

8 SUPPLEMENT TO THE ENVIRONMENTAL REPORT

8.1 Introduction

8.1.1 Overview

A decommissioning environmental report (Reference 8-1), dated December 1993, was prepared for the YNPS site, in conjunction with the plant's Decommissioning Plan. This report concluded that the environmental impacts of decommissioning activities are small and bounded by the previously issued Final Generic Environmental Impact Statement (FGEIS) issued by the Nuclear Regulatory Commission as NUREG-0586 (Reference 8-2) and by the YNPS environmental assessment, associated with construction period recapture. In 1997, a license termination plan (LTP) was prepared and submitted to the NRC but was later withdrawn, following the release of MARSSIM guidance (Reference 8-3). In 2002, activities associated with the LTP restarted using MARSSIM and other updated guidance.

The purpose of this section of the LTP is to describe any new information on significant environmental impacts associated with site-specific license termination activities and to determine if these impacts are within the scope of the environmental impacts previously evaluated either generically or on a site-specific basis by:

1. the environmental impact statement developed in support of the original facility,
2. the environmental impacts described in conjunction with the Decommissioning Plan (and PSDAR) related to decommissioning activities, or
3. the Final Generic Environmental Impact Statement addressing decommissioning (NUREG-0586).

The NRC has issued guidance associated with the impacts of decommissioning, including Supplement 1 to NUREG-0586 (Reference 8-4). Supplement 1 to NUREG-0586 focuses on the impacts of decommissioning nuclear power reactors licensed by the NRC, unlike the 1988 FGEIS, which took a broad look at decommissioning of a variety of sites and activities.

Supplement 1 to NUREG-0586 is intended to consider, in a comprehensive manner, all aspects related to the radiological decommissioning of nuclear reactor facilities. Supplement 1 uses an approach that defines a measure of significance and severity of potential environmental impacts and an applicability of these impacts to a variety of facilities. The significance of an impact is described as being SMALL, MODERATE, or LARGE. The applicability of impacts is described as being generic or site-specific. These terms are clearly defined in Section 4 of Supplement 1 to NUREG-0586.

Table H-1, located in Appendix H to Supplement 1 of NUREG-0586, provides a listing of activities for which the NRC has generically determined that no environmental impacts exist. Because these activities have already been determined not to result in environmental impacts, no further review is required in connection with the LTP.

Table H-2 provides a summary of the decommissioning activities and associated environmental issues that have been determined to have *potential* impacts. As stated in Section 4.3 of Supplement 1 to the FGEIS, if these plant-specific impacts fall within the scope of the environmental impacts previously identified and evaluated by the NRC staff, these activities can be performed without further evaluation. The issues identified in Table H-2 to be evaluated for plant-specific impacts are:

- Onsite/offsite land use
- Water use
- Water quality
- Air quality
- Aquatic ecology
- Terrestrial ecology
- Threatened and endangered species
- Radiological
- Radiological accidents
- Occupational
- Socioeconomics
- Environmental justice
- Cultural impacts
- Aesthetic s
- Noise
- Transportation
- Irretrievable resources.

According to Supplement 1 to NUREG-0586, the NRC assessed the impacts of each of these issues using data from previous studies and environmental reviews in addition to information obtained during site visits and provided by plants undergoing decommissioning. The NRC then examined the cumulative impacts of decommissioning activities and other past, present, and reasonably foreseeable future activities at the sites. After analyzing the issues, the NRC determined the impact of each and assigned a significance level (SMALL, MODERATE, or LARGE).

The NRC also determined whether the analysis of the environmental issues could be applied to all plants. Each environmental issue identified was assigned one of the following two categories: generic or site-specific.

Generic issues met the following three criteria:

1. The environmental impacts associated with the issue have been determined to apply to all plants, or, for some, issues to a group of plants of a specific size, specific locations, or having a specific type of cooling system or site characteristic.
2. A single significance criterion (SMALL, MODERATE, or LARGE) has been assigned to describe the impacts.
3. Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

If one or more of the above criteria cannot be met, the issue is considered to be “site-specific” and a site-specific evaluation of the issue is required. Table 8-1 summarizes the NRC’s findings with respect to applicability and impact of the identified environmental issues pertinent to decommissioning.

Decommissioning and license termination activities at YNPS fall within the range of activities evaluated for the FGEIS and NUREG-0586, Supplement 1. For those issues identified as “generic” in Table 8-1, the NRC’s prior conclusions bound environmental impacts at YNPS from decommissioning and license termination.

The LTP addresses the issues identified in Table 8-1 as “site-specific.” In addition, consistent with RG 1.179, the review focuses on any new information or significant environmental change associated with site-specific termination issues. Impacts associated with site-specific termination activities have been compared to previously analyzed decommissioning and termination activities, in this LTP and its references. The proposed termination activities related to the end use of the site do not result in significant environmental changes that are not bounded by the site-specific decommissioning activities described in the Decommissioning Plan, PSDAR, the FGEIS, or NUREG-0586.

Note that the review and conclusion in this Section relate only to activities and impacts associated with termination of the NRC license. YNPS is conducting other site characterization for non-radiological remediation and site restoration, which are not part of the license termination activities and are outside of the scope of NRC regulation. The non-radiological activities are addressed in an environmental closure plan that was submitted to the Massachusetts Department of Environmental Protection acting as the lead agency. Other agencies, such as the EPA, are also routinely involved in aspects of non-radiological site remediation.

8.1.2 Proposed Site Conditions at the Time of License Termination

The YNPS site is intended to be released for unrestricted use, under the radiological release criteria of 10CFR20.1402 (Reference 8-5) upon termination of its NRC license. Sections 3 and 4 of this LTP discuss in greater detail the activities that have been completed, those ongoing and remaining, and the proposed final state of the site.

At the time of license termination, the site will be a backfilled and graded land area, with the potential for selected above grade structures to remain. In general, structures are being demolished to site elevation 1022'-8" with the demolition debris removed from the site as industrial or radiological waste (Reference 8-6). Any remaining partial basements will be perforated, to allow groundwater to flow through. After completion of any required remediation and completion of final status survey activities, these basements will be backfilled with soil.

In general buried piping and utilities have been or will be removed. Any buried piping or utilities to remain will be evaluated and surveyed in place, as appropriate, in accordance with plant procedures to ensure that no detectable radioactivity exists.

8.1.3 Remaining Dismantlement and Decommissioning Activities

YAEC originally submitted a Decommissioning Plan (Reference 8-7), which was approved in February of 1995. In accordance with Regulatory Guide 1.185 (Reference 8-8), licensees with approved decommissioning plans were permitted to "replace their decommissioning plans with a Post-Shutdown Decommissioning Activities Report (PSDAR) update that uses the format and content specified in this document." YAEC later elected to relocate pertinent information to a PSDAR (Reference 8-9) conforming to the guidance of Regulatory Guide 1.185.

YAEC continues to implement the DECON alternative as the most appropriate alternative for decommissioning the YNPS site. Evaluation of the environmental effects of the DECON alternative is contained in NUREG-0586 and its supplement.

8.1.3.1 General Description of Decommissioning Activities

Since 1993 YAEC has removed and disposed of the steam generators, pressurizer, reactor vessel and reactor vessel internals. Portions of the reactor vessel internals are considered to be greater-than-Class-C (GTCC) waste and are stored in the ISFSI.

As indicated in the PSDAR, the decommissioning activities are being completed in three phases:

- The first phase of decommissioning consisted of mechanically and electrically isolating the Spent Fuel Pit, removing of any systems and components that did not support fuel storage in the SFP or subsequent decommissioning, and moving spent fuel and GTCC to the ISFSI. The first phase of decommissioning was completed when the spent fuel and all GTCC waste was removed from the SFP in June of 2003.
- The second phase of decommissioning involves the dismantlement and de-contamination of remaining systems, structures, and components (SSCs), including the SFP and its supporting SSCs. It also includes the removal of most of the structures to grade. This phase of decommissioning is ongoing.
- The final phase of decommissioning is the termination of the possession only license.

A more detailed discussion of the activities to be performed in each of the phases is provided in Section 3 of this LTP

8.1.3.2 Other Decommissioning Considerations

The PSDAR discusses other decommissioning considerations, including decontamination and dismantlement methods, storage and removal of spent fuel and GTCC waste, and site restoration.

8.1.3.3 General Decommissioning Activities Related to Removal of Radiological Components and Structures

Site structures and components are being removed using techniques and methods appropriate for the particular circumstances and are consistent with Decommissioning Work Packages. Openings in structures will typically be covered or sealed to minimize the spread of contamination. Components may be moved to an area for processing or volume reduction and/or packaging into containers, so that they can then be shipped to a processing facility for decontamination or to a low-level radioactive waste disposal facility. Buried contaminated components are being decontaminated to meet the free release criteria or are being excavated and removed for disposal.

8.1.3.3.1 Decontamination Methods

Contaminated systems and components are being removed and sent to an offsite processing facility or to a low-level radioactive waste disposal facility. Onsite decontamination of systems and components is generally limited to those activities needed to maintain personnel exposure ALARA, to expedite equipment removal, and to minimize the spread of contamination.

Application of coating and hand wiping are the preferred methods for stabilizing or removing loose surface contamination. If other methods are employed (e.g., grit blasting, high-pressure washing), airborne contamination control and waste processing systems are used, as necessary, to control and monitor any release of contamination.

Contaminated and activated concrete, as well as other contaminated materials, are being removed and sent to a low-level radioactive waste disposal facility. Concrete removal methods, such as scabbling and scarifying, will control concrete removal depth in order to minimize the waste volume produced. HEPA filtration is being used on dust and debris effluents in order to minimize the need for additional respiratory protection control measures. YAEC will consider new decommissioning techniques and technologies, as appropriate.

8.1.3.3.2 Dismantlement Methods

YAEC uses two basic dismantlement methods:

- Mechanical methods: Mechanical methods machine the surface of the material that is being cut. Typically, these methods are capable of cutting remotely without generating significant amounts of airborne contamination. This attribute makes mechanical methods attractive for removing most of the contaminated piping, components, and equipment.

- Thermal methods: Thermal methods melt or vaporize the surface of the material being cut. The cutting debris is transported from the cut region with a gas jet or water spray. Although thermal methods are more expedient than mechanical methods, they have large power requirements and generate airborne contamination when applied to contaminated systems in an air environment. However, thermal methods can be used with a cutting station and air filtration. For these reasons, application of thermal cutting methods on contaminated systems, structures or equipment is being restricted to areas that can be easily sealed, filtered, or maintained under water. Appropriate lead paint removal controls must also be implemented when using thermal cutting methods.

While these methods represent the most practicable and widely used decontamination methods available at this time, YAEC will consider new decontamination technologies if appropriate.

8.1.3.3.3 Special Programs

There are no special or unusual programs related to the decommissioning of YNPS. All procedures and processes used at YNPS are consistent with those considered in the FGEIS and its supplement.

8.1.3.3.4 Removal of LLW and Compaction or Incineration

LLW is being processed in accordance with plant procedures and sent to LLW disposal facilities. While no incineration will be performed onsite, YAEC may use an offsite licensed facility.

8.1.3.3.5 Soil Remediation

Soils and pavement are being surveyed and characterized in accordance with the site radiological characterization program. As necessary, soils, and pavement will be remediated (i.e., removed, processed and disposed of at a licensed facility) if determined to contain contamination levels above the site release criteria.

8.1.3.3.6 Processing and Disposal Site Locations

Currently, there are several facilities available for (1) processing of waste materials to achieve volume reduction prior to disposal or (2) disposal of low-level radioactive waste. These locations include: GTS Duratek – Barnwell, South Carolina; Envirocare – South Clive, Utah; and GTS Duratek – Oak Ridge, Tennessee.

8.1.3.3.7 Removal of Mixed Wastes

Mixed wastes are being managed according to all applicable federal and state regulations, including NRC handling, storage, and transportation regulations. Mixed wastes from YNPS are being transported only by authorized and licensed transporters and shipped only to authorized

and licensed facilities. If technology, resources, and approved processes become available, they will be evaluated to render the mixed waste non-hazardous.

8.1.3.3.8 Storage/Removal of Spent Fuel and GTCC Waste

YAEC will store spent fuel and GTCC waste in the ISFSI, until the DOE takes title to such wastes. Movement of fuel to the ISFSI began in June of 2002 and was completed in June of 2003. GTCC wastes were moved to the ISFSI in June of 2003.

YAEC cannot make a precise determination of when spent fuel and GTCC wastes will be removed from the YNPS site. Currently, YAEC expects that turnover to the DOE of spent fuel and GTCC wastes will be completed in 2022.

8.1.3.3.9 LTP, Final Status Survey, and Site Release Criteria

The ultimate goal of decommissioning the YNPS site is to release it for unrestricted use. This requires assurance that future uses of the site, after license termination, will not expose members of the general public to unacceptable levels of radiation.

Section 1 provides a history of previous LTP and final status survey (also referred to as the final radiological survey) activities. Consistent with a commitment made in the PSDAR, this LTP uses the guidance of NUREG-1700 to address the 10CFR20 criteria for license termination. Final status surveys will then be conducted to verify that structures and open land areas meet the release criteria. An independent NRC contractor will then conduct a verification survey, thereby allowing unrestricted release of the site. After final status survey and NRC verification, some of the remaining surveyed structures and open land areas may be removed from the license. YAEC will then maintain control over the site until license termination.

8.1.3.3.10 Site Restoration

Many site restoration activities may be initiated during the dismantlement period. During decommissioning those remaining plant structures are to be demolished. All building foundations will be back filled with structural fill or concrete debris (with no detectable radioactivity). Site areas will be graded and landscaped as necessary.

8.1.3.4 Schedule of Decommissioning Activities

The current schedule for decommissioning activities is provided in Section 3 of this LTP. Planning sequences and dates are based upon current knowledge and could change in the future. Yankee will continue to inform the NRC of all major changes to the planned decommissioning activities in accordance with 10CFR50.82(a)(7).

8.1.3.5 Conclusions Regarding Environmental Impact Included in the PSDAR

The PSDAR included a discussion of environmental impacts from decommissioning the YNPS. These conclusions were based largely upon the information provided in the YNPS Decommissioning Environmental Report (DER). The DER was based upon NUREG-0586, “Final Generic Environmental Impact Statement (FGEIS) on Decommissioning of Nuclear Facilities” and the site-specific environmental assessment from the re-capture of the construction period time duration.

The PSDAR concluded that the impacts due to decommissioning would be bounded by the previously issued environmental impacts statements. This was principally due to the following reasons:

- The postulated impacts associated with the method chosen, DECON, have already been considered in the FGEIS.
- There are no unique aspects of the plant or decommissioning techniques to be utilized that would invalidate the conclusions reached in the FGEIS.
- The methods to be employed to dismantle and decontaminate the site are standard construction-based techniques fully considered in the FGEIS.
- The site-specific person-rem estimate for all decommissioning activities has been conservatively calculated using methods similar to those used in the FGEIS.

Specifically, the review concluded that the YAEC decommissioning will result in generally positive environmental effects, in that:

- Radiological sources that create the potential for radiation exposure to site workers and the public will be eliminated.
- The site will be returned to a condition that will be acceptable for unrestricted use.
- The thermal impact on the Deerfield River from facility operations will be eliminated.
- Noise levels in the vicinity of the facility will be reduced.
- Hazardous material and chemicals will be removed.
- Local traffic will be reduced (fewer employees, contractors and materials shipments than required to support an operating nuclear power plant).

Furthermore, the YNPS decommissioning will be accomplished with no significant adverse environmental impacts in that:

- No site specific factors pertaining to YNPS will alter the conclusions of the FGEIS.

- Radiation dose to the public will be minimal.
- Radiation dose to decommissioning workers will be a fraction of the operating exposure.
- Decommissioning is not an imminent health or safety problem and will generally have a positive environmental impact.

The Decommissioning Plan estimated the total radiation exposure impact for decommissioning to be 744 person-rem. This estimate was re-evaluated in 1996, resulting in a lower value of 580 person-rem (Reference 8-9). The actual exposure, through December 31, 2002, for decommissioning activities is 555 person-rem (Reference 8-10).

Radiation exposure due to transportation of radioactive waste has been conservatively estimated to be approximately 7 person-rem. This value is bounded by the FGEIS value of 100 person-rem of occupational exposure for transport of radioactive material.

Radiation exposure to offsite individuals for expected conditions, or from postulated accidents is bounded by the Environmental Protection Agency's Protective Action Guidelines and NRC regulations. The public exposure due to radiological effluents will continue to remain well below the 10CFRPart 20 limits and the ALARA dose objectives of 10CFR50, Appendix I. This conclusion is supported by the YNPS Annual Effluent Release Reports in which individual doses to members of the public are calculated for station liquid and gaseous effluents.

No significant impacts are expected from the disposal of low-level radioactive waste (LLW). The total volume of YNPS LLW for disposal was estimated in the Decommissioning Plan to be approximately 132,000 cubic feet. A review of the annual effluent reports filed with the NRC has determined that, through the end of 2002, 144,184 cubic feet of LLW has been shipped offsite for burial. (Reference 8-9) The previous estimate has been subsequently re-evaluated to reflect the current scope of work, and the "to go" volume for disposal is estimated to be 480,512 cubic feet (Reference 8-11). A final estimate for waste volume will be developed based upon the results of further characterization. The waste volume estimated to be generated by the YNPS decommissioning remains bounded by the FGEIS estimate for a reference PWR of 647,670 cubic feet.

Since the approval of the Decommissioning Plan and the issuance of the Decommissioning Environmental Report, YNPS has identified the presence of polychlorinated biphenyls (PCBs) from some paint coatings in soil. As in the case of radiologically contaminated lead paint, asbestos, and other hazardous materials, contaminated paint that contains PCBs will be managed according to all applicable federal and state regulations.

No significant environmental impacts are anticipated in the event that LLW is required to be temporarily stored onsite because adequate storage space exists and LLW storage will be in accordance with all applicable federal and state regulations.

The non-radiological environmental impacts from decommissioning are temporary and are not significant. The largest occupational risk associated with decommissioning YNPS is related to the risk of industrial accidents. The primary environmental effects are short term: small

increases in noise levels and fugitive dust in the immediate vicinity of the site, as well as truck traffic to and from the site for hauling equipment and waste. No socioeconomic impacts, other than those associated with the cessation of operations (loss of jobs and taxes) have been identified. Also, no significant impacts to local culture, terrestrial or aquatic resources, such as the Sherman Reservoir and Deerfield River have been identified.

8.2 Analysis of Site-Specific Issues

8.2.1 Onsite-Offsite Land Uses

8.2.1.1 Onsite Land Uses

The environmental impacts associated with onsite land uses have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of onsite land uses is documented in Section 4.3.1 of Supplement 1 to NUREG-0586.

YNPS is located on a 2200 acre site, of which approximately 10 acres have been developed for plant use. Decommissioning activities involve the same areas used during initial construction and during operations. The use of a small fraction of the total site area land impacted by decommissioning and the re-use of areas used during initial construction are consistent with the NRC's assumptions in Supplement 1 to NUREG-0586, and thus there are no significant environmental impacts associated with YNPS decommissioning.

YAEC has identified no new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.1.2 Offsite Land Uses

Only areas within the existing site boundary will be used to support decommissioning and license termination activities (such as temporary storage areas and staging areas). As discussed previously in this section, and in detail in Section 5, isolation and control measures will be instituted to prevent the spread of contamination. These measures will also be monitored to ensure their effectiveness. Thus, no environmental impacts associated with the use of offsite lands are anticipated from YNPS decommissioning and license termination activities.

8.2.2 Water Use

The environmental impacts associated with water use, during decommissioning, have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of water use is documented in Section 4.3.2 of Supplement 1 to NUREG-0586.

During plant operation, an average of 0.4 million gallons of water per day from the Sherman Reservoir was used to cool plants systems. Water use was discussed in the "Environmental Assessment by the U.S. Nuclear Regulatory Commission, Related to the Request to Authorize Facility Decommissioning," dated December 14, 1994 (Reference 8-12). At that point in the decommissioning project, water usage was estimated to be less than 1% of the average water usage during operations.

Since 1994, a number of systems that contributed to water usage have been removed from operation. Section 3 of this LTP describes those water-containing systems that have been removed from service or drained and identifies the systems remaining in operation. Only a few systems remain, and as described in Supplement 1 to NUREG-0586, the operational demands for cooling and make-up water have been eliminated with the removal of spent fuel and GTCC waste from the spent fuel pit.

Use of water for decontamination of systems such as the Reactor Coolant System and the Spent Fuel Pit are addressed in the FGEIS. Other water usage, such as for dust abatement, are similar to those that occurred during construction of the plant. In addition, potable water for decommissioning contractor staff is being provided via bottled water, and sanitary services are provided by portable toilet facilities, thus minimizing the impacts on the on-site water supply.

In summary, the conditions for YNPS decommissioning are consistent with the assumptions of Supplement 1 to the FGEIS, and thus there are no significant environmental impacts associated with water use during the decommissioning of the YNPS. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.3 Water Quality

The environmental impacts associated with surface water quality have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of surface water quality is documented in Section 4.3.3 of Supplement 1 to NUREG-0586.

All discharges are controlled under the National Pollutant Discharge Elimination System (NPDES) permit (Reference 8-13). This permit is issued jointly by the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MDEP). The Offsite Dose Calculation Manual (Reference 8-14) also addresses limitations on doses to members of the public from liquid effluent and requires that they be maintained below the limits in:

- 10CFR50, Appendix I;
- 10CFR20, Appendix B, Table 2, Column 1; and
- 40CFR190.

Radiological impacts are being assessed and monitored by use of on- and offsite groundwater monitoring wells for aquifers that discharge to Sherman Reservoir, including monitoring Sherman Spring. Currently the levels of radionuclides in these well samples, with the exception of tritium, are below the EPA's drinking water MCLs. A detailed discussion about the groundwater assessments (completed and planned) and available data are provided in Section 2 of this LTP.

As previously discussed, site buildings are being removed to ground level at 1022'-8", and basements are being cleaned to meet the appropriate DCGLs. These basements are also being perforated to allow equilibrium with the water table, and soils are being used to backfill the holes. Contaminated concrete debris from demolition of the buildings will be removed from the

site and disposed of at an appropriate facility. This contaminated debris will not be used as backfill at the site, and thus does not have the potential to affect ground or surface water quality.

Thus, the conditions for YNPS decommissioning are consistent with the assumptions of Supplement 1 to the FGEIS, and thus there are no significant environmental impacts associated with surface water quality during the decommissioning of YNPS. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.4 Air Quality

The environmental impacts of decommissioning associated with air quality have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of air quality is documented in Section 4.3.4 of Supplement 1 to the FGEIS.

Supplement 1 to the FGEIS identifies the following decommissioning activities as having the potential for non-radiological impacts on air quality:

- Worker transportation to and from the site,
- Dismantling of systems and removal of equipment,
- Movement and open storage of materials onsite,
- Demolition of buildings and structures, and
- Shipment of material and debris to offsite locations.

Worker transportation: Consistent with the assumptions in the FGEIS, the work force at YNPS has decreased from the time the plant ceased operation. The work force will further decrease as decommissioning nears completion. There will and have been occasional increases during specific decontamination and decommissioning activities. The work force during decommissioning is smaller than that associated with plant construction and refueling at YNPS. Accordingly, the adverse changes in air quality, associated with changes in worker transportation, will not be detectable and are not destabilizing.

Dismantling systems and removal of equipment: Generation of particulate matter associated with the physical activities of dismantlement and by the release of gases from systems during removal are potential sources that could impact air quality. Methods and provisions are available to minimize fugitive dust (e.g., wet suppression and chemical stabilization agents) and to minimize airborne contamination in buildings (e.g., isolation of areas and HEPA filtration). Local filtration systems can also be used when activities are located in areas that are not ventilated to the plant stack, and are likely to generate airborne radioactivity. Thus, it is highly unlikely that particulate matter generated during decommissioning and released to the environment will be detectable offsite. Any refrigerants will be disposed of in accordance with the applicable state and federal regulations.

Movement and open storage of materials onsite: Movement of equipment and open storage of materials during decommissioning may result in fugitive dust. Provisions as discussed in Section

3 and identified above can mitigate these effects. Thus, it is highly unlikely that particulate matter generated as a result of movement or storage of material onsite will be detectable offsite.

Demolition of buildings or structures: As discussed in the FGEIS, demolition of structures and buildings on the YNPS site may result in a temporary increase in fugitive dust. The controlled dismantlement and packaging of site components and structures will minimize the potential for fugitive dust from becoming an ambient air quality concern during decommissioning. Fugitive dust from demolition of buildings and structures generally involves large particles that settle quickly. Dust and smaller particles will be controlled using mitigation methods such as wet suppression. Thus, it is highly unlikely that particulate matter generated as a result of building or structure demolition will be detectable offsite.

Shipments of material to an offsite location: Material, debris, and equipment will be removed from the site during decommissioning. Although the remaining number of shipments to be sent during decommissioning is relatively large, these shipments are taking place over a couple of years, and thus the average number of shipments per day is relatively small. As stated in the FGEIS, it is unlikely that the emissions associated with the small number of daily shipments would be detectable offsite.

Air effluent released from the site is monitored in accordance with the Offsite Dose Calculation Manual (ODCM) which sets limits on doses caused by effluents, based upon the ALARA (as low as reasonably achievable) objectives of 10CFR50.34a, 10CFR50.36a, and Section IV.B.1 of Appendix I to 10CFR50. Effluents are reported annually to the NRC.

Based upon the above considerations, it has been determined that the conclusions of the FGEIS are applicable to YNPS, and decommissioning of YNPS will not noticeably affect offsite air quality. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.5 Aquatic Ecology

8.2.5.1 Activities Within the Operational Area

The environmental impacts associated with aquatic ecology for decommissioning activities within the operational area have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of aquatic ecology for activities within the operational area is documented in Section 4.3.5 of Supplement 1 to NUREG-0586. Any new wetland areas created as a result of the ISFSI construction will remain during decommissioning.

8.2.5.2 Activities Outside of the Operational Area

The FGEIS identifies generation of runoff due to ground disturbances and surface erosion as having the potential to impact aquatic resources. Provisions will be made to reduce surface erosion and runoff.

It is understood that decommissioning of shoreline and in-water structures has the potential to impact aquatic habitats and biota. YAEC will consult with regulatory and resource agencies to

obtain permits and plan activities to minimize the duration and extent of these impacts. Regardless, impacts would be limited to those areas previously disturbed during construction and operation, and these areas would be expected to re-colonize as they did following initial construction. Thus, even considering the removal of shoreline and in-water structures, the impacts of decommissioning on aquatic ecology are minimal.

YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.6 Terrestrial Ecology

8.2.6.1 Activities Within the Operational Area

The environmental impacts of decommissioning associated with terrestrial ecology for activities within the operational area have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of terrestrial ecology for activities within the operational area is documented in Section 4.3.6 of Supplement 1 to the FGEIS.

8.2.6.2 Activities Outside the Operational Area

Only areas within the existing site boundary will be used to support decommissioning and license termination activities (such as temporary storage areas and staging areas). These areas are within those areas that were disturbed during initial construction. The FGEIS states that terrestrial habitats disturbed during the construction of the site often continue to be of low habitat quality during operation and decommissioning.

As discussed previously in this section, and in detail in Section 5, isolation and control measures will be instituted to prevent the spread of contamination, and these measures will be monitored to ensure their effectiveness. Because the YNPS site has been in active decommissioning since the decision to permanently close the facility was made, it is reasonable to conclude that areas disturbed during the construction and operation of the plant have not become new sensitive areas with respect to terrestrial biota. Thus, no environmental impacts associated with the use of offsite lands are anticipated from YNPS decommissioning and license termination activities related to the end use of the site.

8.2.7 Threatened and Endangered Species

While the YNPS site consists of over 2000 acres of land, only a small fraction consisting of approximately 10 acres has been developed for plant use. During planning and construction of the independent spent fuel storage facility (which is adjacent to the areas being decommissioned), the Natural Heritage and Endangered Species Program (NHESP), an agency of the Department of Fisheries, Wildlife, and Environmental Law Enforcement, was contacted to review impacts. This review included activities associated with the installation of the ISFSI pad, road improvements, and improvements to the present storm water system. The NHESP had determined that the activities do not occur within the actual habitat of a state-protected rare wildlife species (Reference 8-15).

However, during recent field surveys to complete the mapping and to characterize natural communities, a late-larval spring salamander (*Gyrinophilus porphyriticus*) was identified on the YAEC property. It was found at the northeast end of the property, in one of the headwater channels of Wheeler Brook and very near the property line (which is also the Massachusetts/Vermont State Line) in a forestry management area.

The spring salamander is a species of Special Concern in Massachusetts. This status means that it is a species that has either been documented as suffering a decline that could threaten the species if allowed to continue or which occurs in small numbers or with a very restricted distribution in the state.

The implications of this species occurring on the site are fairly minimal since (1) this species occurs in a habitat that is already provided a high level of protection under the Massachusetts Wetlands Protection Act and (2) spring salamanders hardly ever stray far from their home streams. Standard best forestry practices include limiting stream crossings, retain tree cover adjacent to streams, and prohibit activities (such as skidding or brush piling) in streams. No evidence of any past forest management activities affecting habitat in this stream was observed during the survey and future forest management activities are not expected to require alteration of the stream.

Only a very small section of Wheeler Brook comes close to the industrial portion of the property, less than 200 feet. In that area, Wheeler Brook is generally of lower gradient than preferred by the spring salamander. Therefore, decommissioning and license termination activities at the YNPS site are not expected to affect the spring salamander.

Thus, decommissioning and license termination activities at the YNPS site does not adversely impact threatened or endangered species.

8.2.8 Radiological

8.2.8.1 Activities Resulting in Occupational Doses to Workers

The environmental impacts associated with radiological activities resulting in occupational doses to worker have been determined by the NRC to be generically applicable with a SMALL impact, because of the existence of guidance regulating doses to workers (10CFR20) which remain applicable to the YNPS. The NRC's analysis of the environmental impacts of radiological activities resulting in occupational doses to workers is documented in Section 4.3.8 of Supplement 1 to NUREG-0586.

8.2.8.2 Activities Resulting in Doses to the Public

The environmental impacts associated with radiological activities resulting in doses to the public have been determined by the NRC to be generically applicable with a SMALL impact, because of the existence of guidance regulating and documenting doses to members of the public (10CFR20). The NRC's analysis of the environmental impacts of radiological activities resulting in doses to the public is documented in Section 4.3.8 of Supplement 1 to NUREG-0586. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

Potential doses to the public following license termination are not covered by the Supplement to the FGEIS but were evaluated during promulgation of rulemaking for the radiological criteria for license termination (10CFR20.1402). The basis for public health and safety considerations associated with the license termination rule is discussed in NUREG-1496.

8.2.9 Radiological Accidents

The environmental impacts associated with radiological accidents have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of radiological accidents is documented in Section 4.3.9 of Supplement 1 to NUREG-0586. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

The NRC concluded that radiological impacts, due to accidents, are considered to be undetectable and non-destabilizing, in the National Environmental Policy Act (NEPA) sense, if the doses remain within regulatory limits. The YNPS FSAR provides a summary of the evaluation of plant transients that have a potential impact on both occupational and public safety and health. The risk of accidents resulting in a significant radiological release during decommissioning activities is considerably less than during plant operations.

The analysis of decommissioning events includes all phases of decommissioning activities: decontamination, dismantlement, packaging, storage, radioactive materials handling, and license termination activities (including final status surveys). The following radiological events were identified as having the potential to affect public health and safety:

- Decommissioning activity events.
- Loss of support system events, including loss of offsite power, cooling water and compressed air.
- Fire and explosion events.
- External events.
- Spent fuel storage events.

YAEC requested and received an exemption from the emergency preparedness requirements of 10CFR50.47 (Reference 8-16); however, approval of the exemption request was predicated on the absence of any accidents where the offsite dose consequences could exceed the EPA protective action guidelines (PAGs). Releases resulting from accidents postulated in the decommissioning accident analysis were evaluated using the EPA PAGs as an upper limit and found to be bounded by this criterion. Use of the EPA PAGs as an administrative limit also ensure that postulated accident offsite doses are significantly less than the 10CFR100 reference values.

Thus, because the dose consequences resulting from radiological events, identified as having the potential to affect public health and safety, are below the EPA PAGs and the criteria of 10CFR100, the associated impacts on the environment are minimal.

8.2.10 Occupational Issues

The environmental impacts of occupational issues have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of occupational issues is documented in Section 4.3.10 of Supplement 1 to NUREG-0586.

YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

As Supplement 1 to the FGEIS indicates, the Occupational Safety and Health Act of 1970 was enacted to protect the health of workers, and applicable regulations are administered by the Occupational Safety and Health Administration (OSHA). YNPS is subject to 29 CFR 1910 and 1926 for worker health and safety protection under OSHA regulations. These requirements are implemented under existing plant programs and procedures.

8.2.11 Socioeconomic Impacts

The environmental impacts of socioeconomic impacts have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of socioeconomic impacts is documented in Section 4.3.12 of Supplement 1 to NUREG-0586.

The impacts that are observed by the community are primarily those resulting from plant closure rather than from decommissioning, although some decommissioning activities began very shortly after closure. These impacts occur either through changes in employment levels and local demands for housing and infrastructure, or through decline of the local tax base and the ability of local government entities to provide public services. Supplement 1 to NUREG-0586 states that decommissioning, itself, has no impact on the tax base and no detectable impact on the demand for public services.

Additionally Supplement 1 to NUREG-0586 concludes that the effects of employment changes on population growth are:

1. not detectable if population changes (reductions or increases) are less than 3% per year,
2. detectable but not destabilizing if the population change is between 3% and 5%, and
3. de-stabilizing if the population change is greater than 5% per year.

Table 8-2 shows the change in population over the last two decades. For the decade 1990 to 2000, which includes the period of shutdown and partial decommissioning, the overall change in population in the vicinity of the site was a 5% decrease over this ten-year period. As can be seen, the average annual population change, based upon the data from 1990 and 2000, does not exceed the NRC's threshold of 3%, and thus signifies that the changes are neither detectable nor destabilizing. Thus no significant socioeconomic impacts are associated with YNPS decommissioning and license termination activities related to the end use of the site.

8.2.12 Environmental Justice

Radioactive waste shipments, from the site to an interstate highway, traverse a six-county area including the following counties: Berkshire, Franklin, and Hampshire in Massachusetts; Bennington in Vermont; and Columbia and Rensselaer in New York. The total population of this area is approximately 611,400 people. The number of minority (non-white) persons is about 7% of the total population, and the percentage of people below the poverty level is about 9% of the total population. The area is generally rural along the shipping routes. These data were derived from the Bureau of the Census 2000 Reports (References 8-17, 8-18, and 8-19).

Environmental Justice was addressed by the NRC during the review and approval of the YNPS Decommissioning Plan (Reference 8-20). The NRC concluded that there are no significant environmental impacts associated with the proposed decommissioning activity that would have a significant effect on the quality of the human environment. The NRC included consideration of the transportation of radioactive wastes from the YNPS site to the interstate transportation corridor (both rail and highway) and concluded that such transportation will not have a disproportionate effect on minority or low income populations.

These conclusions remain valid. The types of decommissioning and license termination activities, conducted or planned at YNPS, are not significantly different than those described in the Decommissioning Plan and the assumptions related to affected populations remain valid, considering the information from the 2000 Census, presented above. Thus, there are no environmental justice impacts introduced by decommissioning or license termination.

8.2.13 Cultural and Historic Resource Impacts

8.2.13.1 Activities Within the Operational Area

The environmental impacts associated with cultural and historic resource impacts from activities within the operational area has been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of cultural and historic resource impacts from activities within the operational area is documented in Section 4.3.14 of Supplement 1 to NUREG-0586. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.13.2 Activities Outside the Operational Area

An independent review of files from the Massachusetts Historic Commission, the Massachusetts State Archives, and the State House Library was performed to determine the significance of buildings and areas in the vicinity of the YNPS site. There are no historic or cultural resources which are listed in the National Register of Historic Places within five miles of the plant (References 8-21, 8-22, 8-23 and 8-24). The Hoosac Tunnel, just beyond five miles of the site to the southwest, is designated as a National Register Property. The closest locale considered to have local historic significance is the Brigham Young birthplace monument located in Whitingham, Vermont, approximately five miles northeast of YNPS. The Sherman Dam Development District (including individual structures) and the Monroe Bridge Development/Glassine Paper Company/Deerfield Dam District (including individual structures) have been deemed eligible to be on the State Register of Historic Places. The YNPS structures have not

been identified as a historic site or asset, and decommissioning and license termination activities will not involve or impact any site or structure listed in the State Register of Historic Places.

8.2.14 Aesthetics

The environmental impacts associated with aesthetics have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of aesthetics is documented in Section 4.3.15 of Supplement 1 to NUREG-0586.

Aesthetic resources include natural and man-made landscapes and the way the two are integrated. As a part of construction and operation of the facility, the landscape was previously altered. Decommissioning activities will be conducted onsite, both inside and outside of existing buildings (in the case of dismantlement or shipping activities). The NRC has concluded that any visual intrusion resulting from decommissioning will be temporary and would serve to reduce the aesthetic impacts of the facility. YAEC will use best management practices to control many of the potentially adverse impacts of decommissioning on aesthetics (such as dust and noise), as discussed in other sections.

YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.15 Noise

The environmental impacts associated with noise have been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of noise is documented in Section 4.3.16 of Supplement 1 to NUREG-0586.

As stated in the "Environmental Assessment by the U.S. Nuclear Regulatory Commission, Related to the Request to Authorize Facility Decommissioning," dated December 14, 1994, decommissioning activities at YNPS will add minimally to the ambient noise of the surrounding environment, beyond the security fence.

Decommissioning activities will, in general, be intermittent and temporary, and limited to a relatively small portion of the entire YNPS site. Noise is attenuated by the mature forests surrounding the plant. During fall and winter, absence of foliage will allow some additional transmission of noise, and, to the areas north and west of the plant, the presence of Sherman Reservoir will allow some transmission of noise over the water before attenuation by forest. However, a review of wildlife species existing in the vicinity of the plant indicates an assemblage consistent with that found within similar regional habitats. This indicates that the noise levels generated at YNPS during decommissioning have added only minimally to the ambient noise levels and have had a negligible effect on the vicinity and the environment. YAEC has not identified any new information or significant environmental change associated with the site-specific termination activities related to the end use of the site.

8.2.16 Transportation

The environmental issue of transportation has been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of transportation is documented in Section 4.3.17 of Supplement 1 to NUREG-0586.

The number of shipments and the volume of waste shipped are greater during decommissioning than during operations. In Supplement 1 to the FGEIS, the public health and safety impacts of transportation of radioactive wastes are evaluated on the basis of compliance with regulation. The NRC has concluded that compliance with regulation is adequate to protect the public against unreasonable risk from the transportation of radioactive materials. The supplement to the FGEIS notes that the evaluation leading to that conclusion was based, in part, on information in NUREG-0170 and that recent re-evaluation of transportation risks, using updated information and assessment tools, found that risks are lower than those estimated in NUREG-0170. Because YNPS will comply with all applicable regulations when shipping radioactive wastes from decommissioning, the effects of transportation of that radioactive waste on public health and safety are considered to be neither detectable nor destabilizing.

Non-radiological impacts of transportation include increased traffic and wear and tear on roadways. Because the average number of shipments from the site will be relatively small, there will be no significant effect on traffic flow or road wear. Additionally, because of the industry's emphasis on training and adherence to established procedures, truck accident rates for activities at nuclear facilities has been lower than the national average for similar activities. The NRC has concluded that impacts of transportation accidents would neither be detectable nor destabilizing.

Thus, transportation of wastes associated with the YNPS decommissioning and license termination activities do not present significant adverse impacts.

8.2.17 Irretrievable Resources

The environmental issue of irretrievable resources has been determined by the NRC to be generically applicable with a SMALL impact. The NRC's analysis of the environmental impacts of irretrievable resources is documented in Section 4.3.18 of Supplement 1 to NUREG-0586.

Supplement 1 to the FGEIS indicates that land associated with a site released for unrestricted use is available for other uses, regardless of whether or not the decommissioning process returned the land to an open space or to an industrial complex. Thus the land resource would not be considered "irretrievable." The Supplement to the FGEIS evaluated other irretrievable resources such as the materials/equipment used to decontaminate the facilities and the fuel used for construction machinery and for transporting wastes and concluded these resources are minor.

Thus, the impact of decommissioning and license termination on irretrievable resources is neither detectable nor destabilizing.

8.3 References

- 8-1 YNPS Decommissioning Environmental Report., dated December 1993.
- 8-2 NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," dated August 1988.
- 8-3 NUREG-1575, NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual," Revision 1, dated August 2000.
- 8-4 Supplement 1 to NUREG-0586, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," dated November 2002.
- 8-5 Title 10 to the Code of Federal Regulations, Subpart E to Part 20.
- 8-6 Attachment E to the "Contract for the Performance of Demolition and Disposal and Related Services, By and Between DEMCO, Inc. and Yankee Atomic Electric Company," dated February 28, 2003
- 8-7 Yankee Nuclear Power Station Decommissioning Plan, Revision 0.0.
- 8-8 Regulatory Guide 1.185, "Standard Format and Content for Post-shutdown Decommissioning Activities Report," dated July 2000.
- 8-9 YNPS Post-Shutdown Decommissioning Activities Report, dated June 2003.
- 8-10 USNRC Atomic Safety and Licensing Board Docket No. 50-029-DCOM, Supplemental Affidavit of Russell A. Mellor, September 3, 1996.
- 8-11 Memorandum RP-03-045 from Greg Babineau to Jim Kay, dated November 19, 2003.
- 8-12 "Environmental Assessment by the U.S. Nuclear Regulatory Commission, Related to the Request to Authorize Facility Decommissioning," dated December 14, 1994.
- 8-13 R. Janson (EPA) to J. A. Kay (YNPS), dated July 29, 2003, "Issuance of NPDES Permit No. MA0004367.
- 8-14 Offsite Dose Calculation Manual, Revision 15.
- 8-15 NHESP 99-5798, "Installation of an on-site storage pad, road improvements, and improvements to present storm water system," dated November 30, 1999, from Patricia Huckery, NHESP Wetlands Environmental Review to the Rowe Conservation Commission.
- 8-16 NYR 92-144, Exemption From 10CFR Part 50 - Appendix E - Emergency Preparedness Training Exercises at the Yankee Nuclear Power Station (TAC No. M83415), M. B. Fairtile (USNRC) to J. M. Grant, July 24, 1992.

- 8-17 “Massachusetts: 2000, Summary Population and Housing Characteristics,” U.S. Department of Commerce, issued September 2002
- 8-18 “Vermont: 2000, Summary Population and Housing Characteristics,” U.S. Department of Commerce, issued October 2002.
- 8-19 “New York: 2000, Summary Population and Housing Characteristics,” U.S. Department of Commerce, issued July 2002.
- 8-20 NRC Letter, “Order Approving the Decommissioning Plan and Authorizing Decommissioning of the Yankee Nuclear Power Station,” dated February 14, 1995.
- 8-21 State Register of Historic Places/1988, Massachusetts Historical Commission.
- 8-22 BYR 2003-063 “Project Notification Form, Request for Determination of No Adverse Effect,” from Gregg Demers and John McTigue, ERM, to Brona Simon, Massachusetts Historical Commission, dated July 11, 2003.
- 8-23 National Register Survey Books, Bennington County and Windham County Listings, Vermont Division of Historic Preservation.
- 8-24 Deerfield River Project, Deerfield River, Vermont and Massachusetts—Information for the Initial Stage of Consultation FERC Project No. 2323, Volumes I and II, New England Power Company, March 1988.

Table 8-1 Summary of Environmental Impacts from Decommissioning			
Issue	Generic	Impact	LTP Section
Onsite-Offsite Land Uses			8.2.1
• Onsite Land Uses	Yes	Small	8.2.1.1
• Offsite Land Uses	No	Site-Specific	8.2.1.2
Water Use	Yes	Small	8.2.2
Water Quality	Yes	Small	8.2.3
Air Quality	Yes	Small	8.2.4
Aquatic Ecology			8.2.5
• Activities within the operational area*	Yes	Small	8.2.5.1
• Activities outside the operational area	No	Site-Specific	8.2.5.2
Terrestrial Ecology			8.2.6
• Within the operational area	Yes	Small	8.2.6.1
• Outside the operational area	No	Site-Specific	8.2.6.2
Threatened and Endangered Species	No	Site-Specific	8.2.7
Radiological			8.2.8
• Activities resulting in occupational doses to workers	Yes	Small	8.2.8.1
• Activities resulting in doses to the public	Yes	Small	8.2.8.2
Radiological accidents	Yes	Small	8.2.9
Occupational issues	Yes	Small	8.2.10
Cost	N/A	N/A [†]	7
Socioeconomic	Yes	Small	8.2.11
Environmental Justice	No	Site-Specific	8.2.12
Cultural and Historic Resource Impacts			8.2.13
• Activities within the operational area	Yes	Small	8.2.13.1
• Activities outside the operational area	No	Site-Specific	8.2.13.2
Aesthetics	Yes	Small	8.2.14
Noise	Yes	Small	8.2.15
Transportation	Yes	Small	8.2.16
Irretrievable Resources	Yes	Small	8.2.17

* The operational area is defined as the portion of the plant site where most or all of the site activities occur, such as reactor operation, materials and equipment storage, parking, substation operation, facility service, and maintenance. This includes areas within the protected area fences, the intake, discharge, cooling, and associated structures as well as surrounding paved, graveled, maintained landscape, or other maintained areas.

[†] A decommissioning cost assessment is not a specific National Environmental Policy Act (NEPA) requirement.

Table 8-2
Population Changes in the Vicinity of YNPS

Location	1980 (Ref 8-1)	1990 (Ref 8-1)	2000 (Ref 8-17 & 8-18)	% change in decade before shutdown	% change in decade including shutdown
Massachusetts					
Adams	10,381	9,445	8,809	-9%	-7%
Clarksburg	1,871	1,745	1,686	-7%	-3%
Florida	730	732	676	0%	-8%
North Adams	18,063	16,797	14,681	-7%	-13%
Savoy	644	634	705	-2%	11%
Buckland	1,864	1,928	1,996	3%	4%
Charlemont	1,149	1,249	1,358	9%	9%
Colrain	1,552	1,757	1,813	13%	3%
Hawley	280	317	336	13%	6%
Heath	482	716	805	49%	12%
Monroe	179	115	93	-36%	-19%
Rowe	336	387	351	15%	-9%
Vermont					
Halifax	488	782	782	60%	0%
Whitingham	1,043	1,298	1,298	24%	0%
Wilmington	1,808	1,968	2,225	9%	13%
Readsboro	638	762	809	19%	6%
Stamford	773	773	813	0%	5%
Overall	42,281	41,405	39,236	-2%	-5%