TROJAN NUCLEAR PLANT

PGE-1061, "Decommissioning Plan"

Revision 2

---- The following is provided as a guide for updating PGE-1061, "Decommissioning Plan" ----

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1. SUMMARY OF PLAN

1.1 PLAN AND DECOMMISSIONING ALTERNATIVE

This section provides a brief introduction and overview of the information furnished in the Trojan Nuclear Plant (TNP) Decommissioning Plan.

1.1.1 INTRODUCTION

TNP is located in Columbia County, Oregon, approximately 42 miles north of Portland, Oregon. The site consists of approximately 634 acres incorporating a recreational area/park, various office buildings, and an industrial area enclosed by a security fence.

TNP is jointly owned by Portland General Electric (PGE), 67.5 percent; the City of Eugene, 30 percent through the Eugene Water and Electric Board (EWEB); and Pacific Power and Light/PacifiCorp (PP&L), 2.5 percent. Ownership rights and operation of TNP are defined in "Agreement for Construction, Ownership, and Operation of the Trojan Nuclear Project," dated October 5, 1970. PGE is the majority owner and has responsibility for operating and maintaining TNP. The Bonneville Power Administration (BPA), a power marketing agency under the United States Department of Energy (DOE), is obligated through Net Billing Agreements to pay costs associated with EWEB's share of TNP, including decommissioning and spent fuel management costs.

TNP achieved initial criticality in November 1975 and began commercial operation in May 1976. The reactor output was rated at 3411 MWt with an approximate net electrical output of 1130 MWe. The nuclear steam supply system was a four-loop pressurized water reactor designed by Westinghouse Electric Corporation.

TNP was shutdown for the last time on November 9, 1992. On January 27, 1993, after approximately 17 years of operation, PGE notified the Nuclear Regulatory Commission (NRC) of its decision to permanently cease power operations. The owners' decision was predicated on both financial and reliability considerations. The NRC amended the TNP Facility Operating License (NPF-1) to a Possession Only License on May 5, 1993.

PGE chose the DECON alternative for decommissioning. Following plant shutdown a transition period of approximately six years is scheduled to allow for decay heat dissipation, prior to transferring fuel to an Independent Spent Fuel Storage Installation (ISFSI). During the transition period some dismantlement activities may occur. An evaluation of these dismantlement activities will be performed using administrative procedures prior to conducting the activity. This evaluation process is discussed further in Section 1.4.

Following fuel transfer to the ISFSI, dismantlement of the radioactive systems, components, and structures is scheduled. Components and structures will be removed consistent with approved plant procedures and processes, including the TNP Nuclear Quality Assurance Program, where appropriate. The Nuclear Quality Assurance Program provides controls for quality-related activities pertaining to the operation, maintenance, design, modification, and decommissioning of TNP. Section 7 discusses the Nuclear Quality Assurance Program.

The TNP Decommissioning Plan is being submitted in accordance with the requirements of 10 CFR 50.82, "Application for termination of license," Paragraph (a), which requires submittal of a proposed Decommissioning Plan within two years of permanent cessation of operations. The objective of the Decommissioning Plan is to demonstrate TNP can be decommissioned in a safe manner and to describe plans for demonstrating the facility and site meet the criteria for release for unrestricted use. The plan is designed to allow implementation flexibility in actual decommissioning activities to incorporate evolving technology, where appropriate.

1.1.2 CONTENTS OF THE DECOMMISSIONING PLAN

The Decommissioning Plan was prepared in accordance with 10 CFR 50.82(b) [10 CFR 50.82(a)(4) as of August 28, 1996] and the guidance provided in Draft Regulatory Guide DG-1005, "Standard Format and Content for Decommissioning Plans for Nuclear Reactors." In part, the Decommissioning Plan discusses TNP decommissioning methodology and organization, estimated costs and available funds, major tasks and schedules, protection of occupational and public health and safety including site characterization, radiation protection, waste management, and analyses of hypothetical decommissioning events. It also addresses a number of additional areas and programs such as quality assurance, fire protection, and physical security provisions.

The license termination plan will be a supplement to the DSAR or equivalent and will be submitted at least 2 years before termination of the license date.

The license termination plan will include:

1. A site characterization;

2. Identification of remaining dismantlement activities;

3. Plans for site remediation;

4. Detailed plans for the final radiation survey;

5. A description of the end use of the site, if restricted;

6. An updated site-specific estimate of remaining decommissioning costs; and

7. A supplement to the environmental report, pursuant to §51.53, describing any new information or significant environmental change associated with the licensee's proposed termination activities.

1.2 MAJOR TASKS, SCHEDULES AND ACTIVITIES

TNP decommissioning is divided into two broad periods: transition, and decontamination and dismantlement. Decommissioning will be followed by site restoration. This section provides a brief description of these activities. Details are provided in Section 2.2.

1.2.1 DESCRIPTION OF MAJOR ACTIVITIES

The transition period began with permanent plant shutdown in January 1993 and will continue until spent fuel is transferred to an ISFSI. The decontamination and dismantlement period will begin once the spent fuel is transferred to the ISFSI, which is expected to occur in 1998. Site restoration will begin following termination of the Part 50 license and involves the final disposition of structures, systems, and components.

Throughout TNP decommissioning, PGE may use contractors to provide specialized services or to supplement the facility staff when necessary. PGE will administer the tasks and oversee contractors as delineated in Section 2.5.

Storing fuel at TNP during and after plant decommissioning significantly impacts both the process and costs associated with decommissioning. The TNP contract with DOE, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste," stipulates services provided by DOE shall begin not later than January 31, 1998. This contract clause provides the basis for the schedule forecast in DOE's annual acceptance priority ranking for receipt of spent fuel and/or high level waste. The published schedule specifies the first TNP shipment to be in 2002 (the fifth year of repository operation, assuming initial operation in 1998), and the final shipment is projected for 2018. Recognizing the uncertainty, but with no better formal estimate, the contract dates for fuel shipment are currently being used for planning purposes. The spent fuel management plan is discussed in Section 3.3.

1.2.1.1 Transition Period

During this period, PGE will maintain systems and components required to support decommissioning and spent fuel storage in accordance with the Facility Operating (Possession Only) License NPF-1 and administrative procedures. Activities anticipated include assessing the functional requirements for systems, structures, and components; deactivating systems, structures, and components; some dismantling, including removal of steam generators, pressurizer, and other

systems/components not necessary for assuring safe spent fuel storage in the spent fuel pool; and maintaining safe spent fuel storage. PGE will also conduct detailed decommissioning project planning, prepare engineering specifications and procedures, procure special equipment needed to support decommissioning, and negotiate service contracts required for decommissioning activities.

Major activities scheduled to occur following Decommissioning Plan approval during the transition period include system deactivations and system/component removal not necessary for safe storage of fuel; reactor vessel internals removal; decontamination and dismantlement planning; licensing and constructing an ISFSI; and transferring the fuel from the spent fuel pool to the ISFSI.

Spent fuel will be transferred from the spent fuel pool to facilitate decontamination and dismantlement. Once the spent fuel is transferred to the ISFSI, the transition period ends and the decontamination and dismantlement period begins.

1.2.1.2 Decontamination and Dismantlement

Major activities planned during the decontamination and dismantlement period include removing remaining contaminated systems and components, decontaminating structures, and a final radiation survey to verify radioactivity has been reduced to sufficiently low levels to allow for unrestricted release of the site.

Contaminated systems, components, and structural material will be decontaminated or removed and packaged. The packaged material will either be shipped to an off-site processing facility, shipped directly to a low-level radioactive waste disposal facility, or otherwise handled in accordance with applicable regulations.

Decontaminating plant structures may be completed concurrent with removing equipment and systems and may include the use of a variety of techniques ranging from water washing to surface material removal. Demolishing certain buildings may be necessary based on degraded structural integrity as a result of decontamination efforts and/or removal of systems and components, surrounding walls, or other barriers.

A final radiation survey will be performed to determine the final condition of the site after decontamination activities are complete. The purpose of the final radiation survey is to demonstrate radiological conditions at TNP are within the final site release criteria to support license termination. Upon completing the final survey, a final survey report will be submitted to the NRC.

1.2.1.3 Site Restoration

Nonradiological site remediation activities are scheduled to be completed following termination of the Facility Operating (Possession Only) License NPF-1. Nonradiological site remediation activities are scheduled to begin around 2018 and conclude in 2019. Some site restoration activities may be completed during the decontamination and dismantlement period of decommissioning.

1.2.2 FINAL RELEASE CRITERIA

TNP decommissioning will safely reduce radioactivity at the site to acceptable levels thereby allowing release of the site for unrestricted use. Release criteria are discussed in Section 4.2.

1.2.3 SCHEDULE FOR DECOMMISSIONING/SITE RESTORATION ACTIVITIES

A detailed schedule for decommissioning/site restoration activities is presented in Section 2.2. The following is an overview of the current TNP decommissioning/site restoration project schedule.

January 1993 - Mid 1998	Transition period
Late 1994 - Late 1995	Large Component Removal Project
Late 1996 - Mid 1998	Decontamination and dismantlement planning
Late 1996 - Mid 1998	Complete planning/building an ISFSI
Early 1997 - Early 1998	Reactor Vessel Internals Removal
Mid 1998	Transfer spent nuclear fuel to the ISFSI
Mid 1998 - Late 2001	Full-scale decontamination and dismantlement
Late 1999	Submit application for termination of the license
Late 2001	Complete final radiation survey
Late 2001 - Mid 2018	Caretaking
Mid 2018 - Late 2019	Demolish buildings

1.3 DECOMMISSIONING COST ESTIMATE AND FUNDING PLAN SUMMARY

This section provides a summary of the final estimated costs and funding methodology for TNP decommissioning, spent fuel management, and nonradiological decommissioning activities. The decommissioning cost estimate and the co-owners' plan for assuring availability of funds for completing these activities is provided in Section 5.

1.3.1 COST ESTIMATE SUMMARY

TNP decommissioning, spent fuel management, and nonradiological decommissioning costs are estimated at approximately $425.1 million in 1993 dollars. Costs are derived from a cost estimate prepared by PGE and TLG Services, Inc. Table 5.1-1 provides an itemized summary of costs.

1.3.2 FUNDING PLAN SUMMARY

1.3.2.1 Current Decommissioning Funding Capabilities

Co-owners separately collect and maintain funds for decommissioning. Funds are collected through rates and deposited to external trust funds. Because TNP was shutdown prematurely, the external trust funds contain only a portion of the total amount needed for decommissioning. As of December 31, 1993, approximately $63 million were in the funds. Table 5.3-1 summarizes the status of the decommissioning trust funds.

1.3.2.2 Decommissioning Funding Plans

The decommissioning trust fund cash flow and funding plan for each of the co-owners are presented in Tables 5.3-2, 5.3-3, and 5.3-4. The co-owner funding information incorporates trust fund contribution schedules and necessary financial assurance and bridging funds. The trust fund contribution schedules are based on funding requirements for both radiological and nonradiological decommissioning costs, as well as financing costs and specific spent fuel management costs including planning, design, construction, operations and maintenance (O&M), and decommissioning of an ISFSI.

As indicated above, decommissioning trusts will not initially contain the funds necessary to complete radiological decommissioning prior to the start of the decontamination and dismantlement period in 1998. Therefore, prior to commencing this period, each co-owner will secure and maintain a financial assurance mechanism in accordance with 10 CFR 50.75, "Reporting and recordkeeping for decommissioning planning." Additional funding plan details are provided in Section 5.

1.4 EVALUATION OF CHANGES, TESTS, AND EXPERIMENTS

The Decommissioning Plan is an extension of the Defueled Safety Analysis Report (DSAR). PGE may make changes to the Decommissioning Plan without prior NRC approval provided the proposed changes do not:

1. Involve a change to Facility Operating (Possession Only) License NPF-1;

2. Involve an unreviewed safety question as defined in 10 CFR 50.59, "Changes, tests and experiments;"

3. Cause a significant increase in the consequences of a decommissioning event as described in Section 3.4 of this plan, or create the potential for a new or different kind of decommissioning event from those previously analyzed;

*4. Preclude release of the site for unrestricted use;

*5. Adversely impact the availability of funds to complete radiological decommissioning, as a result of change in radiological decommissioning costs or funding; or

*6. Create the potential for adverse effects on the environment not previously considered in the TNP Environmental Report or its Supplement.

In taking actions permitted under 10 CFR 50.59, PGE is required to notify the NRC and the State of Oregon, in writing, before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules described in the Decommissioning Plan (PGE-1061), including changes that significantly increase the decommissioning cost. [10 CFR 50.82(a)(7)]

*Comparable to requirements of Final Decommissioning Rule, 10 CFR 50.82(a)(6).

2. CHOICE OF DECOMMISSIONING ALTERNATIVE AND DESCRIPTION OF ACTIVITIES

2.1 DECOMMISSIONING ALTERNATIVE

PGE reviewed the decommissioning alternatives described in NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities." Although the NUREG discusses three alternatives[1], DECON, SAFSTOR, and ENTOMB, the NRC concluded the ENTOMB option was less desirable and would result in a decommissioning period greater than 60 years. Consequently, PGE selected several DECON and SAFSTOR implementation methods for detailed review and analysis.

PGE chose the DECON alternative for decommissioning since this alternative minimizes financial uncertainties associated with waste disposal and other decommissioning costs. The DECON alternative will also use experienced plant personnel and allows for prompt site remediation and release for unrestricted use.

The TNP decommissioning schedule is consistent with the 60 year decommissioning time limit specified in 10 CFR 50.82(b)(1) [10 CFR 50.82(a)(3) as of August 28, 1996].

1. NUREG-0586 defines the three alternatives as follows.

   DECON is the alternative in which equipment, structures, and portions of a facility and site containing radioactive contaminants are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of facility operations.

   SAFSTOR is the alternative in which the nuclear facility is placed and maintained in a condition that allows the nuclear facility to be safely stored and subsequently decontaminated to levels that permit release for unrestricted use.

   ENTOMB is the alternative in which radioactive contaminants are encased in a structurally long-lived material, such as concrete. The entombed structure is appropriately maintained, and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property.

2.2 DECOMMISSIONING ACTIVITIES, TASKS, AND SCHEDULES

2.2.1 INTRODUCTION

This section presents a description of activities and tasks associated with TNP decommissioning. Included is a schedule for implementation of decommissioning activities, estimates of associated occupational radiation dose, and projected volumes of radioactive waste. The information presented reflects initial planning for decommissioning activities. Detailed planning will precede initiation of these activities, and will include engineering design, as low as is reasonably achievable (ALARA) planning, and refinement of the cost, schedule, and required resources.

2.2.2 SCHEDULE OF DECOMMISSIONING/SITE RESTORATION ACTIVITIES

A decommissioning/site restoration schedule is presented in Figure 2-11. This schedule was used in the preparation of the decommissioning cost estimate discussed in Section 5. PGE will perform task-specific scheduling as part of the detailed planning for decontamination and dismantlement.

TNP decommissioning can be divided into two broad periods:

1. Transition period; and

2. Decontamination and dismantlement period.

Nonradiological site restoration activities, involving the final disposition of structures, systems, and components, are scheduled to be completed following the termination of Facility Operating (Possession Only) License NPF-1. Some site restoration activities may be completed during the decontamination and dismantlement period of decommissioning.

Major activities planned during the transition period include:

1. Lay-up of plant systems;

2. Removal of the steam generators and pressurizer;

3. Removal of the reactor vessel internals;

4. Development of specific work plans and procedures;

5. Licensing and construction of an ISFSI; and

6. Maintaining safe storage of spent fuel.

7. Dismantlement and removal of some systems/components not necessary for assuring safe spent fuel storage in the spent fuel pool.

The transition period began with permanent plant closure in January 1993 and will continue until the spent fuel is transferred to the ISFSI. Decontamination and dismantlement of the remaining facility radioactive systems, components, and structures are scheduled to be conducted upon completion of the transfer of spent fuel to the ISFSI. For planning purposes, it was assumed that spent fuel and high-level waste will be stored in the spent fuel pool until 1998, at which time it will be transferred to the ISFSI. Some dismantlement activities may occur during the transition period.

Major activities planned during the decontamination and dismantlement period include:

1. Removal of remaining contaminated systems and components;

2. Decontamination of structures; and

3. Final radiation survey.

Major decontamination and dismantlement activities are expected to last from mid-1998 to the end of 2001. The final radiation survey will be conducted following decontamination and dismantlement.

Some activities, such as detailed planning, may continue through more than one period.

2.2.3 TRANSITION PERIOD

Plant closure activities were initiated following the decision to permanently cease TNP power operations in January 1993. These activities culminated with the plant in a safe transition state awaiting decontamination and dismantlement. Detailed project planning and engineering activities for the decontamination and dismantlement period, as discussed in Section 2.2.4.2, will begin during the transition period. Plant activities will continue to be implemented in compliance with the existing possession only license and other regulatory requirements.

Removal of the four steam generators and pressurizer has been completed. These components were disposed of at the US Ecology radioactive waste disposal facility near Richland, Washington. Removal of the steam generators and pressurizer were accomplished through a new opening in the south face of the Containment Building. That opening is equipped with a door so that the Containment Building can be maintained in a closed condition except during active

component removal. Prior to removal of the components from the Containment Building, low-density cellular concrete was placed inside each steam generator and the pressurizer. The concrete fixed internal contamination and provided additional shielding.

Each component was moved via an internal rail system out of the Containment Building, loaded by a gantry crane onto a multi-wheeled transporter, moved to a preparation area within the TNP Industrial Area, and prepared for river barge shipment to the Port of Benton, Washington. The component, transport cradle assembly, and transporter was then moved as an integral unit by river barge from the TNP barge slip to Benton, Washington, on the Columbia River. The multi-wheeled transporter was used to off-load the barge and move the component to the US Ecology facility on the Hanford reservation.

Piping systems that were opened during component removal were closed and/or isolated as appropriate. The Containment Building door will be controlled in accordance with the TNP security plan.

Removal of the reactor vessel internals is scheduled to commence after NRC approval of the Decommissioning Plan. Segmentation of the components will be performed underwater in the reactor cavity. Segmented components that are classified as greater than Class C waste in accordance with 10 CFR 61, "Licensing requirements for land disposal of radioactive waste," will be transferred to the spent fuel pool for storage pending disposal.

Additional activities that were completed or are in process during the transition period include, but are not limited to the following:

1. Assessment of the functional requirements for plant systems, structures, and components.

   Plant systems, structures, and components needed to support safe storage of the spent fuel, support spent fuel pool cooling, and facilitate ongoing plant activities have been identified.

2. Deactivation/removal of plant systems, structures, and components.

   Systems, structures, and components not required to support safe storage of the spent fuel, support spent fuel pool cooling, or support of ongoing plant activities may be deactivated, drained, and removed as appropriate. A comprehensive plant lay-up program was developed and implemented as described in Section 2.2.4.7. Systems, structures, and components may be decontaminated, decommissioned and/or removed during the transition period provided that the cost schedules of Section 5 are adhered

to and systems, structures, and components required to support decommissioning and spent fuel storage in accordance with the possession only license and other administrative and implementing procedures are maintained. The plant maintenance program in effect during the transition period consists of corrective maintenance, preventive maintenance, and surveillance activities.

3. Redefinition of regulatory basis for the defueled plant.

The termination of operations and the conversion of the operating license to a possession only license has rendered many of the existing provisions of the TNP Technical Specifications inappropriate. On July 31, 1993, PGE submitted a request to revise the TNP Technical Specifications to reflect the permanently defueled status of the plant. That request was supplemented by PGE on March 8, 1994. On March 31, 1995, the NRC issued Amendment #194 to Facility Operating (Possession Only) License NPF-1. This amendment provided the TNP Technical Specifications to reflect the permanently defueled condition of the plant, and regulatory requirements and operating restrictions to ensure the safe storage of spent fuel in the spent fuel pool.

The Final Safety Analysis Report was revised to reflect the permanently defueled plant condition and was retitled "Defueled Safety Analysis Report." The DSAR was transmitted to the NRC on October 7, 1993. Additional licensing basis documents were also revised to reflect the plant's defueled condition.

4. Assessment of the plant's radiological status.

Section 3.1 presents an assessment of the radiological status of TNP. This assessment was used in developing the Decommissioning Plan.

2.2.4 DECONTAMINATION AND DISMANTLEMENT: GENERAL INFORMATION

2.2.4.1 Overview

This section presents a general description of the decontamination and dismantlement period activities for TNP decommissioning. These activities involve the reduction of radioactivity to acceptable levels, allowing for release of the site for unrestricted use. This information provides the basis for development of the programs and procedures for ensuring safe decommissioning and a basis for detailed planning and preparation to be completed prior to initiating decontamination and dismantlement activities.

During this period, the remaining contaminated systems and components will be decontaminated or removed, packaged, and either shipped to an offsite processing facility, shipped directly to a low-level radioactive waste disposal facility, or handled by other alternatives in accordance with applicable regulations (e.g., greater than Class C waste).

Decontamination of plant structures may be completed concurrently with equipment removal. Decontamination of structures may include a variety of techniques ranging from water washing to surface material removal. Contaminated structural material may be packaged and either shipped to a processing facility, or shipped directly to a low-level radioactive waste disposal facility. Alternative disposal methods, in accordance with applicable regulations, may also be used.

A comprehensive final radiation survey will be conducted following the removal or decontamination of contaminated systems, components, and structures. The survey will verify that radioactivity has been reduced to sufficiently low levels to allow the release of the site for unrestricted use. Upon completion of the final survey, PGE will submit a report to support license termination per 10 CFR 50.82 and State of Oregon regulations. A discussion of the final radiation survey is provided in Section 4.

2.2.4.2 Detailed Planning and Engineering Activities

Detailed project plans will be developed in accordance with design control procedures to support the decontamination and dismantlement activities before they are initiated. The plans will be used to develop work packages, support ALARA reviews, aid in estimating labor and resource requirements, and track decommissioning costs and schedule.

Work packages will be used to implement the detailed plans and provide instructions for actual field implementation. The work packages will address discrete units of work and will include appropriate hold and inspection points. Administrative procedures will control work package format and content, as well as the review and approval process.

2.2.4.3 General Decontamination and Dismantlement Considerations

The following general decontamination and dismantlement considerations, as applicable, will be incorporated into the decommissioning work packages. Specific considerations are presented in Section 2.2.5.

Dismantlement activities will be carefully reviewed to ensure they do not impact the safe storage of fuel. This review will not be limited solely to dismantlement activities but will include the impact of external events. When applicable, work packages will include specific steps to physically protect the systems, structures, and components supporting spent fuel storage, or establish safe load paths and protective zones around these systems, structures and components.

Work packages will be implemented in accordance with administrative controls that require evaluations in accordance with the requirements of 10 CFR 50.59.

Temporary shielding will be used where practical for ALARA purposes during decommissioning activities. Some dismantlement activities may be performed under water for shielding purposes as well as contamination control.

The capability to isolate or to mitigate the consequences of a radioactive release will be maintained during decontamination and dismantlement activities. Isolation is the closure of penetrations and openings to restrict transport of radioactivity to the environment. This consideration should not preclude the removal of penetrations and attachments to containment, provided that openings are closed in a timely manner.

Airborne radioactive particulate emissions will be filtered. Effluent discharges will be monitored and quantified. Consideration will be given to the following items:

1. Operation of the appropriate portions of the containment ventilation and purge system, or an approved alternate system, during decontamination and dismantlement activities in the Containment Building;

2. Operation of the appropriate portions of the auxiliary building and fuel building ventilation system, or an approved alternate system, during decontamination and dismantlement activities in the Auxiliary and Fuel Buildings; and

3. Use of local high efficiency particulate air (HEPA) filtration systems for activities expected to result in the generation of airborne radioactive particulates (e.g. grinding, chemical decontamination, or thermal cutting of contaminated components).

Work activities will be planned to minimize the spread of contamination. Contaminated liquids will be contained within existing or supplemental barriers and processed by a liquid waste processing system prior to release. To minimize the potential for spread of contamination the following considerations will be incorporated into the planning of decommissioning work activities:

1. Isolation of electrical and pneumatic services from components prior to their dismantlement;

2. Covering of openings in internally contaminated components to confine internal contamination;

3. Decontamination and dismantlement of contaminated systems, structures, and components by decontamination in place, removal and decontamination, or removal and disposal;

4. Removal of contaminated supports in conjunction with equipment removal or decontamination of supports in conjunction with the building;

5. Removal of contaminated systems and components from areas and buildings prior to structural decontamination. (Block shield walls, or portions of other walls, ceilings, or floors may be removed to permit removal of systems and components.);

6. Removal or decontamination of embedded contaminated piping, conduit, ducts, plates, channels, anchors, sumps, and sleeves during area and building structural decontamination activities;

7. Consideration of local or centralized processing and cutting stations to facilitate packaging of components removed in large pieces; and

8. Removal of small or compact plant components and parts intact, where feasible. (This includes most valves, smaller pumps, some small tanks, and heat exchangers. These components could then be decontaminated in whole or part, and reduced to smaller dimensions in preparation for disposal or release.)

2.2.4.4 Decontamination Methods

Systems and components that are contaminated will typically be removed and sent to an offsite processing facility, sent to a low-level radioactive waste disposal facility, or decontaminated onsite and released.

Although large scale chemical decontamination is not anticipated as part of the TNP decommissioning, limited application may be used on systems or tanks to reduce radiation dose rates prior to dismantlement or general area decontamination.

Other decontamination methods typically include wiping, washing, vacuuming, scabbling, spalling, and abrasive blasting. Selection of the preferred method will be based on the specific situation. Other decontamination technologies may be considered and used if appropriate.

Application of coatings and hand wiping may be used to stabilize or remove loose surface contamination. Airborne contamination control and waste processing systems will be used as necessary to control and monitor releases. If structural surfaces are washed to remove contamination, controls will be established to ensure that waste water is collected in liquid waste processing systems.

2.2.5 DECONTAMINATION AND DISMANTLEMENT: SYSTEMS, STRUCTURES, AND COMPONENTS

2.2.5.1 Overview

This section of the Decommissioning Plan presents a brief, general description of TNP systems, components, and structures that are known or considered to be internally contaminated or that may be used to support decommissioning activities. Discussion of activities and tasks associated with decommissioning internally contaminated systems, structures, and components is presented. Also discussed are systems or components that may be used to support decommissioning. Because external contamination is generally considered to exist on systems, structures and components located in the radiologically controlled areas (RCAs) of the plant, it is not specifically noted in the following system discussions. However, systems, components, and structures that are externally contaminated will be decontaminated for release or disposed of as radioactive waste. Plant layout and general arrangement drawings are provided in Figures 2-1 through 2-9.

The considerations identified in this section are based on preliminary planning and will be used during detailed planning in the development of specific work packages. With the exception of the removal of the steam generators, pressurizer, and reactor vessel internals, and some dismantlement activities, full-scale dismantlement of the facility radioactive systems, structures, and components is scheduled to begin after completion of the transfer of spent fuel to the ISFSI.

This section of the Decommissioning Plan describes the major components of contaminated plant systems and, in some cases, a description of equipment removal considerations for system components. The section is intended to provide general information and guidance for work package planning and is not required to be updated to reflect equipment removal. Table 2.2-5 provides a list of major components described in the subsections of 2.2.5 that are removed each year (beginning in 1996).

2.2.5.2 Reactor Coolant System

The reactor coolant system (RCS) has four parallel stainless steel piping loops connected to the reactor vessel. The major components of the RCS are the reactor vessel, four steam generators, the pressurizer, four reactor coolant pumps, and associated valves, piping, fittings, and instrumentation. The removal of the reactor vessel is addressed separately in Section 2.2.5.4.

The RCS is located inside the Containment Building. The system is not required to support decommissioning or safe spent fuel storage. The system is internally contaminated. The following specific considerations apply.

Piping sections can be removed through open steam generator cubicles, reactor coolant pump access hatches, or other accessways using carts or skids. The resistance temperature detector (RTD) bypass loops were removed during the transition period.

2.2.5.3 Reactor Vessel Internals

The reactor vessel internals consist of an upper internals assembly and a lower internals assembly.

The upper internals assembly provided structural support to the fuel assemblies, as well as orientation and guidance for control rod assemblies and incore instrumentation. The upper internals assembly consists of an upper instrumentation conduit and support assembly, upper support plate, control rod guide tubes, and the upper core plate.

The lower internals assembly (lower core support structure) consists of a core barrel, core baffles, lower core plate and support columns, neutron shield pads and specimen holders, and lower core support plate.

Neutron irradiation from reactor operation generated activation products in the reactor vessel internals. Based on the neutron activation analysis, portions of the reactor vessel internals are expected to be greater than Class C radioactive waste per 10 CFR 61. The reactor vessel internals are also contaminated. The portions of the reactor vessel internals that are classified greater than Class C (GTCC) wastes will be segmented and stored in containers fabricated to standard fuel assembly size for interim storage in the existing spent fuel racks. The lower level wastes will be packaged and shipped to the radioactive waste disposal facility near Richland, Washington, for burial.

To support reactor vessel internal removal, the reactor vessel head will be removed and a refueling cavity seal will be seal welded in place. The transfer tube blank flange will be removed to allow for later transfer of segmented components to the spent fuel pool for storage. Unsegmented components or large segments in casks may also be transferred through the equipment hatch to the spent fuel pool. After completing preparations, the reactor cavity and transfer canal will be flooded. The upper internals will be removed from the reactor vessel and placed in the storage stand within the cavity. Removal of the lower internals to its storage location within the reactor cavity may be delayed pending segmentation and removal of the upper internals.

PGE will perform a safety evaluation prior to commencing physical activities associated with movement of the RV internals into the spent fuel pool. This safety evaluation will address the effects of the packaging, movement and storage of the RV internals on spent fuel pool performance.

The activities associated with the movement of the RV internals over the spent fuel will be conducted in accordance with plant procedures to ensure that the load restrictions and surveillance requirements of Technical Specification 3.1.4, "Spent Fuel Pool Load Restrictions," are met. Water level in the spent fuel pool will be maintained in accordance with Technical Specification 3.1.1, "Spent Fuel Pool Water Level."

Administrative controls for segmentation will include as a minimum:

1. Segmentation of the reactor vessel internals underwater in the reactor cavity;

2. Use of a continuous air monitor to detect an increase in normal airborne activity levels. The alarm setpoint will be based on maintaining worker exposure ALARA;

3. Monitoring of the reactor cavity water for activity. Filtration will be provided as required to maintain worker exposure ALARA and ensure the potential for airborne release is maintained below the limits provided in Section 3.4.3.1;

4. Operation of the containment ventilation exhaust via HEPA filtration during segmentation of reactor vessel internals; and

5. Development of work activities for segmentation implementing the requirements of ALARA. Continuous monitoring of radiological conditions will be performed during performance of the work.

Segmentation will be suspended if administrative controls or limits cannot be maintained.

Provisions for maintaining the integrity of the reactor cavity liner and for ensuring spent fuel pool boron concentration and water level will be maintained during segmentation and transfer of segmented components into the spent fuel pool will be specified in the detailed segmentation plan and/or work package.

2.2.5.4 Reactor Vessel

The reactor vessel supported and contained the reactor core, directed coolant flow through the core, and facilitated operation, control, and handling of reactor components. The reactor vessel is a fabricated cylinder with a hemispherical bottom head and a removable hemispherical upper head. It contains the core support and other internal structures. The reactor vessel has four inlet and four outlet nozzles located in a horizontal plane below the upper head flange. The reactor vessel is carbon steel with weld deposited austenitic stainless steel on surfaces that were exposed to the reactor coolant.

The vessel is contaminated and activated. The following specific considerations apply.

The reactor vessel upper head can be disposed of intact or in segments. If it is disposed of intact, a cover plate will be installed over the bottom flange. Control rod drive mechanism (CRDM) housings and other attachments to the head will be removed and the penetrations sealed. If the reactor vessel upper head is disposed of in segments, the upper head can be processed using cutting methods suitable for cutting thick, highly activated components. The sections can then be packaged and shipped.

The reactor vessel may also be removed intact, or sectioned. The method selected will be based on an evaluation of the ease of execution, personnel exposure, schedule impact, transportation availability, and cost.

High dose rates from the activated surfaces of the reactor vessel may require the use of special shielding and handling methods to ensure that personnel exposure is maintained ALARA.

Neutron irradiation from the reactor operation generated activation products in the reactor vessel. Based on the neutron activation analysis shown in Tables 3.1-8 and 3.1-9, the reactor vessel can be disposed of as 10 CFR Part 61, Class A waste (vessel wall) and Class C waste (vessel clad). The radionuclide content estimates will be verified with a radiation survey of the reactor vessel after reactor vessel internals removal. Detailed classification evaluations will be completed as a part of detailed planning of the reactor vessel removal activity.

Intact vessel removal would involve shipping the vessel to a low-level radioactive waste disposal facility in one piece. This may require certification of an exclusive use shipping container for transporting the vessel, or the vessel may serve as its own shipping container. The following items will be considered if the vessel is removed intact:

1. Removal of support attachments;

2. Removal of piping up to the nozzles and capping the nozzles;

3. Installation of a cover over the vessel flange to reduce dose rate and control airborne radioactivity;

4. Removal of water from the vessel;

5. Application of a fixative coating or grouting to stabilize remaining internal surface contamination;

6. Reconfiguration of the polar crane to its 400 ton capacity;

7. Selection of an appropriate lifting point on the vessel;

8. Attachment of a skid box or upending device for handling the vessel; and

9. Routing the vessel through the construction opening and loading it onto a transporter.

Segmented vessel removal would involve shipping vessel sections to a low-level radioactive waste disposal facility inside appropriate shipping containers.

Sectioning of the vessel can be performed by appropriate cutting or machining processes. The vessel is lined with stainless steel which limits methods for sectioning. However, removal of the stainless steel lining with machining, grinding, or other techniques would expose the carbon steel vessel wall. The carbon steel could then be sectioned using appropriate thermal or mechanical cutting techniques. Alternatively, the vessel could be filled with grout and sliced into sections using a diamond wire saw. The following items will be considered if the vessel is removed in sections:

1. Shipping the lower hemispherical head in one piece after removal and plugging of incore detector sleeves;

2. Use of a water purification system and/or an underwater vacuum cleaner in the proximity of the cutting to minimize contamination levels in the water and to maintain clarity when water is in the vessel during cutting operations;

3. Use of a temporary HEPA filtration unit in the proximity of the cutting during cutting operations;

4. Sealing the RCS piping penetrations to minimize the transport of contamination; and

5. Use of a cover plate and shielding on the reactor flange to reduce dose rate and spread of contamination.

2.2.5.5 Steam Generators

The four steam generators are vertical shell and U-tube heat exchangers with integral moisture separating equipment. The reactor coolant channel head is divided into inlet and outlet plenums by an inconel vertical partition plate extending from the head to the tube sheet. The steam generators are constructed primarily of carbon steel. The heat transfer tubes are inconel, the primary side of the tube sheet is clad with inconel, and interior surfaces of the reactor coolant channel head and nozzles are clad with austenitic stainless steel. These components are internally contaminated.

The steam generators were removed during the transition period.

2.2.5.6 Reactor Coolant Pumps

The reactor coolant pumps are single-speed, centrifugal pumps driven by air-cooled, three-phase induction motors. The pumps have bottom inlet, and side discharge openings and are equipped with controlled leakage seals on the shaft. The motors are mounted above the pumps and can be removed as separate components. A flywheel mounted on the shaft, above the motor, provided additional inertia to extend pump coastdown.

The reactor coolant pumps are internally contaminated. The following specific considerations apply.

The reactor coolant pumps, their motors, and flywheels may be removed from the Containment Building and shipped off-site as integral units or as separate components. The oil reservoirs have been drained. Reactor coolant pump piping will be cut and capped as close to the pump as practical. Hatches above the pumps allow rigging and polar crane access to reactor coolant pump motors and pumps. Pump nozzle covers will be installed, and grout or fixative coatings will be applied, as necessary, to contain contamination prior to shipment.

2.2.5.7 Pressurizer and Pressurizer Relief Tank

The pressurizer is a vertical, cylindrical vessel with hemispherical top and bottom heads, constructed of carbon steel that is clad with austenitic stainless steel on surfaces exposed to reactor coolant. Electric heaters are installed through the bottom head of the vessel. The spray nozzle, relief, and safety valve connections are located in the top head of the vessel.

The pressurizer was removed during the transition period.

The pressurizer relief tank is located inside the Containment Building. It is internally contaminated. The pressurizer relief tank can be moved from its location and lifted out of the Containment Building in one piece, or it may be sectioned in place.

2.2.5.8 Chemical and Volume Control System

The chemical and volume control system (CVCS) consists of several subsystems: charging, letdown and seal water, chemical control, purification and makeup, and boron recovery. Main components of the system are two centrifugal pumps, one positive displacement pump, a volume control tank, three ion exchangers, a regenerative heat exchanger, a letdown heat exchanger, an excess letdown heat exchanger, a seal water return heat exchanger, and associated valves, piping, fittings, filters, and instrumentation. Additional major components include two boric acid

evaporators, three holdup tanks, two boric acid tanks, concentrates holding tank, two monitor tanks, boric acid batching tank, chemical mixing tank, and a resin fill tank.

The CVCS is located in the Auxiliary and Fuel Buildings and inside the Containment Building. Portions of the system are internally contaminated. The following specific considerations apply.

The two centrifugal charging pumps were removed and transferred to another nuclear utility. The positive displacement charging pump is located on the 25 ft elevation of the Auxiliary Building. This pump is skid mounted and relatively compact and accessible. Monorails are installed over the pump skid. The pump skid can be removed as a unit, or the pump can be separated from its motor, speed increaser, and other equipment.

The volume control tank is surrounded by thick shielding walls and sectioning may be the best method of removal. Because of the size of the monitor tanks and holdup tanks, they will likely require sectioning for removal. The relatively thin west wall of the monitor tank room may be removed to facilitate the removal of these tanks. The access openings to the holdup tanks could be enlarged to facilitate tank removal. The boric acid tanks may also require sectioning for removal. Access plugs above the tanks may facilitate removal of sections. The chemical mixing tank can be removed in one piece. The boric acid batching tank and resin fill tank are not internally contaminated. Each tank can be removed in one piece.

The regenerative and excess letdown heat exchangers are located on the 61 ft elevation inside the Containment Building. The letdown and seal water heat exchangers are located on the 61 ft elevation of the Auxiliary and Fuel Buildings, respectively. The heat exchangers are relatively compact and can be removed from their location without sectioning. The Auxiliary and Fuel Building heat exchanger rooms have knockout panels in the walls. Certain heat exchanger areas are equipped with monorails and have knockout panels in the walls.

The boric acid evaporator components are skid mounted. Components can be removed individually.

2.2.5.9 Safety Injection System

The safety injection system consists of two centrifugal safety injection pumps, four safety injection accumulators, and associated valves, piping, fittings, and instrumentation.

Safety injection system pumps are located on the 5 ft elevation of the Auxiliary Building. The accumulators are located on the 45 ft elevation of the Containment Building. The following specific considerations apply.

Safety injection pumps are skid mounted and relatively compact. The skids can be removed as a unit or the pumps can be separated from their motors and other skid-mounted equipment.

Monorails are provided in the pump rooms for equipment removal. The accumulators can be removed intact from the Containment Building if interferences are removed. The accumulator vessels can also be sectioned in place and moved to rigging pathways inside the Containment Building.

Internal contamination should be relatively low, allowing for rapid removal of the pipe. Piping inside the bioshield can be removed in conjunction with other pipes connecting to the reactor coolant loops. Piping can be removed either through the normal access into the bioshield or through the steam generator or reactor coolant pump access openings.

2.2.5.10 Residual Heat Removal System

The residual heat removal system contains two pumps, two heat exchangers, a common containment recirculation sump, and associated valves, piping, fittings, and instrumentation.

The residual heat removal pumps and heat exchangers are located on the 5 ft elevation of the Auxiliary Building. The system is internally contaminated. The following specific considerations apply.

Access hatches for removal of heat exchangers or tube bundles were included in the building construction. Those access hatches can be opened, interfering piping and cables removed, and the entire heat exchangers (or large portions of them) can be removed via that path. Alternatively, the heat exchangers can be sectioned in the heat exchanger room and removed in smaller pieces.

The residual heat removal pump rooms have knockout panels and are equipped with monorails to aid in pump removal.

The recirculation sump screens, racks, and supporting structure on the 45 ft elevation of the Containment Building can be disassembled in place for removal and decontamination, or shipment and burial.

2.2.5.11 Containment Spray System

The containment spray system consists of two pumps, a sodium hydroxide tank, two eductors, two spray headers, and associated valves, piping, fittings, and instrumentation.

The containment spray pumps are located on the 5 ft elevation, and the sodium hydroxide tank is located on the 25 ft elevation of the Auxiliary Building. The spray headers are located inside the Containment Building. The system is internally contaminated. The following specific considerations apply.

The containment spray pumps can be removed intact or separated from their motors. The spray headers, spray nozzles, and other piping at the 205 ft level inside Containment can be removed by using the polar crane trolley as a platform. Pipe sections may be light enough to be rigged, using relatively lightweight rigging, and lowered to the 93 ft elevation of the Containment Building for removal. Scaffolding can be erected to access sections of pipe supported and routed up the Containment wall.

Removal of the sodium hydroxide tank intact would require removal of its cubicle walls and an obstructing motor control center. It may be more practical to remove the tank by sectioning in place and removing the pieces.

2.2.5.12 Component Cooling Water System

The component cooling water (CCW) system consists of three pumps, two surge tanks, two main heat exchangers, a chemical addition tank, equipment heat exchangers, and associated valves, piping, fittings, and instrumentation.

The CCW heat exchangers and pumps are located on the 45 ft elevation of the Fuel Building. The surge tanks are located on the 77 ft elevation in the pipe penetration area. Portions of the system support spent fuel cooling and are required until the fuel is moved to the ISFSI or alternate cooling is established. Portions of the system have detectable levels of internal contamination. The following specific considerations apply.

Existing tube pulling openings in the wall north of the CCW heat exchangers can be enlarged, or the wall entirely removed, to allow passage of the heat exchanger into the Fuel Building crane bay. The CCW pumps can be removed after the heat exchangers are cleared. The CCW surge tanks can be removed by enlarging the stairwell openings in the pipe penetration area for rigging, or by sectioning in place.

2.2.5.13 Service Water System

The service water system supplies raw water from the Columbia River via the intake structure to the component cooling water heat exchangers, essential room coolers, emergency make-up to the spent fuel pool and component cooling water system, and other equipment. The system has three service water pumps, four service water booster pumps, equipment heat exchangers, and associated valves, piping, fittings, and instrumentation.

The service water system pumps are located in the intake structure. Portions of the service water system support spent fuel cooling and will be required until the fuel is moved to the ISFSI or alternate cooling is established. This system may also be required to provide dilution for liquid radwaste discharges. The system is not internally contaminated, but room and equipment coolers in contaminated areas of the plant may have external contamination.

Removal of these coolers is considered to be associated with the decontamination and dismantlement of structures.

2.2.5.14 Spent Fuel Pool and Fuel Handling Equipment

The spent fuel pool and fuel storage structures consist of the spent fuel pool, the spent fuel storage racks, the fuel transfer canal, the cask loading pit, and the new fuel storage area. The spent fuel pool provides for irradiated fuel storage. Additionally, the spent fuel pool provides a transparent radiation shield for personnel. Fuel assemblies are stored in stainless steel spent fuel storage racks located at the bottom of the spent fuel pool. The fuel transfer canal and cask loading pit facilitated handling of irradiated fuel by providing isolable underwater operating areas for fuel transfer evolutions. The new fuel storage area provided a protected area for dry, subcritical storage of new fuel assemblies. The fuel transfer canal and cask loading pit are connected to the spent fuel pool by transfer slots which can be closed and sealed by leak-tight gates. The spent fuel pool, fuel transfer canal, and the cask loading pit are reinforced concrete structures with seam-welded stainless steel linings.

The spent fuel pool is located in the Fuel Building. Fuel handling equipment is located in the Fuel Building and the Containment Building. The spent fuel pool supports spent fuel storage and will be required until the fuel is moved to the ISFSI. The fuel handling equipment in the spent fuel pool may be required to transfer the fuel to the ISFSI. Additionally, the spent fuel pool bridge crane may be required to support the decommissioning of the spent fuel pool. The system is contaminated. The following specific considerations apply.

The potential for high levels of contamination exists for components removed from the spent fuel pool. The spent fuel storage racks are accessible with the Fuel Building crane and could be removed from the spent fuel pool intact for sectioning and packaging at another location. The liner of the spent fuel pool, fuel transfer canal, and cask load pit will be sectioned for removal. The fuel transfer tube and sleeve will also be sectioned for removal. The fuel handling cranes, the fuel transfer cart, its tracks, and the upender frames will be sectioned into manageable pieces for removal. It may be possible to decontaminate and release sections of the liners, and the spent fuel storage racks.

Dismantlement of the majority of the spent fuel pool and fuel handling radioactive systems, components, and structures is scheduled to be conducted upon completion of the transfer of spent fuel to the ISFSI. Spent fuel will be in the ISFSI prior to decontamination and dismantlement of the spent fuel pool liner. Other items stored in the spent fuel pool will be moved to alternate storage locations or disposed of before decontamination and dismantlement of the spent fuel pool liner.

2.2.5.32 Containment Building

The Containment Building consists of two structures on a common foundation. One is the containment itself; the other is the internal structure, referred to as the containment internals, whose function is to provide biological shielding. Supports for equipment, operating decks, access stairways, and platforms are included in the containment internals. The two structures are structurally separated above the foundation by a gap based on considerations of maximum relative displacement during an earthquake.

The Containment Building encloses[ed] the reactor, reactor coolant loops, refueling cavity, and portions of auxiliary and engineered safety features systems.

The Containment Building is a fully reinforced concrete structure in the shape of a cylinder with a hemispherical roof and flat foundation. The approximate dimensions of the Containment Building are: 124-ft inside diameter, 203-ft inside height, 3½-ft wall thickness and 2½-ft dome thickness.

The reactor cavity and instrumentation tunnel are located below the foundation slab. The cylindrical section has a post-tensioning system consisting of vertical and hoop tendons. The dome has a two-way post-tensioning system consisting of hoop tendons and continuous vertical tendons. The inside of the concrete shell is steel-lined. The liner plate is coated with an epoxy-phenolic finish that is approximately 5 mils thick generally to a height of 6 ft above the floors, and 2 to 3 mils inorganic topcoat above that. Penetrations in the Containment Building include the equipment hatch, two personnel air locks, and numerous smaller electrical and mechanical penetrations.

The following specific considerations apply.

Portions of exposed surfaces inside the Containment Building are contaminated. Concrete internal walls can be decontaminated by water or chemical washing. Surfaces that can not be decontaminated can be scabbled or surface ground down to non-contaminated depths. Portions of concrete structures inside the Containment Building (e.g., the primary shield wall) are activated and could require removal of large sections of the concrete. This may be accomplished by chipping, saw cutting or alternate means. Portions of activated concrete walls may be left in place, provided they meet site release criteria.

Plate steel, structural steel, grating, ladders, and platforms may be decontaminated in place or may be removed by unbolting or cutting, and rigged out for decontamination or disposal.

The liner of the refueling cavity will be sectioned for removal. The polar crane or the fuel handling crane can be used to lift the sections out. Potential for high levels of contamination exist for components removed from the refueling cavity. It may be possible to decontaminate and release sections of the liners.

During the removal of the steam generators and pressurizer the tendons were detensioned, a construction opening cut in the side of the Containment Building, and a roll-up door installed in the construction opening.

2.2.5.33 Auxiliary Building (Including Pipe Facade)

The Auxiliary Building has two floors below grade, one at grade (elevation 45 ft), and three floors above grade. The portion at or above grade is structurally connected to the Fuel Building on the east and to the Control Building on the west. A number of framing members in the Auxiliary Building are supported by the Containment Building wall.

The exterior walls below grade and slabs are constructed of reinforced concrete. Interior framing members below grade and framing members above grade are structural steel. Exterior walls above grade are generally constructed of concrete masonry block with exterior precast concrete panels (elevation 45 ft) or metal siding at the upper floors. Interior walls are constructed of concrete block masonry. Portions of the Auxiliary Building are coated with an epoxy surface. The surface is generally applied to the floors and to a height of 12 inches above the floor, but may extend up to 6 ft in corridors and selected rooms.

The Auxiliary Building houses[ed] the following major plant equipment (including necessary electrical support equipment):

1. Ventilation equipment for the Auxiliary, Fuel, and Containment Buildings;
2. Demineralizers and filters;
3. Boric acid evaporators;
4. Volume control tank;
5. Service water booster pumps;
6. Liquid radioactive waste system tanks and pumps;
7. Spent fuel cooling pumps;
8. Positive displacement charging pumps;
9. Containment spray pumps;
10. Safety injection pumps;
11. Residual heat removal pumps and heat exchangers;

12. Waste gas decay tanks, surge tank, and compressors; and

13. Component cooling water pump.

Many of the plant components in the Auxiliary Building are located in thick walled cubicles which provided shielding to personnel during plant operation. Notable among shielded components are the ion exchangers and filters located in the demineralizer and filter galleries on the 77 ft elevation. Cell enclosures in this area are concrete masonry walls between 20 and 40 inches thick. Many of the thick shield walls supplement the structural characteristics of the Auxiliary Building and their removal may require structural analysis.

The Auxiliary Building also contains vertical pipe chases and horizontal pipeways. The function of these features is to provide pathways for routing pipe from components, such as pumps, to heat exchangers or other components or end use points. Piping from multiple systems is frequently routed through common pipe chases or pipeways.

Portions of exposed surfaces in the Auxiliary Building are contaminated. The following specific considerations apply.

The surfaces of walls and slabs in traffic areas have protective coatings. Concrete can be decontaminated by water or chemical washing. Surfaces that can not be decontaminated can be scabbled or surface ground down to non-contaminated depths.

Filter housings can typically be removed from their cells through the filter access plugs at the 93 ft elevation slab and sectioned and reduced, or shipped intact. Piping connections to the filters will be severed using techniques as described earlier.

Demineralizer vessels are relatively inaccessible. Small access ways allow personnel entrance to the cubicles via the valve gallery. Once the resins are removed from the demineralizer vessel and the vessel is rinsed, the vessel can be sectioned in place using techniques described in Section 2.2.4.5. Alternately, openings can be prepared in the slabs or walls for access to the vessel for intact or sectional removal. Removal of entire walls or portions of walls may require evaluation of the building's structural integrity. Consequently, additional supports or modifications may be required.

2.2.5.34 Fuel Building

The Fuel Building contains facilities for storage of new and spent fuel and systems used for processing liquid, solid and gaseous wastes generated by plant operation. It consists of four floors above grade, the spent fuel pool, cask loading pit, new fuel storage pit, cask wash pit, and three reinforced concrete vaults enclosing the CVCS holdup tanks. Portions of the Fuel Building are coated with an epoxy surface. The surface is generally applied to the floor and to a height of 12 inches above the floor, but extends up to 6 ft in corridors and selected rooms. The walls and

base slab of the spent fuel pool are constructed of thick (approximately 5-ft to 6½-ft) reinforced concrete. The CVCS holdup tanks are enclosed by walls that are approximately 2-ft to 2-ft 9-inches thick.

Major plant equipment contained in the Fuel Building includes the following items;

1. Solid radioactive waste processing equipment;
2. CVCS monitor tanks and pumps;
3. Seal water heat exchangers;
4. Spent fuel pool heat exchangers;
5. Boric acid tanks;
6. CVCS holdup tanks;
7. Component cooling water heat exchangers; and
8. Component cooling water pumps.

Portions of exposed surfaces inside the Fuel Building are contaminated. The following specific considerations apply.

The surfaces of walls and slabs in traffic areas have protective coatings. Concrete can be decontaminated by water or chemical washing. Surfaces that can not be decontaminated can be scabbled or surface ground down to non-contaminated depths. Removal of entire walls or portions of walls may require evaluation of the building's structural integrity.

2.2.5.35 <u>Other Buildings</u>

The Main Steam Support Structure consists of two floors, one at grade (Elevation 45 ft) and one at Elevation 63 ft. It is located between the Containment Building and Turbine Building and provided protection and support for the main steam isolation, power-operated relief and safety valves, as well as main steam and feedwater piping. The structure is constructed of reinforced concrete and structural steel.

The Condensate Demineralizer Building is a three-story, partially below grade structure located west of the Turbine Building. The building is used for temporary storage of low-level radioactive waste prior to disposal.

The Steam Generator Blowdown Building is located south of the Main Steam Support Structure, between the Containment Building and Turbine Building. It houses the steam generator blowdown tank, heat exchanger, pump, and associated valves and instruments. The building has a reinforced concrete slab floor, reinforced masonry block walls, and a reinforced concrete roof supported by steel beams and metal decking. The building has a foundation curb designed to contain liquid spills.

The Radwaste Annex is a single-story windowless structure adjacent to the north wall of the Fuel Building. It is utilized for laundry sorting, storage, and frisking, as well as solid waste compaction and drum storage.

The Wright-Schuchart-Harbor (WSH) Warehouse is a Quonset type building that is used to store parts and materials to support plant activities.

The Steam Generator Blowdown Building, Main Steam Support Structure, WSH Warehouse, and Radwaste Annex are potentially contaminated. The Condensate Demineralizer Building is not considered to be contaminated.

2.2.6 DECOMMISSIONING EXPOSURE PROJECTIONS

A summary of the projected radiation exposures for the removal of the steam generators and pressurizer, decommissioning activities, and spent fuel management activities is presented in Table 2.2-1. These represent conservative estimates of radiation exposure.

These estimates are for planning purposes only; detailed exposure estimates and exposure controls will be developed in accordance with the requirements of the Radiation Protection Program (Section 3.2.1) during detailed planning of these activities.

The estimates incorporate the following assumptions and bases:

1. Area dose rates are based on radiological surveys that have been adjusted to account for radioactive decay to the estimated start of decommissioning activities;

2. The projected exposure for decommissioning activities is based on site information;

3. The projected exposure for removal of the steam generators and pressurizer is based on detailed project planning;

4. Personnel radiation exposure during the transition period (1994-mid-1998) is estimated to be approximately 2 person-rem per year, excluding some dismantlement activities; and

5. Estimated personnel exposure due to the transfer of fuel to the ISFSI is approximately 1.6 person-rem for each of the estimated 36 casks.

2.2.7 DECOMMISSIONING RADIOACTIVE WASTE PROJECTIONS

The radioactive waste management program (Section 3.3) will be used to control the generation, processing, handling, shipping, and disposal of radioactive waste during decommissioning. Activated and contaminated systems, structures, and components represent the largest volume of low-level radioactive waste expected to be generated during decommissioning. Other forms of waste generated during decommissioning include:

1. Contaminated water;
2. Used disposable protective clothing;
3. Expended abrasive and absorbent materials;
4. Expended resins and filters; and
5. Contamination control materials (e.g., strippable coatings, plastic enclosures).

Tables 2.2-2, 2.2-3, and 2.2-4 provide projections of waste volumes for decommissioning. The waste volume projections are conservative estimates obtained from the decommissioning cost estimate, removal of the steam generators and pressurizer, and removal of the reactor vessel internals. Included in this estimate is 340 ft^3 of greater than Class C radioactive waste from the reactor vessel internals. This waste will be disposed of with the spent fuel.

The decommissioning cost estimate (Section 5) assumes that cost effective waste volume reduction methods are limited. It also assumes significantly contaminated or activated materials are sent directly to a disposal facility. However, alternative processing methods will be evaluated during decommissioning.

2.3 DECOMMISSIONING ORGANIZATION AND RESPONSIBILITIES

2.3.1 DECOMMISSIONING ORGANIZATION

The TNP organization (General Manager and above) is shown in Figure 2-10.

The Trojan Site Executive and Plant General Manager has corporate responsibility for overall nuclear safety and decommissioning activities at TNP. The General Manager, Trojan Plant is responsible for operations, maintenance, personnel/radiation protection, including the ALARA and onsite safety and hazardous materials programs, and emergency preparedness. Reporting to the General Manager, Trojan Plant are the General Manager, Nuclear Oversight; General Manager, Engineering/Decommissioning; General Manager, Plant Support and Technical Functions; Manager, Operations; Manager, Personnel/Radiation Protection; and Manager, Maintenance. The Independent Review and Audit Committee (IRAC) reports to and advises the General Manager, Trojan Plant.

The General Manager, Nuclear Oversight, is responsible for quality assurance and quality control. The Nuclear Oversight Department is independent of other departments performing quality-related activities. The General Manager, Engineering/Decommissioning, is responsible for decommissioning planning and engineering. The General Manager, Plant Support and Technical Functions is responsible for cost control, nuclear security, licensing, and training.

Experienced and knowledgeable personnel will be utilized to perform the technical and administrative tasks required during TNP decommissioning. To the extent practicable, the decommissioning organization will include staff previously employed at TNP to capitalize on their knowledge and familiarity with the facility. Contractors may be used to provide specialized services, or to supplement the facility staff, when warranted.

Each member of the facility staff will meet or exceed the minimum qualifications of ANSI N18.1-1971, "Selection and Training of Nuclear Power Plant Personnel," for comparable positions, except for the Manager, Radiation Protection, who shall meet or exceed the qualifications of Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Revision 2, April 1987.

2.3.2 REVIEWS AND AUDITS

The Independent Review and Audit Committee (IRAC) is responsible for reviews and audits in accordance with the TNP Technical Specifications, Appendix A to Facility Operating (Possession Only) License NPF-1. The IRAC is responsible for advising the General Manager, Trojan Plant on matters relating to safe storage of irradiated fuel. This review and audit function is independent of the line organization responsibilities.

As specified in the TNP Technical Specifications, the Independent Review and Audit Committee will review and/or audit safety evaluations completed under the provisions of 10 CFR 50.59, special nuclear material control, radiation protection activities, radioactive waste controls, and reportable occurrences.

2.4 TRAINING PROGRAM

The TNP Training Program is designed to provide the necessary instruction to ensure that individuals have adequate knowledge and skills to perform their job functions safely. Training programs are conducted in accordance with appropriate plant procedures. Initial training programs prepare entry level employees to assume their assigned tasks; retraining programs enable employees to maintain their proficiency.

Individuals requiring access to TNP, including radiologically controlled areas, will receive training commensurate with the potential hazards to which they will be exposed. This applies to PGE employees, contractors, and visitors.

Training applicable to specific activities, tasks, and conditions will be developed or discontinued, as appropriate, as decommissioning progresses. Since decommissioning activities will occur while fuel remains stored at TNP, PGE will retain those elements of the TNP Training Program necessary to ensure safe fuel storage and handling, including protection of workers from hazards associated with such activities.

2.4.1 PROGRAMS

TNP will maintain training and retraining programs throughout decommissioning as necessary to provide the TNP staff with the specialized training and technical skills necessary to maintain the plant in a safe condition.

2.4.1.1 General Employee Training

Individuals requiring unescorted access to the TNP Industrial Area will receive General Employee Training, which includes the following representative topics:

1. TNP introduction;
2. Radiological protection fundamentals;
3. Emergency response plan;
4. Plant safety;
5. Fire protection;
6. Chemical safety;

7. Security;

8. Quality assurance; and

9. Corporate drug awareness.

Individuals requiring unescorted access to the protected area, RCAs, or the control room will receive additional training, as necessary, in the following topics:

1. TNP site specific radiation protection; and

2. Fitness for duty.

Escorted individuals will receive appropriate training for the areas they will be entering.

General Employee Retraining is conducted annually and includes subject material from General Employee Training. General Employee Training and Retraining Programs consist of lectures and demonstrations that may be augmented with selected audiovisual aids. The content of the course may be revised, as needed, during decommissioning.

2.4.1.2 Certified Fuel Handler Training

Training for operators is described in topical report PGE-1057, "Certified Fuel Handler Training Program." The Certified Fuel Handler Training Program is based on a systems approach to training. The program ensures that staff members are adequately trained to perform activities that support the proper handling, storing, and cooling of the fuel.

2.4.1.3 Work-Specific Training

Work specific training for selected activities will include the appropriate level of training in decontamination and other decommissioning activities, health physics, and the use and maintenance of radiation surveillance and monitoring equipment. Cognizant managers will ensure that employees and contractors who perform decommissioning activities are properly trained, qualified, and proficient in the principles and techniques of activities necessary to perform their assigned tasks, in accordance with approved procedures.

2.4.2 TRAINING RECORDS

Records of training on quality-related activities will be maintained as quality assurance records.

2.4.3 INSTRUCTOR QUALIFICATION

Training may be conducted by PGE employees or contractors. The background, qualifications, and experience of instructors will be appropriate for the subject matter. Instructor qualifications are administratively controlled by approved procedures. Instructors are responsible for ensuring training materials are technically accurate and applicable prior to their use or issuance. Instructors are also responsible for documenting training sessions.

2.5 CONTRACTOR ASSISTANCE

2.5.1 CONTRACTOR SCOPE OF WORK

During decommissioning PGE may use contractors to provide specialized services or to supplement the facility staff when warranted. Tasks where contractors may be used to provide support during decommissioning include, but are not limited to, the following:

1. Processing, packaging, transportation, and disposal of radioactive material;

2. Decontamination and recycling of radioactively contaminated material;

3. Radiation protection staff augmentation;

4. Design and fabrication of special dismantling equipment;

5. Engineering and design services such as heavy loads management and transportation engineering; and

6. Dismantlement and demolition of components, systems, and structures.

2.5.2 CONTRACTOR ADMINISTRATIVE CONTROLS

PGE has the responsibility for contractor control, including the contractor's effectiveness in performing to bid specifications. PGE will provide the necessary management oversight to ensure that tasks performed by the contractors are in full compliance with topical report PGE-8010, "PGE Nuclear Quality Assurance Program for the Trojan Nuclear Plant," the purchase agreement, and applicable regulatory requirements.

2.5.3 CONTRACTOR QUALIFICATIONS AND EXPERIENCE

2.5.3.1 General

Potential contractors for activities will be required to supply their qualifications as part of bid specifications. These qualifications will be evaluated and reviewed for:

1. Demonstrated experience in providing services on similar projects;

2. Cost and schedule compliance;

3. Technical and operational capability; and

4. Ability to meet regulatory requirements.

2.5.3.2 TLG Services, Inc.

TLG Services, Inc. was contracted to perform the TNP Activation Analysis for use in site characterization and Decommissioning Cost Analysis to support the development of the Decommissioning Plan.

TLG Services, Inc. is an engineering firm with extensive experience in performing decommissioning cost estimates and other aspects of nuclear facility decommissioning. TLG Services Inc.'s experience includes:

1. More than 60 utility and government sponsored decommissioning studies for more than 90 units; providing costs, occupational exposure, and waste generation estimates;

2. Development of NUREG/CR-3587, "Identification and Evaluation of Facilitation Techniques for Decommissioning Light Water Power Reactors," June 1986;

3. Development of industry-accepted reference manual, AIF/NESP-036, "Guidelines to Producing Decommissioning Cost Estimates"; and

4. Active participation on four Industry Standards Committees associated with decommissioning.

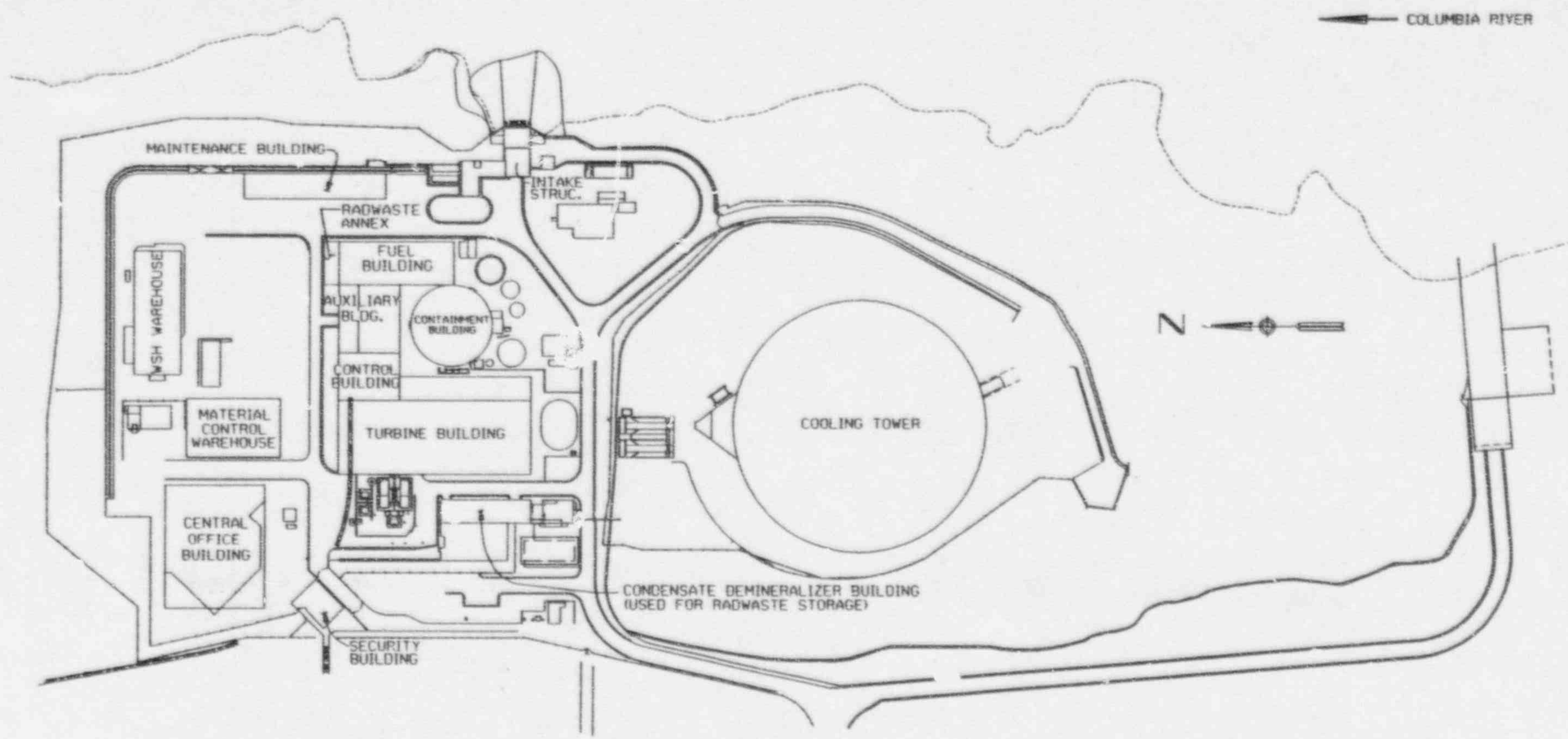
5. Performance of activation analyses for five nuclear facilities.

TABLE 2.2-5

MAJOR COMPONENTS REMOVED (BY YEAR)

1996:

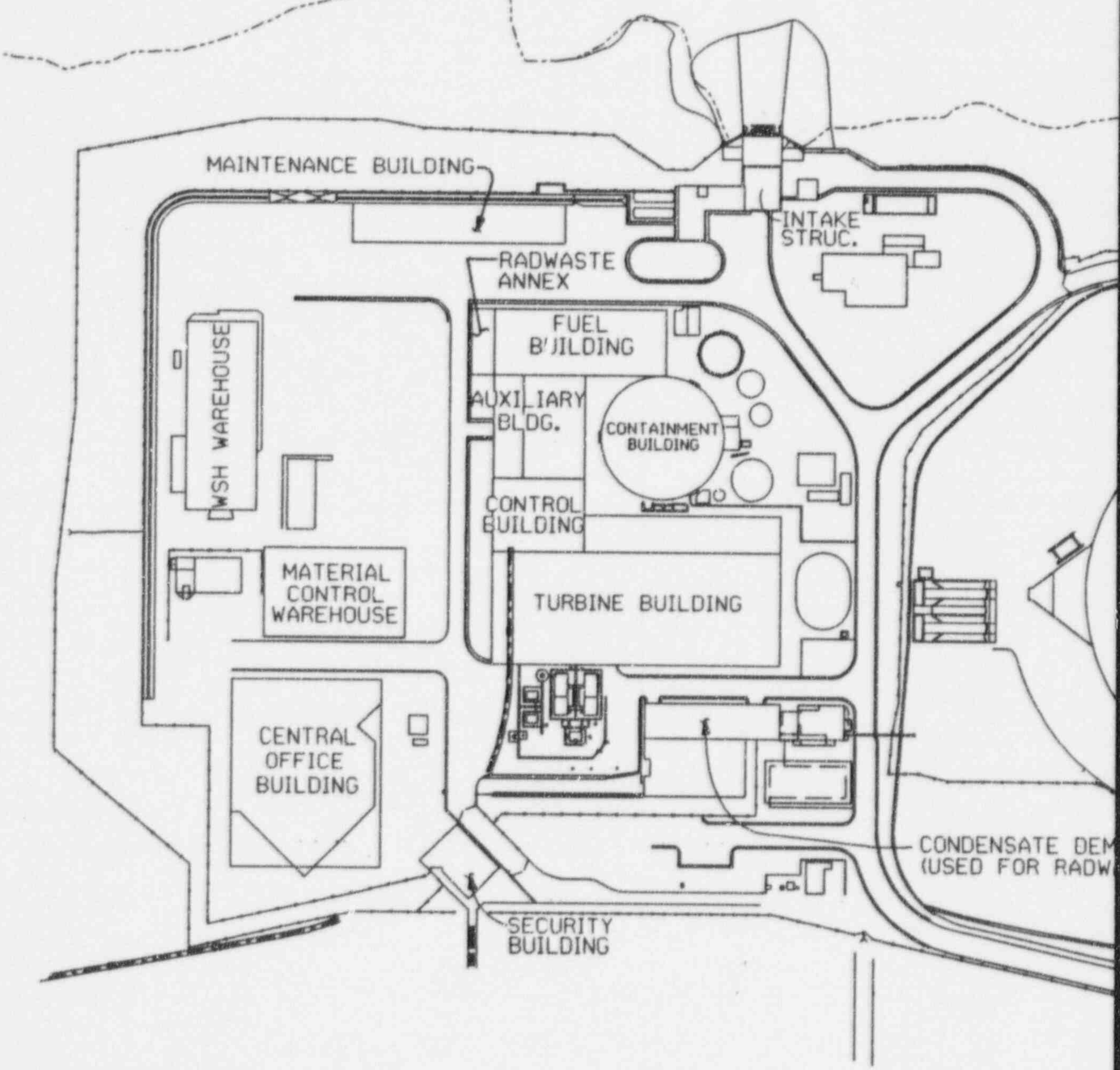
Reactor Coolant Pumps and Motors - (4)
Reactor Coolant System (RCS) Piping (up to bioshield wall)
RCS and Steam Generator support structural steel
Containment Main Steam and Feedwater Piping and Supports (all B/C loops; partial A/D loops)
A Residual Heat Removal Heat Exchanger
B Residual Heat Removal Heat Exchanger
Positive Displacement Charging Pump/Motor
A Centrifugal Charging Pump Motor
B Centrifugal Charging Pump Motor
A Safety Injection Pump/Motor
B Safety Injection Pump/Motor
A Containment Spray Pump/Motor
B Containment Spray Pump/Motor
B Component Cooling Water Pump/Motor (Note: replaced with smaller pump)
Condensate Demineralizer vessels
Decontamination Shop Equipment
Portions of Outside Buildings (WSH warehouse, Maintenance Shop)
Low-Level Radwaste Storage Building (Replaced by Condensate Demin Bldg)



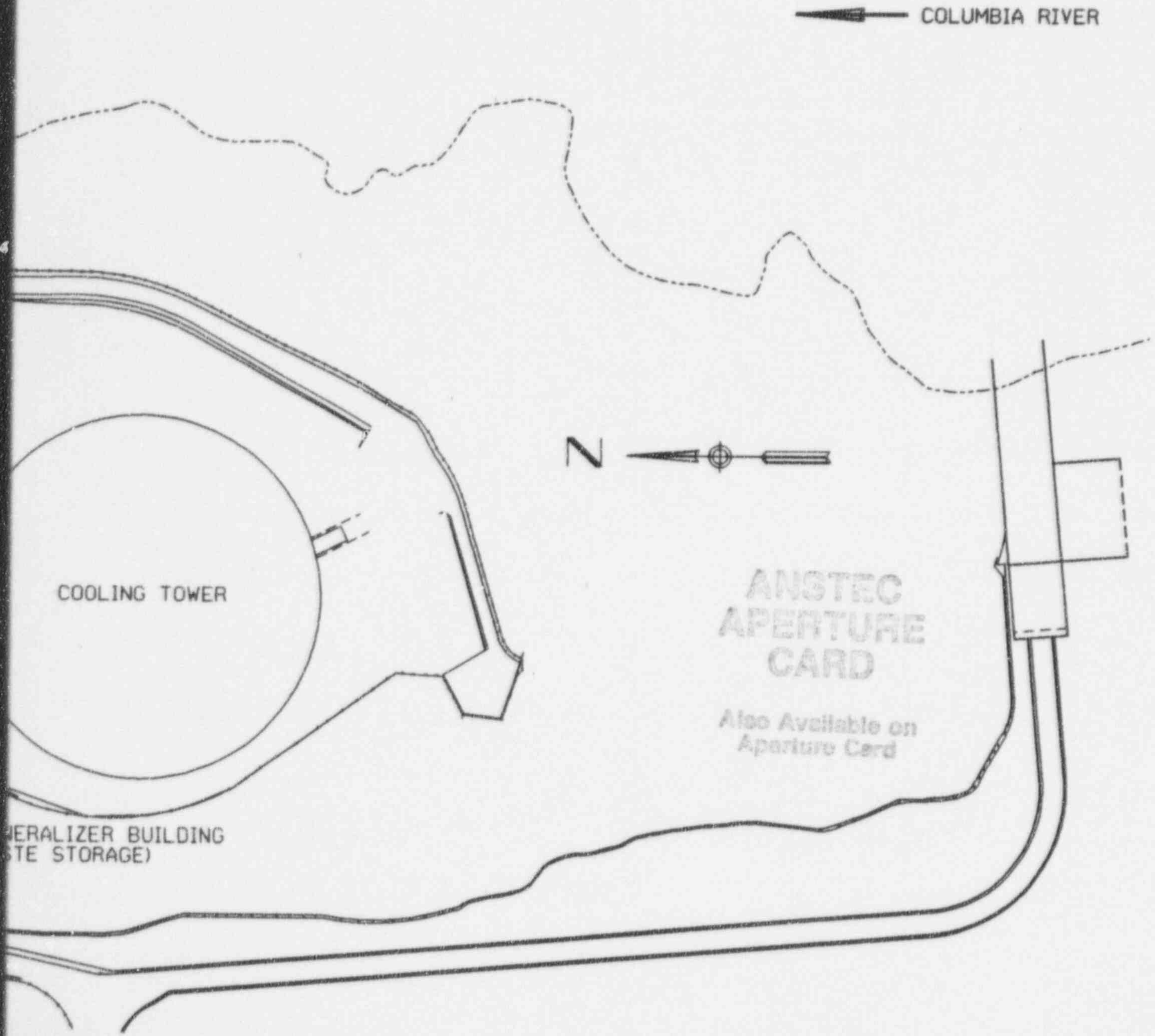
* Figure is representative of plant areas at the time of shut down. Some equipment may have been deactivated or removed.

Trojan Nuclear Plant
DECOMMISSIONING PLAN

Figure 2-1
Site Plan



* *Figure is representative of plant areas at the time of shut down. Some equipment may have been deactivated or removed.*



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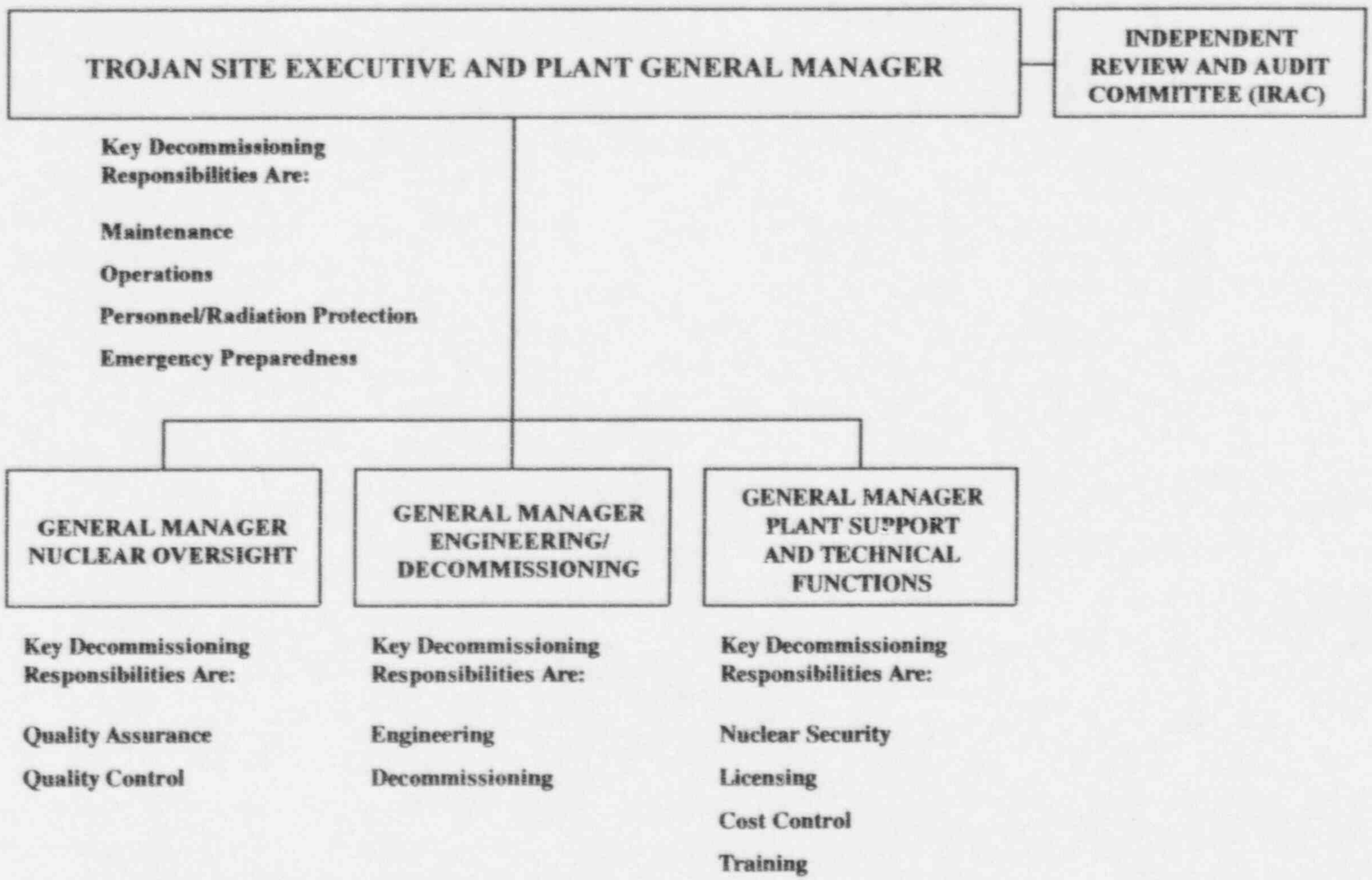
Trojan Nuclear Plant

DECOMMISSIONING PLAN

Figure 2-1
Site Plan

Figure 2-10

TROJAN ORGANIZATION



near the drain on the south end. All other survey location measurements were below the cleanup criteria.

Turbine Building - 45 ft Elevation

This is the grade-level floor of the Turbine Building. The primary components on this floor include the main condensers, make up water treatment system and the air compressors. One area is identified with exposure rates above cleanup criteria. This area is on floor near the flow transmitter stand by the southwest corner of condenser A. Exposure rates at this floor location are up to 18 net μR/hr. Biased contamination survey results identified fixed contamination measured in the pipe trough between the electric AFW pump and the condensate pump pit. Contamination levels of 50k dpm/100 cm^2 over approximately 40 ft^2 were found. All other survey location measurements were below the cleanup criteria.

Turbine Building - 35 and 27 ft Elevation

These elevations contain the condensate pumps, neutralizing tank, and the Turbine Building sump and pump. The Turbine Building sump is a contaminated area. Site characterization loose contamination surveys were taken from areas other than the sump and results were below the cleanup criteria. General area exposure rates were below cleanup criteria. However, exposure rates at the floor on the south end of the 35 ft elevation ranged up to 6 net μR/hr. Fixed contamination levels of 5-50k dpm/100 cm^2 were identified over an area of 2181 ft^2. The contamination is a result of sump overflows and condensate pump and heater drain pump leaks during periods of primary-to-secondary leakage.

Control Building Roof

Survey results were below the cleanup criteria.

Control Building - 105 ft Elevation

This elevation is for control room ventilation systems and contains the control room viewing gallery. Survey results were below cleanup criteria.

Control Building - 93 ft Elevation

The main areas include the main control room and the chemistry cold lab. The lab has numerous systems which are either contaminated or potentially contaminated. Equipment in the chemistry cold lab contains low levels of radioactivity due to

8.10, "Operating Philosophy for Maintaining Occupational Exposures As Low As Is Reasonably Achievable," Revision 1.

Radiological hazards are monitored and evaluated on a routine basis to maintain radiation exposures and the release of radioactive materials to unrestricted areas ALARA. Air sampling is required whenever work which could cause the generation of airborne radioactivity is performed. Local grab sampling equipment or continuous air monitors are available to measure airborne radioactivity. Radiation protection training is provided to occupationally exposed individuals to ensure they understand their responsibility to follow procedures and to maintain their radiation doses ALARA.

3.2.4 RADIATION PROTECTION ORGANIZATION

The PGE organizational structure that will be used to implement the Radiation Protection Program during decommissioning is shown in Figure 3-39.

3.2.5 MANAGEMENT RESPONSIBILITIES

PGE management establishes specific ALARA goals and objectives for the Radiation Protection Program and ensures that work specifications, designs, and work packages involving radiation exposure or handling of radioactive materials incorporate effective radiological controls. Implementation of specific ALARA actions, as incorporated into daily work activities, is the responsibility of each individual manager, supervisor, and worker. Specific management responsibilities for radiation protection and for maintaining exposures ALARA are summarized in this section.

3.2.5.1 General Manager, Trojan Plant

The General Manager, Trojan Plant has the ultimate responsibility for assuring that an effective Radiation Protection Program is implemented and is responsible for ensuring a coordinated and effective approach to the minimization of individual and collective dose and the control of radioactive material. He is also responsible for establishing the goals and objectives for the plant and for ensuring that personnel comply with radiation protection requirements.

3.2.5.2 Manager, Personnel/Radiation Protection

TNP Radiation Protection Program development and implementation is under the direct authority of the Manager, Personnel/Radiation Protection, who reports to the General Manager, Trojan Plant. The Manager, Personnel/Radiation Protection is responsible for ensuring that radiation protection activities of the Radiation Protection Department are effectively implemented and comply with the Facility Operating (Possession Only) License NPF-1,

regulatory requirements, and TNP procedures. The Manager, Personnel/Radiation Protection has overall responsibility for ensuring that radiation exposures are ALARA.

3.2.5.3 Engineering Management

Engineering Management is responsible for ensuring that radiation exposures during planned engineering activities are maintained ALARA, and that engineering personnel comply with radiation protection requirements and maintain their radiation exposures ALARA.

3.2.5.4 Managers and Supervisors

Managers and supervisors have responsibilities related to the Radiation Protection Program including the following:

1. Maintaining ALARA awareness and cooperating with Radiation Protection to provide individual personnel with the understanding and the means to minimize their own exposures;

2. Ensuring that personnel assigned to work with radioactive material attend required training; and

3. Ensuring personnel under their direction comply with radiation protection requirements.

3.2.6 RADIATION PROTECTION PROGRAM IMPLEMENTATION

The purpose of this section is to summarize how TNP's Radiation Protection Program will be implemented during decommissioning to maintain radiation exposure ALARA. The Radiation Protection Program is implemented and audited in accordance with approved plant procedures. Additional details concerning TNP's Radiation Protection Program are provided in the DSAR and in radiation protection implementing procedures.

3.2.6.1 Radiation Protection Equipment and Instrumentation

The various equipment and instrumentation for conducting radiation surveys and measuring and minimizing personnel exposure are summarized in this section. Additional information on the facilities for radiation protection activities, and the procedures and equipment employed for measuring and minimizing personnel exposure, is provided in the DSAR.

3.2.6.1.1 Laboratory Radiation Protection Instrumentation

The laboratory-type radiation instrumentation includes the following:

1. High-resolution solid-state detector(s) provided with lead shielding and a multichannel analyzer;

2. A beta counting system using Geiger-Mueller detectors;

3. A liquid scintillation counter;

4. A low-background thin-window gas flow proportional counter; and

5. An alpha counting system (solid-state detector).

Counting efficiencies of laboratory radiation detectors have been determined with certified radionuclide standards. A periodic calibration check is performed to check the efficiency of "in use" laboratory radiation detectors. Additional detail regarding calibration, testing, and maintenance of laboratory radiation protection instrumentation is provided in the DSAR and in radiation protection implementing procedures.

3.2.6.1.2 Portable Radiation Detection Instrumentation

The portable radiation detection instrumentation available for use within the plant includes the following:

1. Alpha detectors having count rate output;

2. Ionization chamber instruments equipped with a beta window and correction factor for beta measurement; and

3. Wide-range Geiger-Mueller instruments having dose rate and count rate output.

spent fuel, and other high-level radioactive waste stored in the pool, to the ISFSI would allow decontamination and dismantlement of structures, systems, and components throughout TNP to proceed without impacting the safe storage of the spent fuel. This action will allow earlier termination of TNP's Part 50 license.

The spent fuel, and other high-level radioactive waste stored in the pool, will be relocated to the ISFSI prior to:

1. Beginning decommissioning activities that have the potential to adversely affect the spent fuel pool and its contents; and

2. Beginning decommissioning of systems and components needed for moving and loading spent fuel into casks for storage in the ISFSI.

The ISFSI will include the capability to transfer spent fuel from a storage cask to a shipping cask for shipment directly to an offsite repository. Since the spent fuel pool will be decontaminated and dismantled prior to the shipment of spent fuel to a permanent offsite facility, the capability to transfer the fuel from a storage cask to a shipping cask using the spent fuel pool will no longer exist.

3.3.1.2 Effects of Permanent Repository Schedule on Spent Fuel Management Plan

Under the terms of the "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste" executed between PGE and the DOE, the DOE has the responsibility, following commencement of operation of a repository, to take title to and possession of the TNP spent fuel and high-level radioactive waste as expeditiously as practicable upon the request of PGE. The scope of the contract states, in part, that the services to be provided by DOE shall begin, after commencement of facility operations, not later than January 31, 1998. This contract clause provides the basis for the schedule forecast in the DOE's annual Acceptance Priority Ranking and Annual Capacity Report for receipt of spent fuel and/or high-level waste.

If a DOE facility is in operation as of January 31, 1998, then the first shipment from TNP would occur in 2002. Shipments are forecast to continue through 2018. This projection is based on DOE's 1991 Acceptance Priority Ranking (DOE/RW-0331P, December 1991), 1991 Annual Capacity Report (DOE/RW-0328P, December 1991), and an extrapolation beyond the 10-year DOE outlook. This schedule was used to develop the decommissioning cost estimate described in Section 5.

8. Shipment of radioactive waste in accordance with DOT and NRC requirements; and

9. Disposal and offsite volume reduction arrangements.

Radioactive waste storage facilities onsite include the Condensate Demineralizer Building, and, depending on the type and radiation levels, may also include areas of the Auxiliary and Fuel Buildings. Other temporary radioactive waste storage areas may be established as necessary.

A projection of radioactive waste generation (projected waste volumes, radionuclide concentrations, waste forms, and classification) is contained in Sections 2.2.7 and/or 3.1.2.

A loss of compressed air does not result in events leading to significant releases of radioactive material to the environment during decommissioning activities. Therefore, public health and safety are not adversely affected by a loss of compressed air event.

3.4.4.5 Fire Events

A fire event could affect several plant systems, structures, and components simultaneously. Combustible materials can be ignited by either external ignition sources (e.g., oxyacetylene torches) or internal ignition sources (e.g., spontaneous combustion). Adequate fire protection features will be maintained through implementation of the fire protection program discussed in Section 9, thereby minimizing the potential of occurrence of a fire. These features include:

1. Fire detection and suppression systems and equipment;

2. Fire barrier maintenance and control;

3. Personnel training and qualification;

4. Fire Protection Program procedures; and

5. Control of transient combustible materials and ignition sources.

Following permanent shutdown of TNP, a deactivation program was undertaken which included, in part, the removal of carbon from ventilation filters, the removal of oil from non-essential pumps and motors, and the deenergization of electrical power to non-essential equipment. This has reduced the amount of combustibles in the facility and the potential for fires.

A calculation was performed to determine the maximum expected release that would occur in the event of a fire. The worst case fire is assumed to occur in the Condensate Demineralizer Building, which stores low-level radioactive waste. A source term based on historical waste generation was assumed. This was considered conservative as discussed below.

Waste generated during decommissioning includes contaminated clothing, decontamination materials resulting from physical or chemical removal of radioactive contamination, work containment materials (plastic tents, etc.), contaminated residue from cutting and grinding, and contaminated components. These activities are basically similar to the types of work and materials generated during refueling and maintenance outages. The size of the work force that will be generating radioactive waste during decommissioning activities is expected to be less than the number typically employed during a refueling and maintenance outage. It is unlikely that a greater volume of combustible radioactive material will be generated during

decommissioning than was present during plant operations. Wastes of this type will be produced at a slower rate than during normal outages and will be shipped offsite on a regular basis rather than accumulated over long periods of time, further reducing the probability of a large source term being available for conflagration.

The results of this analysis determined that the offsite dose from a worst case fire involving radioactive material was approximately 5 mrem whole body. This is well below the 0.5 rem limit as discussed in Section 3.4.3.1.

3.4.4.6 Explosion Events

During decontamination and dismantlement activities portable gas bottles may be used in support of welding or cutting activities or as fuel for vehicles such as fork lifts. The use, movement, and storage of portable bottles of combustible gases (e. g., acetylene, hydrogen, and propane) in the plant will be controlled by administrative procedures. These procedures will establish requirements ensuring that the planned use, movement, or storage meets appropriate fire protection codes and safety standards. In addition, administrative procedures will control the use of ignition sources within the plant. These measures will serve to limit both the residence time of portable bottles within the plant and the potential for ignition sources in close proximity to the bottles.

NUREG/CR-5759, "Risk Analysis of Highly Combustible Gas Storage, Supply, and Distribution in PWR Plants" provides a discussion of the risks associated with the use of bottled gases in plants. The report states that a review of historical information for safety-related plant areas did not identify any incidents of explosions of bottles. The report further explains that based on discussions with explosion experts, the explosion of an individual bottle of hydrogen containing 200-250 standard cubic feet of gas in a confined space, could result in the breach of fire doors and concrete block walls. However, this would serve to dissipate the energy and no widespread damage would result. NUREG/CR-5759 concludes the risk to plant safety from the explosion of portable gas bottles is not significant.

The aforementioned administrative controls, in conjunction with the information provided in NUREG/CR-5759, provide the basis for a determination that appropriate measures are/will be provided to minimize the potential for explosion events. Given the limited potential for widespread damage as described in NUREG/CR-5759, it can be concluded that the consequences of the explosion event are bounded by the postulated fire event discussed in Section 3.4.4.5.

3.4.4.7 External Events

A review of external events was done to evaluate the effects of natural and manmade events on the radiological consequences of decommissioning activities. The hazards associated with these events are assumed to be consistent with those that could have occurred during TNP operation. Several external events were identified as having potential applicability to TNP decommissioning:

1. Earthquake;
2. External flooding;
3. Tornadoes and extreme winds;
4. Volcanic activity;
5. Lightning; and
6. Toxic chemical event.

Such events are of extremely low probability. A discussion for each of the above listed events follows.

3.4.4.7.1 Earthquake

A seismic event during decommissioning could initiate a materials handling event similar to those described in Section 3.4.4.3. The analysis in Section 3.4.4.3 concludes that the bounding material handling event results in an Exclusion Area Boundary dose that is significantly less than the 0.5 rem limit.

Structures whose failure during a seismic event could significantly affect the spent fuel pool or spent fuel integrity are seismically qualified. Decommissioning activities which could impact the seismic qualification of these structures/components will be evaluated. One of the purposes of these evaluations is to ensure that the dismantling activities do not result in a configuration that could fail during a seismic event collapsing onto or into the spent fuel pool or affect the seismic qualification of the spent fuel pool or spent fuel integrity. The consequences of a seismic event on the safe storage of spent fuel has already been analyzed with the results provided in Section 6.3 of the DSAR. This analysis concluded that a seismic event would not result in Exclusion Area Boundary doses which would exceed the applicable limits.

Following transfer of the spent nuclear fuel and high level radioactive waste to the ISFSI, seismic qualification of the spent fuel pool will no longer be required.

During the Large Component Removal Project, the Containment Building was detensioned and the opening in the south face was covered by a roll-up door. An evaluation was performed on the Containment Building structural integrity in this configuration. It was concluded that under bounding environmental loading conditions, the Containment Building will remain stable and the reinforced concrete and liner plate integrity will be maintained.

3.4.4.7.2 Flooding

As discussed in the DSAR, the water surface level of the maximum flood level is calculated to be 41 ft mean sea level (MSL). The TNP yard elevation is 45 ft MSL. This level is sufficient to be considered safe from projected floods. Access to the Auxiliary Building, Fuel Building, Containment Building, and Condensate Demineralizer Building are above the maximum expected flood level. If storage of radioactive material outside of the structures becomes necessary, it will be limited to areas with an elevation or protection equivalent to an elevation of 45 ft MSL. Alternatively, the dedicated capability to relocate stored radioactive material to a protected elevation within 60 hours (minimum warning time for flood peak following failure of Grand Coulee dam) will be maintained. In the unlikely event that a maximum flood level was experienced during decommissioning, loss of offsite power is considered to be the only potentially significant resultant decommissioning event. The consequences associated with loss of offsite power was discussed in Section 3.4.4.4.1.

3.4.4.7.3 Tornadoes and Extreme Winds

Dismantling activities take place within structures that were designed to withstand credible meteorological conditions for the area. The Containment Building was modified by the Large Component Removal Project as described below.

During the Large Component Removal Project, the Containment Building was detensioned and the opening in the south face was covered by a roll-up door. An evaluation was performed on the Containment Building structural integrity in this configuration. It was concluded that this configuration does not adversely affect the ability of the structure to withstand tornado forces. Postulated radiological releases as a result of breaching the opening door during a tornado or extremely high winds are bounded by other analyzed events.

Storage of radioactive material is normally limited to locations within the Fuel Building, Radwaste Annex, and Condensate Demineralizer Building. The storage of radioactive material will be administratively controlled to ensure adequate protection to prevent airborne releases. These administrative controls are contained in the Radiation Protection Program.

Based on the administrative controls, tornadoes and extreme winds are not expected to initiate conditions that would result in releases that would exceed 0.5 rem TEDE limit.

Tornadoes or extreme winds could initiate a loss of offsite power event. The analysis in Section 3.4.4.4.1 concludes that the 0.5 rem TEDE limit is not exceeded in the event of a loss of offsite power.

3.4.4.7.4 Volcanic Activity

Section 2.5.6 of the DSAR provides a discussion of the probability and credible effects of volcanic activity. The credible effects associated with volcanic activity are identified as:

1. Ash fall;

2. Air blast, debris avalanche and pyroclastic flows; and

3. Mud flow - flooding.

An impending ash fall at TNP (irrespective of volume) would activate preparations for cleanup and maintenance of necessary systems. If necessary, dismantling activities could be suspended to minimize activities that could result in airborne contamination. Ash fall is not considered to be an initiating event for any event resulting in offsite radiological release.

The distance of TNP from areas of known volcanic activity makes damage from air blast, debris avalanche, and pyroclastic flows remote and is not considered a credible initiating event for decommissioning events.

Mud flow and flooding resulting from volcanic activity have been analyzed and peak flood levels in the TNP area are not expected to exceed 30 ft MSL. This level is less than that expected for the Probable Maximum Flood level discussed in Section 3.4.4.7.2.

3.4.4.7.5 Lightning

A lightning strike could result in the loss of offsite power or fire event. The loss of offsite power event is discussed in Section 3.4.4.4.1 and the effect of an onsite fire is provided in section 3.4.4.5.

Table 3.1-5

Status of Buildings in the Radiologically Controlled Area

Building	Elevation (ft)	Room or Component	β-γ Removable Contamination Level (dpm/100 cm^2)	General Area Dose Rate (mrem/hr)	Maximum Contact Dose Rate (mrem/hr)
Wright-Schuchart-Harbor RMSA	45	General area	<1k	<0.2 to 5	NA
Refueling water storage tank	45	Exterior inside fence	<1k	2.5 to 5	NA
Primary water storage tank	45	Exterior	<1k	<0.2	NA
Condensate demineralizer building	33	Hopper room, sump not included	<1k	NA	NA

NA - Not applicable

* Recent survey data is not available.

NRC decommissioning activity costs are separately identified in Table 5.1-2 as large component removal activities and other radiological decommissioning costs, the latter of which are incorporated into the column entitled "DECON Planning/DECON/License Termination." With the exception of costs associated with radiological waste burial, reactor vessel internals removal, and decommissioning plan preparation, the DECON Planning/DECON/License Termination column costs are derived from the TLG Services, Inc. decommissioning cost analysis methodology. Burial costs were derived from PGE modeling and analysis of low-level radioactive waste disposal costs in July 1994, which more conservatively reflect projected burial rates. PGE also used site-specific data to independently analyze and project costs associated with removal of the reactor vessel internals and development of the decommissioning plan. Controls exist to ensure funds are expended consistent with the provisions of 10 CFR 50.82(a)(8).

The rule will be met by executing standard ongoing financial controls. Throughout the budgetary process and budget year, costs associated with new projects or activities are evaluated to determine their correct cost classification, ie, fuel management, radiological, nonradiological decommissioning, capital, etc. As a result, only costs which meet the intent of the Decommissioning Plan are submitted for reimbursement from the decommissioning trust. The activities described in the Decommissioning Plan satisfy the definitions of "decommission" and "major decommissioning activity" from 10 CFR 50.2.

Periodic reports are also prepared and submitted to the ODOE that compares costs by major classification to the decommissioning cost estimate. Plant personnel review variances and impacts, if any, are examined.

Corporate finance personnel review PGE's trust fund activity and balance periodically and for Trojan Co-owners. Any significant activity which is inconsistent with the Decommissioning Plan would be brought to the attention of Trojan management.

During 1996, the decommissioning cost estimate was recast in such a manner that actual costs can be related more easily to the cost estimate. Information will be available to access the validity of the cost estimate and/or Trojan's ability to complete decommissioning tasks within cost estimate totals. Periodically, variances between the estimate and actual costs will be reviewed as they relate to the total cost estimate to provide assurance that the cost estimate continues to be reasonable. This complies with 10 CFR 50.82(a)(8)(i)(A).

Costs required to maintain spent fuel in a safe storage condition are not funded by the trust fund while the spent fuel remains in wet storage. Once the spent fuel is transferred to dry storage, there are sufficient trust fund annual contributions to more than cover annual costs. This is described in the Decommissioning Plan, Sections 5.2 and 5.3.2 and Table 5.1-2. This complies with 10 CFR 50.82(a)(8)(i)(B).

Finally, PGE calculates the financial assurance amount required to complete radiological decommissioning. The trust fund balance, and a letter of credit, must equal the amount needed to complete radiological decommissioning. This calculation must be completed periodically and the letter of credit adjusted. The "bridge" funds are described in the Decommissioning Plan, Section 5.3. This complies with 10 CFR 50.82(a)(8)(i)(C).

5.1.2.2 Nonradiological Decommissioning Costs

Although not required by NRC regulations, the decommissioning cost estimate for TNP incorporates nonradiological decommissioning costs, as indicated in Table 5.1-2. The TNP decommissioning cost estimate considers nonradiological decommissioning costs to be those costs associated with site remediation and demolition and removal of uncontaminated structures. The decommissioning cost estimate does not include in nonradiological decommissioning costs those costs associated with spent fuel management or NRC decommissioning activities.

Nonradiological site remediation costs were identified and incorporated into the TLG Services, Inc. cost estimate based on a study conducted for PGE in April 1994 by CH2M Hill, an engineering firm specializing in environmental remediation and water treatment. The methodology that CH2M Hill used to estimate the nonradiological site remediation costs was consistent with the methods used by EPA and State of Oregon under their site clean-up programs.

The relatively larger projected expenditures in 2018 and 2019 for nonradiological decommissioning activities (Table 5.1-2) reflect the intent to perform the majority of the site restoration and uncontaminated building demolition activities after the spent fuel and other high-level radioactive waste have been transferred to an offsite repository in 2018. Significant activities planned prior to this time include removal and disposal of asbestos contained in the cooling tower in 1997, as well as annual activities related to nonradiological site remediation.

5.1.2.3 Spent Fuel Management Costs

Implementation costs associated with the spent fuel management plan described in Section 3.3.1 are reflected in the projected cost schedule for the onsite management of irradiated fuel detailed in Table 5.1-2. Spent fuel management costs begin with ongoing spent fuel pool operation, surveillance, and maintenance activity costs, and continue through ISFSI planning, construction, and operation until possession and title of the irradiated fuel is transferred to the DOE for ultimate disposal (assumed in this estimate to be completed in 2018). As indicated in Table 5.1-2, spent fuel pool operation expenditures are projected to end in 1998 as a result of the transfer of the spent fuel pool contents to the ISFSI. Costs associated with onsite management of the spent fuel will then involve ISFSI operation, maintenance, and surveillance expenditures. Finally, upon transfer of the ISFSI contents to an offsite repository,

spent fuel management costs end in 2018 with final expenditures necessary for disposal of greater than Class C waste and ISFSI decommissioning activities.

PGE has analyzed spent fuel operations and maintenance costs related to storage in both the spent fuel pool and the ISFSI. The methodology used in this analysis considered plant-specific values, as applicable, for labor, material, and outside professional services requirements as well as for other distributed items such as overheads, property and liability insurance, regulatory fees, fire protection activities, and power usage. The results of this analysis were then incorporated into the TLG decommissioning cost study.

5.1.2.4 Financial Activity Costs

Additional costs will be incurred by each TNP co-owner as necessary during decommissioning to secure and maintain assurance that adequate funds will be available to complete radiological decommissioning of the TNP site, and to secure loans or other "bridging" mechanisms to augment existing funds to cover near-term decommissioning costs. The financial assurance costs (e.g., letter of credit and standby trust fees) indicated in Table 5.1-2 are based on the basis points and projected amount of required financial assurance appropriate for each co-owner as described in Section 5.3, "Decommissioning Funding Plan." The loan costs in Table 5.1-2 are based on the interest rate and loan amount appropriate for each TNP co-owner requiring financial bridging as described in Section 5.3. The method which each co-owner will use to provide the required financial assurance mechanism and bridging funds is described in detail in Section 5.3.

5.2 SPENT FUEL MANAGEMENT FUNDING PLAN

Spent fuel management costs are segregated in Table 5.1-2 into spent fuel pool operation costs and dry storage (ISFSI) costs. Ongoing costs associated with the storage of spent fuel and other high-level radioactive waste in the spent fuel pool are currently incorporated into the TNP O&M budget, and are expected to continue to be funded in this manner until the contents of the spent fuel pool are transferred to the ISFSI. Costs associated with dry storage activities, including ISFSI planning, construction, O&M, and decommissioning, as reflected under the column heading "Dry Storage" in Table 5.1-2, will be funded with decommissioning trust funds collected for that purpose. Additional details on the decommissioning trust fund collections for each TNP co-owner are provided in Section 5.3.

5.3 DECOMMISSIONING FUNDING PLAN

5.3.1 CURRENT DECOMMISSIONING FUNDING CAPABILITIES

Each of the TNP co-owners separately collect and maintain funds for the decommissioning of TNP. These funds are collected through rates and deposited to external trust funds in accordance with 10 CFR 50.75. However, the external trust funds were established assuming that the total collected funds at the expected time of decommissioning would be sufficient to pay both radiological and nonradiological decommissioning costs. Because the TNP was shutdown prematurely, the external trust funds established by the TNP co-owners currently contain only a portion of the total amount needed for site radiological decommissioning. Table 5.3-1 summarizes the status of the TNP co-owners' decommissioning trust funds as of December 31, 1993.

The NRC's general policy requires, prior to the start of final dismantlement (DECON), either funds needed for decommissioning (as the term "decommission" is defined in 10 CFR 50.2, "Definitions") to be available or an appropriate financial vehicle to be secured and maintained that will assure the availability of adequate funds for completion of NRC (radiological) decommissioning. As indicated above, the trusts established by the TNP co-owners for decommissioning will not contain the funds necessary for completion of radiological decommissioning prior to the start of the DECON phase in 1998. Thus prior to commencing DECON, each TNP co-owner is required to secure a financial assurance mechanism allowed by 10 CFR 50.75. This financial assurance must be maintained throughout the DECON period until termination of TNP's Part 50 license. Furthermore, during DECON each co-owner's decommissioning trust fund balance is projected to be reduced to a point where it will be necessary in certain instances to borrow or otherwise provide "bridging" funds to complete decontamination activities and allow scheduled collections to restore the decommissioning trust fund balance.

5.3.2 TNP CO-OWNERS' DECOMMISSIONING FUNDING PLANS

Each of the TNP co-owners has established a program in conjunction with specified goals for the collection of funds for the decommissioning of TNP. These programs were based upon early studies of costs for decommissioning nuclear plants of comparable type and size to TNP. At the time that these programs were established, a specific decommissioning study for the TNP was not performed due to the existence and availability of studies for similar nuclear plants and because it was not planned to decommission until after 2011.

Following the decision to permanently shutdown TNP, the TNP-specific decommissioning cost estimate described in Section 5.1 was prepared, enabling each TNP co-owner to evaluate the adequacy of its current funding plan. Because the results of the decommissioning cost estimate indicate total decommissioning costs higher than those upon which the current TNP co-owner decommissioning trust fund contribution schedules are based, each TNP co-owner has adopted a revised decommissioning fund collection schedule which ensures that each co-owner's portion of the decommissioning activity expenditures will be fully funded. These updated trust fund contribution schedules are based on funding requirements for both radiological and nonradiological decommissioning costs, as well as financing costs and specific spent fuel management costs including planning, design, construction, O&M, and decommissioning of an ISFSI. The updated collection schedules do not include funding for spent fuel pool O&M costs since these costs are being paid with O&M budget funds rather than decommissioning trust funds. The decommissioning trust fund cash flow for each of the TNP co-owners, based on the expenditure schedule in Table 5.1-2 and the revised co-owner contribution schedules, is described below.

5.3.2.1 PGE Funding

Table 5.3-2 provides PGE's decommissioning trust fund cash flow in nominal dollars (3.8% escalation) during decommissioning. The trust fund expenditures described in this table are PGE's share (67.5%) of the expenditures described in Table 5.1-2, with the exception of spent fuel pool O&M costs since these costs are being paid with O&M budget funds rather than decommissioning trust funds. The trust fund contributions listed in Table 5.3-2 are based upon PGE's updated decommissioning trust fund contribution schedule which ensures that PGE's portion of the decommissioning activity expenditures will be fully funded.

Projected requirements for bridging funds have been incorporated into PGE's decommissioning trust fund cash flow. As previously discussed, PGE's external trust fund currently contains only a portion of the total amount needed for PGE's share of site radiological decommissioning costs. Based on the decommissioning trust fund cash flow analysis presented in Table 5.3-2, bridging funds will be required in the year 2000 to complete decontamination activities and allow scheduled collections to restore the decommissioning trust fund balance. Projected interest on bridging funds has also been incorporated into PGE's trust fund cash flow as indicated in Table 5.3-2.

In addition, because the trusts established by the TNP co-owners for decommissioning will not contain the funds necessary for completion of radiological decommissioning prior to the start of the DECON phase in 1998, each TNP co-owner must secure a financial assurance mechanism allowed by 10 CFR 50.75, and maintain this assurance throughout the DECON period until termination of TNP's Part 50 license. PGE's financial

assurance mechanism will consist of the decommissioning trust fund balance together with a letter of credit. Because financial assurance will be maintained only for NRC decommissioning activities, the methodology used to determine the size of the letter of credit ensures that if a given amount of the decommissioning trust fund is used for non-NRC activities during a current year, the portion of the financial assurance provided by the letter of credit must be increased by the same amount. This methodology can be summarized as follows:

$$L_{fa} = T_1 - T_2 + T_3 \quad \text{where}$$

L_{fa} = Letter of Credit Portion of Financial Assurance Needed for Current Year
T_1 = Total costs of remaining NRC activities
T_2 = Current decommissioning trust fund balance
T_3 = Portion of trust balance planned for non-NRC costs during current year

Financial assurance for remaining NRC decommissioning activities will be calculated at the beginning of each year and will be periodically reviewed during each year to ensure that an adequate level of financial assurance is maintained.

5.3.2.2 EWEB/BPA Funding

BPA is obligated through Net Billing Agreements to pay costs associated with EWEB's share of TNP, including decommissioning and spent fuel management costs. BPA will fulfill the decommissioning funding obligations of EWEB, including providing financial assurance for EWEB's portion of decommissioning costs in a manner stipulated in 10 CFR 50.75(e)(3)(iv) for Federal government licensees. Table 5.3-3 provides BPA/EWEB's decommissioning trust fund cash flow in nominal dollars (3.8% escalation) during decommissioning. The trust fund expenditures described in this table are BPA/EWEB's share (30%) of the expenditures described in Table 5.1-2, with the exception of spent fuel pool O&M costs since these costs are being paid with O&M budget funds rather than decommissioning trust funds. The trust fund contributions listed in Table 5.3-3 are based upon BPA/EWEB's updated decommissioning trust fund contribution schedule which ensures that BPA/EWEB's portion of the decommissioning activity expenditures will be fully funded.

Projected requirements for bridging funds have been incorporated into BPA/EWEB's decommissioning trust fund cash flow. As previously discussed, BPA/EWEB's external trust fund currently contains only a portion of the total amount needed for BPA/EWEB's share of site radiological decommissioning costs. Based on the decommissioning trust fund cash flow analysis presented in Table 5.3-3, bridging funds will be required to complete decontamination activities and allow scheduled collections to restore the decommissioning trust fund balance. These bridging funds are not expected to incur interest costs since BPA, as a government entity, will provide the additional decommissioning funding when necessary according to the schedule listed in Table 5.3-3.

As allowed by 10 CFR 50.75(e)(3)(iv), BPA, as a Federal government entity fulfilling the decommissioning funding obligations of EWEB, a licensee, will provide financial assurance in the form of a statement of intent. The statement of intent will contain a reference to the TNP decommissioning cost estimate described in Section 5.1, indicating that funds for radiological decommissioning will be obtained when necessary.

5.3.2.3 PP&L Funding

Table 5.3-4 provides PP&L's decommissioning trust fund cash flow in nominal dollars (3.8% escalation) during decommissioning. The trust fund expenditures described in this table are PP&L's share (2.5%) of the expenditures described in Table 5.1-2, with the exception of spent fuel pool O&M costs since these costs are being paid with O&M budget funds rather than decommissioning trust funds. The trust fund contributions listed in Table 5.3-4 are based upon PP&L's updated decommissioning trust fund contribution schedule which ensures that PP&L's portion of the decommissioning activity expenditures will be fully funded.

Based on the decommissioning trust fund cash flow analysis presented in Table 5.3-4, PP&L's decommissioning trust balance will remain adequately funded during decommissioning such that bridging funds will not be required. However, because the trusts established by the TNP co-owners for decommissioning will not contain the funds necessary for completion of radiological decommissioning prior to the start of the DECON phase in 1998, PP&L must secure a financial assurance mechanism allowed by 10 CFR 50.75, and maintain this assurance throughout the DECON period until termination of TNP's Part 50 license. PP&L's financial assurance mechanism will consist of the decommissioning trust fund balance together with a letter of credit. The methodology for determining the size of the letter of credit is as described in Section 5.3.2.1, "PGE Funding."

9. FIRE PROTECTION PROGRAM

9.1 FIRE PROTECTION PLAN

The TNP fire protection program is described in topical report PGE-1012, "Trojan Nuclear Plant Fire Protection Plan."

The objectives of the fire protection program are to provide for the protection of the health and safety of PGE employees and the public, to minimize the probability and severity of fires throughout the plant, and minimize the potential for radioactive releases to the environment. These objectives are achieved through the integration of fire protection into the design, construction, operation, and maintenance of the plant and equipment; by fire prevention efforts; and by providing appropriate fire detection and suppression features and fire-resistive compartmentation. These multiple levels of safety measures constitute a "defense-in-depth" approach by:

1. Preventing fires from starting;
2. Detecting rapidly, controlling, and extinguishing promptly those fires that do occur; and
3. Providing protection for structures, systems, and components important to safety.

The Fire Protection Plan describes the organization and management of the fire protection program, with emphasis on administrative controls, procedures, and individual responsibilities; discusses the fire protection features provided, such as fire barriers, fire detection and suppression systems, and emergency communication systems; provides an overview of the fire hazard analysis for each area; and contains a comparison of the fire protection program against Appendix A to NRC Auxiliary Power Conversion Systems Branch Technical Position 9.5-1.

Changes to the fire protection program required for decommissioning activities will be made in accordance with the provision of License Condition C.(8) of Facility Operating (Possession Only) License NPF-1 and 10 CFR 50.59. License Condition C.(8) states that PGE may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely impact the safe storage of irradiated fuel or increase the likelihood of an offsite release of radioactive material due to a fire. The Fire Protection Plan also conforms to the recently revised 10 CFR 50.48, which addresses permanently shut-down facilities.