public health and safety. (PNPS-AC)

**Comment:** ... New information exists that needs to be analyzed including, but not limited to: population projections and age distribution for the 10-mile Emergency Planning Zone; 50 mile ingestion zone; and for the 2 zones analyzed by Sandia National Laboratory’s Consequence Analysis for a Core Melt At Pilgrim, CRAC-2 Report – 20 mile peak fatal zone and 65 mile zone peak injury zone...

There must be “reasonable assurance” that adequate protective measures can be taken in the event of a radiological emergency, including a severe accident that occurs simultaneously with another event – such as a storm or a terrorist attack that complicates planning. This means that the infrastructure required in an emergency can, beyond a reasonable doubt, respond to the emergency needs of projected population during the 2012-2032 time-periods.

NRC needs to analyze in this licensing procedure the projected populations for the years 2012-2032 in the 10-mile Emergency Planning Zone; the 50-mile ingestion zone; and the 20 mile peak 1st year early fatality zone and the 65 mile peak 1st year injury zone, Sandia CRAC-11 Report.

We can not get around this by shrinking the size of the area of impact of an accident to let's say 2 miles around and 5 miles downwind . Because we know in a severe accident that the impact will be greater than 2 miles round ; the concept of "downwind" is not applicable in coastal communities; the "shadow evacuation" phenomena was established at TMI and Katrina; and new technology means that news will rapidly spread far and wide of a disaster due to the widespread use of cell phones and hand-held computers.

Neither can we get around this by claiming that an accident will be slow breaking or of minimal consequence. A core melt at a Boiling Water Reactor, such as PNPS, could occur in minutes. A spent fuel accident is a credible event; is likely to come without warning; and result in catastrophic consequence.

Nor can we get around the issues by saying that we can simply shelter the population and ignore evacuation. In a severe accident, sheltering would not be effective.

The NRC must require the Licensee to demonstrate that the population in the rapidly growing Southeastern Massachusetts could safely evacuate in the event of a severe nuclear accident during the extended twenty year operation before granting a license extension to 2032.

NRC must analyze the impact on planning of the increased elderly population projected to be living in this area - such as impact on the transportation dependent and nursing home populations.

In this proceeding the above mentioned new information must be considered, although it was not presented in Entergy's filing. It includes new population data and its effect on emergency planning; and the further impact of the new means of rapid communication, new evidence from Katrina's evacuation, and terrorism as a credible event. (PNPS-AC)

**Comment:** Emergency planning and a severe accident analysis should assume reasonably foreseeable difficulties associated with notification, traffic conditions, panic, ensuing accidents and so on, with due consideration of the fact that not all individuals will be willing or able to evacuate, either immediately or at all, in the case of an alarm. The ER is deficient in this respect. (PNPS-AE)

**Comment:** The assumptions and input data used in the SAMA analysis does not provide accurate conclusions regarding emergency response consequences in a severe accident.

The ER assumes, in its sensitivity case, that the longest likely delay before residents begin to evacuate is two hours. This assumption, however, is misguided because notice of the evacuation could take longer than two hours to reach residents. While Pilgrim's sirens meet federal requirements, there is significant danger that the sirens that are in place are not heard inside homes, businesses, and cars, which means that many of the people the sirens exist to warn are unable to hear the warnings, which impacts evacuation and sheltering plans. It is thus highly likely that the delay in evacuating will be will in excess of the two hours assumed in Entergy's sensitivity case. These assumptions do not indicate what steps, beyond sirens, will be used to instigate the evacuation and what form such information should take. The ER does not detail any secondary analysis of how effective the cue for evacuation will be but assumed only that two hours will be an average response time.

Moreover, even if information of a warning reaches an individual quickly, it has been noted that "people simply do not take action in response to warning message as soon as they hear the first warning ...unless there is a clear explanation of the need for an immediate response, they might

wait for a second, third or fourth official warning before responding." Individuals do not simply comply with official direction. Instead, they use warning signals as a cue to seek out additional information, from which to make their decisions to evacuate or not. While parallel sources of information may improve response time, other factors - whether the family is already together and accounted for (as opposed to spread out at school or work) or what the response of neighbors is to an evacuation order- may reduce compliance or delay evacuation response time. (PNPS-AE)

**Response:** *An analysis of Severe Accident Mitigation Alternatives (SAMAs) is included as part of the environmental review of the application for license renewal if it had not been considered earlier for the facility. The SAMA review is an evaluation of alternatives to mitigate severe accidents. Severe accidents are those that could result in substantial damage to the reactor core, whether or not there are serious off-site consequences. The NRC staff reviews and evaluates SAMAs to ensure that changes that could improve severe accident safety performance are identified and evaluated. Potential improvements could include hardware modifications, changes to procedures, and changes to the training program.*

*If the NRC staff has not previously evaluated SAMAs for an applicant's plant in an EIS, a supplement, or an EA, the license renewal applicant is required to consider alternatives to mitigate severe accidents as part of the license renewal application. Entergy has submitted a SAMA evaluation for PNPS as part of its license renewal application.*

*Although these comments mention severe accidents and SAMA, they are related to emergency response and planning and are specifically excluded from the scope of license renewal. The comments provide no new information, and are not within the scope of license renewal under 10 CFR Part 51 and Part 54. Therefore, they will not be evaluated further. However, SAMA issues will be addressed in Chapter 5 and Appendix G of the SEIS.*

**Comment:** Rapid notification of emergency responders and the public is central to planning. Emergency Responders must have communication equipment that is interoperable – not the case throughout the EPZ. Public notification: At present notification systems are inadequate in that they essentially rely on one system - sirens. Sirens can not be heard in all parts of the EPZ towns and can not be heard inside if the windows are down - they are simply an outdoor warning system. Sirens can and have failed.

Pilgrim's sirens have been unreliable. They failed 12 times from January 2000 to January 2004. The latest siren failure came after a brand-new siren system was installed.

What is needed? Outdoors: sirens in sufficient number with an audible, but simple, voice message and battery back-up. Indoors: rapid dialing systems that have the capability to notify workers and every household and business within the EPZ in less than 15 minutes. Systems are on the market today that can do the job. Roads: Reader boards –more installed on major highways and portable reader boards provided to EPZ communities. Low frequency dedicated radio capability. Busses/Vans for transportation dependent – radio equipment on board so that they can be notified. (PNPS-AC)

**Comment:** The Environmental Report states "The elapsed time between siren alert and the beginning of the evacuation is 40 minutes. A sensitivity case that assumes 2 hours for evacuees to begin evacuation was considered in this study to evaluate consequence sensitivities due to uncertainties in delay time." Application ER Appendix E.1.5.2.7, p. E-1-64. In other words, the assumption is that the longest likely delay before residents begin to evacuate is 2 hours. This assumption is incorrect for the simple reason that notice of the evacuation could take longer



than 2 hours to reach people. The sirens that are in place cannot be heard by residents inside some buildings and houses, when the windows are closed, when air conditioners are on, in bad weather, or if the dwellings are set back from a main road. They also cannot be heard inside vehicles. Citizens have complained to Entergy about the inadequacies of the early warning sirens. It is more likely that notification will result from word-of-mouth, adding to delay. If, for example, the accident occurs at 1:00AM, it would be more than 5-6 hours before the community had awakened and word spread. (PNPS-AC)

**Comment:** There are both specific, physical steps Pilgrim can take - such as, at a minimum, the addition of more sirens throughout the Town - as well as developing a more robust information and warning system. These steps are not addressed in the ER. (PNPS-AE)

**Comment:** My concerns are the following, the warning towers, if you would call them, are insufficient in terms of warning people inside a building, particularly if there is a sufficient storm outside, a windstorm, or a snowstorm or rain, and more particularly, at 3:00 in the morning when you are sound asleep, you just don't hear them.

My recommendation would be, instead, would be to have every dwelling or every building, office space, be outfitted with a radio receiver that would be on and one, it would have a battery back up built into it so that people could be woken up, if Pilgrim goes off at 2:00 in the morning, which, you know, this does not, there is no provision for this, at the present time, so that if there is any type of alarm, you are not going to hear it, if you are asleep. (PNPS-R)

**Response:** *The comments are related to the ability of adequate notification in the event of a nuclear emergency (i.e., sirens). Emergency planning is addressed under the current operating license. The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Requirements related to emergency planning and response are in the regulations 10 CFR 50.47 and Appendix E to 10 CFR Part 50. The comments are noted. However, the comments are not within the scope of license renewal under 10 CFR Part 51 and Part 54 and will not be evaluated further.*

**Comment:** One other speaker talked about the evacuation and, by the way, we have a summer place here for 35 years, my wife has been here for over 50 years, and all of us who are here, remember the last time they went off? I mean who even realizes what it is? We are a tourist community, what do the tourists know? We are protected classes here. Not only do we have a lot of children here and a growing demographic that is going to continue to grow for elderly, we have nursing homes, we have elderly, these are people in protect classes who need to have something special.

So I would suspect that anyone who could look at the demographics we have today, versus what we had 20 or 30 years ago, and the demographics that we all know are happening because we are keeping track of the growth here, realize that, as to those protective classes, be they children, and by the way, we also have a prison here, which has people locked up, so we have a lot of concerns we have to have, so anybody who can say, not an expert but anybody who is a public official who can get up here and say, I believe, it was a fast moving event, that, oh, no problem, then that raises a serious, serious concern for me about this whole process that I think we need to be concerned about because one of the things I'm learning is about the NRC's antipathy for having interventions, even in I think it was the State of New Jersey. (PNPS-AA)

**Comment:** You may try to get around this by saying that we are going to have some type of safety in place or some type of shelter in place, then we have to spend a lot of time talking about what that shelter place is going to be. Not for us because the truth is we are going to have to

worry about getting our children, and our elderly and our protected classes out of here before we worry about the rest of us, but we have to at least take care of those children and the elderly because what we do for the least of our children we do for me, to quote the Bible. (PNPS-AA)

**Comment:** The peak population in the EPZ approximates 100,000 who are spread over approximately 150 square miles and engaged in a variety of activities. Hence it must be anticipated that some time will elapse between transmission and receipt of information advising people of the accident. The amount of elapsed time will vary from one individual to the next depending where that person is (at home, at the beach, sailing or in motor boats, fishing, out-of-home entertainment center); what the person is doing (working, shopping at a regional mall); time of day, families may be united in the evenings, but dispersed in the day; week-day versus week-end and holidays. Some may be outside the EPZ at the time the emergency is declared. These people may be commuters, shoppers who reside within the EPZ and who will return to join the other household members upon notification of an emergency. Use of a 2 hour delay time in the sensitivity case is overly optimistic. (PNPS-AC)

**Comment:** Reception Centers are required to monitor, decontaminate, assess medical needs and provide transportation to hospitals if required, and reunite families. NUREG-0654, J-12 states that Reception Centers must monitor 100% of the population within 12 hours.

However, Pilgrim's Reception Centers have a capacity only for 20%. NRC, the State and the applicant justify this violation of regulation based on an outdated "Krimm's Memorandum," named after a FEMA official who pulled 20% out of a hat based on response to a hurricane. You can't base policy on hurricanes. People react very differently to a nuclear disaster than to a hurricane warning. Public warning for a hurricane is ample –TV & Radio Storm Watch reports give ample warning, often days in advance; in contrast, the time of official notice of a nuclear attack/accident can be very short –less than 30 minutes.

This policy leaves 80% without an opportunity to be monitored and decontaminated risking their health. If 80% are not monitored and decontaminated they will not only put at unnecessary risk their physical and psychological health; they will contaminate populations in other areas with dirty vehicles. Also, it is likely many more than 20% will go to the Reception Center and it will be overwhelmed so none will be served.

Institutionalized populations may not go to the Reception Centers at all. School children, the most vulnerable population, may simply be sent to the "Host School," facilities that do not have monitors or decontamination capability. Residents at Nursing Homes, Group Homes and detainees in jail are not brought to the Reception Centers. They will be brought to other locations – locations without monitors and decontamination equipment. The most vulnerable populations are "skimmed" – perhaps this is because collectively their number exceeds 20%.

The ER must take this into consideration and factor in what the consequences will be in a severe accident if 80% of the population continues not to be provided for. (PNPS-AC)

**Comment:** Shadow evacuation is ignored. Studies of human behavior following Three Mile Island (TMI) were described in a study published in Evacuation Behavior In Response To Nuclear Power Plant Accidents, Donald Ziegler and James Johnson, Jr., The Professional Geographer, (May, 1984). At TMI a limited evacuation advisory of pregnant women and pre-school children within 5 miles of the reactor was recommended by the Governor; that number would have resulted in 3,400 evacuees. Instead up to 200,000 people actually evacuated, approximately 39% within 15 miles of the reactor. The "shadow" evacuation is not expected to diminish until approximately 25 miles out from the reactor. The study found that in addition to the

high rate of voluntary evacuation, those evacuees tended to travel greater distances than observed in other kinds of disasters. The TMI study evidenced that the median distance traveled by evacuees was 85 miles. Professor Zeigler issued a later report for Long Island in December 2001. He reported on a telephone survey asking what the response would be if an accident occurred at Shoreham Station. He concluded if emergency planners assume that only those people who are told to evacuate will actually evacuate, they will expect 2,700 families to be on the road; instead, they will have 289,000 families from all over Long Island.

Extrapolating from these studies and looking at population projections in towns outside the Pilgrim EPZ, but along the major evacuation routes, makes it obvious that the roads upstream will be filled by panicked residents once word of the accident gets out. This could result in those near the core being trapped and their departure very significantly delayed. (PNPS-AC)

**Comment:** Emergency planning should be designed to account for the full spectrum of potential consequences, including the so-called “fast-breaking” release scenarios in which radioactive releases would begin within 30 minutes after an attack. This is one of the major conclusions of the report conducted for the government of New York by James Lee Witt Associates. Certain terrorist attack scenarios could be capable of causing such rapid releases. (PNPS-AC)

**Comment:** Transportation dependent are not considered by the applicant in their time estimates. There will be a larger number of transportation dependent 2012-2032 because of the increased projected EPZ population projected of over age 55 and the increasing trend of dual income and single parent households resulting in increased numbers of “latch-key” children. The ER must analyze the size of the transportation dependent population; where the providers are coming from; whether the number of providers meets the need; the response time; and whether the actual response time has been tested by sending busses to EPZ assigned locations. If drivers do not show up are the National Guard under contract and trained to do the job? (PNPS-AC)

**Comment:** Emergency responders, including school teachers, are required to have training – 50.47 (a), (b). The ER must analyze what percent actually have received training; decide if it is sufficient that they have only been offered training, but not taken it; whether there is, or should be, a fixed percent of each category of responder (Fire, Police, DPW, Harbor/Beach personnel, teachers, nursing/group home workers, bus drivers etc) that must receive training in each calendar year for the local plan to be in compliance? (PNPS-AC)

**Comment:** Some areas that are likely-to-be exposed can not evacuate in a timely manner in certain weather conditions – they are trapped. Gurnet and Saquish, part of Plymouth, can not evacuate in exceptionally high tides or snow storms. In a low tide, boats can not get in to evacuate either. Cape Cod is another example of a trapped population.

The ER must analyze the consequence of providing no “reasonable assurance” to segments of our population in a severe accident under certain weather conditions and scenarios. (PNPS-AC)

**Comment:** The guidance in Appendix 1 to NUREG-0654, Supplement 3 states, having people seek shelter if they cannot evacuate before the plume arrives was considered to apply only for a short-term (puff) release of known duration. In addition, studies have shown that except for very limited conditions, evacuation in a plume is still more effective in reducing health risks that prolonged sheltering near the plant.

The staff has considered these uncertainties and has recognized that sheltering people in most structures close to a nuclear plant, where plume concentrations and dose consequences are

likely to be highest, will not prevent early adverse health effects during a major radioactive release. Accordingly the staff has concluded that it is better to evacuate promptly near the plant for a serious reactor accident as a precautionary measure rather than to wait for additional information that may become available after a release occurs.

How does the ER reconcile the facts that: (1) sheltering is not effective in a severe accident, in other than a short-term puff release; (2) a timely evacuation of all likely-to-be-affected populations realistically is not possible in likely-to-be affected areas in a severe accident due to increased population and limited infrastructure –roadways and emergency personnel; (3) increased number of transportation dependent 2012-2032 due to an increase in the number of elderly and latch-key children; and (4) none of the EPZ Town Shelters were designed and properly equipped for fallout and none, excepting Duxbury's, even are stockpiled with KI and N95 face masks? (PNPS-AC)

**Comment:** Currently protective gear is not provided for EPZ emergency responders (except in the Town of Duxbury that purchased their own) even in a general emergency described in the Emergency Calendar as the most serious type of emergency.” However Police, Fire and DPW workers are outside on duty at this time. Worse protective gear is not provided for those who volunteer for lifesaving missions that is to go outside after their dosimeter has exceeded the recommended “safe” level. Lacking protective gear not only is bad for the workers health but decreases the number who will show up to perform the job. How will the ER analyze this?

The REWMDS, the center to decontaminate emergency workers, is in the peak fatal zone, directly across the street from the 10 mile EPZ demarcation line in Carver. The ER must analyze how workers can be effectively monitored and decontaminated in a likely-to-be contaminated area. (PNPS-AC)

**Comment:** The assumption that snow removal can add up to an hour and a half to evacuation time is also optimistic. It assumes that workers will be available to plow and does not account for the likely event that they will evacuate with their families. And although July 4th holiday traffic could easily slow evacuations more than an hour and one-half, KLD did not analyze “special events” in their traffic estimates. Summer week-end traffic was also ignored despite the fact that Pilgrim is located in a popular summer resort area due to the many beaches, forests and historic sites. The route to and from Cape Cod passes almost directly past the nuclear plant such that traffic getting to and departing from the Cape travels over the same routes that are designated in a nuclear evacuation. (PNPS-AC)

**Comment:** 50.47 (b) (12) requires that arrangements are made to treat the contaminated and injured. However, the plan does not acknowledge that some accident scenarios will result in large numbers of injured and contaminated individuals.

Hospitals listed to serve those within the 10-mile EPZ of Pilgrim, for example, cannot handle monitoring and decontaminating large numbers of people. Also, some hospitals listed to serve the EPZ are too close to the reactor site to be of use Cape Cod and Falmouth.

The Commonwealth of Massachusetts has stated that they intend to set up mobile decontamination tents. Has the ER ascertained that MDPH has an adequate supply of monitors, decontamination equipment, KI and trained personnel? Because of the possibility that there may be multiple attacks, as occurred in 9/11, Massachusetts can not rely on moving needed equipment from other reactor sites. (PNPS-AC)

**Comment:** The Town is continuing to experience population growth. Increased population places greater burdens on local, state, and federal infrastructure. With little potential for major highway expansion, the evacuation of the Town in the event of a nuclear incident is extraordinarily challenging. Significant radioactive emissions would effect not only the Town, but depending on wind direction, could affect many other nearby cities and towns, including Boston, a mere 40 miles away. Thus, the need for extreme care in the review is heightened. (PNPS-AE)

**Comment:** Additionally, the model used by Entergy in its ER does not take into the account the segment of the population who, regardless of intent, will be unable to evacuate and must shelter in place. The sick and the elderly may not be able to drive. Although shelter-in-place can be an effective tool where evacuation is not appropriate, a number of studies show that for an individual to obtain the maximum benefit of taking shelter in a home or in the office, the individual will need to tape windows, doors, and vents shut and, if possible, do so in a room with no external walls. One study showed that sealing of a bathroom in a home could be between 4 and 17 times more effective in reducing air exchange than simply shutting doors and windows. And these individually who are left behind in an evacuation may be the least able to take such additional precautionary measures. The ER does not take into account and shelter-in-place program, even the most rudimentary effort simply to stay indoors, let alone one ensuring that individuals forced to stay at home receive the maximum protection from such sheltering programs. (PNPS-AE)

**Comment:** Setting aside the weakness in Entergy's emergency warning system, there is a limited number of roads in and around the Town to accommodate a mass evacuation in the event of an accident. This factor, combined with a significant increase in the area population over the last thirty years since the plant first began operations (145% population growth over the last two decades), will lead to traffic congestion during evacuation operations, which in turn means that some residents will be unable to leave the area and will need to shelter in place. In assessing emergency response plans, it is critical that the assumptions underlying such plans reflect up-to-date information. The ER, for example, at Table 2-7, "Traffic Counts for Roads in the Vicinity of PNPS," in looking at estimated average daily traffic volume around the plant, is relying on data that, with one exception is from the 1990s (i.e., 1992, 1995, 1998, and 1990). There has been an influx in population in the region since those years, with more households using cars and the roadways near the plant, with and attendant effect on traffic patterns. These factors must be taken into account for emergency planning purposes; the use of outdated data for such purposes could have dangerous repercussions for the safety and health of the residents of the Town and neighboring areas. (PNPS-AE)

**Comment:** On emergency evacuation plans, he [Congressman Bill Delahunt] does feel that although MEMA and FEMA are doing their best, money needs to be provided for an independent analysis of the plan today, irrespective of relicensing, and he is working on that. (PNPS-C)

**Comment:** But you ought to know that we look upon the plant as being one of the businesses that must itself recognize the humanity of the people who live here and in this entire area. We look to the sea, but it also means we have our back to the sea, if you are thinking about evacuation. And if you are thinking about Cape Cod, poor Cape Cod. In the summer, we can't get over the bridges. What would it take, in a real disaster, for Cape Cod to be evacuated? (PNPS-E)

**Response:** *The Commission considered the need for a review of emergency planning issues in the context of license renewal during its rulemaking proceedings on 10 CFR Part 54, which included public notice and comment. As discussed in the Statement of Considerations for rulemaking (56 FR 64966), the programs for emergency preparedness at nuclear plants apply to*



*all nuclear power plant licensees and require the specified levels of protection from each licensee regardless of plant design, construction, or license date. Requirements related to emergency planning are in the regulations at 10 CFR 50.47 and Appendix E to 10 CFR Part 50. These requirements apply to all operating licenses and will continue to apply to plants with renewed licenses. Through its standards and required exercises, the Commission reviews existing emergency preparedness plans throughout the life of any plant, keeping up with changing demographics and other site-related factors. Therefore, the Commission has determined that there is no need for a special review of emergency planning issues in the context of an environmental review for license renewal.*

*The comments are noted. Emergency planning is addressed under the current operating license. The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. An NRC safety review for the license renewal period is conducted separately. The comments provide no new information, and are not within the scope of license renewal under 10 CFR Part 51 and Part 54 and will not be evaluated further.*

## **12.b Comments Concerning Security and Terrorism**

**Comment:** Outside responders can offer little help. On site security personnel are under-manned, under-trained, under-equipped, under-paid and unsure of what they can do according to the workers, themselves. See: the Project on Government Oversight and “Are These Towers Safe?” Time Magazine, June 20, 2005. The Time article has comments by Pilgrim’s former security training officer, Kathy Davidson. (PNPS-AC)

**Comment:** The cooling water in the spent fuel pool could be lost due to acts of malice or insanity resulting in an uncontrolled fire and release of large amounts of radiation. (PNPS-AC)

**Comment:** A mitigation strategy that the ER must analyze is a combination of on-site missiles and a no-fly zone for a pre-warning. The ER should compare the cost of mitigation versus the cost of the consequences resulting from a severe accident of doing nothing. The Raytheon Phalanx Close-In Weapon System, in particular, is thought to be ideally suited to protect nuclear reactors because it is available 24 hours a day and able to differentiate between a real threat and a passing or lost aircraft. Its’ computerized radar system can determine if an aircraft's flight path termination point is at the reactor site. If such a determination is made, operating personnel can verify the approaching threat and destroy it shortly before it strikes the reactor. The system is ideal to use when the reactor is close to an airport or busy traffic lines, like Pilgrim NPS, because of its advanced analysis capabilities. We are not suggesting that it be operated by personnel other than U.S. military. (PNPS-AC)

**Comment:** Air: Since September 11, 2001, a “no- fly” zone was put into effect for a short period, and was then eliminated. Because of the proximity of Boston and other airports, a “no fly” zone can not be large enough to permit effective response by Air Force or National Guard fighter aircraft. Even at the relatively slow speed of 300 miles per hour, a ten-mile “no fly” zone would provide only 2 minutes advance warning. The time for the two interceptor jets on “high alert” to be airborne is ten minutes. Flights between secondary airports do not even screen passengers. Hyannis, for example, is a five minute flight from Pilgrim; Pilgrim is surrounded by secondary airports. A small plane or helicopter loaded with explosives could cause the intended damage to the spent fuel pool, reactor building, control room or other support structures. (PNPS-AC)

**Comment:** [Summarized from Table in Comments]

MODE OF ATTACK: Commando-style by land CHARACTERISTICS: Could involve heavy weapons/sophisticated tactics, Attack requiring substantial planning and resources PRESENT DEFENSE: Alarms, fences, lightly armed guards, with off-site backup.

MODE OF ATTACK: Commando-style by water CHARACTERISTICS: Could involve heavy weapons/sophisticated tactics, Could target intake canal, Attack may be planned to coordinate with land attack PRESENT DEFENSE: 500 yard no entry zone - marked by buoys - simply, "no trespassing" signs, Periodic Coast Guard surveillance by boat or plane.

MODE OF ATTACK: Land-vehicle bomb. CHARACTERISTICS: Readily obtainable, Highly destructive if detonated at target. PRESENT DEFENSE: Vehicle barriers at entry points to protected areas

MODE OF ATTACK: Anti-tank missile. CHARACTERISTICS: Readily obtainable, Highly destructive at point of contact. PRESENT DEFENSE: None if missile is launched from offsite.

MODE OF ATTACK: Commercial aircraft. CHARACTERISTICS: More difficult to obtain than pre-9/11, Can destroy larger, softer targets. PRESENT DEFENSE: None.

MODE OF ATTACK: Explosive-laden smaller aircraft. CHARACTERISTICS: Readily attainable, Can destroy smaller, harder targets. PRESENT DEFENSE: None

MODE OF ATTACK: 10-kilotonne nuclear weapon. CHARACTERISTICS: Difficult to obtain, Assured destruction is detonation at target. PRESENT DEFENSE: None. (PNPS-AC)

**Comment:** Disabling necessary support Systems Alternatively, a nuclear meltdown or spent fuel pool fire could occur by disabling secondary support, such as cutting off electrical power to a plant/spent fuel pool and disabling the backup generators, clogging or cutting off the main water supply to the plant/spent fuel pool and gaining control to the control room. (PNPS-AC)

**Comment:** A nuclear meltdown, exposing the fuel rods inside the reactor core, can be accomplished by breaching the primary containment wall. A small plane or helicopter loaded with explosives could accomplish the task. (PNPS-AC)

**Comment:** BWR Mark I & Mark II Reactors like Pilgrim are especially vulnerable: Pilgrim is a GE Mark I BWR. This type of reactor is especially vulnerable to attack because the pool is located at the top of the reactor building, outside primary containment. "The spent fuel pool, (in GE Mark I BWR reactors) is located in the reactor building well above ground level. Most designs [including Pilgrim] have thin steel superstructures. The superstructures and pools were not, however, specifically designed to resist terrorist attack." Id. at 41. "The vulnerability of a spent fuel pool to terrorist attack depends in part on its location with respect to ground level as well as its construction. Pools are potentially susceptible to attacks from above or the sides depending on their elevation ...." Id. at 43. Prior to the National Academy Report, independent scientists from our leading universities came to the same conclusion. Reducing the Hazards from Stored Spent Power-Reactor Fuel in the United States, Robert Alvarez, Jan Beyea, Klaus Janberg, Jungmin Kang, Edwin Lyman, Allison MacFarlane, Gordon Thompson, Science & Global Security, Vol. 11, No.1, (2003). (PNPS-AC)

**Comment:** Pilgrim's spent-fuel pool is located above ground level. Hence it could drain completely if either its bottom or sides were punctured. Concerns that the turbine shaft of a crashing high-speed fighter jet or an act of war might penetrate the wall of a spent-fuel storage pool and cause a loss of coolant led Germany in the 1970s to require that such pools be sited

with their associated reactors inside thick-walled containment buildings. When Germany decided to establish large away-from-reactor spent-fuel storage facilities, it rejected large spent-fuel storage pools and decided instead on dry storage in thick-walled cast-iron casks cooled on the outside by convectively circulating air. The casks are stored inside reinforced-concrete buildings that provide some protection from missiles. A terrorist attack with a shaped-charge anti-tank missile could also puncture a pool. The National Academy of Sciences reported to Congress last year that "successful terrorist attacks on spent fuel pools, though difficult, are possible." NAS Safety and Security Report, *supra* at 3. This report found that "[i]f an attack leads to a propagating zirconium cladding fire, it could result in the release of large amounts of radioactive material." *Id.* The long-term contamination consequences of such a fire could be "worse than those from the Chernobyl accident." (PNPS-AC)

**Comment:** A crash into the spent fuel pool by an aircraft would raise concerns of both puncture and fire. To study the potential for fire, researchers at the Sandia National Laboratory, using water to simulate kerosene, crashed loaded airplane wings into runways. They concluded that at speeds above 60 m/s (135 mph), approximately "50% of the liquid is so finely atomized that it evaporates before reaching the ground. If this were fuel, a fireball would certainly have been the result, and in the high-temperature environment of the fireball a substantially larger fraction of the mass would have evaporated." Reducing the Hazards from Stored Spent Power-Reactor Fuel, *supra* at 14. The blast that would result from such a fuel-air explosion might not destroy the pool but could easily collapse the building above, making access difficult and dropping debris into the pool. A small explosive laden plane could cause this catastrophic series of events. (PNPS-AC)

**Comment:** New information shows that spent fuel pools are structurally vulnerable to destructive acts of malice or insanity, and sabotage-induced pool fires. In a report issued in April 2005, entitled "Safety and Security of Commercial Spent Nuclear Fuel Storage Public Report" (hereinafter "NAS Safety Report") the National Academy of Sciences addressed the hazards of stored spent power- reactor fuel. The report concluded that reactor pools are especially attractive terrorist targets because of their large inventory of radionuclides and consequent capability of immense destruction; they are particularly vulnerable to terrorist attack because they are less well protected structurally than reactor cores, and they typically contain inventories of medium and long-lived radionuclides that are several times greater than those in individual reactor cores. (PNPS-AC)

**Comment:** Safety and Security of Commercial Spent Nuclear Fuel Storage Public Report, National Academy of Sciences, p.36 (April 2005). A loss-of-pool-coolant event resulting from damage or collapse of the pool could have severe consequences. Severe damage of the pool wall could potentially result from several types of terrorist attacks, including attacks with large civilian aircraft, high-energy weapons, or attacks with explosive charges. (PNPS-AC)

**Comment:** Finally, the spent fuel pool is vulnerable to a terrorist attack. The reactor at the plant are particularly vulnerable to attacks on their fuel pools because they are located in the reactor building well above ground level and usually have thin steel superstructures. Entergy, however, has not addressed this issue in its SAMA analysis. (PNPS-AE)

**Comment:** And then there is the security in the era of 9/11, another issue which did not exist when the nuclear industry was first born. Suicidal terrorists, could they be stopped? Is there security that could stop a shoulder launched missile attack, considering that these missiles have a range of several miles? Is Plymouth going to become the proving ground for the success of another terrorist scenario? Twenty more years of operation would certainly increase the amount of waste and the damage of such an attack. (PNPS-Z)

**Response:** *The NRC and other Federal agencies have heightened vigilance and implemented initiatives to evaluate and respond to possible threats posed by terrorists, including the use of aircraft against commercial nuclear power plants and independent spent fuel storage facilities. The NRC routinely assesses threats and other information provided to them by other Federal agencies and sources. The NRC also directed that licensees implement additional measures to enhance their ability to address the current threat environment. Although NEPA does not require consideration of intentional malevolent acts on a case-by-case basis in conjunction with an environmental review, the NRC, as part of its mission to protect public health and safety and provide for the common defense and security, will continue to focus on prevention of terrorist acts for all nuclear facilities. The issue of security and risk from malevolent acts at nuclear power plants is not unique to facilities that are renewing their licenses. These matters will continue to be addressed through the ongoing regulatory oversight process as current and generic regulatory issues that affect all nuclear facilities.*

*The comments are noted. The NRC's environmental review here is confined to environmental matters relevant to the extended period of operation requested by the applicant. Appropriate safeguards and security measures have been incorporated into the site security and emergency preparedness plans. Any required changes to emergency and safeguards contingency plans related to terrorist events will be incorporated and reviewed under the operating license. The comments provide no new information and are not within the scope of license renewal under 10 CFR Part 51 and 54. The comments will not be evaluated further.*

**Comment:** There is a 500 yard “exclusion zone”, marked by buoys or floating “no-trespassing” signs, is not impenetrable, and is not patrolled most of the time. There is no capability of immediate armed response. There is no screen across the in-take canal to block a submerged explosive- simply a boom. Sunbathers, kayakers, photographers have been apprehended on the beach in front of the reactor. The point is that they were there not simply that they were eventually caught. (PNPS-AC)

**Comment:** Mitigation strategies for the ER to analyze are a screen across the mouth of the intake canal (recommended for the Millstones by Homeland Security) and secure the perimeter with water barriers such as those manufactured by Wisprawave and used at U.S. Navy installations. Compare, for example, the cost of the consequences resulting from a successful sea-based attack to the cost of installing a grate across the mouth of the intake canal, a floating sea barrier and additional security. (PNPS-AC)

**Comment:** On-site security tests are not credible because Wackenhut, the foreign –owned company that provides security for Pilgrim and half the nation’s reactors will also test security at these reactors - a conflict of interest. The tests, themselves, are not adequate because there is too much advance notice; the tests set a low bar to hurdle by using a low passing grade; the tests are performed during operating hours when the number of workers on site are minimal; tests limit the insider role to that of a passive participant; tests require defense against only a small number of attackers; tests do not assess the reactor’s ability to defend the spent fuel pool or defend against an attack using aircraft or boats; if a licensee performs poorly there are not enforcement actions; no independent observers or input. (PNPS-AC)

**Comment:** Mitigation strategies for the ER to analyze include: federalizing security; increased onsite training of off-site responders with on-site responders in mock attack drills; how long it takes for a sufficient number of offsite responders to mobilize onsite; enforced 40 hour work week for each security worker - not averaging security personnel’s total hours; increased security force; increased training; supplied and trained with appropriate weapons; clarifying the



appropriate/allowable response permitted of onsite security personnel – when they can shoot. The ER comparison should include comparing the cost of remedying these deficiencies to the cost of consequences from doing nothing. (PNPS-AC)

**Comment:** In speaking with, and rather recently, a Coast Guard Captain, he admitted that they could not adequately patrol the harbor outside of the nuclear plant because they are stretched too thin in these days because they don't have enough money, because they don't have enough ships, because they don't have enough men and women. (PNPS-E)

**Response:** *Security issues such as safeguards planning are not tied to license renewal, but are considered to be issues that need to be dealt with constantly as a part of the current operating licenses. Security issues are periodically reviewed and updated (and extended) at every operating plant. These reviews will continue throughout the period of any extended license. If issues related to security are discovered at a nuclear plant, they would be addressed immediately, and any necessary changes reviewed and incorporated under the operating license, rather than waiting for the period of extended operation. The comments are noted. The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Appropriate safeguards and security measures have been incorporated into the site security and emergency preparedness plans. Any required changes to emergency and safeguards contingency plans related to terrorist events will be incorporated and reviewed under the operating license. The comments provide no new information and are not within the scope of license renewal under 10 CFR Part 51 and 54. Therefore, the comments will not be evaluated further.*

**Comment:** The 9th Circuit Court of Appeals ruled, June 2, 2006, that likely environmental consequences of a potential terrorist attack on a nuclear facility must be considered in an environmental review under the National Environmental Policy Act (San Luis Obispo Mothers for Peace; Santa Lucia Chapter of the Sierra Club; Peg Pinard V. Nuclear Regulatory Commission; United States of America).

The Court found that the possibility of a terrorist attack on a nuclear facility is neither “remote nor speculative;” the numeric probability of a specific attack is not required in order to assess likely modes of attack, weapons, and vulnerabilities of a facility, and the possible impact of each of these on the physical environment, including the assessment of various releases scenarios; and there is no support for the use of security concerns as an excuse from NEPA’s requirements.

Therefore NRC must consider in Pilgrim’s environmental review Pilgrim’s vulnerabilities, likely modes of attack and weapons used, and the possible impact of these on the physical environment - including the assessment of various release scenarios and mitigation strategies. (PNPS-AC)

**Comment:** Last the 9th Circuit Court’s decision that terrorism must be considered including its possible impact on the physical environment means all aspects of emergency planning specifically at Pilgrim must be part of the ER. (PNPS-AC)

**Comment:** The Environmental review is now required by the 9th Circuit Court’s decision to analyze security at Pilgrim. It is now necessary to compare the consequences of an attack - billions of dollars and latent cancers - against the “cost” of measures that would lessen the likelihood of an attacks success.

See: The Massachusetts Attorney General's Request for a Hearing and Petition for Leave to Intervene With respect to Entergy Nuclear Operations Inc.'s Application for Renewal of the Pilgrim Nuclear Power Plants Operating License and Petition for Backfit Order Requiring New



Design features to Protect Against Spent Fuel Pool Accidents, Docket No. 50-293, May 26, 2006 includes a Report to The Massachusetts Attorney General On The Potential Consequences Of A Spent Fuel Pool Fire At The Pilgrim Or Vermont Yankee Nuclear Plant, Jan Beyea, PhD., May 25, 2006.

Dr. Jan Beyea's estimated the consequences following the release of Cesium-137 from Pilgrim's spent-fuel pool. We recognize that these are conservative estimates because: (1) he only considers Cesium-137, other radionuclides would be released; and (2) he only looks at latent cancers and not other radiation-linked diseases, reproductive disorders and birth defects. (PNPS-AC)

**Comment:** ... the potential consequences of a terrorist attack should be considered in the scope of the environmental review for Pilgrim. Entergy's ER does not address the environmental impacts of a terrorist attack at the plant. Consistent with the court's ruling and NEPA requirements, Entergy's ER should be amended to examine these consequences. (PNPS-AE)

**Comment:** The Town recognizes that Pilgrim plays an important role in the supply of power to this area of New England. It is not easily replaceable, and the Town is not, at this time, recommending a replacement. However, as set forth below, the Town has significant concerns about safety of the aging Pilgrim plant in particular to an extent with Entergy, the operator, in light of recently made public missteps at Pilgrim and other plants, and some aspects of technology in use at the Pilgrim plant. Due to the potential severity of impacts on the human population and other aspects of the environment from any nuclear plant accident or other mishap, there are many issues that must be fully considered and addressed by the Commission. As an example, the recent decision by the U.S. Court of Appeals for the Ninth Circuit in *San Luis Obispo Mothers v. NRC* that the Commission is required to consider the possibility of terrorist attacks in conducting environmental reviews required by the National Environment Policy Act supports the notion of a complete and thorough review of the environmental impacts of continued operation of the Pilgrim plant for the twenty year license extension. We set out in basic form the nature of the Town's concerns, and look forward to participating in a full review of these and additional issues raised by other commenters and interested parties. (PNPS-AE)

**Comment:** The recent ruling by the U.S. Court of Appeals for the 9th Circuit in *San Luis Obispo Mothers for Peace v. NRC*, No. 03-74628, rejected arguments that the potential for terrorist attacks was too remote and "highly speculative" to require evaluation in environmental reviews required for major projects by the National Environmental Policy Act ("NEPA"). The court found "...inconsidering the policy goals of NEPA and the rule of reasonableness that governs its application, the possibility of a terrorist attack is not so 'remote and highly speculative' as to be beyond NEPA's requirements."

The case concerns PG&E's application to the Commission pursuant to 10 C.F.R. Part 70 for a license to construct and separate a dry cask storage facility at PG&E's Diablo Canyon nuclear power plant. The court disagreed with the Commission that the possibility attack on a nuclear facility is not so remote and speculative that the potential consequences of such an attack need not be considered in a NEPA review, finding that the Commission's position "is inconsistent with the government's efforts and expenditures to combat this type of terrorist attack against nuclear facilities," and, indeed, the Commission's own post-September 11th efforts against the threat of terrorism. The fact that the probability of the risk of a terrorist attack was not easily quantifiable did not authorize the Commission to dismiss the risk of terrorist attacks altogether, concluded the court. "No provision of NEPA, or any other authority cited by the Commission, allows the NRC to eliminate a possible environmental consequence from analysis by labeling the risk as 'unquantifiable.'" According to the court, "[i]f the risk of a terrorist attack is not significant, then

NEPA obligates the NRC to take a 'hard look' at the environmental consequences of that risk." Finally, the court rejected as unreasonable the Commission's argument that it cannot comply with its NEPA mandate because of security risks, noting "[t]here is no support for the use of security concerns as an excuse from NEPA's requirements." The court emphasized "[t]here is no 'national defense' exception to NEPA ...any federal agency, must carry out its NEPA mandate to the fullest extent possible and this mandate includes weighing the environmental costs of the [project] even though the project has serious security implications." (PNPS-AE)

**Comment:** The environmental impacts that must be considered in an EIS include "reasonably foreseeable" impacts that have "catastrophic consequences, even if their probability of occurrence is low." 40 C.F.R 1502.22 (b)(1). In the post-September 11, 2001 world, the possibility of a terrorist attack at a nuclear plant is not so remote and speculative, and should be part of the Commission's environmental review with respect to Entergy's license renewal application. A recent federal court decision agreed with this proposed scope of review. (PNPS-AE)

**Comment:** The issue of on-site storage of spent fuel was the project under analysis in the case of Pacific Gas and Electric Company's nuclear plant that leads the U.S. Court of Appeals for the Ninth Circuit decision finding that examination of the consequences of a terrorist attack was required. Hence, the need for additional storage is known and foreseeable, and therefore an additional impact must be considered. (PNPS-AE)

**Comment:** In addition, we wish to draw your attention to a recent decision by the U.S. Court of Appeals for the Ninth Circuit, in which the court ruled that the Commission's rationale for refusing to consider the environmental impacts of intentional malicious attacks against nuclear facilities, as set forth in Private Fuel Storage (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340 (2002) ("PFS"), fails to meet NEPA's reasonableness standard. *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Commission*, No. 03-74628 (June 2, 2006) ("Mothers for Peace"). A copy of the decision is enclosed. The Mothers for Peace decision constitutes a significant precedent that supports including the environmental impacts of intentional malicious attacks on the Pilgrim pool within the scope of the Supplemental EIS. (PNPS-AH)

**Response:** *Recently, the Ninth Circuit Court of Appeals in San Luis Obispo Mothers for Peace, et al. v. NRC, No. 03-74628 (June 2, 2006), upheld the Commission's decision on the Atomic Energy Act issues, but, as to the NEPA issues, concluded that "the NRC's determination that NEPA does not require a consideration of the environmental impact of terrorist attacks does not satisfy reasonableness review," and held that "the EA prepared in reliance on that determination is inadequate and fails to comply with NEPA's mandate." San Luis Obispo at 6096. The case was remanded for further proceedings. Notwithstanding the Ninth Circuit decision, the Commission has addressed terrorism in the GEIS. See Duke Energy Corporation (McGuire Nuclear Statue, Units 1 & 2; Catawba Nuclear Safety Station, Units 1 & 2) CLI-02-26, 56 NRC 358, 365n. 24 (2002); GEIS § 5.3.3.1.*

## 12.c Comments Concerning Operational Safety

**Comment:** It recently came to light that certain quantities of uranium were missing from Pilgrim, with the location of the nuclear material unknown to Entergy and the number of the missing radioactive devices increasing, bringing to nine the number of missing monitors containing uranium 235. It has not been determined conclusively whether the radioactive materials are on- or off-site. While Entergy officials maintain that the missing uranium does not represent a threat to the public health or safety, the delayed detection of the disappearance of the radioactive

materials in the first instance, the discovery of more devices missing than initially believed, combined with the apparent inability to locate the monitors highlight the gaps in the monitoring plan at the Pilgrim plant which, if not remedied during the license and renewal period, could endanger the public health and safety of Town inhabitants, as well as the environment. As Mr. Neil Sheenan, spokesman for the Commission, has emphasized: "[The materials} are hot. That's why they're controlled ... It's important to store them appropriately and keep track of them." Mr. Sheehan has further indicated that "[the Commission] expect[s] Entergy to do a thorough job of accounting for this material to make sure it's where it should be."

Extension of Pilgrim's license should be made contingent upon a thorough investigation and review of all safety measures. The relicensing should present an opportunity, indeed a mandate, to protect Plymouth against any safety violations. Upon conclusion of the Commission's investigation of this matter, the necessary corrective measures should be adopted as part of any renewed license of Pilgrim. (PNPS-AE)

**Comment:** Some information made available to the Town indicates that there is a possibility that the use of tie rods at GE US BWR plants like Pilgrim as a device to repair the core shroud could create a safety hazard. Specifically, GE has identified Pilgrim as a plant where the tie rod support material may be susceptible to cracking associated with Intergranular Stress Corrosion Cracking ("IGSCC") if subjected to sustained, large peak stress conditions. Cracking in the tie rods could lead to a substantial safety hazard at Pilgrim, such as loss of core shroud configuration integrity during postulated accident conditions. Loss of core shroud integrity could impact the ability to maintain adequate core cooling, a significant risk to safe operation of the plant which must be addressed during the renewal period. It is critical that tie rods remain effective in maintaining core shroud configuration integrity during sustained, large peak stress conditions to minimize the likelihood of a substantial safety hazard at Pilgrim. (PNPS-AE)

**Response:** *In May 2006, Pilgrim Nuclear Power Station, embarked on a spent fuel pool clean-up effort. During the cleanup effort, Entergy discovered that sealed detectors containing small amounts of nuclear material, were not in the dry-tubes as indicated in inventory records. Entergy notified the NRC operations center on June 23, 2006. The Licensee Event Report, 2006-002-00, provides detailed information on this matter, and can be found in the Agencywide Document Management System (ADAMS), Accession No. ML062080143. As a result, the NRC conducted an inspection of the Pilgrim fuel handling and material accounting processes and programs. The inspection results are currently pending. This matter is related to current plant operations and are addressed under the NRC's ongoing reactor licensing and oversight programs. The comment provides no new information, and is outside the scope of the license renewal review and will not be evaluated further.*

## 12.d Comments Concerning Aging Management

**Comment:** Moreover, as reactor components age, it is important to inspect the right components within the right timeframe. The Aging Management Plan in the application does not contain adequate assurance that all components requiring inspection and maintenance will, in fact, be subject to inspection and maintenance in a timely manner. For example, a full cycle of shroud inspections is completed only over a 10-year period. Under these circumstances, there is no way to know until that period ends what the condition of the shroud during the prior years may be. (PNPS-AE)

**Comment:** Furthermore, given the old age of the Pilgrim plant and in light of the risks highlighted above, the Town is concerned that there is no plan to replace or modify the major structures and components at Pilgrim. Indeed, in the ER, Entergy indicated that it does not

intend to conduct any refurbishment activities during the renewal period, but that "[r]outine replacement of certain components during the period of extended operation is expected to occur within the bounds of normal plant maintenance." Inasmuch as there is no planned refurbishment and the renewal period will extend for twenty years, the Town submits that Entergy should be required to demonstrate how the lack of refurbishment activities will not affect safe operation of the plant during the renewal period. (PNPS-AE)

**Response:** *The NRC's environmental review focuses on environmental impacts relevant to the extended period of operation requested by the applicant. Safety matters related to aging are addressed as part of the NRC's safety review for license renewal, which is conducted separately, and will be documented in an NRC staff Safety Evaluation Report. The safety review looks at the applicant's aging management programs for passive long-lived systems, structures and components. The comments provide no new information and will not be evaluated further in the context of the environmental review. However, the comments will be forwarded to the project manager for the license renewal safety review for consideration.*

## **12.e Comments Concerning Energy Costs**

**Comment:** Further, since no new major power plants are planned and Cape Wind, the only one that's in process, becomes, faces opposition, it becomes even more vital that we maintain our current supply, including Pilgrim. From an economic standpoint, since the owners of the plant sell their power through long term contracts and not on the volatile short term market, the power produced at Pilgrim is much lower cost than the regional average. (PNPS-F)

**Comment:** Massachusetts ranks third in the nation in terms of highest electricity cost and, since we also have some of the highest housing and health care costs, it becomes even more important to maintain Pilgrim's very reliable, low cost electricity so that we don't continue to have an exodus of residents and businesses from our state who can no longer afford to live or work here. (PNPS-F)

**Comment:** Our view is that the environmental impact statement should examine closely the socioeconomic impacts of this plant in relationship to its reliability in the grid in New England, as well as to its support of the pricing of energy in Massachusetts and again in the region. (PNPS-F)

**Comment:** One of the things that I am concerned about is the socioeconomic events, as well as the environmental events on properties that have been constructed in this region since 1945. When I say that, in particular, I'm looking at different situations and how we are going to deal with the energy cutbacks that we are going to be facing in another year or two, or perhaps a little bit farther out. (PNPS-F)

**Comment:** And quite frankly, it's scary to think how much higher the prices could go without Pilgrim and how that would impact our quality of life even further. (PNPS-F)

**Comment:** The existence, the very existence of the NRC points to the possibility of a major environmental disaster as a result of all these reactors. At the beginning of nuclear power, power was supposed to be produced and electricity so efficiently that it would be too cheap to meter. As it has turned out, this form of energy is the least efficient with over 92 percent of the original energy being wasted and, two, it costs two to three times more to generate power with nuclear energy than any other form of power generation. (PNPS-F)

**Response:** *The economic costs and benefits of renewing an operating license are specifically directed to be outside of the scope of license renewal in 10 CFR 51.95(c)(2). The comments provide no new and significant information and, therefore, will not be evaluated further.*

## **12.f Comments Concerning Energy Needs**

**Comment:** In addressing the purpose and need for the NRC's proposed re-licensing action, the NRC should assess and discuss the role of Pilgrim Station in meeting New England's energy needs. (PNPS-AG)

**Comment:** If a relicensing is in fact in order, then I think that much greater mitigation and much greater contributions to the environment have to result from this energy. We have to remember that our energy consumption, like our water consumption, is way out of whack with the rest of the world. It is not essential, it is a convenience, it is something that we are growing accustomed to in our lifestyle of having three and four computers in the home that require this level of energy. We can compare our need for that energy with our need to water our lawns, for instance, we don't need this, we want it, and we are trading something for it and what we are trading here is the value of our ecosystem. (PNPS-AG)

**Comment:** They are over here generating quite a bit of electricity for us, doing their thing. If we lose them, we are going to lose that power, we are going to have to rely on tankers. I recall, last summer, over in Buzzard's Bay, when they were bringing the Bouchard Tanker up, it hit a rock, 90,000 barrels of oil or gallons of oil in Fairhaven, where I used to live, where I used to have a boat. I saw the devastation caused by that little tanker problem. We're talking about the LNG tankers up in Boston, for natural gas, we don't want that, and all these things here that you brought up tonight, but people are forgetting one simple fact, we need the electricity. (PNPS-T)

**Comment:** We all have to keep in mind that if we do shut the plant down and we don't extend the license, we are still going to have to get that 680 megawatts from someplace else and, like the previous gentleman said, where is that electricity going to come from and what's the environmental impact going to be from the generation of that additional megawatts from someplace else? (PNPS-U)

**Comment:** Obviously, everything we are dealing with right now is a result of our lifestyle and the lifestyle we have did not bring me to count one bicycle in the parking lot this evening, as I came into the meeting. I think we are responsible for our own future. (PNPS-V)

**Comment:** We also have a child that has brain damage, she is living with a working mom and, as we are trying to deal with dependable electricity for this young woman, our concerns are she has to have an air conditioned, climate controlled environment. (PNPS-V)

**Comment:** ...these are properties that have been developed in the last two decades that have to in fact pump all of their sewage into the towns, and our lift stations that we have are something that's critical. When we are dealing with sewage, we are dealing with a public health issue and I think, as far as those public health issues are concerned, we have to review the fact that just about everything that we count on for energy has a risk involved in it. (PNPS-V)

**Comment:** We also have to look at the fact that we, in America, including myself, I guess, we are all energy gluttons. (PNPS-V)

**Response:** *The need for power is outside of the scope of license renewal pursuant to 10 CFR 51.95(c)(2). The purpose and need for the proposed action (renewal of an operating license) is*



*to provide an option that allows for power generation capability beyond the term of the current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and where authorized, Federal (other than NRC) decisionmakers. The comments provide no new and significant information and, therefore, will not be evaluated further.*