3 IDENTIFICATION OF REMAINING SITE DISMANTLEMENT ACTIVITIES

3.1 Introduction and General Considerations

In accordance with 10CFR50.82(a)(9)(ii)(B), Reference 3-1, the License Termination Plan (LTP) must identify the major dismantlement activities that remain. Included in this information are estimates of occupational radiation dose associated with those activities and estimates of projected volumes of radioactive waste. These activities are undertaken pursuant to the current 10CFR50 license, are consistent with the PSDAR (Reference 3-2), and do not depend upon approval of the LTP to proceed.

YAEC intends to release the YNPS site for unrestricted use, and its primary goals are to decommission the YNPS safely and to maintain continued safe storage of spent fuel, until it is removed from the site. YAEC will decontaminate and dismantle YNPS in accordance with the DECON alternative, as described in the NRC's Final Generic Environmental Impact Statement (NUREG-0586 and its supplements, Reference 3-3). Completion of the DECON option is contingent upon continued access to one or more low-level waste disposal sites. Currently YNPS has access to low-level waste disposal sites in Barnwell, South Carolina, and South Clive, Utah.

Decommissioning activities at YNPS are being conducted in accordance with the YNPS PSDAR, YDQAP, FSAR, Technical Specifications, Part 50 license, and the requirements of 10CFR50.82(a)(6) and (a)(7). As such, the conduct of the decommissioning activities described herein is not dependent upon approval of the LTP. In addition, YAEC does not foresee any of the specific decommissioning activities described herein as resulting in the need for prior NRC approval upon evaluation under 10CFR50.59. These activities are being conducted in accordance with existing program and procedures which have been reviewed by the NRC, including: YNPS Radiation Protection Program, Occupational Safety Program, Radioactive and Non-Radioactive Waste Management Programs and the Decommissioning Quality Assurance Plan. Activities conducted during decommissioning do not pose any greater radiological or safety risk than those conducted during plant operation and refueling. Nonetheless, if any activity requires prior NRC approval under 10CFR50.59(c)(2) or a change to the YNPS Technical Specifications or license, a submittal will be made to the NRC for review and approval before implementing the activity in question.

3.2 Decommissioning Approach

Decommissioning activities are being completed in three phases:

Phase 1: Mechanically/electrically isolate the Spent Fuel Pool, remove SSCs not supporting fuel storage, and remove fuel and GTCC waste from the SFP,

Phase 2: Dismantlement and disposition of remaining systems, structures, and components (SSCs), and

Phase 3: Termination of the Part 50 license.

As discussed herein, Phase 1 has been completed. Phase 2 activities are ongoing and their status is described in this section. Phase 3 is intended to occur following completion of all radiological decommissioning activities.

The following are general decontamination and dismantlement considerations that are being incorporated, as appropriate, into the activities for decommissioning the systems, components and structures at YNPS.

- Radiological characterization survey data has been used to identify the systems, structures, and components to be decontaminated and dismantled. The extent of contamination associated with the SSCs is presented in Table 3-1.

- Decommissioning work documents with sufficient detail are being developed, reviewed, and approved in accordance with project and plant programs and procedures.

- Plant tag-out procedures are being used to de-energize electrical and control equipment, isolate, and drain fluid systems, and isolate and depressurize pneumatic systems. Radiation Protection procedures will be used to ensure compliance with radiological requirements for contamination control and worker protection and ALARA programs. Occupation safety standards will be observed.

- Components are being identified prior to removal. The components are then removed using the techniques and methods as specified in the decommissioning work packages. There the components are either decontaminated or shipped to a low-level radioactive waste disposal facility or, if appropriate, shipped to an approved landfill.

- Contaminated concrete is being removed and packaged into containers for shipment to a low-level radioactive waste disposal facility. Contaminated structural steel components, on which a volume reduction process is being applied, may be moved to a processing area and packaged into containers for shipment to an off-site waste processing facility.

- Remaining buried contaminated components (e.g., piping, drains, and conduit) are being excavated. After excavation, the components will be examined to ensure that they are physically sound prior to cutting and removal. Most buried contaminated piping is

located in steel conduits (i.e., pipes enclosed in pipes). Contamination controls will be modified as necessary if the components are significantly degraded.

- Once decommissioning and/or remediation activities have been completed, and prior to final status survey, isolation and controls will be implemented as described in Section 5.4.5.

- A final status survey will be performed to verify removal of contamination to below release levels.

- Coatings will be removed, as required by local, state, and federal regulations. PCB paints will be removed from exposed concrete surfaces as required by the Alternate Method of Disposal Authorization (AMDA) requirements prior to demolition of the structure, as authorized by the EPA on October 8, 2002 (Reference 3-4) and subsequent changes thereto.

3.2.1 Phase 1 Activities

Since 1993 Yankee has removed and disposed of the steam generators, pressurizer, and the reactor vessel. The reactor vessel internals, which are greater-than-Class-C (GTCC) waste, remain onsite and are stored at the site's independent spent fuel storage installation (ISFSI).

The Spent Fuel Pit (SFP) and other systems associated with fuel storage were electrically and mechanically isolated to create a Spent Fuel "Island" that would not be adversely impacted by other decommissioning activities. The majority of systems and components not required to support the storage of spent fuel have been dismantled and disposed of in accordance with the YNPS Decommissioning Plan and Final Safety Analysis Report. The status of plant SSCs, as of July 2003 is provided in Table 3-2.

Once a Spent Fuel "Island" was established, the focus of site activities shifted to the removal of spent fuel and GTCC waste from the SFP, to the ISFSI. Movement of the fuel and the non-fuel GTCC waste from the SFP to the ISFSI was completed in June 2003.

3.2.2 Phase 2 Activities

After removing the spent fuel and GTCC waste from the SFP, the remaining components of the systems listed below are being dismantled and decontaminated.

- Temporary Waste Water Processing System,
- Radiation Monitoring System,
- Ventilation Systems (Including VC Ventilation and Purge System),
- Fuel Handling Equipment System,
- SFP Cooling and Purification System,
- Auxiliary Service Water System,
- Demineralized Water System,

- Compressed Air System,
- Electrical System,
- Heating System, and
- Fire Protection and Detection System

After removing systems and components from an area or building, contaminated concrete, steel, and other building materials are being decontaminated or removed. The structures listed below are being decontaminated and/or dismantled during the decommissioning of the SFP Island.

- Yard Area Crane and Support Structure,
- Vapor Container (VC),
- Reactor Support Structure,
- VC Polar Crane,
- Radiation Shielding,
- Pipe Chases,
- Fuel Transfer Chute,
- Ion Exchange Pit,
- Primary Vent Stack,
- Spent Fuel Pit and SFP Building,
- New Fuel Vault,
- Primary Auxiliary Building,
- Waste Disposal Building,
- Safe Shutdown System Building,
- Potentially Contaminated Area (PCA) Storage Buildings and Warehouse,
- Compactor Building
- Service Building and Fuel Transfer Enclosure,
- Miscellaneous Storage Tanks and
- Meteorological Tower.

Upon the completion of Phase 2 activities, all systems and components will have been removed from plant buildings and yard areas (with the exceptions of those supporting spent fuel and GTCC storage in the ISFSI) and disposed of at the appropriate facility. In general, above grade portions of site buildings will be demolished and removed from the site. Below grade portions of site structures (elevation 1022'-8" and below) are being remediated to meet the site release criteria or removed. Details concerning dismantlement and remediation efforts are provided in the subsections to follow.

Following submittal of the License Termination Plan, final status surveys will be conducted to verify that structures and open land areas meet the release criteria. Independent verification of the results by the NRC will allow for the release of the individual surveyed structures and open land areas. In order to facilitate remediation, the facility superstructures may be demolished before remediating substructure and soils beneath the structures. Measures, as described in LTP Section 5.4.5, will be implemented to prevent recontamination of surveyed areas prior to final status survey.

General decontamination and dismantlement considerations are given in Section 3.2; however, specific decontamination and dismantlement considerations for applicable systems, structures, and components are given in the following sections. The contamination status for the remaining systems is provided in Table 3-1. Also, the description and status of remaining SSCs are presented in Sections 3.2.2.1 (Systems and Components) and 3.2.2.2 (Structures)

3.2.2.1 Systems and Components

3.2.2.1.1 Temporary Waste Water Processing System

The Temporary Waste Water Processing System receives, contains, treats, and safely disposes of liquid radioactive wastes. Waste water generated as a result of decommissioning activities is routed to a 20,000 gallon waste water storage tank (TK-81). The tank currently accepts water from the radioactive lab sump discharge line. The waste water is pumped to this storage tank and is then transferred to the evaporator equipment enclosure for processing and eventual discharge. Per the NPDES permit, discharge of construction waste water can also be via the storm drain system.

Most of the major equipment (the 20,000 gallon tank, the equipment enclosure, two 5,000-gallon test tanks, and the package pool boiler) is located in the area east of the Spent Fuel Pit Building, adjacent to Fire Hose House 15.

Decontamination and dismantlement considerations for the Temporary Waste Water Processing Island are as follows:

- The Temporary Waste Water Processing Island should be isolated at the connections to the Plant Ventilation System, Auxiliary Service Water System, and the Rad Lab Sump System.

- Sludge will be removed from the Rad Lab Sump tanks and the 20,000 gallon storage tank prior to dismantlement of the system.

The Temporary Waste Water Processing System will be dismantled and disposed of as radioactive waste.

3.2.2.1.2 Radiation Monitoring System

The Radiation Monitoring System monitors plant radiological conditions through two subsystems:

- Process Radiation Monitoring Subsystem
- Area Radiation Monitoring Subsystem

The following components of the Process Radiation Monitoring Subsystem are required to support plant operation during the dismantlement period:

Auxiliary Service Water/Liquid Waste Effluent Channel: This channel monitors Auxiliary Service Water (ASW) and also monitors liquid effluent from the Temporary Waste Water Processing Island System before it is discharged to Sherman Reservoir. If any of the following conditions occur, the release will be terminated:

- A high or failure alarm from the ASW/liquid effluent radiation monitor
- Loss of power to the ASW/liquid effluent radiation monitor or control circuit.

The Offsite Dose Calculation Manual has provisions for a liquid effluent release with the ASW radiation monitor out of service. Operation of the ASW System for release of liquid effluent will continue, as required by the ODCM, through decommissioning to support dismantlement and decontamination activities.

Primary Vent Stack Channel: This channel monitors airborne releases from ventilated areas of the primary side of the plant before release to the environment. Airborne release monitoring will continue throughout the decommissioning until ventilated areas are sufficiently decontaminated and/or demolished. This monitoring will be conducted until no longer required by the ODCM.

The following Area Radiation Monitoring channels, located in potentially contaminated areas, will be used to monitor conditions during system and component dismantling activities:

- Spent Fuel Pit manipulator crane during component movement activities
- Radiation Control Area Control Point
- Primary Auxiliary Building fan room.

As systems are dismantled, the associated monitoring equipment will also be removed. The Area Radiation Monitoring equipment will remain in operation until contaminated process systems have been removed from the area or are no longer required for demolition activities. It will then be removed prior to the commencement of area and building decontamination activities. Detector locations may be changed to facilitate removal activities if the new location provides comparable detection capability. Radiation Monitoring System (RMS) equipment in uncontaminated areas of the plant will be removed as part of the site dismantlement and restoration process.

Decontamination and dismantlement considerations for the Radiation Monitoring System include removal of the system in uncontaminated areas of the plant, as part of the site dismantlement and restoration process.

3.2.2.1.3 Ventilation Systems (Including VC Ventilation and Purge System)

The Ventilation System includes equipment associated with the collection, monitoring, filtration and discharge of potentially radioactive gaseous effluents from specific plant areas. The Ventilation System provides for the controlled airborne ventilation and discharge function. It is used to ventilate and discharge exhaust air via fixed ductwork from the Vapor Container, Spent Fuel Pit Building, Fuel Transfer Enclosure and Fan Room. The Ventilation System also

ventilates and discharges exhaust air via temporary ducting from the Radioactive Waste Evaporator System, and other areas of the plant as needed to support specific decontamination activities. Potentially radioactive airborne effluents are collected by the Ventilation System, filtered through pre-filters and HEPA filters, and discharged through the Primary Vent Stack (PVS). Instrumentation channels monitor the effluent release through the PVS for noble gases, and sample for tritium and particulates. The Ventilations System components and equipment are located in or on the Primary Auxiliary Building, Vapor Container, and Yard Area.

Ventilation System components and equipment are located in or on the Primary Auxiliary Building, the VC, and the Yard Area. Potential airborne releases from these areas shall be processed (filtered) and monitored prior to release, as specified in the Yankee Decommissioning Quality Assurance Program and the ODCM.

The following are decontamination and dismantlement considerations specific to the Ventilation System:

- Fans and motors will be separated from their associated baseplates before removal,
- Filter units will be dismantled into manageable sections.

Heating and ventilation systems at the Gatehouse will remain to support fuel storage and monitoring at the ISFSI.

Contaminated portions of the Ventilation System will be dismantled and disposed of as radioactive waste.

3.2.2.1.4 Fuel Handling Equipment System

The Fuel Handling Equipment System supported the handling of fuel and irradiated components in the SFP. The system consists of the Spent Fuel Pit manipulator crane and yard area crane, fuel inspection equipment, grappling fixtures, fuel storage racks, and the necessary associated controls and instrumentation.

The fuel handling equipment is no longer used to move spent fuel, since all spent fuel has been removed from the SFP. Elements of this system may be used during the demolition of the SFP and SFP Building.

There are currently no decontamination or dismantlement considerations specific to the Fuel Handling Equipment System. The Fuel Handling System will be dismantled and disposed of as radioactive waste.

3.2.2.1.5 SFP Cooling and Purification System

The SFP Cooling and Purification System cooled and purified Spent Fuel Pit water. The spent fuel has been removed from the pool, and there is no longer any need for the cooling function of this system.

The SFP Cooling and Purification System is not required to support dismantlement activities. Resins from the system will be removed and sent to a radioactive waste disposal facility. The remaining components will be dismantled and disposed of as radioactive waste

Decontamination and dismantlement considerations for the SFP Cooling and Purification System include the isolation of the system at the connections to the Demineralized Water and Auxiliary Service Water System.

3.2.2.1.6 Auxiliary Service Water System

The Auxiliary Service Water (ASW) System supports plant operations by supplying water from the Sherman Reservoir to dilute waste water releases.

The system consists of one auxiliary service water pump and the necessary associated valves, piping, fittings and instrumentation. The pump, installed in the Screenwell House, circulated the Sherman Reservoir water through the SFP Cooling System heat exchanger and discharged it back into Sherman Reservoir. An effluent radiation monitor is installed downstream of the heat exchanger.

The ASW System and components are located in the Screenwell House, the SFP Building, and Yard Area. The system is being used to support decontamination and dismantlement activities.

Once the ASW System is no longer required for demolition activities, it will be isolated at the connections to the SFP Cooling System and the Temporary Waste Water Processing Island. Components and piping will be removed and disposed of.

3.2.2.1.7 Demineralized Water System

The Demineralized Water System supports plant operations by providing demineralized water for decontamination activities.

The system consists of a water storage tank, one make-up pump, and the necessary associated valves, piping, fittings, hoses and instrumentation. The system may be used to support decontamination and dismantlement activities. During decontamination and dismantlement, the Demineralized Water System will be isolated at the connections to plant systems, as they are being isolated and dismantled.

3.2.2.1.8 Compressed Air System

The Compressed Air System provides air for plant use. The system consists of portable electric and/or diesel-driven air compressors, receiver tanks, and the necessary associated valves, piping, fittings, and instrumentation.

The Compressed Air System is required to support dismantlement activities. The system and components are located in various areas of the plant. The system will remain in service to support decommissioning activities. Portions of the Compressed Air System will be isolated, dismantled, and removed as the systems and areas that it supports are dismantled and removed from service.

3.2.2.1.9 Electrical System

The onsite electrical system is powered by the 13.8kV Massachusetts Electric Line. The system consists of transformers, switchboards, motor control centers, distribution panels, and associated instrumentation and controls.

The 13.8 kV Massachusetts Electric Line provides power to the Furlon House, the Training Center, and the Trash Compactor. The electrical system at YNPS provides power to equipment that will remain energized during the final phase of decommissioning.

All onsite electrical equipment is powered from two 480VAC switchboards via two 13.8kV/480V, 100kVA transformers. The 1600 amp Secondary Side Switchboard power equipment is located on the Secondary side of the plant. The Gatehouse and the ISFSI are supplied from the Secondary Side Switchboard. The 1200 amp Primary Side Switchboard powers equipment on the Primary side of the plant. The Spent Fuel Pit motor control center (MCC) and the Fuel Transfer Enclosure Switchboard are powered from the Primary Side Switchboard through a manual transfer switch located near the Primary Side Switchboard. Backup power for portions of the plant electrical system is provided by a manually-started and loaded 175 kW Security Diesel Generator.

Electrical System components associated with the Gatehouse and ISFSI will remain to support storage and monitoring of spent fuel at the ISFSI. There are currently no decommissioning or dismantlement considerations specific to the Electrical System.

3.2.2.1.10 Heating System

The Heating System consists of permanent and temporary electric heater units. The Heating System may be used during the dismantlement period. The system and its components are located in various plant buildings. The system will remain operable to support environmental heating requirements during contaminated system removal activities. Temporary heating may be required during area and building dismantlement activities. Heating System components associated with the Gatehouse will remain to support storage and monitoring of spent fuel at the ISFSI.

There are currently no decommissioning or dismantlement considerations specific to the Heating System.

3.2.2.1.11 Fire Protection and Detection System

The Fire Protection and Detection System provides the equipment needed to detect and to respond to fires that could occur in the plant. The system consists of electric and diesel-driven fire pumps, a pressure maintenance system, hydrants, hoses, detectors, the necessary associated valves, piping, fittings and instrumentation.

Portions of the Fire Protection and Detection System are required to support plant operations during the dismantlement period. The Fire Protection Technical Requirements Manual presents system availability requirements. The Fire Protection Technical Requirements Manual describes the locations of the Fire Protection System components. Portions of the system, that are no longer required to support fire suppression requirements, may be disconnected, isolated and removed.

Modifications to the Fire Protection and Detection System require review and modifications, as necessary, to the YNPS Fire Protection Plan.

3.2.2.2 Structures

3.2.2.2.1 Yard Area Crane and Support Structure

The Yard Area Crane Support Structure is a braced steel frame structure that supports a crane that services the Ion Exchange (IX) Pit, SFP, and Decontamination Room. The crane support structure is approximately 34 feet by 151 feet by 73 feet high, with a design capacity of 80 tons.

The Yard Area Crane and Support Structure may be used to support activities associated with the demolition of the SFP and IX Pit and other heavy lifts. The support columns will be removed to the top of the concrete foundations.

3.2.2.2.2 Vapor Container

The Vapor Container (VC) is a spherical steel structure that surrounds the Reactor Support Structure. It is located about 23 feet above grade and is supported by 16 steel columns. The steel columns are supported by reinforced concrete pedestals.

The Vapor Container provides lateral support to the VC Service Elevator Tower and the PVS. Attachments are limited to minor platform framing, exterior stairs, and lightly loaded supports for pipes and cable trays.

The following considerations are specific to the dismantlement and decontamination of the VC:

- Piping penetrations should be cut off as close as practicable to the VC shell when the process system which passes through it is dismantled.

- Electrical penetrations should be cut off as close as practicable to the VC shell after all cables in the penetration have been disconnected and removed.

- Platforms, ladders, and stairs along with the supporting steel members should be removed in conjunction with area decontamination and dismantlement activities.

The VC is no longer needed for contamination isolation and will be disposed of as radioactive waste.

3.2.2.2.3 Reactor Support Structure

The Reactor Support Structure is a reinforced concrete structure which supports the polar crane. The Reactor Support Structure consists of two concentric concrete cylinders. The cylinders are connected together with reinforced concrete radial walls which formed compartments for the Main Coolant Loops, pressurizer, and Equipment Hatch. The compartments are covered by a reinforced concrete charging floor. The charging floor is composed of removable concrete slabs which allow crane access to the compartments.

The Reactor Support Structure is supported on eight reinforced concrete steel encased columns which penetrate the VC shell. The VC penetrations are sealed by stainless steel expansion joints. An annular space is provided to permit the VC and internal concrete structure to move independently.

The following considerations are specific to the dismantlement and decontamination of the Reactor Support Structure:

- The steel casings of the support columns that form the shell to the expansion joint should be removed to permit access to the concrete columns.

- The concrete columns will be decontaminated, as required.

- All contaminated equipment was removed prior to decontamination or removal of concrete on the walls, floors, and ceilings.

- Concrete and reinforcing bar on the inner section of the inner support wall, which was behind the Neutron Shield Tank, was slightly activated and has been partially removed.

- The concrete and reinforcing around the Main Coolant Loop penetrations may also be slightly activated. The removal zone was determined using cored samples of the concrete reinforcing.

The RSS will be demolished and disposed of as radioactive waste.

3.2.2.2.4 VC Polar Crane

The VC Polar Crane was used to support refueling and maintenance-related activities inside the VC. The crane was originally designed for the installation of the Reactor Vessel and Steam Generators. However, crane capacity was reduced during plant operations by converting one hook to a smaller capacity to increase hook travel speed. The smaller hook was replaced with a larger hook as part of the Component Removal Project, returning the Polar Crane to its original capacity. After the project was completed, the larger hook was again replaced with the smaller hook.

The crane consists of a bridge which rides on a 75-foot diameter crane rail with a common trolley rigged with two hooks. The rated capacity of the bridge and common trolley is 150 tons. The installed hooks have rated capacities of 75 tons (Hook No. 1) and 15 tons (Hook No. 2). The VC Polar Crane may be used to support decontamination and dismantlement activities in the VC.

The following considerations are specific to the decontamination and dismantlement of the VC Polar Crane:

- The VC Polar Crane should be decontaminated at the time of decontamination of the VC shell or should be removed and decontaminated at a designated area/facility.

- The hoist, trolley, motors, and control cab should be removed from the girders.

The VC Polar Crane will be dismantled and disposed of as radioactive waste.

3.2.2.2.5 Radiation Shielding

Radiation shielding is installed for both personnel and equipment protection. The radiation shielding is comprised of several categories according to function:

- Primary Shielding
- Secondary Shielding
- Auxiliary Shielding.

The following considerations are specific to the dismantlement and decontamination of the radiation shielding:

- Auxiliary shielding will be decontaminated and dismantled as part of the area and building decontamination and dismantlement activities.

- Supplemental shielding may be decontaminated and dismantled at any time.

Radiation Shielding will be demolished or dismantled and disposed of as radioactive waste.

3.2.2.2.6 Pipe Chases

There are two pipe chases between the Primary Auxiliary Building and the VC:

Lower Pipe Chase: The Lower Pipe Chase is a corridor that runs between the second story of the PAB and the VC lower hemisphere. The chase is constructed of reinforced concrete.

Upper Pipe Chase: The Upper Pipe Chase is a corridor that runs form the PAB roof to the VC lower hemisphere. The chase is constructed of concrete masonry units and is supported by the lower pipe chase.

The piping in both Pipe Chases has been removed and the VC cut to allow for easier removal of equipment and components from the VC and to serve as an alternate personnel access to the VC. The pipe chases will be removed and disposed of as radioactive waste. The associated support columns will be removed to the level of the PAB ground floor level (elevation 1022'-8").

There are currently no decontamination or dismantlement considerations specific to the Pipe Chases.

3.2.2.2.7 Fuel Transfer Chute

The Fuel Transfer Chute was used to transfer new and spent fuel, as well as irradiated components, between the SFP and the VC. The chute was a series of stainless steel pipe sections connected by bolted flanges enclosed in a reinforced concrete tunnel. The chute is structurally isolated from the VC by a metal bellows expansion joint. The Fuel Transfer Chute was accessed through a below-grade manhole tank.

The Fuel Transfer Chute has been isolated by:

- Re-supporting the Fuel Transfer Chute/SFP penetration assembly to the SFP using the latch mechanism,
- Filling the annular space between the Fuel Transfer Chute pipe and the SFP penetration pipe with grout,
- Removing one section of the Fuel Transfer Chute pipe uphill of the Lower Lock Valve (LLV),
- Installing a blind flange cap on the LLV,
- Erecting permanent form work and placing a concrete barrier in the LLV pit, and
- Installing metal plates above and below the LLV pit to preclude personnel access to this area.

The Fuel Transfer Chute will be removed to elevation 1022'-8", and a temporary cover will be installed on the remaining lower chute segment. There are currently no additional decontamination or dismantlement considerations specific to the Fuel Transfer Chute. The Fuel Transfer Chute will be demolished and disposed of as radioactive waste. The remaining lower chute segment will be demolished with the Spent Fuel Pit.

3.2.2.2.8 Ion Exchange Pit

The Ion Exchange Pit (IX Pit) is a reinforced concrete structure that contained the ion exchange vessels used to purify the SFP and Main Coolant System. The IX Pit is no longer in service, and some decontamination and dismantlement activities have commenced.

The IX Pit shares a common wall with the SFP, and thus, no major dismantlement activities could be performed on this common wall until the SFP had been drained.

The IX Pit metal hatch covers will be removed and disposed of. In general the IX Pit walls will be removed to elevation 1022'-8", with the exception of the south wall and the east wall which will be removed to elevation 1035'-8". The remaining earth-retaining walls will be stabilized as required by engineering analyses. There are currently no additional decontamination or dismantlement considerations specific to the IX Pit. The IX Pit will be disposed of as radioactive waste.

3.2.2.2.9 Primary Vent Stack

The Primary Vent Stack is a steel stack that vents monitored airborne releases from the Ventilation System and the VC Ventilation and Purge System. The bottom of the stack is supported by a steel frame that is supported by the PAB. The Primary Vent Stack may be used during the dismantlement period to support decommissioning activities, and as needed to vent air processed by both the Ventilation System and VC Ventilation and Purge System. There are currently no additional decontamination or dismantlement considerations specific to the Primary Vent Stack. The Primary Vent Stack will be dismantled and disposed of as radioactive waste.

3.2.2.2.10 Spent Fuel Pit and SFP Building

The Spent Fuel Pit (SFP) is a reinforced concrete structure that provided underwater storage of irradiated fuel, control rods, and associated fuel transfer equipment. The SFP inside dimensions are approximately 16 feet by 34 feet by 37 feet deep, with a wall thickness that varies between 5 and 6 feet. A stainless-steel linear was later added to the SFP walls and floor to prevent leakage.

The SFP Building is a steel-braced frame, metal-sided structure that supports the superstructure to both the New Fuel Vault and the SFP. The building provides an enclosed work area and contains the Spent Fuel Manipulator Crane, the New Fuel Hoist, and the SFP Cooling System pumps. Roof hatches are provided for equipment and cask access using the Yard Area Crane, which is located directly above the building.

Components and systems will be removed from the SFP and SFP Building. The SFP walls will be removed to elevation 1022'-8". The support columns will be removed to the top of the concrete foundation. The coatings from remaining interior and exterior surfaces of the SFP will be removed. The liner will be removed and disposed of as radioactive waste.

Decontamination and dismantlement considerations specific to the SFP Building are as follows:

- The SFP liner should be decontaminated before dismantlement.
- The SFP Handling Equipment should be dismantled into more easily managed sections.
- Soil under the SFP will be sampled as a part of site characterization.

The Spent Fuel Pit and SFP Building will be disposed of as radioactive waste.

3.2.2.2.11 New Fuel Vault

The New Fuel Vault is a reinforced concrete and concrete masonry structure. The vault is contained within a lower section of the SFP Building. The west and south walls of the New Fuel Vault are common to the SFP and the IX Pit, respectively.

During decommissioning and dismantlement, all systems and components will be removed from the New Fuel Vault. In general the walls of the New Fuel Storage Vault are being removed to elevation 1022'-8", with the exception of the south wall which is being removed to elevation 1035'-8". There are currently no additional decontamination or dismantlement considerations specific to the New Fuel Vault. The New Fuel Vault will be disposed of as radioactive waste.

3.2.2.2.12 Primary Auxiliary Building

The Primary Auxiliary Building (PAB) is a concrete masonry building with two stories and a partial basement at the southeast corner. Systems and components within the PAB have been dismantled and will be removed (including those on the PAB roof slab). In general the PAB walls will be removed to 1022'-8", with the exception of the south wall and east wall which will be removed to elevation 1035'-8". The remaining earth retaining walls will be stabilized as required by engineering analysis. There are currently no additional decontamination or dismantlement considerations specific to the PAB. The PAB will be disposed of as radioactive waste.

3.2.2.2.13 Waste Disposal Building

The Waste Disposal Building contained system and structures for processing, packaging, and temporarily storing low-level radioactive waste, prior to shipment offsite. The structure is a steel-framed building with concrete masonry unit walls. Systems have been dismantled and the Waste Disposal Building has been decontaminated. The Waste Disposal building shares common walls with the Warehouse, Potentially Contaminated Area (PCA) Storage Building 1, and the Compactor Building.

Systems and components will be removed from the building. Hazardous materials will be removed. The building will be removed to the top of the floor at elevation 1035'-8". There are currently no additional decontamination or dismantlement considerations specific to the Waste Disposal Building. The Waste Disposal Building will be disposed of as radioactive waste.

3.2.2.2.14 Safe Shutdown System Building

The Safe Shutdown System Building contains the Fire Water Storage Tank (TK-55) Heating Boiler and associated components. The Safe Shutdown Building will be required during the dismantlement period to house the heating boiler and prevent the contents of TK-55 from freezing. The structure is constructed of reinforced concrete walls.

During dismantlement activities, building equipment will be removed and disposed of. The building, itself, will be removed to the top of floor elevation 1034'-0". There are currently no additional decontamination or dismantlement considerations specific to the Safe Shutdown System Building. The Safe Shutdown System Building will be disposed of as radioactive waste.

3.2.2.2.15 Potentially Contaminated Area (PCA) Storage Buildings and Warehouse

There are three major areas located on the plant site for the storage of radioactive/hazardous materials and waste awaiting shipment:

PCA Storage Building 1: PCA Storage Building 1 is used primarily for the storage of low-level radioactive material prior to shipment. The structure is comprised of concrete masonry walls.

PCA Storage Building 2: PCA Storage Building 2 is used for the storage of contaminated tools and equipment. The structure is constructed of un-insulated corrugated metal panels.

PCA Warehouse: The PCA Warehouse is used for storage of low-level radioactive waste, waste containers, and contaminated equipment prior to shipment. The structure is a steel-framed building, with reinforced concrete masonry unit walls.

These storage areas may be used during the site dismantlement period to support radioactive material processing and storage. These structures will be decontaminated or disposed of after all radioactive/hazardous materials stored within these areas have been permanently removed.

Once these structures are no longer required, systems and components will be removed from the buildings and disposed of as radioactive waste. These buildings will be removed to elevation 1035'-8". There are currently no additional decontamination or dismantlement considerations specific to the PCA Storage Buildings or Warehouse.

3.2.2.2.16 Compactor Building

The Compactor Building contained two solid waste compactors and provides a packaging area for radioactive waste shipping containers. The structure's walls are constructed from reinforced concrete masonry units. The Compactor Building may be required during the dismantlement

period to reduce exposure to radiation and the spread of contamination. The structure will be removed after contaminated material processing is no longer required.

The Compactor Building will be removed to the top of the floor at elevation 1035'-8", after components and systems are removed. Hazardous materials will be removed from the remaining portions of the structure. There are currently no additional decontamination or dismantlement considerations specific to the Compactor Building. The Compactor Building will be disposed of as radioactive waste.

3.2.2.2.17 Service Building and Fuel Transfer Enclosure

The Service Building is divided into two sections. One of these sections is located in the Radiation Control Area (RCA) of the plant. This section contains the primary side machine shops, control point, primary side chemistry laboratory, counting room, and decontamination showers. The structure's walls are constructed from reinforced concrete masonry units. The building may be required to support dismantlement and decommissioning activities.

The Fuel Transfer Enclosure (FTE) is a relatively new structure that served as the work area for the preparation of the fuel storage canisters, as a part of the overall fuel loading operation. The FTE is a southern extension of the Service Building, under the yard area crane, and immediately adjacent to the SFP Building. It is a steel building that includes the existing North Decon Area, and the existing welding booth, which served as the access point to the FTE. Access to the FTE by the Yard Crane was provided by a roof hatch. The FTE may also be required to support dismantlement and decontamination activities.

The Service Building and FTE will be removed to the top of the ground-level floor slab at elevation 1022'-8", after systems and components have been removed. Hazardous materials will be removed. There are currently no additional decontamination or dismantlement considerations for the Service Building and Fuel Transfer Enclosure. The Service Building and Fuel Transfer Enclosure will be disposed of as radioactive waste.

3.2.2.2.18 Miscellaneous Storage Tanks

The following tanks are contaminated, potentially contaminated, or are needed to support decommissioning activities:

- Primary Water Storage Tank,
- Temporary Waste Water Processing Island Tanks,
- Service Building Radioactive Sump Tanks,
- Propane Tanks,
- Fire Water Storage Tank,
- Fuel Oil Storage Tanks,

These tanks will remain in service, as required, throughout the dismantlement phase. When no longer required, the tanks will be emptied, cleaned and disposed of by an authorized and licensed contractor. The tanks will be removed to the top of the concrete foundations. There are

currently no additional decontamination or dismantlement considerations specific to the miscellaneous storage tanks. Tanks that contained radioactive materials will be disposed of as radioactive waste.

3.2.2.2.19 Meteorological Tower

The Meteorological Tower provided real time capability to determine wind speed and direction for onsite emergency planning purposes. The Meteorological Tower will be removed to grade.

A meteorological tower exists at the ISFSI pad to provide real time capability to determine wind speed and direction for on-site emergency planning purposes. There are currently no decontamination or dismantlement considerations specific to the Meteorological Tower.

3.2.3 Phase 3 Activities

The final phase of decommissioning will take place after all spent fuel and GTCC waste is removed from the site and the dismantlement and decontamination of the ISFSI is complete. In the interim, spent fuel and GTCC will be stored in the ISFSI.

Decommissioning of the ISFSI consists primarily of the disposal of the concrete canister overpacks, provided they are not shipped with the spent fuel casks. The overpack design minimizes neutron activation, thereby generating minimal radioactive waste. This waste should qualify for disposal at a low-level radioactive waste disposal site.

As indicated in Section 1 of the LTP, YAEC may decide to remove some portions of the site from the license before license termination. For those areas the process outlined in Section 1.5 will be followed. Termination of the license will occur after the last stage of final status survey and independent NRC verification (i.e., on the grounds and SSCs associated with the ISFSI).

3.3 Decommissioning Schedule

Figure 3-1 provides an overview of the decommissioning schedule. Updates will be provided to the NRC through current interactions with the NRC Region I personnel.

3.4 Radiological Impacts of Decommissioning

The decommissioning activities are being conducted under the provisions of the YNPS Radiation Protection Program and Radioactive Waste Management Program. These programs continue to be implemented as described in the YNPS FSAR. The Radiation Protection Program implements the regulatory requirements of 10CFR20 through approved plant procedures established to maintain radiation exposures ALARA. The Radioactive Waste Management Program controls generation, characterization, processing, handling, shipping and disposal of radioactive wastes per the approved YNPS Radiation Protection Program, Process Control Program, and plant procedures.

The current Radiation Protection Program (described in FSAR Section 507), Waste Management Program (FSAR Section 508) and Offsite Dose Calculation Manual will be used to protect workers and the public during the various decontamination and decommissioning activities.

These well-established programs are routinely inspected by the NRC to ensure that workers, the public, and the environment are protected during facility decommissioning activities. It is also important to note that most decommissioning activities involve very similar radiation protection and waste management considerations as those encountered during plant operations. As described in the PSDAR, the YNPS decommissioning will be accomplished with no significant adverse environmental impacts in that:

- The postulated impacts associated with the method chosen, DECON, have already been considered in the Final Generic Environmental Impact Statement (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 those in the FGEIS.

3.4.1 Occupational Exposure

The total radiation exposure impact for decommissioning was estimated in the Decommissioning Plan, Reference 3-5, to be approximately 744 person-rem (see breakdown in Table 3-3). This estimate was re-evaluated in 1996, resulting in a lower value of 580 person-rem (see also Table 3-3). As discussed in the PSDAR, the actual exposure through December 31, 2002, is 555 person-rem.

Radiation exposure to off-site individuals for expected conditions, or from postulated accidents is bounded by the EPA's Protective Action Guidelines and NRC regulation. The public exposure due to radiological effluents will continue to remain well below the 10CFR20 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.

3.4.2 Radioactive Waste Projections

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, Reference 3-5, to be approximately 132,000 ft^3. As of the end of 2002, over 144,184 ft^3 was shipped. 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 ft^3 (Reference 3-7). 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 647,000 ft^3. There is no intent to dispose of radioactive materials in unrestricted areas (such as industrial or municipal landfills).

3.5 References

3-1 Title 10 to the Code of Federal Regulations, Part 50.82, "Termination of license."

3-2 YNPS Post-Shutdown Decommissioning Activities Report, dated June 2003.

3-3 Supplement 1 to NUREG-0586, "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," dated November 2002.

3-4 Letter from R.W. Varney, Region Administrator, EPA Region I, to J. Kay, Regulatory Affairs, Yankee, Extension of Amended (as of January 6, 1999) Alternative Method of Disposal Authorization for PCB Paint Removal, dated October 8, 2002.

3-5 YNPS Decommissioning Environmental Report, dated December 1993.

3-6 USNRC Atomic Safety and Licensing Board Docket No. 50-029-DCOM, Supplemental Affidavit of Russell A. Mellor, September 3, 1996.

3-7 Memorandum RP-03-045 from Greg Babineau to Jim Kay, dated November 19, 2003.

Table 3-1

Remaining Contaminated Plant Systems

System	Internally Contaminated?	Externally Contaminated?	Extent of Contamination
Radiation Monitoring System	No	Yes	Entire System
VC Ventilation and Purge System	Yes	Yes	Entire System
Fuel Handling Equipment System	Yes	Yes	Entire System
SFP Cooling and Purification System	Yes	Yes	Entire System
Auxiliary Service Water System	No	Yes	Partial System
Demineralized Water System	No	Yes	Partial System
Compressed Air System	No	Yes	Partial System
Electrical System	No	Yes	Partial System
Heating System	Yes	Yes	Partial System
Ventilation System	Yes	Yes	Entire System
Fire Protection and Detection System	No	Yes	Partial System

Table 3-2

Status of Plant SSCs as of July 2003

SSC	Status
Reactor Vessel	Removed.*
Steam Generators	Removed.
Main Coolant System	Removed.
Pressure Control and Relief System	Removed.
Charging and Volume Control System	Removed.
Chemical Shutdown System	Removed.
Purification System	Removed.
Component Cooling System	Removed.
Primary Plant Corrosion Control System	Removed.
Primary Plant Sample System	Removed.
Waste Disposal System	Original system removed, replaced with temporary liquid waste system.
Shutdown Cooling System	Removed.
Primary Plant Vent and Drain System	Removed.
Emergency Core Cooling System	Removed.
Radiation Monitoring System	Partially removed, portions in service.
VC Ventilation and Purge System	Partially removed, portions in service.
VC Heating and Cooling System	Removed.
Post-Accident Hydrogen Control System	Removed.
Containment Isolation System	Removed.
Fuel Handling Equipment System	Partially removed, portions in service
SFP Cooling and Purification System	Modified for SFP Island
Main Steam System	Removed.
Feedwater System	Removed.
Steam Generator Blowdown System	Removed.
Emergency Feedwater System	Removed.
Service Water System	Partially Removed, ASW installed for SFP Island.
Demineralized Water System	Partially removed, portions in service.
Compressed Air System	Original system removed, temporary system provided for SFP.
Electrical System	Partially removed, portions in service.

* "Removed" SSCs have been physically removed from the site and disposed of in appropriate disposal facilities.

Table 3-2

Status of Plant SSCs as of July 2003

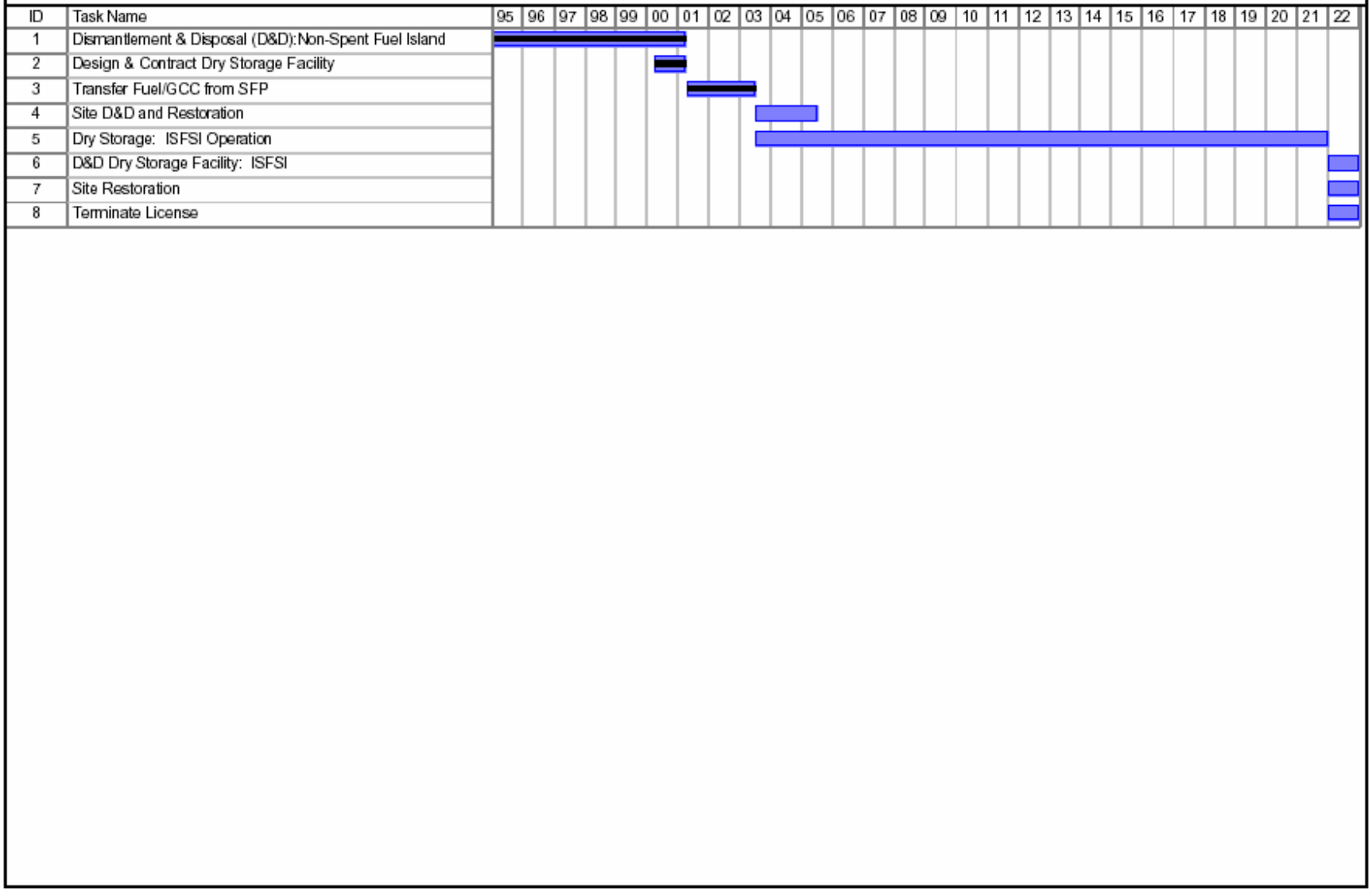
SSC	Status
Heating System	Partially removed.
Ventilation System	Partially removed, portions in service.
Fire Protection and Detection System	Partially removed, portions in service
Primary Pump Seal Water System	Removed.
Safe Shutdown System	Removed.
Water Cleanup System	Removed.
Vapor Container	Placed in lay-up condition.
Reactor Support	Placed in lay-up condition.
Vapor Container Polar Crane	Placed in lay-up condition.
Radiation Shielding	Partially removed/decontaminated.
Neutron Shield Tank	Removed.
Pipe Chases	Placed in lay-up condition.
Fuel Transfer Chute	Partially removed/decontaminated
Yard Area Crane and Support Structure	In service.
Ion Exchange Pit	Partial decontamination in 1997, full decon after fuel removed from SFP. North wall required structurally for SFP.
Primary Vent Stack	In service.
Spent Fuel Pit and Spent Fuel Pit Building	In service.
New Fuel Vault	To be decontaminated after fuel removed from SFP. West wall required structurally for SFP.
Primary Auxiliary Building	Partially decontaminated.
Diesel Generator Building	Building demolished.
Waste Disposal Building	Partially decontaminated.
Safe Shutdown System Building	Partially decontaminated.
Potentially Contaminated Area (PCA) Storage Buildings 1 and 2 and Warehouse	PCA Bldgs No. 1 and 2 and Warehouse to be decontaminated.
Compactor Building	To be decontaminated.
Service Building	Portions of building within the Radiation Control Area are in service.
Miscellaneous Tanks	Most removed; one tank remaining to be decontaminated.
Meteorological Tower	Function no longer required. Tower at ISFSI provides necessary wind speed and direction information.

Table 3-3

Radiation Exposure Projections

Activity	Exposure (Person-rem)	
	Original Estimate, Reference 3-5	**Revised Estimate, Reference 3-6**
Component Removal Project		
• Asbestos Abatement	73	76
• Steam Generators and Pressurizer	62	59
• Reactor Vessel Internals	25	92
Subtotal	**160**	**227**
Fuel Transfer	41	41
Dismantlement		
• Reactor Vessel	48	33
• Main Coolant System	50	36
• Other Systems in Vapor Container	84	48
• Balance of Plant Systems	98	48
• Asbestos Abatement	90	55
• Structures	50	28
• Miscellaneous	82	56
Subtotal	**502**	**304**
Transportation	41	7
Plant Effluents	<1	<1
Total	**744**	**579**

Figure 3-1
YNPS Decommissioning
Summary Schedule



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