YANKEE ATOMIC ELECTRIC COMPANY
49 Yankee Road, Rowe, Massachusetts 01367

July 17, 2007
BYR 2007-054

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Final Safety Analysis Report Biennial Update

Yankee Atomic Electric Company (YAEC) herewith encloses one paper copy and one CD-ROM copy of the updated Yankee Nuclear Power Station (YNPS) Final Safety Analysis Report (FSAR). This update reflects the completion of decommissioning at the YNPS site.

This biennial update of the YNPS FSAR is being submitted in accordance with the requirements of 10 CFR 50.71(e)(4) and replaces in its entirety the last update that was submitted on June 30, 2005 (Reference 2). This update reflects changes made through June 2007.

If you should have any questions regarding this submittal, please contact me at (860) 573-5523 or Joe Bourassa at (413) 424-2223.

Sincerely,

Gerard van Noordennen

Gerard van Noordennen
Regulatory Affairs Manager

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge. Executed on 7-17-07.

Subscribed and sworn to before me this 17th day of July, 2007.

Tracy L Fleming
Tracy Fleming
Notary Public

Date Commission Expires: TRACY L. FLEMING NOTARY PUBLIC STATE OF MARYLAND My Commission Expires March 22, 2011

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(As of January 2007)

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INTRODUCTION AND OVERVIEW OF THE PSDAR

Pursuant to 10CFR50.82(a)(4)(i) and Regulatory Guide 1.185, this appendix contains information concerning post-shutdown activities remaining at the Yankee Nuclear Power Station (YNPS). Section 50.82(a)(4)(i) requires that licensees develop a post-shutdown decommissioning activities report (PSDAR). Licensees with an approved decommissioning plan, however, may "replace their decommissioning plans with a PSDAR update that uses the format and content specified in this document" (Reference 13). The YNPS Decommissioning Plan (Reference 1), which was approved on February 14, 1995 and later became part of the Final Safety Analysis Report (FSAR), describes all remaining decommissioning activities, but in considerably more detail than that required in the PSDAR. Yankee Atomic Electric Company (YAEC) has elected to relocate pertinent information to a PSDAR, which conforms to the guidance in RG 1.185.

HISTORICAL BACKGROUND

YNPS achieved initial criticality in 1960 and began commercial operations in 1961. The Nuclear Steam Supply System is a four loop pressurized water reactor designed by Westinghouse Electric Corporation. The original thermal power design limit of 485 MWt was upgraded to 600 MWt in 1963. The Turbine Generator, also designed by Westinghouse, was rated to produce 185 MWe. Commercial operation ceased in 1992 after about 31 years of operation. During its operation, YNPS achieved an average capacity factor of about 74%.

YNPS shut down on October 1, 1991 in response to regulatory uncertainties associated with the integrity of the Reactor Vessel. During the outage and before February 26, 1992 all fuel assemblies, control rods, and neutron sources were removed from the Reactor Vessel and stored in the Spent Fuel Pit. A total of 533 fuel assemblies are stored in the Spent Fuel Pit. Plant systems required to support spent fuel storage and to support permanently defueled operations were in service until 2003.

On February 26, 1992, the YAEC Board of Directors decided to cease power operations permanently at YNPS. By letter, dated February 27, 1992 (Reference 2), YAEC notified the Nuclear Regulatory Commission (NRC) of the Company's decision to permanently cease power operations at the YNPS. After notifying the NRC, YAEC initiated decommissioning planning and other plant closure activities to safely reduce radioactivity at the site to residual levels, allowing release of the site for unrestricted access.

On August 5, 1992, the NRC amended the YNPS Facility Operating License (DPR-3) to possession only status (Reference 3). This, combined with other amendments and program changes, formed the basis of the Decommissioning Plan. The plan (Reference 1) was submitted by YAEC in accordance with the requirements of 10CFR50.82(a) [pre-1996], that required submittal of a proposed Decommissioning Plan within two years of the permanent cessation of operations. The Decommissioning Plan was subsequently approved on February 14, 1995 (Reference 4). A commitment from the approval process required that the Decommissioning Plan be incorporated into the FSAR.

Plant closure activities, which were commenced following the decision to cease power operations, were completed in December 2006, in accordance with applicable regulatory requirements and

YAEC's commitment to maintain the facility in a safe and economical manner. These activities have included site security modifications, control rod disposal, decontamination, disposal of radioactive components, lay-up of plant equipment, demolition of plant structures and final grading.

After deciding to close YNPS permanently, YAEC reviewed the plant licensing basis to evaluate the applicability of existing Technical Specifications and NRC regulations to a permanently defueled condition. Beginning in June 2002, spent fuel and GTCC waste were transferred to dry casks and placed on the onsite Independent Spent Fuel Storage Installation (ISFSI). The transfer activities were concluded in June 2003. The remaining Technical Specifications that are applicable have been relocated to the Yankee Decommissioning Quality Assurance Program (Reference 14).

DECOMMISSIONING ALTERNATIVE

Following an evaluation of the three decommissioning alternatives, YAEC selected DECON as the most appropriate alternative for decommissioning YNPS. YAEC's choice of a decommissioning alternative is consistent with NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities,"(Reference 6). In that document, the NRC concluded that DECON and SAFSTOR alternatives are reasonable for decommissioning a pressurized water reactor. Implementation of the DECON alternative is within the 60 year limit (after cessation of operation) in 10CFR50.82(a)(3).

DESCRIPTION OF DECOMMISSIONING ACTIVITIES

Since 1993 YAEC has removed and disposed of the steam generators, pressurizer, reactor vessel and reactor vessel internals. The reactor vessel internals components, which are Greater-Than-Class-C (GTCC) waste, remain onsite and are stored within a dry cask along with the 15 dry casks of spent fuel located at the onsite ISFSI. YAEC has sought accelerated acceptance of its spent fuel by the Department of Energy (DOE) in accordance with the current fuel disposal contract. The DOE's position is that they have not yet determined whether priority will be accorded shutdown reactors, or if priority is granted, under what specific circumstances it might be granted.

As of December 2006, all plant systems and components have been dismantled and disposed of in accordance with the YNPS Decommissioning Plan and Final Safety Analysis Report (References 1 and 12). Measures have been implemented to prevent recontamination of surveyed areas prior to final license termination. Partial release of the site may also be considered to reduce the site to what is needed for the dry cask storage facility.

The final phase of decommissioning involves the dismantlement and decontamination of the ISFSI and its supporting systems, structures, and components. In the final phase of decommissioning, the possession only license will be terminated.

A. License Termination

The final phase of decommissioning will take place after all spent fuel and GTCC waste is taken off-site in order to complete the dismantlement and decontamination of the ISFSI.

Decommissioning of the ISFSI would consist primarily of the disposal of the Vertical Concrete Casks (VCCs) and the concrete storage pad. The VCC design minimizes neutron activation, thereby generating minimal radioactive waste. This waste should qualify for disposal at a low-level radioactive waste disposal site.

The 10CFRPart 50 license may be terminated after the last stage of final status surveys and independent NRC verification. Site restoration activities will then be conducted.

OTHER DECOMMISSIONING CONSIDERATIONS

The dismantlement and, if necessary, decontamination of contaminated systems, structures and components was accomplished using the following three approaches: decontamination in place, dismantlement and decontamination, or dismantlement and disposal. Furthermore, a combination of these methods was used to reduce contamination levels, worker radiation exposures, and project costs. General considerations applicable to these activities are described in detail in Section 200 of the FSAR and are summarized below. An approved work control process is used to perform demolition, decommissioning, and or decontamination work activities in accordance with an approved Independent Safety Review.

A. General Decommissioning Activities Relating to Removal of Radiological Components & Structures

Components were safely and efficiently removed using techniques and appropriate methods for the particular circumstances and consistent with Decommissioning Work Packages. Openings in components were typically covered and sealed to minimize the spread of contamination. The components were moved to a processing area for volume reduction and packaging into containers for shipment to a processing facility for decontamination or a low-level radioactive waste disposal facility. Buried contaminated components (e.g., piping, drains, etc.) will be decontaminated in place or excavated.

B. Decontamination Methods

Contaminated systems and components were removed and sent to an off-site processing facility or to a low level radioactive waste disposal facility. On-site decontamination of systems and components were generally be limited to activities needed to maintain personnel exposure as low as is reasonably achievable, to expedite equipment removal, and to control the spread of contamination.

Application of coatings and hand wiping were the preferred methods for stabilizing or removing loose surface contamination. If other methods were utilized (e.g., grit blasting, high pressure water), airborne contamination control and waste processing systems were used as necessary to control and monitor any releases of contamination.

Contaminated and activated concrete as well as other contaminated materials was removed and sent to a low-level radioactive waste disposal facility. Concrete removal methods, such as scabbling and scarifying, controlled the removal depth to minimize the waste volume produced. Vacuuming the dust and debris effluent with HEPA filtration minimized the need for additional respiratory protection control measures. While these methods represent the most practicable and widely used decontamination methods available at this time, YAEC also considered new decontamination technologies as appropriate.

C. Dismantlement Methods

YAEC used two basic dismantlement methods:

- *Mechanical Methods* - Mechanical methods machine the surfaces of the material that is being cut. Typically, these methods are capable of cutting remotely without generating significant amounts of airborne contamination. This attribute made these methods attractive for removing most of the contaminated piping, equipment, and components at YNPS. The outside diameter machining method, in particular, was best suited for cutting large bore contaminated piping.

- *Thermal Methods* - Thermal methods melt or vaporize the surfaces of material. The cutting debris is transported from the cut region with a gas jet or water spray. Although thermal methods are significantly quicker than mechanical methods, they have high power requirements and generate airborne contamination when used on contaminated systems in air. Generation of airborne contamination was easily controlled when the method was used underwater. Thermal methods are suitable for segmenting large vessels in areas that can easily be sealed, filtered, or maintained underwater. The method is also suitable for use at a cutting station with air filtration. Thermal methods are appropriate for removing structural steel if it has been decontaminated or if a local contamination envelope with HEPA filtration is established. Appropriate lead and/or PCB paint removal controls must also be implemented.

D. Special or Unusual Programs

There are no special or unusual programs. All procedures and processes used at YNPS are consistent with those considered in the Final Generic Environmental Impact Statement (FGEIS).

E. Removal of Low Level Radioactive Waste (LLW) and Compaction or Incineration

LLW is processed in accordance with plant procedures and sent to LLW disposal facilities. While no incineration of low level Radwaste (to remove radionuclides) will occur onsite, YAEC has used an off-site licensed facility. YAEC has no intention, however, to use onsite compaction at this time.

F. Soil Pavement and Concrete Remediation

Soils and pavement are being surveyed and characterized in accordance with the site radiological characterization program. As necessary, soils, concrete and pavement is remediated (i.e., removed, processed and disposed of at a licensed facility) if determined to contain contamination levels above the derived concentration guideline levels (DCGLs) established in the License Termination Plan.

G. Processing and Disposal Site Locations

Currently, there are several facilities available for (1) the processing of waste materials to achieve volume reduction prior to disposal or (2) the disposal of low-level radioactive waste. These locations include (but are not limited to) GTS Duratek - Barnwell, South Carolina; Envirocare - South Clive, Utah; GTS Duratek - Oak Ridge, Tennessee; RACE in Memphis Tennessee

H. Removal of Mixed Wastes

Mixed wastes are managed according to all applicable federal and state regulations including NRC handling, storage, and transportation regulations. Mixed wastes from YNPS are transported only by authorized and licensed transporters and shipped only to authorized and licensed facilities. YAEC has used an appropriate approved process to render mixed waste non-hazardous onsite. A thermal desorption system was used to remove PCB materials from soils.

I. Storage/Removal of Spent Fuel and GTCC Waste

In June 2003, YAEC completed transfer of spent fuel and GTCC waste to an onsite Independent Spent Fuel Storage Installation (ISFSI). YAEC cannot make a precise determination of when spent fuel and GTCC waste will be removed from the YNPS because the availability of a licensed DOE high level waste repository is uncertain. Currently, YAEC expects that the turnover of spent fuel and GTCC waste to the DOE will be completed in 2022.

J. License Termination Plan, Final Radiological Survey and Site Release Criteria

The objective for decommissioning the Yankee Nuclear Power Station (YNPS) is to reduce residual radioactivity to levels that permit release of the site for unrestricted use and for termination of the 10CFR50 license, in accordance with the Nuclear Regulatory Commission's (NRC's) site release criteria set forth in 10CFR20, Subpart E. The purpose of the YNPS License Termination Plan (LTP) is to satisfy the requirements of 10CFR50.82, "Termination of License" using the guidance provided in Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Reactors". NRC staff review guidance, in the form of NUREG-1700 and NUREG-1757 has also been considered.

In May 1997, YAEC submitted to the Commission for approval an LTP for YNPS, pursuant to 10CFR50.82, as amended by 62 Fed. Reg. 39091 (July 29, 1996). YAEC's LTP employed

a survey methodology based on the "Manual for Conducting Radiological Surveys in Support of License Termination (Reference 9)," known as the NUREG-5849 Methodology. Subsequently, the Commission, jointly with a group of other federal agencies, approved an alternative survey methodology, known as NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM – Reference 10). In May 1999 (Reference 11), YAEC advised the Commission that it intended to shift from the NUREG-5849 Methodology to MARSSIM and withdrew its previously submitted LTP application. YAEC submitted a new LTP in 2003 incorporating the more recent regulatory guidance and descriptive of the MARSSIM final status survey (FSS). The LTP was approved by the NRC on July 28, 2005. FSS was conducted to verify that structures and open land areas met the release criteria. An independent NRC contractor also conducted verification surveys, to confirm YNPS FSS results that the remaining structures and open land areas met the unrestricted release criteria . After final status surveys and NRC verification, individual surveyed structures and open land areas will be released. YAEC will, nevertheless, maintain control over the site until termination of its 10CFRPart 50 license.

K. Site Restoration

Following termination of the YNPS possession only license by the NRC, YAEC will complete site restoration activities. Site areas will be graded and landscaped as necessary.

SCHEDULE OF DECOMMISSIONING ACTIVITIES

As stated above, decommissioning will be completed in three phases. The first phase consisted of the decontamination and dismantlement of remaining systems and components that did not support fuel storage. Next the spent fuel was removed from the SFP and the SFP was drained in 2003. The second phase of decommissioning involved the dismantlement and decontamination of the SFP and its supporting systems, structures and components. The final phase of decommissioning will involve the termination of the possession only license. License termination of the ISFSI will occur after all spent fuel has been taken off-site. All decommissioning activities accomplished to date have resulted in no significant adverse environmental impacts.

YAEC completed the second phase of dismantlement and decontamination and final status surveys by late 2006. The design and construction of a dry cask storage facility was completed in 2001. Fuel transfer activities commenced in 2002 and were completed in 2003. Following the transfer of spent fuel and GTCC waste from the SFP, decommissioning of the SFP island was completed over a period of approximately three years, including final status surveys. The dry cask storage facility is expected to be operated from 2002 to 2022, when the last fuel assembly is assumed to be taken off-site. Using this assumption, the YNPS license will be terminated after the dry cask storage facility is decommissioned.

Planning sequences and dates are based on current knowledge and could change in the future. Dry storage is addressed in the spent fuel management plans contained in the FSAR. Yankee will continue to inform the NRC of all major changes to the planned decommissioning activities in accordance with 10CFR50.82(a)(7).

DECOMMISSIONING COST ESTIMATE

The YNPS Decommissioning Plan (Reference 1) was submitted to the NRC in December 1993 and included a cost study for operating the facility through a safe storage period, decommissioning the facility, restoring the site, and storing spent fuel until its transfer to the DOE. In October 1994, Yankee completed a revised cost study to assist the NRC in its review of the Decommissioning Plan and to fulfill a commitment to Federal Energy Regulatory Commission (FERC). This 1994 cost study was based on the assumption that dismantlement activities would not begin until a low-level radioactive waste disposal site became available to Yankee.

In June 1995, the State of South Carolina re-opened the low-level waste facility in Barnwell, South Carolina to radioactive waste generators throughout the United States. In response, Yankee updated the cost estimate to reflect several significant changes in parameters affecting decommissioning costs. This study, called the 1995 Cost Study, was filed with FERC in August 1995. This study was a site-specific cost study that adjusted the 1994 Cost Study for differences in decommissioning timing, waste disposal costs, and one year of escalation. The 1995 Cost Study estimate of "to-go" costs remaining as of January 1995 was $303.2 million. In addition, as part of the final December 1995 FERC settlement, Yankee was allowed to collect another $3.2 million in the decommissioning trust fund to adjust for adjudicatory delays during re-approval of the Decommissioning Plan, bringing the total January 1995 "to-go" cost to $306.4 million (1995 dollars).

As required by the FERC settlement, an updated cost estimate was filed in December 1999. The total decommissioning costs remaining (as of January 1, 1999) are $246 million in constant value 1999 dollars. The total cost of decommissioning (expressed in 1999 dollars) is summarized below:

• Expended dollars (1993 – 1998)	$207,100,000
• Dismantlement Activities	147,700,000
• Spent Fuel Storage	98,300,000
• **Total Cost to Remove/Dismantle YNPS**	**$453,100,000**

Yankee Atomic submitted a new decommissioning cost estimate to FERC in April 2003 to seek additional revenue requirements billed through 2010 for the period through December 2022. That estimate supercedes the 1999"to go" cost estimate. As of 1/1/2003 the remaining cost to complete NRC required decommissioning activities is $121.1 million stated in 2003 dollars. An update was provided to the NRC on March 31, 2005 providing the current status of the Decommissioning fund (Reference 15).

Yankee has collected its decommissioning funds through its Power Contracts. The collections were deposited in an independent and irrevocable trust at a commercial bank, with the principal and interest used to discharge decommissioning obligations as they are incurred. This trust is in compliance with 10CFR50.75(e)(1)(ii) and a copy of the trust document has been provided to the NRC. The Power Contracts obligate the purchasers for the full costs of decommissioning YNPS, including spent fuel. The FERC orders received by Yankee acknowledge the continuing obligation of the purchasers with respect to the full cost of decommissioning YNPS. The periodic reviews of

decommissioning cost studies mandated by FERC provide the mechanism for updating the required payments under the Power Contracts to assure adequate funds for that purpose.

ENVIRONMENTAL IMPACTS

YAEC prepared an Environmental Report [Reference 5] to evaluate all actual or potential environmental impacts associated with the proposed decommissioning activities. This evaluation used as its basis NUREG-0586, "Final Generic Environmental Impact Statement (FGEIS) on Decommissioning of Nuclear Facilities," [Reference 6] and the site-specific environmental assessment from the re-capture of the construction period time duration [Reference 7].

This Environmental Report concluded that the impacts due to decommissioning of the YNPS will be bounded by the previously issued environmental impact statements, specifically the FGEIS and previously issued environmental assessments. This is 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 and consistent with the FGEIS.

Specifically, this review concludes 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 materials and chemicals will be removed.
- Local traffic will be reduced (fewer employees, contractors and materials shipments than are 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 would 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 experience.
- Decommissioning is not an imminent health or safety problem and will generally have a positive environmental impact.

The total radiation exposure impact for decommissioning was estimated in the Decommissioning Plan (Reference 1) to be approximately 744 person-rem. This estimate was re-evaluated in 1996, resulting in a lower value of 580 person-rem (Reference 8). The estimate of 580 person-rem has been re-evaluated and the current estimate is 594 person-rem. As of 12/31/05, all decommissioning activities with the potential for radiation exposure impact were completed. The total radiation exposure for decommissioning was approximately 594 person-rem.

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 for transportation occupational exposure.

Radiation exposure to off-site 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 low-level radioactive waste for disposal was estimated in the Decommissioning Plan to be approximately 132,000 ft^3. A total volume of approximately 1,670,000 ft3 of LLW was shipped from the YNPS site for off-site disposal. A significant portion of this waste contained very low levels of radioactivity (DOT exempt) and was created as a result of remediation activities to satisfy EPA clean-up requirements for PCBs, to satisfy the Massachusetts Department of Public Health (DPH) radiological release criteria of 10 mRem/year and to meet the Massachusetts Contingency Plan regulations for non radiological release criteria under the Department of Environmental Protection (DEP) requirements. The volume of LLW that would have been required to be disposed of to satisfy the NRC 25 mRem/year release criteria would have been a significantly lower volume in the 300,000 ft3 range, significantly below the FGEIS estimate of 647,670 ft3 for a reference PWR.

Since the approval of the Decommissioning Plan (Reference 1) and the issuance of the Decommissioning Environmental Report (Reference 5), YNPS identified the presence of solid Polychlorinated Biphenyl's (PCB's) in some paint coatings. As in the case of radiologically contaminated lead paint, asbestos, and other hazardous materials, contaminated paint that contains PCB's 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 significant socioeconomic impacts, other than those associated with cessation of operation (loss of jobs and taxes), or impacts to local culture, terrestrial or aquatic resources such as the Sherman Reservoir and Deerfield River have been identified.

REFERENCES

1. Letter, J. K. Thayer (YAEC) to T. E. Murley (USNRC), Decommissioning Plan for Yankee Nuclear Power Station (YNPS), December 20, 1993.

2. Letter, A. C. Kadak (YAEC) to T. E. Murley (USNRC), Permanent Cessation of Power Operations at the Yankee Nuclear Power Station, BYR 92-024, February 27, 1992.

3. Letter, M. B. Fairtile (USNRC) to J. M. Grant (YAEC), Issuance of Amendment #142 to Facility License DPR-3 – Yankee Nuclear Power Station, August 5, 1992.

4. Letter, M. B. Fairtile to J. A. Kay (YAEC), Order Approving the Decommissioning Plan and Authorizing Decommissioning of the Yankee Nuclear Power Station, February 14,1995.

5. Yankee Nuclear Power Station Decommissioning Environmental Report, December 1993.

6. NUREG-0586, Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, August 1988.

7. Letter, M. B. Fairtile (USNRC) to G. Papanic (YAEC), dated June 2, 1988.

8. USNRC Atomic Safety and Licensing Board Docket No. 50-029-DCOM, Supplemental Affidavit of Russell A. Mellor, September 3, 1996.

9. NUREG-5849, "Manual for Conducting Radiological Surveys in Support of License Termination," Draft, June 1992.

10. NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual," December 1997.

11. Letter, D.K. Davis (YAEC) to USNRC, "Withdrawal of Proposed License Amendment to Approve Yankee Nuclear Power Station's License Termination Plan," May 25, 1999.

12. Yankee Nuclear Power Station Final Safety Analysis Report.

13. Regulatory Guide 1.185, Standard Format and Content for Post-Shutdown Decommissioning Activities Report, July 2000.

14. Letter J.B. Hickman (USNRC) to J.A. Kay (YAEC), Issuance of Amendment #157 Re: Deletion of Operational and Administrative Requirements Following Fuel Transfer to ISFSI, NYR 03-027, April 18, 2003.

15. Letter Jack Rollins (YAEC) to DCD, Decommissioning Funding Assurance-(10CFS50.75(f), March 31, 2005.

16. Letter John B. Hickman (USNRC) to Jack D. Rollins (YAEC), Issuance of Amendment #158 Re: License Termination Plan, NYR 2005-030, July 28, 2005.

100 SPENT FUEL MANAGEMENT PLAN

100.1 Background

This section documents the YNPS spent fuel management plan in accordance with 10CFR50.54(bb) (Reference 100-1). This regulation also requires a funding plan for spent fuel storage. The spent fuel storage cost estimate and funding plan are presented in the PSDAR.

YAEC contracted with NAC International to transfer the spent fuel from the spent fuel pit to a dry cask storage facility. The location of the new storage facility is at the south end of the YNPS site (see Figure 257-1). There are 533 fuel assemblies stored in 15 NAC Multi-Purpose Canisters (MPCs) on the ISFSI pad. These fuel assemblies were discharged from the reactor between 1972 and 1992. There were also a number of failed fuel pins that were consolidated into a Reconfigured Fuel Assembly (RFA) which was then transferred to a dry cask. The Greater than Class C (GTCC) radioactive waste in the form of canisters containing reactor vessel internals (core baffle) and dross material and having the same external dimensions as fuel assemblies have also been transferred to a NAC-MPC. Several miscellaneous GTCC radioactive items also are stored in the NAC-MPC containing the GTCC (e.g. neutron sources, fuel assembly cage components, fixed incore detector wires, etc.).

YAEC is currently seeking accelerated acceptance of YNPS's spent fuel by the Department of Energy in accordance with the current fuel disposal contract. The Department of Energy's current position is that they have not yet determined whether priority will be accorded shutdown reactors, or if priority is granted, under what specific circumstances it might be granted. For planning purposes, fuel shipments are assumed to be completed in 2022. This projection is based on the Department of Energy's Acceptance Priority Ranking, Annual Capacity Report, and an extrapolation beyond the 10 year Department of Energy outlook. For planning purposes, YAEC's current decommissioning cost estimate assumes storage of fuel in the dry storage facility until 2022.

100.2 Special Nuclear Material Control

Information regarding Special Nuclear Material Control is available for inspection by authorized personnel.

REFERENCES

100-1 59-FR-10267, Notification of Spent Fuel Management and Funding Plans By Licensees of Prematurely Shut Down Power Reactors, March 4, 1994.

100-2 YRP 435/92, Spent Nuclear Fuel Storage Study Report and Recommendations, B. W. Holmgren, J. M. Buchheit, R. A. Mellor to J. K. Thayer, October 9, 1992.

100-3 YRP 303/93, Impact of Wet Spent Fuel Storage on Decommissioning, P. A. Rainey to R. A. Mellor, July 15, 1993.

229 ELECTRICAL SYSTEM

229.1 Description

The on-site electrical system is powered by a Massachusetts Electric Line. The system consists of a transformer, switchboard, distribution panels and the necessary associated equipment to support ISFSI operations.

256 METEOROLOGICAL TOWER

256.1 Description

A Meteorological Tower installed at the ISFSI pad provides real time capability to determine wind speed and direction for on-site emergency planning purposes.

257 INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)

257.1 Description

The Independent Spent Fuel Storage Installation (ISFSI) provides dry cask storage of spent nuclear fuel and Greater-Than-Class-C (GTCC) waste generated at the YNPS. Dry cask storage of spent nuclear fuel is conducted under the general license provisions of 10CFR72, Subpart K and 10CFR30. The NAC International, Inc., Multi-Purpose Canister (MPC) system (Docket No. 72-1025), which received a certificate of compliance in April 2000 (Reference 257-1), is used at the ISFSI.

The ISFSI is designed to store a combination of up to 18 NAC-MPC dry fuel or GTCC waste storage casks. It is located in the southwest corner of the site (Figure 257-1) and consists of a concrete pad, access road, security fences, temperature monitoring instrumentation, lighting, security, ISFSI Instrumentation Enclosure.

The ISFSI facility has 16 Vertical Concrete Casks (VCCs). Each VCC contains a Transportable Storage Canister (TSC). The TSCs contain either spent fuel or GTCC waste.

The VCC is the storage overpack for the TSC and provides structural support, shielding, protection from environmental conditions, and natural convection cooling of the TSC during storage. The VCC is a reinforced concrete structure with a carbon steel inner liner. Each VCC is approximately 160 inches in height, has an outside diameter of approximately 128 inches and weighs approximately 155,000 lbs. Each VCC has 4 inlet vents evenly spaced around the bottom of the VCC. There are also 4 outlet vents spaced evenly around the top of the VCC, offset by 45 degrees in order to provide a non-planar path for the natural circulation of air around the TSC and to minimize radiation streaming.

The TSC is a stainless steel circular cylindrical shell with a welded bottom plate. It has an outside diameter of approximately 71 inches and is approximately 123 inches in height. The TSC can accommodate up to 36 Yankee Class spent fuel assemblies. The TSC may also contain one or more Reconfigured Fuel Assemblies (RFAs), which are designed to hold Yankee Class spent fuel rods as intact or damaged fuel or fuel debris. An RFA can accept up to an equivalent of 64 full length spent fuel rods in an 8 by 8 array. The stainless steel RFA container has the same external dimensions of a standard fuel assembly. The weight of a fully loaded TSC is approximately 55,000 lbs.

The VCC Temperature Monitoring System is designed to monitor the thermal performance of each concrete cask. The system is comprised of a network of thermocouples at the outlet vents of all the casks and at four different points for ambient temperature that feed into a panel within the ISFSI Instrument Enclosure where temperature readings can be obtained.

Radiation monitoring using Thermoluminesent Dosimeters (TLDs) is in place to demonstrate compliance with 10CFR72.104 and 40CFR190.

The ISFSI pad is within a protected area located to the south of the general site area of the YNPS. The ISFSI pad is a reinforced structural concrete pad that was designed to store and support the loaded VCCs. The pad is approximately 48 feet wide by 160 feet long. The east end of the pad is elevated approximately 30 inches above the grade of the access road to facilitate the loading/removal

of the VCCs from the heavy-haul trailer. The VCCs are moved by using air pads and a specially rigged fork lift vehicle (cask primary mover).

The ISFSI Enclosure Building is a free standing building, measuring approximately 12 feet wide by 15 feet long by 10 feet in height, located within the protected area to the west of the ISFSI pad. The ISFSI Enclosure Building houses the temperature monitoring panel, I/O racks, transformers, Uninterruptible Power Supplies (UPS), communications, fire detection and other ISFSI and security related equipment.

The ISFSI protected area is fenced, monitored by security, and has alarms to prevent unauthorized access. Access to the ISFSI area is controlled by the YNPS Security Department.

257.2 Status

The ISFSI construction is complete. Spent nuclear fuel and GTCC waste transfer is complete. The YNPS ISFSI contains 15 NAC-MPC Spent Fuel Storage Casks in addition to 1 NAC-MPC Cask that contains GTCC waste.

REFERENCES

257-1 Letter, NRC to NAC International, Inc., dated March 17, 2000, Certificate of Compliance for the NAC International, Inc., Multi-Purpose Canister (MPC) System (TAC No. L22907).

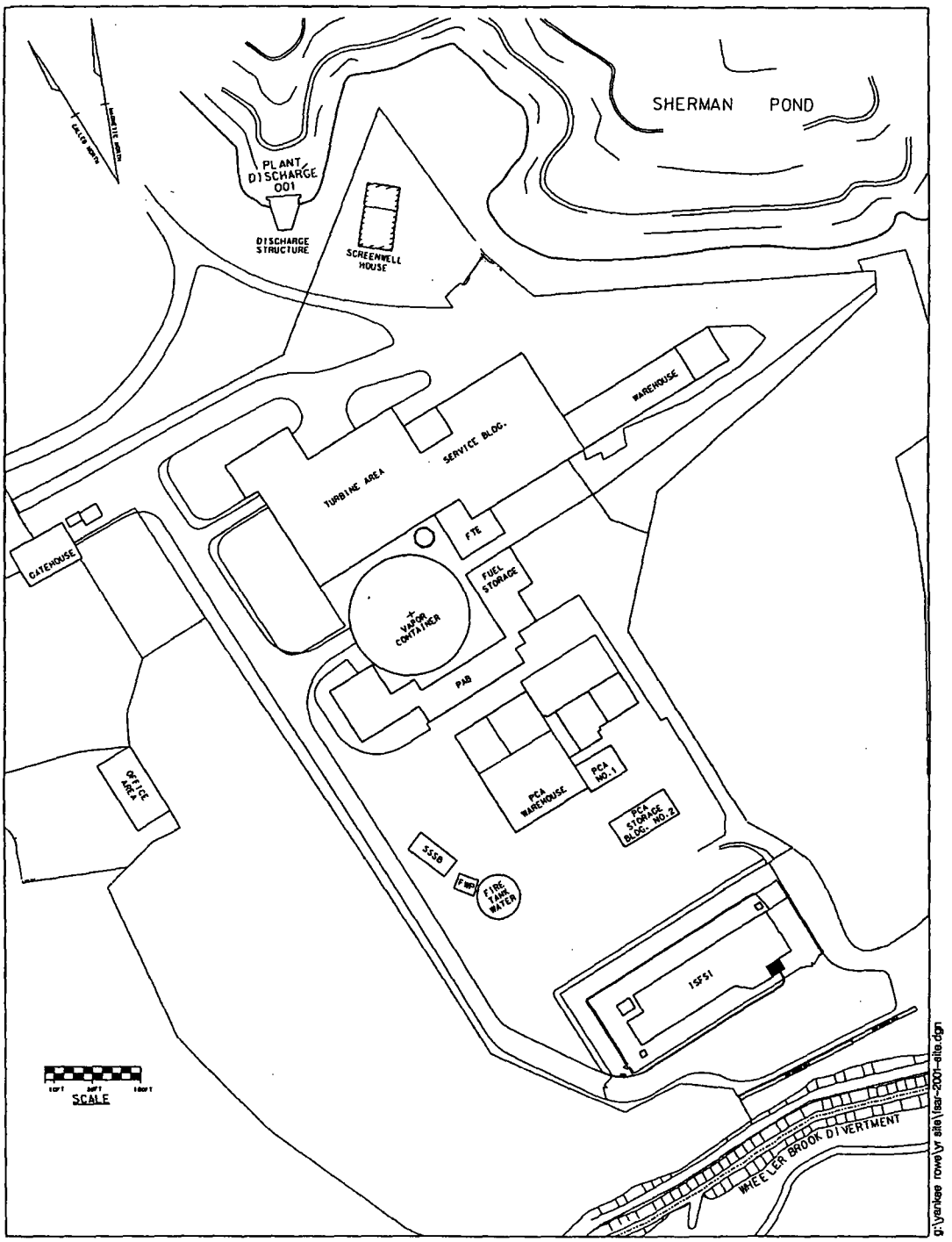


FIGURE 257-1

Site Design

300 ENVIRONMENTAL – SITE CHARACTERISTICS

300.1 Demography

YNPS is located in the Berkshire Hills of Franklin County in Rowe, Massachusetts. The site is at the bottom of a deep valley along the Deerfield River on the southeast bank of Sherman Reservoir. The area surrounding the site is mostly wooded with very steep gradients on both sides of the Deerfield River.

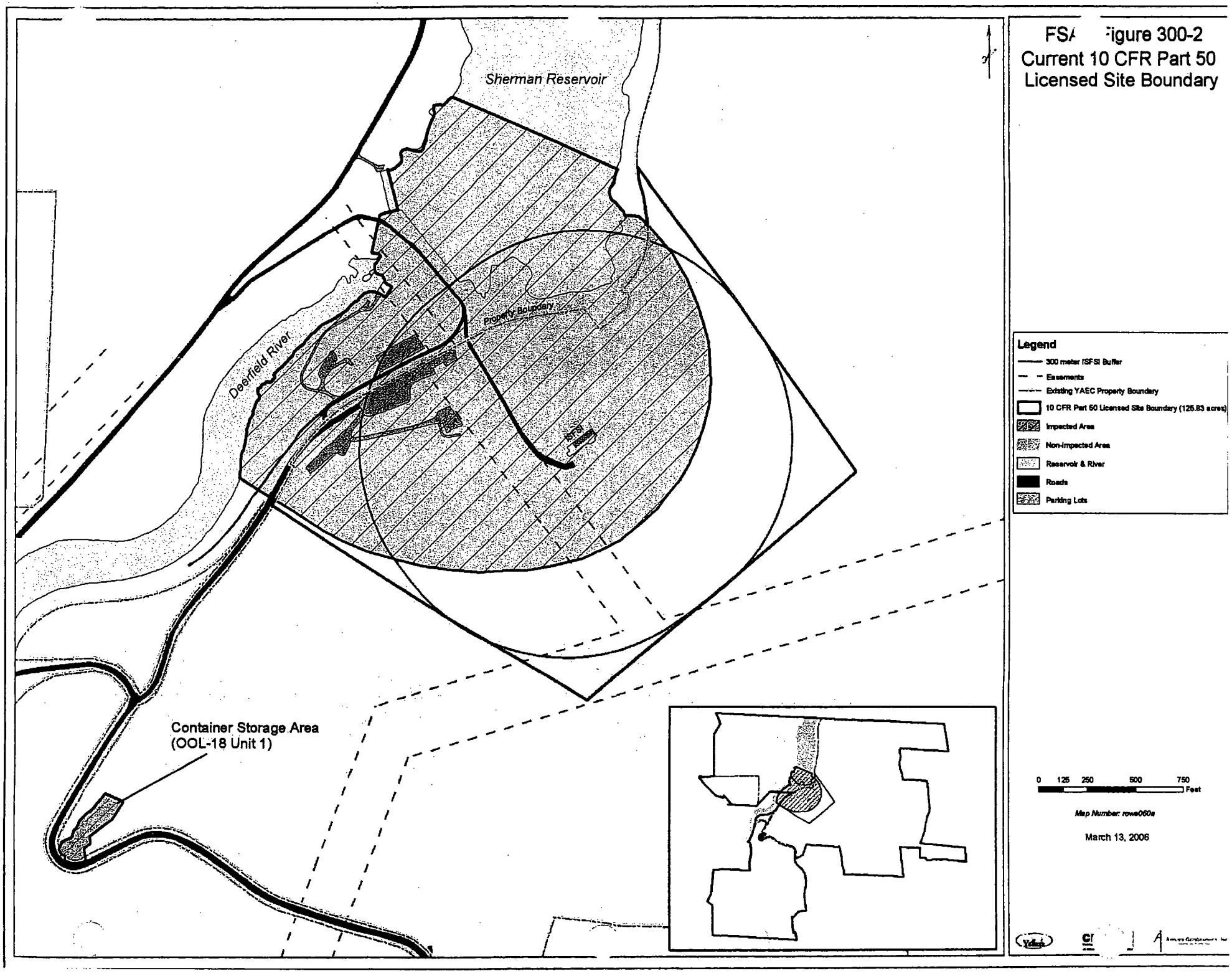
The YNPS site boundary and plant exclusion area is shown in Figure 300-2.

300.2 Geography and Land Use

The population density in the rural area surrounding the YNPS site is low. Within one mile of the site, for example, the population is 48 (based on 1989 Massachusetts municipal census counts). The populations of the two closest towns, Rowe and Monroe, are 354 and 141, respectively. The nearest population center of 25,000 or more is Pittsfield, Massachusetts, located about 21 miles south-west of the site. The regional population is expected to remain virtually unchanged over the next decade.

Land use near the site is made up of a few farms and some commercial businesses. The centers of Rowe and Monroe have small, mixed clusters of local businesses, municipal buildings, and residences, with homes scattered throughout the area. There is no large industrial activity within five miles of the site; the only industry in the area is the YNPS and several hydroelectric facilities along the Deerfield River.

The nearest highway and railroad are each about five miles south of the site. The closest airport is in North Adams, Massachusetts, about ten miles west of the site.



FSA Figure 300-2
Current 10 CFR Part 50
Licensed Site Boundary

301 METEOROLOGY (GENERAL CLIMATE, SEVERE WEATHER)

The site lies in the prevailing westerlies, the belt of eastward moving air that is found in middle latitudes. Many storms pass over Massachusetts compared to other parts of the United States. This is a result of extensive air masses originating at higher and lower latitudes. The three major air mass types that affect the site are cold, dry, subartic air from Canada; warm, moist air from the Gulf of Mexico; and cool, damp air from the North Atlantic Ocean.

The hills on either side of the site rise about 1000 feet above ground level within one mile and extend from 12 miles north to 8 miles south southeast of the site. This feature affects the winds. There is, for instance, a high frequency of occurrence of "channel flow" up and down the Deerfield River valley. Also, night -time drainage flow down the east side of the river valley occurs frequently.

Normal daily temperatures range from 10°F in January to 80°F in July. Recorded extreme temperatures for the site region are -25°F and 98°F. Thunderstorms occur about 28 days per year; the annual flash density of ground lightning strikes is four flashes per square kilometer.

The site design wind speed (defined as the "fastest-mile" wind speed at 30 feet above the ground with a 100 year return period) is 80 mph. Hail storms occur about two days annually and freezing rain about 12 days per year. The maximum radial ice thickness expected for the region is 1.25 inches. Mean annual snowfall at the site totals 100 inches, with maximum snow depth on the ground totaling about 40 inches.

302 HYDROLOGY

The site is located on the east bank of the Deerfield River adjacent to Sherman Reservoir, which serves as the source of the cooling water for the plant. The drainage area upstream of the plant is characterized by a dendritic pattern, is 236 square miles, and has an average annual rainfall of between 40 and 50 inches.

The Deerfield River flow is highly regulated by two large, upstream hydroelectric reservoirs. The average long-term flow near the plant is 738 ft^3/sec.

Bedrock in the region is not a significant source of groundwater nor are there major bedrock aquifers within the site area. The direction of groundwater flow under the site is from the recharge areas on the slopes surrounding the plant toward the Deerfield River.

303 GEOLOGY AND SEISMOLOGY

The regional bedrock geology is complex; bedrock age ranges from 100 million to over one billion years old and is comprised of mostly a mosaic of metamorphic and igneous rocks. The youngest deposits are glacial soils, 10 to 12 thousand years old. Most volcanic and sedimentary rock in the area are now metamorphosed.

The site is situated on dense Wisconsinian-aged glacial till. YNPS structures are founded on this till, which ranges from 0 to 140 feet thick across the site. Bedrock under the till is part of the lower Cambrian Hoosac formation and consists of quartz-albite-biotite gneiss and a rusty gneiss in adjacent areas. Underlying these are garnet schist and a layered gneiss with some dolomitic marble, with the latter units belonging to the lower Cambrian or older Cavendish formation. A south-plunging anti-cline, whose axis is just east of the site, defines local bedrock structure.

Site bedrock is hard, internally welded metamorphic rock, not subject to significant deterioration. Bedrock fracturing is not a prominent structural feature of this bedrock; outcrops exhibit either no joints or minor, discontinuous joint surfaces. Fracture pattern analysis of site vicinity joints, joint sets, and faults show no anomalous trends for fractures. This suggests the absence of any through-going zones of post-metamorphic faulting or shear.

The site is in the Western New England Fold Belt province. It borders the Adirondack Uplift province to the west, the Valley and Ridge province to the southwest, and the New York Recess to the south. The Southeast New England Platform and Merrimack Synclinorium occur to the east and northeast, respectively.

Regional seismic events are very infrequent and do not cause surface faulting. Only two events in the province were greater than Intensity V (MM). These events were 125 miles and 210 miles from the site. The site seismic design level for new seismically qualified installations at the plant is a peak ground acceleration of 0.19 g. The return period is between 10,000 and 100,000 years.

304 WATER SUPPLY

Potable water is supplied by an on site bedrock well.

305 EFFLUENTS

There are no liquid effluents from the ISFSI.

Stormwater and surface water runoff follows various swales, ditches, and culverts [to the Deerfield River or Sherman Pond] that were created during final site grading.

Surface water use downstream from the site is mostly for recreation and sport fishing, with limited irrigation. Water supply for the municipalities within five miles downstream of the plant is from private wells. The closest public water supplies are well fields 20 to 25 miles downstream of the plant.

306 ENVIRONMENTAL RADIOLOGICAL STATUS

306.1 Radiological Environmental Monitoring Program

The Yankee Quality Assurance Program establishes the requirements for the Radiological Environmental Monitoring Program. The purpose of the program is to monitor the radiation in the environs of the ISFSI.

REFERENCES

306-1 YNPS Off-Site Dose Calculation Manual.

306-2 Yankee Nuclear Power Station's License Termination Plan

400 TRANSIENTS

400.1 General Overview

Decommissioning activities for the Yankee Rowe Site are complete. All fuel and GTCC material has been transferred to dry fuel storage and is located at the ISFSI. The NAC-MPC FSAR contains the design basis safety analysis for the NAC-MPC system components in use at the Yankee-Rowe ISFSI.

401 EVENTS AFFECTING OCCUPATIONAL HEALTH AND SAFETY

With the completion of decommissioning the potential for radiological and industrial safety events which could effect site personnel or the public is minimized. Radiological events are minimized or the consequences are mitigated through the implementation of the Radiation Protection Program (Section 507) and the ISFSI Emergency Plan (Section 515). Industrial safety events are minimized by implementing the site safety program for site activities.

The primary objective of the Radiation Protection Program is to protect workers and visitors to the site from radiological hazards from ISFSI operations. Activities conducted during ISFSI operations that have only a small potential for exposure of personnel to either radiation or radioactive materials and it will be managed by qualified individuals who will implement program requirements in accordance with established procedures. Radiological conditions will be monitored and evaluated on a routine basis to maintain radiation exposures to unrestricted areas as far below specified limits as is reasonably achievable. Radiation protection training will be provided to individuals classified as occupationally exposed to ensure that they understand and accept the responsibility to follow procedures and to maintain their individual radiation dose as low as is reasonably achievable.

The ISFSI Emergency Plan defines an on-site emergency response capability. This capability includes removal of personnel from an affected area, including site evacuation, if necessary. The plan is implemented by ISFSI personnel.

Implementation of these programs ensures that potential radiological and industrial safety events will be sufficiently minimized and mitigated to not warrant further consideration in this analysis.

403 ISFSI DECOMMISSIONING ACTIVITY EVENTS

With the completion of decommissioning and the transfer of fuel and GTCC material to the ISFSI the potential for the creation of events with radiological consequences is significantly reduced.

None of the ISFSI structures, systems or components contain surface contamination that could result in the creation of a significant radiological event.

404 LOSS OF SUPPORT SYSTEM EVENTS

Electric power is provided to support ISFSI operations. Loss of this system could potentially affect many ISFSI areas and support facilities simultaneously; however, the support system is not quality or safety related.

Loss of Off-Site Power

Off-site power is used to energize tools, lighting and security equipment used during ISFSI activities.

Back-up power sources such as UPS and Security Diesel Generator backup power capability will be maintained to support Gatehouse and ISFSI operations.

The public health and safety are not adversely affected by a loss of off-site power event.

405 FIRE EVENTS

A fire event could affect several ISFSI systems, structures and components simultaneously. Combustible materials can be ignited by external ignition sources (e.g., oxyacetylene torches). Adequate levels of the following fire protection features will be maintained through implementation of the Fire Protection Program (Section 513) minimizing the potential of occurrence of a fire:

- Fire detection equipment and systems.
- Personnel training and qualification programs.
- Fire Protection Program procedures.
- Control of transient combustible materials and ignition sources.

The public health and safety are not adversely affected by a fire event.

406 EXPLOSION EVENTS

An explosion event could affect the ISFSI. Explosions are possible from the following sources:

- Explosives
- Compressed Gas Bottles and Tanks

Explosion Events: ISFSI

In EDCR 01-001, "Implementation of YR Dry Fuel Storage Using the NAC-MPC System"an evaluation concluded that the existing NAC analysis bounded an explosion of two 1000 gallon propane tanks and the resulting effects on the casks within the Fuel Transfer Enclosure (FTE). Since the fuel in FTE was closer than the ISFSI to the propane tanks, the effects of an explosion of these types of tanks on the ISFSI is also bounded by the existing NAC-MPC analysis. Evaluation ENG 05-11, "Thermal Desorption System – Hypothetical Propane Explosion Evaluation, G.H. Philley/B.W. Holmgren to F.N. Williams," dated May 26, 2005 concluded that the existing NAC analysis for overpressure also bounded an explosion of the six 1000 gallon propane tanks and there would be no adverse impact on the spent fuel canisters stored at the ISFSI.

REFERENCES

EDC 01-001, Implementation of YR Dry Fuel Storage Using the NAC-MPC System.

ENG 05-11, Thermal Desorption System – Hypothetical Propane Explosion Evaluation, G.H. Philley/B.W. Holmgren to F.N. Williams, May 26, 2005.

407 EXTERNAL EVENTS

A systemic assessment of external events was previously made to evaluate the effects of natural and manmade events on decommissioning activities. With the completion of decommissioning there is no longer any impact from external events on decommissioning activities.

All YNPS spent fuel is located at the ISFSI and is stored within fifteen NAC Multi-Purpose Canisters (MPCs). Chapter 11 of the NAC-MPC FSAR addresses the various off-normal and accident events which were postulated in support of the licensing and certification of the system for General License, "NAC-MPC, Final Safety Analysis Report, Multi-Purpose Canister System, Docket No. 72-1025." In each case, there were no radiological consequences as a result of the postulated event.

REFERENCE

NAC-MPC, Final Safety Analysis Report, Multi-Purpose Canister System, Docket No. 72-1025.

408 SPENT FUEL STORAGE EVENTS

408.1 Events

All YNPS spent fuel is located at the ISFSI and is stored within fifteen NAC Multi-Purpose Canisters (MPCs). Chapter 11 of the NAC-MPC FSAR addresses the various off-normal and accident events which were postulated in support of the licensing and certification of the system for General License, "NAC-MPC, Final Safety Analysis Report, Multi-Purpose Canister System, Docket No. 72-1025." In each case, there were no radiological consequences as a result of the postulated event.

The YNPS developed and maintains a 10CFR72.212 Evaluation Report, which concludes that all site-specific parameters found at the YNPS site are bounded by the NAC-MPC design basis analyses performed for the NAC-MPC system.

REFERENCE

NAC-MPC, Final Safety Analysis Report, Multi-Purpose Canister System, Docket No. 72-1025.

500 ADMINISTRATION OF THE DECOMMISSIONING PLAN

500.1 Regulatory Basis for Administration of the Decommissioning Plan

Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report)" (Reference 500-6), encourages licensees with an approved Decommissioning Plan to "extract the pertinent detail from the Decommissioning Plan and submit a PSDAR update in the format and content specified by the regulatory guide." As a result, information from the approved YNPS Decommissioning Plan that was incorporated into the FSAR has since been extracted, updated and relocated to the PSDAR within the FSAR.

REFERENCES

500-1 Letter, YAEC to USNRC, dated December 20, 1993.

500-2 Draft Regulatory Guide DG-1005, "Standard Format and Content For Decommissioning Plans for Nuclear Reactors."

500-3 Letter, USNRC to YAEC, dated February 14, 1995.

500-4 Letter, YAEC to USNRC, dated August 22, 1995.

500-5 NUREG-0586, Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, August 1988.

500-6 Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report, dated July 2000."

501 DECOMMISSIONING COST ESTIMATE AND FUNDING PLAN

Decommissioning Cost Estimate

This information has been extracted, updated and relocated to the PSDAR within the FSAR.

Decommissioning Funding

This information has been extracted, updated and relocated to the PSDAR within the FSAR.

502 DECOMMISSIONING ORGANIZATION AND RESPONSIBILITIES

YAEC Commitment

Yankee Atomic Electric Company (YAEC) is committed fully to compliance with the existing license and applicable regulatory requirements during all phases of YNPS of ISFSI operations. YAEC's commitment to the safe storage of fuel and GTCC will be accomplished with diligence and quality. Corporate principles, policies, and goals will be followed to ensure performance excellence, management competence, and high standards in every facet of ISFSI operations.

Goals

The primary goal of the YNPS is to safely store spent nuclear fuel and GTCC material until it can be removed from the site. While achieving this primary goals, YAEC will conduct all ISFSI operations consistent with applicable regulations.

YAEC Organization and Functions

The YAEC organizational structure that will be implemented as described in Section 1 of the Yankee Quality Assurance Program (QAP). The functions are described in site administrative procedures.

503 TRAINING PROGRAM

YAEC will maintain a training program commensurate with ISFSI operational activities. The training program, in conjunction with other administrative programs and controls, will ensure that qualified individuals are available to operate and maintain the ISFSI in a safe manner. The training programs will be based on a systematic analysis of job performance requirements. The analysis will ensure that personnel will have qualifications commensurate with the performance requirements of their jobs.

Access Training

Access Training will be provided to designated personnel who have unescorted access to the ISFSI. Initial and requalification training will be provided.

Radiation Worker Training

Initial and requalification radiation worker training will be provided to designated personnel as required by ISFSI procedures.

Specific Job Training

YNPS training programs will assure the following:

- Personnel responsible for performing activities are instructed as to the purpose, scope, and implementation of applicable controlling procedures.
- Personnel performing activities are trained as appropriate, in the principles and techniques of the activity being performed.
- The methods of implementing the training programs are documented.

Training Records

Training records will be maintained and retained in accordance with administrative procedures.

REFERENCES

503-1 NYR 93-149, NRC Partial Exemption from the Training Rule, 10CFR50.120 (TAC No. M87168), M. B. Fairtile (USNRC) to J. M. Grant (YAEC), November 19, 1993.

503-2 NYR 03-027, J. Hickman (USNRC) to J. Kay (YAEC), Issuance of Amendment #157 RE: Deletion of Operational and Administrative Requirements Following Fuel Transfer to ISFSI, April 18, 2003.

504 DEFUELED TECHNICAL SPECIFICATIONS

The Defueled Technical Specifications was initially approved on December 23, 1992 and has been maintained with additional changes to reflect the current condition of the site. Reference the Defueled Technical Specifications for information related to the License and facility requirements.

505 PROCEDURES

ISFSI Operating Procedures

The ISFSI Operating Procedures have been developed in accordance with the Yankee Quality Assurance Program. The controlled procedures, utilized by ISFSI personnel for the conduct of operations, are contained in the ISFSI Procedures Manual and are available for inspection.

Emergency Procedures

The Emergency procedures are comprised of the Emergency Operating Procedures. These procedures are revised, reviewed and controlled in accordance with the Yankee Quality Assurance Program.

The Emergency Operating Procedures have been developed to provide instructions to the ISFSI personnel. These procedures provide ISFSI personnel with the guidance needed to respond to emergency events and provide instructions that assist in mitigating an the event and its consequence(s) to the ISFSI, site personnel, the public and the environment.

506 MAINTENANCE PROGRAM

The Maintenance Program is designed to ensure continued system reliability for those systems used to support dry cask storage at the YNPS ISFSI. The program is implemented through administrative and maintenance procedures. These procedures have been developed in accordance with the Yankee Quality Assurance Program. The controlled procedures are utilized for the conduct of maintenance activities and are available for inspection.

507 RADIATION PROTECTION PROGRAM

507.1 Introduction

YNPS intends to maintain essential elements of the Radiation Protection Program, that were implemented successfully during its 31 year operating life and subsequent decommissioning, to apply to ISFSI operations activities. Changes to the program will be made as necessary to meet the needs of ISFSI operations.

The Radiation Protection Program has undergone and continues to undergo inspections and audits from both the NRC and the YAEC Quality Assurance responsible individual as required by the Yankee QAP. The purpose of these reviews is to ensure that the program complies with the Code of Federal Regulations, applicable regulatory guidance documents, and industry standards. YAEC is committed to maintaining a high level of performance and to enhancing the quality of the Radiation Protection Program throughout the YNPS ISFSI operations.

The YNPS Radiation Protection Program for site closure will continue to be implemented through existing YNPS ISFSI procedures and instructions.

This section of the FSAR presents an overview of the Radiation Protection Program that will be implemented for ISFSI operations.

507.2 Management Policies

507.2.1 Management Policy Statement

YAEC is committed to the safe operation of the YNPS ISFSI. The primary objective of the Radiation Protection Program is to minimize the actual and potential exposure of workers, visitors, and general public to radiation. YAEC and its contractors will provide sufficient qualified staff, facilities, and equipment to conduct radiologically safe ISFSI operations. YAEC will continue to comply with regulatory requirements, radiation exposure limits, and radioactive material release limits. In addition, YAEC will make every effort to maintain radiation exposures as low as is reasonably achievable (ALARA). The ALARA philosophy will be incorporated into all ISFSI operations and will have full management support.

YAEC requires good radiation work practices as a condition of employment. Each radiation worker is responsible for performing work in a radiologically safe manner, consistent with the standards of conduct described in the Radiation Protection Program ISFSI procedures and instructions.

This management policy will continue to be communicated to all radiation workers through Site Access and Training and will continue to be incorporated into all applicable ISFSI procedures and instructions.

507.2.2 Administrative Policy

YAEC will ensure that activities conducted during ISFSI operation will be managed by qualified individuals who will perform program operations in accordance with established procedures and instructions. Radiological hazards will be monitored and evaluated on a routine basis to maintain radiation exposures as far below specified limits as is reasonably achievable. Each element of the Radiation Protection Program will be defined and implemented using written ISFSI procedures and instructions. Radiation protection training will be provided to all occupationally exposed individuals to ensure that they understand and accept their responsibility to follow procedures and to maintain their individual radiation dose as low as is reasonably achievable.

YAEC management will ensure that work specifications, designs, and work packages involving potential radiation exposure or handling of radioactive materials incorporate effective radiological controls.

Radiation protection records will be prepared and maintained using high standards of accuracy, traceability, and legibility to meet the requirements of regulatory agencies and company procedures.

507.2.3 ALARA Policy

YAEC is committed to maintain the ALARA concept. All activities at YNPS involving radiation and radioactive materials will be conducted such that exposure of employees, contractors, and the general public to radiation is maintained as low as is reasonably achievable. This determination will consider the current state of technology and the economics of improvements in relation to their benefit (i.e., reduction of dose).

Appropriate ALARA considerations will be incorporated into ISFSI operation activity planning and design activities at an early stage to allow full consideration of reasonable alternatives. All design modifications will be reviewed to ensure that ALARA was incorporated into the activities.

507.2.4 Regulatory Compliance Policy

YAEC is committed to maintain the Radiation Protection Program in compliance with the requirements of the Code of Federal Regulations and, to the extent practical, information contained in industry standards, regulatory guides, and other guidance documents. The Radiation Protection Program is assessed against all new regulatory guidance and modified as necessary. YAEC implemented the revised 10CFR Part 20 on January 1, 1994.

507.3 Radiation Work Permits (RWP)

Radiation Work Permits will continue to be used to administratively control designated radiological work activities. The primary function of the RWP is to allow authorized activities to be conducted in a safe manner and with radiologically sound practices. The permit documents the work description, the worker names, the radiological conditions, and the radiological precautions and requirements. The RWP implements the ALARA concept and establishes any necessary ALARA Controls.

An ISFSI procedure presents the requirements for generating and using RWP's.

507.4 Area Definitions and Postings

An ISFSI procedure describes the requirements for radiological postings. The purpose of the postings is to advise workers of radiological hazards that may be encountered in the areas. Informational postings may also be used to provide additional radiological instructions to workers. Each worker is responsible for the observance of the area postings and compliance with the indicated requirements.

507.5 External Dosimetry

507.5.1 General Considerations

External radiation dose will be monitored, as required by ISFSI procedures, and instructions through the use of thermoluminescent dosimeters (TLD) and/or direct reading dosimeters. The official record of external dose from beta, gamma and neutron radiation normally will be obtained from the TLD readings. Direct reading dosimeters will be used as required as a means for tracking dose between TLD processing and may also be used as a back-up to the TLDs. TLDs will be processed at a frequency that ensures personnel dose limits are not exceeded.

507.5.2 Monitoring Whole Body Dose

All radiation workers are required to wear external radiation monitoring devices in accordance with ISFSI procedures and instructions. These dosimetry requirements are specified on a Radiation Work Permit.

507.5.3 Dosimetry Quality Control

The dosimetry processing laboratory will be accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for dosimetry.

507.5.4 Radioactive Material Controls

The Radiation Protection Program establishes radioactive material controls that ensure the following:

- Prevention of inadvertent radioactive material release to uncontrolled areas.

- Assurance that personnel are not exposed inadvertently to radiation from radioactive materials.

Materials will be released if no discernable plant-related activity is detected within the capability of the survey methods utilized. Any radioactive material that is shipped from the site is handled in accordance with guidance provided in YNSP ISFSI procedures and instructions, which will ensure compliance with applicable NRC and Department of Transportation requirements.

507.5 Surveillance

Routine radiological surveillances will continue to be conducted during decommissioning to monitor radiation sources, to determine radiological conditions, and to comply with the requirements of 10CFR Part 20. Surveys also will be performed to evaluate radiological conditions in support of ISFSI operational activities. YNPS ISFSI procedures and instructions will be used to implement the surveys.

507.6 Instrumentation

A sufficient inventory and variety of operable and calibrated portable, radiological instrumentation will be maintained on site to allow for effective measurement and control of radiation exposure and radioactive material and to provide back-up capability for inoperable equipment. Equipment will be capable of measuring the range of gamma, beta, alpha and neutron dose rates expected. Instrumentation will be calibrated at prescribed intervals or prior to use against certified equipment having known valid relationships to nationally recognized standards. A YNPS ISFSI procedure or instruction will be used to control the use of radiation protection instrumentation.

507.7 Review and Audit

To ensure the Radiation Protection Program is effectively implemented and maintained, an organized system of reviews and audits will continue to be implemented during ISFSI Operations in accordance with the Yankee Quality Assurance Program.

507.8 Radiation Protection Program Performance Analysis

A YNPS ISFSI procedure will be used to evaluate the causes of unacceptable performance, to initiate corrective actions, and to trend overall performance. This process will be used to address the following types of deficiencies:

- Work activities generating unnecessary radiation exposure.
- Procedural actions resulting in unacceptable radiological performance.
- Unacceptable radiological work practices resulting in unnecessary radiation exposure.
- Activities violating Radiation Work Permit instructions, postings, and radiation protection implementing procedures and instructions.

508 RADIOACTIVE WASTE MANAGEMENT

The decommissioning of YNPS required the handling of a large volume of radioactive materials to reduce residual radioactivity to a level permitting release of the site for unrestricted use in preparation to complete the partial site release of the License to the ISFSI. With the completion of decommissioning and the storage of fuel and GTCC at the ISFSI there is only a small potential to generate radiological material that will have to be managed as radioactive waste until the decommissioning of the ISFSI. The YAEC will continue to maintain programmatic controls within the Yankee Quality Assurance Program to ensure that federal and state regulations and disposal site requirements would be satisfied should the need arise for radioactive waste management . The YNPS radioactive waste management program would be implemented through the Radiation Protection Program (Section 507).

REFERENCES

508-1 58-FR-34947, Notification of Spent Fuel Management and Funding Plans By Licensees of Prematurely Shut Down Power Reactors, June 30, 1993.

508-2 Yankee Nuclear Power Station Off-site Dose Calculation Manual.

508-3 Yankee Quality Assurance Program

509 TESTS

Tests may be performed to ensure the continuous, safe, and efficient operation of equipment necessary to support safe fuel storage. The various types of tests are those conducted in accordance with the QAP and governing applicable engineering practices and standards (ASME, IEEE, ISA, etc.), or those based on good engineering judgement and operational experience.

512 SECURITY PLAN

The YNPS Security Plan provides the requirements and measures to ensure the safe storage of spent nuclear fuel at the Yankee Rowe ISFSI. Procedures have been developed to implement the Security Plan and Program to ensure requirements are fully achieved.

YNPS access control requirements are established and are presented in an administrative procedures.

REFERENCES

512-1 BYR 92-077, Defueled Security and Training and Qualification Plans, J. K. Thayer to M. B. Fairtile (USNRC), August 11, 1992.

512-2 BYR 92-102, Defueled Security and Training and Qualification Plans, J. K. Thayer to M. B. Fairtile (USNRC), October 22, 1992.

512-3 NYR 92-194, Exemptions From Certain Requirements of 10CFR73.55 For The Yankee Nuclear Power Station (YNPS) (TAC No. M84267), M. B. Fairtile to J. M. Grant, November 24, 1992.

512-4 BYR 2000-068, Proposed Amendment to YNPS Security Plan, B. Wood (YAEC) to NRC, dated October 12, 2000.

512-5 NYR 2002-023, YNPS – Issuance of Amendment and Exemption from Requirements of 10CFR73.55 (TAC No. MB0209), J. Hickman (NRC) to J. Kay (YAEC), dated March 13, 2002.

513 FIRE PROTECTION

A Fire Protection Plan has been developed to minimize any potential impacts on the ISFSI from fire related events. This Fire Protection Plan has been incorporated into the ISFSI set of Procedures and its implementation is supported by other fire protection procedures.

Administrative controls are established for controlling materials and events that could create potential fire hazards at the ISFSI.

An onsite incipient fire brigade (utilizing fire extinguishers) is adequate to protect the facility until off-site assistance provided by the Town of Rowe arrives. The Rowe Fire Department is available within a 30-minute response time.

Fire detection capabilities will remain in place to protect those facilities associated with the ISFSI.

REFERENCES

513-1 NYR 03-027, J. Hickman (USNRC) to J. Kay (YAEC), Issuance of Amendment 157 RE: Deletion of Operational and Administrative Requirements Following Fuel Transfer to ISFSI, April 18, 2003.

514 QUALITY ASSURANCE PROGRAM

Yankee Atomic Electric Company (YAEC) has developed and implemented a comprehensive Quality Assurance Program to assure conformance with established regulatory requirements set forth by the Nuclear Regulatory Commission (NRC) and accepted industry standards. The participants in the Yankee Quality Assurance Program (QAP) assure that the storage of spent fuel and GTCC at the Yankee Nuclear Power Station is performed in a safe and effective manner. All remaining applicable operational and administrative requirements that were contained in the YNPS Defueled Technical Specifications have been relocated to the QAP.

The QAP complies with the requirements set forth in Appendix B of 10CFR Part 50, along with applicable sections of the Updated Final Safety Analysis Report (UFSAR) for the license application.

The QAP is also established, maintained and executed to comply with the requirements of 10CFR71, Subpart H, and 10CFR72, Subpart G for the storage and transportation of spent nuclear fuel and high level waste under the provisions of a General License contained in these parts.

The QAP is submitted periodically to the NRC in accordance with 10CFR50.54(a).

REFERENCES

514-1 License No. DPR-3 - Yankee Nuclear Power Station

514-2 10CFR Part 50 Appendix B; Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

515 EMERGENCY PLAN

The Defueled Emergency Plan for YNPS was approved by the NRC and issued on October 30, 1992. There are no longer any events (radiological or non-radiological) that could occur at the site outside of the ISFSI that could cause activation of the Defueled Emergency Plan. Therefore on March 3, 2005 a revision to the Emergency Plan was issued which eliminated all facets of the Plan not related to the ISFSI. The Plan was re-titled ISFSI Emergency Plan.

The ISFSI Emergency Plan is implemented through the use of Emergency Operating Procedures which are referenced in the Plan. The ISFSI Emergency Plan is formally audited as part of the Quality Assurance Program.