U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No.: 50-344/94-01

License: NPF-1

Licensee: Portland General Electric Company (PGE)
121 S. W. Salmon Street
Portland, Oregon 97204

Facility Name: Trojan Nuclear Plant (TNP) - Rainier, Oregon

Inspection At: TNP site, Columbia County, Oregon

Inspection Conducted: January 26 through 28, 1994

Inspector: _____ 3/3/94
H. Dean Chaney, Senior Radiation Specialist — Date Signed

Approved By: _____ 3/7/94
for James H. Reese, Chief, — Date Signed
Facilities Radiological Protection Branch

Inspection Summary

Areas Inspected: A routine announced inspection of the licensee's post operational phase activities involving radiation protection, environmental monitoring, conduct of operations and surveillances, and followup on a transportation of radioactive materials incident. NRC Inspection Procedures 83750, 84750, 86750, and 61726 were used. This inspection was extended past the Exit Meeting on January 27, 1994, to observe the licensee's staffing and activities on Friday January 28, 1994, a day when a majority of the plant staff was absent. Only a staff comprised of security and operations personnel (RP personnel are on call) are on-site from Friday though Sunday.

Results:

No violations or deviations were identified. In the areas inspected, the licensee's programs appeared fully capable of accomplishing of their safety objectives. Strengths were noted in the licensee's audit/surveillance program. The licensee had resolved satisfactorily the problems associated with the transportation of radioactive materials (waste) incident reported in NRC Morning Reports Nos. 5-93-0104 and 5-94-0001 (Section 5). The licensee identified a long term problem with the analytical performance of their contract laboratory performing radiological environmental sample analyses (Section 3.1). An unresolved item concerning the Radiological Environmental Monitoring Program (REMP) is discussed in Section 3.1.

DETAILS

1. PERSONS CONTACTED

1.1 Licensee Personnel

S. Quennoz, General Manager, Trojan Plant
*B. Shoemaker, Supervisor, Security Watch
L. Houghtby, General Manager, Plant Support
*G. Huey, Manager, Radiation Protection (RP) Technical Support
*T. Meek, Manager, Personnel Protection/RP
D. Nordstrom, General Manager, Nuclear Oversight
*S. Schneider, Manager, Operations
*M. Featherston, Licensing Engineer
L. Rocha, RP Engineer
*A. Bowman, Supervisor, Chemistry and RP (C/RP) Technicians
M. McQuiston, Quality Control (QC) Supervisor
*J. Vingerud, Maintenance Manager
*B. Susee, Decommissioning Manager
*D. M[illegible]on, Supervisor, Personnel Security
M. [illegible] Manager, Nuclear Security
J. [illegible], Shift Manager, Operations
P. Winters, Auxiliary Operator, Operations
M. Stien, Health Physics (HP) Technician
L. Larson, Radiological Engineer

1.2 Oregon Department of Energy

A. Bless, Resident Safety Manager

*Denotes those personnel attending the exit meeting on January 27, 1994. The inspector contacted other PGE employees (operations, security, radiation protection, licensing, and administration) during this inspection period.

2. PLANT STATUS

The TNP reactor/facility is in a defueled and shut down condition awaiting decommissioning. Spent Fuel is safely stored in the Spent Fuel Pool. The licensee is awaiting issuance of their Permanently Defueled Technical Specifications and planning for removal of the reactor's four steam generators and the pressurizer (Large Component Removal Project-LCRP). The licensee is also preparing for submittal (mid May 1994) their 10 CFR 50.82(a) required Decommissioning Plan for TNP.

The licensee has completed draining of plant systems. Ongoing work continues on surveillances and maintenance on spent fuel pool associated systems, preparation and shipment of radioactive wastes and, completion of the TNP site nonradiological and radiological characterization project.

The licensee continues in a staff reduction mode at a very deliberate pace. The licensee's current organization structure and staffing were reviewed. Plant staffing is essentially the same as discussed in NRC

Inspection Report No. 50-344/93-10. License staff is comprised of approximately 209 on-site personnel. Some temporary technical help is contracted out as needed. Permanent staffing will be reduced to approximately 158 by June 1994, and to 150 by 1995. The security force will be the largest component in the organization structure in 1995. Both the radiation protection and the operation staffs appear to be stable and at an adequate number to accomplished all required health and safety activities. The Operations Department is currently working four 10-hour shifts during a work week. Fridays through Sundays are minimally staffed by all other departments except for Operations and Security departments. The entire plant staff is migrating toward the four 10-hour shifts. Attachment 1 is an update of the organization chart previously presented in NRC Inspection Report 50-344/93-10.

The inspector was briefed by the TNP staff on the funding request submitted by TNP to the PGE Board of Directors on the Large Component Removal Project (LCRP). The submittal requested that LCRP be approved for start around April 1994 with completion by the end of 1995. The LCRP will entail the removal of the four steam generators and the reactor pressurizer and shipping them to a radioactive burial site. This project would be reviewed and authorized in accordance with the requirements of 10 CFR Part 50.59. The licensee's proposal is included as Attachment 2 to this report.

2. OCCUPATIONAL RADIATION EXPOSURE (83750)

The licensee's radiation protection program was inspected to determine their compliance with the requirements of 10 CFR Part 20 and those contained in their current (Amendment 193) Trojan Technical Specifications (TTSs); and agreement with the radiation protection program and ALARA commitments contained in Sections 5.6 and 5.7 of the TNP Defueled Safety Analysis Report (DSAR).

2.1 Implementation of 10 CFR Part 20 Revisions

The licensee's implementation of the revisions to 10 CFR 20, as set forth in Federal Register 56 FR 23377, dated May 21, 1991, were examined. The licensee had successfully implemented the Part 20 revisions. However, the licensee was not able to implement their new computerize dosimetry record and access control system due to procurement problems. The licensee has made modifications to the existing access and records systems to incorporate applicable 10 CFR 20 attributes.

2.2 Audits and Appraisals

The inspector examined the licensee's audit and appraisal program, and reviewed the content of several audits and surveillances. Audit and surveillance programs for operational activities were reviewed in addition to those concerning the radiation protection program.

The following licensee documents associated with the quality assurrance program were reviewed.

- PGE Nuclear Quality Assurance Program, Revision 16
- Daily Corrective Action Request (CAR) Report, January 27, 1994
- CAR C-94-0004, "Opening of a Radioactive Material Package," January 26, 1994
- 1993 - 1995 Integrated Audit/Surveillance Schedule; Serial No. DLN-004-94, Revision 0, dated January 10, 1994.
- Surveillance - Shift Routines; Serial No. 93-014-SURV, dated October 12, 1993.
- Audit - Trojan Technical Specifications, AP-707; Serial No. DLN-212-93, dated October 21, 1993.
- Audit - Trojan Fire Protection Activities; Serial No. DLN-259-93, dated December 16, 1993.
- Surveillance - Emergency Planning Exercise; Serial No. 93-016-SURV, dated December 21, 1993.
- Surveillance - 10 CFR 20 Revision Implementation; Serial No. 93-015-SURV, dated December 14, 1993.
- Surveillance - 10 CFR 20 Revision Implementation Followup; Serial No. 94-002-SURV, dated January 13, 1994.

The licensee's audit program is staffed with qualified personnel and the audits are of good quality. Followup on the effectiveness of previous corrective actions is routinely performed. Audits and surveillances are probing in nature and broad in scope.

2.3 External Exposure Control

The licensee's personal dosimeter/dose measuring system had been replaced by a contracted service. The inspector verified that the dosimetry processor met the accreditation requirements of 10 CFR Part 20.1501(c)(1). The official personnel deep dose equivalence (external dose) measurement device being used by the licensee is a multi-element thermoluminescent type dosimeter.

Plant radiological access and high radiation area controls and area posting were found to be satisfactory and in accordance with 10 CFR Part 20.1902 and TTS 6.12.

2.4 Control of Radioactive Materials and Contamination, Surveys, and Monitoring

The licensee had finished the complete non-radiological and radiological hazard characterization of the TNP site and facility systems. A draft copy of the report was provided to the inspector for review. The licensee did not identify any radiological problem areas outside of the protected area (security fence) during the characterization.

The characterization involved the systematic sampling of soils, sediment and water, the obtaining of environmental dose rates (pressurized ion chambers and sodium iodide measurements), and the direct survey of

surfaces with beta-gamma radiation sensitive instruments. Background levels were obtained in a similar fashion in areas outside TNP property that would not have been affected by plant effluents. Both preoperational and operational environmental radiological monitoring data were also used to determine the statistical importance of the characterization project results. Analysis of samples will be performed on site and/or at a contacted laboratory. Analyses will include determination of presence of non-gamma radiation emitting radionuclides.

The inspector reviewed the licensee's routine plant radiological surveys and the frequency of their performance. The licensee has determined the baseline loose contamination levels and dose rates for all in plant areas. During inspector walkdowns independent exposure/dose rate surveys did not identify any areas in disagreement with the licensee's documented results.

2.5 Facility Tours

Tours of the licensee's facilities were conducted during the inspection period. Independent radiation measurements were made with the following NRC instruments:

- Xetex Model 305B gamma radiation exposure rate measurement instrument, Serial No. 036062, due for calibration May 20, 1994; and

- Eberline Model RO-2 beta-gamma dose rate measurement instrument, Serial No. 008985, due for calibration July 6, 1994.

Personnel in radiologically controlled areas were noted to be equipped with proper dosimetry, including electronic alarming dosimeters. No abnormal radiation measurements were identified. Radioloigcal posting was satisfactory. All areas toured were found to be clean.

The licensee's radiation protection program is well documented, appropriately staffed (for current conditions), is afforded appropriate oversight, and is implemented in a quality manner. No violation or deviations were identified during this portion of the inspection.

3. RADIOACTIVE WASTE TREATMENT, AND EFFLUENT AND ENVIRONMENTAL MONITORING (84750)

The licensee's program was reviewed to determine compliance with the requirements set forth in TTS 6.8.4.f, and the Off Site Dose Calculation Manual (Amendment 10); and agreement with the commitments in Section 5.0 of the DSAR. The inspector reviewed the following documents associated with the licensee's program.

- TNP Offsite Dose Calculation Manual, Amendment 10 (December 1993)
- TNP Semiannual Radioactive Effluent Release Report for the period January 1, 1993 through June 30, 1993, dated August 26, 1993.

3.1 Licensee Identified Problem

The licensee discussed with the inspector a problem they recently discovered with the lower level of detection (LLD) values being provided by their contact laboratory performing the Radiological Environmental Monitor Program (REMP) sample analyses. The REMP is dictated by the requirements contained in TTS 6.8.5.f and the Offsite Dose Calculation Manual (ODCM) Section 3/4.3. The TNP staff recently determined that their contract laboratory had been routinely (for at least the last 6 years) analyzing environmental samples to LLD's higher than called for in Table 4.3-1 of the ODCM. The radionuclides involved were Barium 140 (Ba-140) and Lanthanum 140 (La-140) for water and milk samples, and Iron 59 (Fe-59) and Niobium 95 (Nb-95) for water samples, see Table 1 below.

Table 1

Isotopes	TTS LLD*	Contract-Lab*	Reportable Levels* (water/milk)
La-140	15	120-250	100/90
Ba-140	60	120-250	100/90
Fe-59	30	31-33	200/7000
Nb-95	15	16-18	200/na

*Values in units of picoCuries/liters(ρCi/l) taken from the ODCM and the contract laboratory's reports.

All the above isotopes have relatively short radiological half-lives (less than 50 days). Both the La and Ba values presented in the Annual REMP reports to the NRC, per TTS 6.9.1.5.2, for the last six years have been above the ODCM reporting levels in Table 3.3-2, without any discussion on corrective actions.

The TNP staff's preliminary investigation had determined that the problem may be due to the licensee not providing the contracting laboratory with definitive LLD's and reporting level values. This was also due to the licensee's failure to properly review each years purchase order to the ODCM requirements. The laboratory also, did not count the licensee's samples in a timely manner that would allow development of LLD's at the levels required. TNP personnel previously responsible for this area have since left TNP.

The licensee is conducting a detailed review of the last six years of annual environmental reports and will be including a special report on the results of their investigation, recalculated offsite dose consequences, and any corrective actions required, in the 1993 Annual REMP report to the NRC, per ODCM Section .

The licensee has requested the contracting laboratory to analyze samples to the ODCM specified values and has provided the laboratory with the ODCM (Amendment 10) values.

Conclusions

This occurrence is considered an unresolved item (50-344/94-01-01) pending further NRC review of the licensee's program and the licensee's final report and the results of their recalculation of doses via the various evnironmental exposure pathways to the public using the worst case of effluent releases during the periods in question.

An unresolved item is a matter about which more information is required to ascertain whether it is an acceptable item, a deviation, or a violation.

4. **MAINTENANCE/SURVEILLANCE TESTING** (81726)

The inspector reviewed records of required surveillances (TTS 4.9.11) conducted since the last inspection involving the spent fuel pool support systems and control room staffing (TTS 6.2.2) to determine compliance with TTS requirements and agreement with the commitments contained in Section 3.2.2.2 of the TNP DSAR.

4.1 Operator Rounds and Control Staffing

The inspector visited the control room and examined the off-shift staffing, reviewed operations and surveillance logs (January 1 through 28, 1994), reviewed operations staff's required reading assignments, an accompanied an auxiliary operator during his rounds. The spent fuel pool liner leak detection valves were observed to be dry. The spent fuel pool water level and temperature are being maintained at:

- Approximately 72 degrees Fahrenheit (°F) (limit <140 °F)
- Approximately 24.5 feet above the irradiated fuel (limit >23 feet above the irradiated fuel)

The following documents and records were reviewed during this phase of the inspection.

- POT-24-6-DA, "Shift Operating Routines," Revision 0
- OG 13-1, Log Sheet, "Auxiliary Operator Rounds," Revision 1
- POT-24-2-D, Data Sheet, "Daily Routines," Revision 48

Control room/operations staffing satisfied the requirements of TTS 6.2.2 and is accomplished without the undo use of overtime.

The inspector concluded that the licensee's performance in this area was satisfactory, and their surveillance test program appeared to be capable of accomplishing of its safety objectives. No violations or deviations were identified during this portion of the inspection.

5. SOLID RADIOACTIVE WASTE MANAGEMENT AND TRANSPORTATION OF RADIOACTIVE MATERIALS (86750)

The inspector reviewed with the TNP staff the licensee's investigation of the radioactive waste transportation incident that was reported by the licensee to the NRC on December 23, 1993, and discussed in NRC Morning Report Nos. 5-93-0104 and 5-94-0001.

Initially it was reported by the license that the Washington State inspector at a Washington State radioactive waste burial site had determined that a licensee shipment was exhibiting external radiation dose rates greater than allowed by 49 CFR 171.441(b)(1). Upon confirmatory surveying by the State of Washington and the licensee it was determined that the shipment conformed to dose limits requirements of 49 CFR. The State of Washington also determine (during the initial inspection of the shipment) that 24 packages in the shipment did not conform to burial site permit requirements concerning unique labeling of each package as to the stability classification of the package. In this case, each package should have been specifically labeled as "Class A, Stable" but only "Class A" was marked on the packages. The licensee indicated that the failure to properly label the packages was the result of a communication problem involving the parties involved and the failure of the individuals to question the process (of not including the word "stable" on the packages) being performed. The licensee accurately documented all of the State of Washington findings in CAR C-93-0099-01, and developed corrective actions. Corrective actions had been implemented and appeared effective in preventing similar incidents in the future.

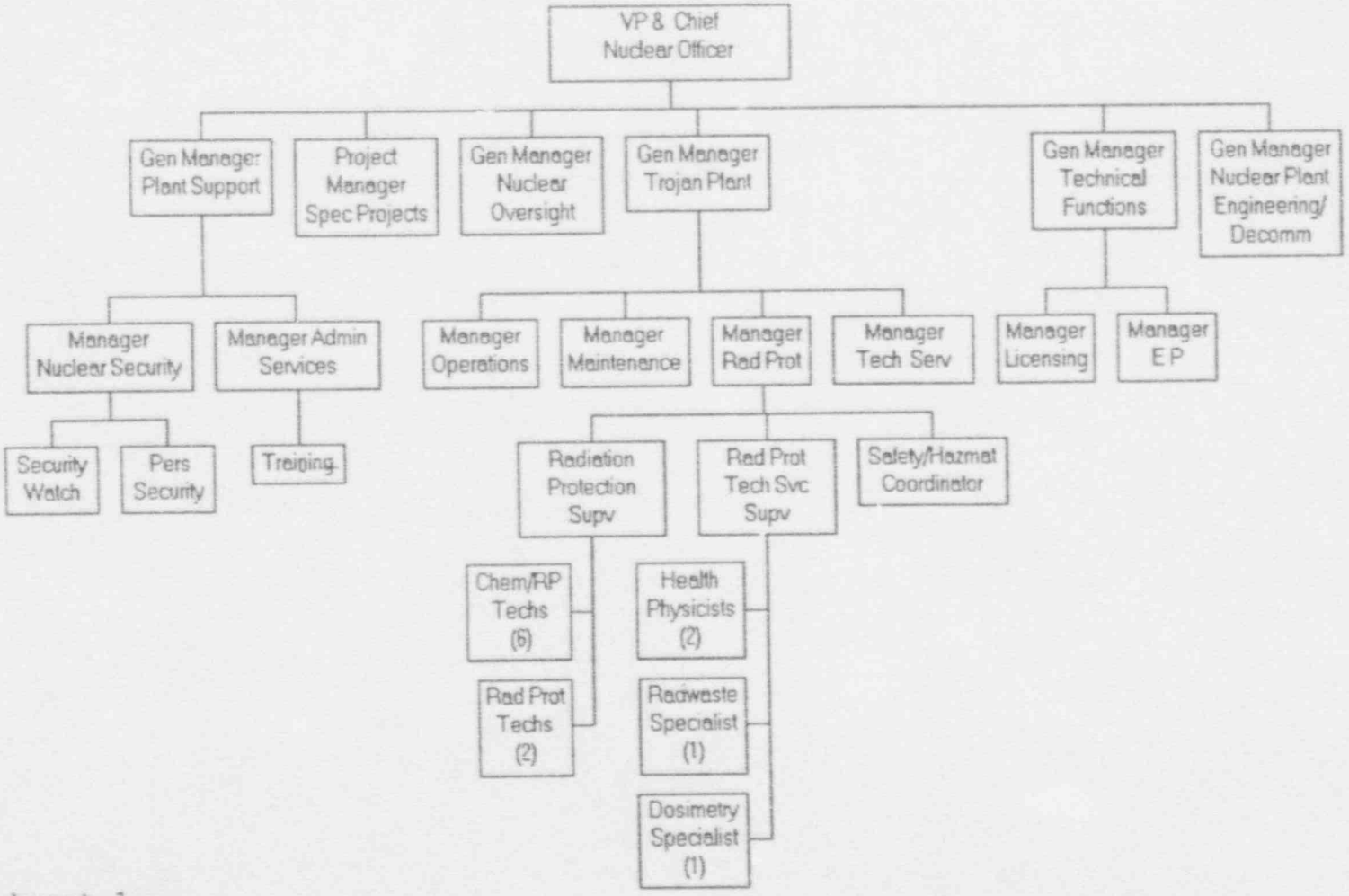
During this inspection the inspector was informed by the Radiation Protection Manager that another incident involving poor communications (CAR C-94-0004) had occurred in the area of radwaste activities. Due to the recent event involving the waste shipment of December 22, 1993, an all hands meeting was being held with the Radiation Protection and Radwaste personnel to ensure TNP management's expectations concerning compliance with verbal directions and the need for attention to detail are clearly understood by all personnel.

The licensee's radwaste and radioactive material transportation programs appear to be conducted in accordance with TNP procedures with only minor procedural infractions occurring infrequently. No violations or deviations were identified during this portion of the inspection.

6. EXIT MEETING

An exit meeting was conducted on January 27, 1994. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary any of the materials provided to, or reviewed by the inspector during the inspection.

TROJAN NUCLEAR PLANT ORGANIZATION



Attachment 1
NRC Inspection Report No. 50-344/94-01

AUTHORIZATION FOR PROJECT

TROJAN

LARGE COMPONENT REMOVAL

PROJECT

JANUARY 19, 1994

ATTACHMENT 2
NRC INSPECTION REPORT 50-344/94-01

OBJECTIVE

This AFP is being submitted to the Board of Directors for approval of up to $18.5 million needed to perform the Large Component Removal (LCR) project. The objective of the LCR project is to remove and dispose of Trojan's 4 steam generators and pressurizer prior to the end of 1995 to reduce the cost to customers, provide an opportunity to accelerate other decommissioning activities, and reduce the risk of potentially much higher costs of disposal in the future.

BACKGROUND

After the Trojan Nuclear Plant was permanently shut down on January 4, 1993, PGE was confronted with identifying the most cost effective means of decommissioning the plant and submitting a Decommissioning Plan including a detailed cost estimate to the NRC within two years. During the ensuing study it was determined that the cost of radioactive waste disposal provides a great amount of uncertainty as a result of future disposal rates and disposal facility availability. Because of the high degree of uncertainty associated with the disposal issues, it was determined that prompt decommissioning in 1998 was the least cost alternative and was proposed in the November 1993 rate case. Most recently, a favorable agreement has been reached with U.S. Ecology for relatively low burial rates for the years 1994-95, further improving the economics of the early removal of major components.

PROJECT SCOPE

The scope of the LCR project was selected by identifying components with high curie content and large volume that could be removed from the plant under the current evaluation process prior to approval or even submittal of a Decommissioning Plan. It was determined that disposing of the 4 steam generators and the pressurizer would be the optimum scope. There are approximately 4.22 million curies of radiation contained at the Trojan Plant (not including fuel) with 4.19 million contained in the reactor vessel. The LCR project will eliminate 87.5% of all of the curie radiation outside of the reactor vessel at the site. These 5 components also comprise 12% of the total radioactive waste volume at the Plant. In addition, Yankee Rowe Nuclear Plant, which was also shut down prematurely, recently completed removal of these same components prior to submittal of their Decommissioning Plan to the NRC, thus setting an industry precedent for this project.

This scope also was chosen to minimize later remobilization costs during prompt decommissioning. Because these 5 components are the largest at the plant, remobilizing the high priced heavy lift contractor's cranes will not be necessary in the future. The costs associated with remobilizing the other subcontractors will be minimal, since their equipment is relatively small and extensive use of local craft labor is planned.

In summary, the project includes the following activities:

1. Refurbish and test the containment building polar crane.
2. Sever piping attached to the steam generators and pressurizer.
3. Remove and dispose of egress interferences including concrete walls.
4. Move the vessels out of the containment building and lower to ground level.
5. Transport the vessels to a laydown/preparation area.
6. Prepare the vessels as shipping containers by filling the vessels with low density concrete, welding plugs on all openings, and applying a protective coating.
7. Load vessels onto a barge, and ship up the Columbia River to a burial site on the Hanford Reservation and pay burial fees to U.S. Ecology.

BENEFITS OF THE PROJECT

Future Uncertainties

The LCR project reduces the financial and regulatory risks associated with disposing of Trojan's radioactive waste in the future.

Risk of Future Cost Uncertainty

An agreement with U.S. Ecology reduces volume-based disposal rates by 25% for 1994-95. It is highly likely that the rates will increase significantly after 1995. The recommendation to proceed with this project now is based on the lower and more certain rates in 94-95 coupled with the unknown and probably higher rates later.

The economic results of early vs delayed removal of the Steam Generators and Pressurizer indicated that early removal is least cost in 90% of anticipated future outcomes. The evaluation is inclusive of the potential range of future burial costs of low-level waste. When the anticipated burial cost escalates more rapidly than the time value discount rate used for economic analysis, early removal is preferred. The historical burial costs and estimated range of future burial costs are illustrated on the attached charts. The future real cost escalation ranged from 3.9% to 6.9%. The discount rate used for making the economic evaluation is representative of PGE's real incremental after-tax cost of capital of approximately 4.5%. The results indicate that the escalation rate will exceed the discount rate indicating early removal is preferred in over 90% of possible futures.

The burial cost evaluation is inclusive of many forces which can affect the cost including burial site costs and additional taxes by the government. Burial site costs, as evidenced by the prices at other sites, may vary wildly and are politically motivated.

A delay into 1996 with a substantial increase in burial costs would result in a loss of opportunity. Potential cost increases were determined to be highly probable from 1996 and beyond because agreement with U.S. Ecology will be renegotiated for 1996 and later.

Regulatory Risks/Cost Recovery

In addition to the projected uncertainties associated with radwaste disposal, future changes to regulations associated with decommissioning are probable. Many plants are nearing the end of their licensed operating life and others are reviewing least cost alternatives including premature closure. As regulators focus on the decommissioning process due to this increased activity, additional regulatory oversight will likely produce additional regulation. The further decommissioning is pushed into the future, the higher the likelihood of more complex and expensive regulatory requirements.

The scope of this project includes obtaining authorizations to proceed from various regulatory agencies. These include:

- Authorization to use monies from each partner's Decommissioning Trust Fund by the NRC and Trojan Owners and project review by the PUC.
- Review of the Safety Evaluation by the NRC, ODOE, and Energy Facility Siting Council (EFSC).
- License approval by the NRC for utilizing the four steam generators and pressurizer vessels as their own shipping containers.

A precedent was set by Yankee Rowe who obtained NRC approval to remove and license their steam generators and pressurizer using their Decommissioning Trust Funds prior to submittal of their Decommissioning Plan. The amount required for the LCR project ($18.5 million) is well below the current balance in the Trust Fund (~$60.5 million per latest figures available as of 1/13/94). Because of the industry precedent, the available funding, and the potential cost savings over costs that may be incurred if the removal were delayed, it is probable that this option would be reviewed favorably by the various regulatory bodies.

Political Ramifications

Starting to decommission the Plant now rather than waiting until 1998 or later would most likely be seen in a positive light by the public. Removal of these large contaminated components would be a tangible display of PGE's intent to never operate the plant again and to properly dispose of Trojan's contaminated equipment. The resultant lowering of total decommissioning costs would also be seen by the public as an effort by PGE to meet least cost plan goals.

On the other hand, environmental and Trojan opposition groups could protest the early removal of contaminated components. Other utilities have experienced political opposition due to the removal of components prior to NRC approval of a Decommissioning Plan and protests concerning the shipment of large contaminated cargos over public thoroughfares (i.e., barging on a public river). Such opposition can be mitigated by an aggressive Public Relations campaign. Also, because of the close proximity of the burial site to Trojan and the numerous shipments of Navy nuclear reactors along the same route, less opposition may be encountered at Trojan.

Opportunities

The LCR project has no negative impact on and can be done independently of other decommissioning activities at the Trojan site, including Modified Wet Fuel Storage, Reactor Vessel Internals Removal, Independent Spent Fuel Storage Installation, Natural Gas Turbine Plant Siting, and Prompt Decommissioning. Overall, this project has beneficial impact on these other Trojan Site projects.

Modified Wet Fuel Storage

The strategy to minimize overall decommissioning costs is to dispose of as much radwaste as soon as possible. In order to prepare the Trojan plant for maximum low level radioactive material removal in the near future, it is necessary to isolate the high level radioactive waste (fuel and some of the reactor vessel internals) from the plant systems. This would avail other systems for removal. The first step in this process is to modify the present fuel storage pool to be independent of the other plant systems. The Modified Wet Storage Project would accomplish this and would reduce O&M costs associated with maintaining and monitoring the present spent fuel pool configuration.

The LCR project will not physically interfere with the Modified Wet Fuel Storage Project. In addition, because preliminary estimates for the Modified Wet Fuel Storage indicate low cost (below $500,000) relative to the LCR project ($18.5 million), there should be no funding conflicts.

Reactor Vessel Internals Removal

In light of the recent agreement with U.S. Ecology for lower and stable burial rates for 1994-95, a study is underway to determine feasibility and cost of removing the Reactor Vessel Internals. Removal of the internals would involve moving those parts that are highly radioactive and cannot be shipped into the spent fuel pool and disposing of the lower level radioactive parts that can be shipped at Hanford, WA. This project would have two major benefits: 1) disposal of high-curie content components at the low 94-95 burial rates and 2) make available the remaining systems in containment for prompt decommissioning.

The combination of the Modified Wet Fuel Storage and Reactor Vessel Internal Removal projects would isolate all the highly radioactive material in the plant. This would provide additional flexibility in decommissioning the remainder of the plant and allow us to minimize costs by early disposal of as much waste as possible.

The LCR project would not preclude or interfere with removal of the reactor vessel internals.

Independent Spent Fuel Storage Installation (ISFSI)

Since ISFSI construction would not begin until 1996 and the LCR project would be complete in 1995, no logistical interface problems are foreseen. There are no technical interfaces between the two projects so the LCR project would not preclude the capability of building the ISFSI. If the ISFSI was constructed first, it would present an interference to the designed laydown area for preparation of the large components for transport. Removing the large components prior to ISFSI construction precludes that interference.

Gas Turbines

If Gas Turbines were determined to be an economic viability, the only potential interface foreseen between the LCR and the Gas Turbine projects is the possibility of site congestion during the first half of 1995 when the large components are being moved out of containment and prepped for shipping. This interface could be coordinated for minimal impact on both schedules.

Prompt Decommissioning

In addition to the potential cost savings, positive political ramifications, and reduction of future risk, the LCR project will increase the flexibility of overall decommissioning and provide opportunities for further cost savings.

COST

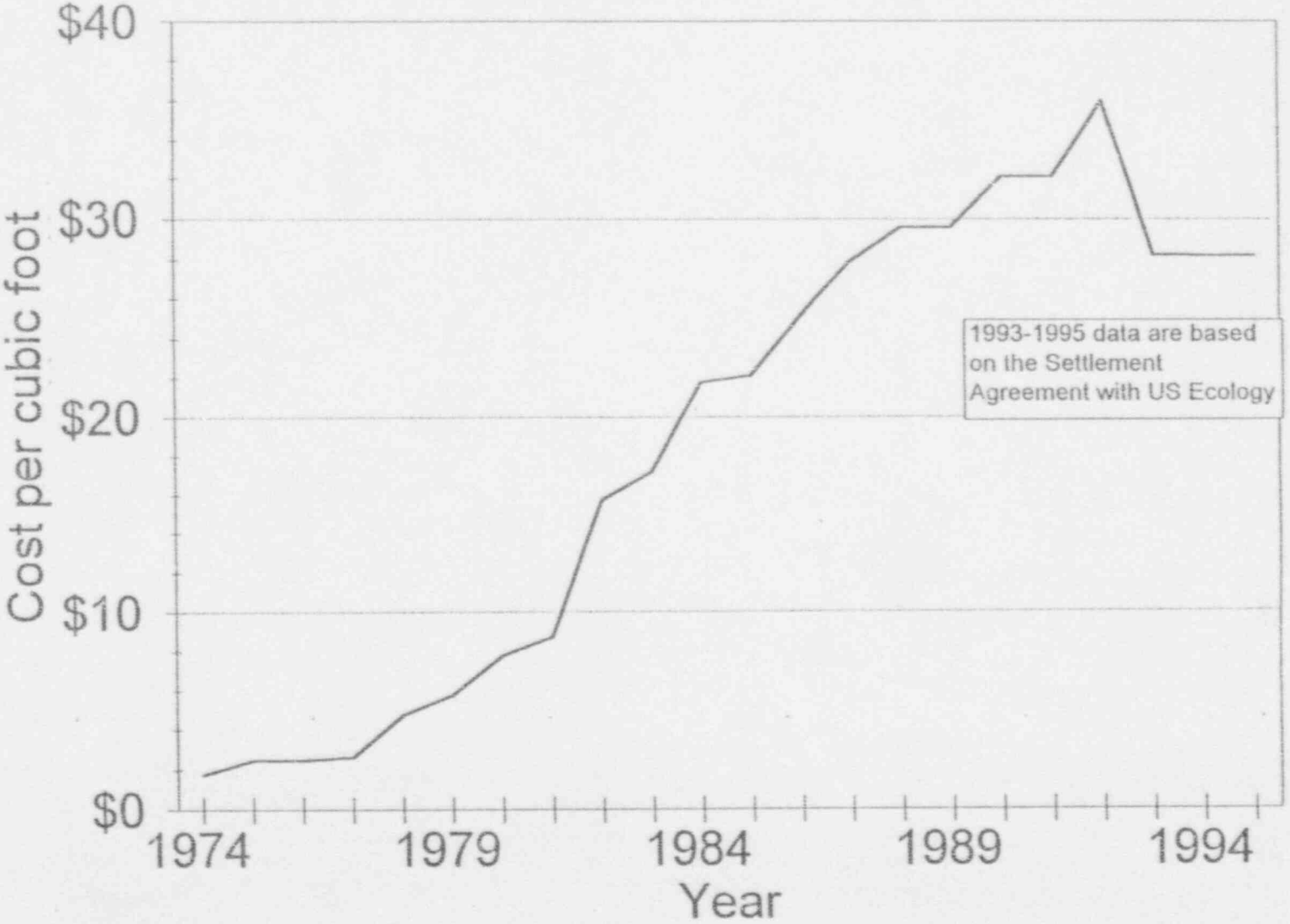
The costs of performing this project are included in the current rate filing and will result in a decrease in the rate case estimate of the cost included for the removal of major components. We do not anticipate updating the decommissioning cost estimate for ratemaking purposes until the final estimate for the Decommissioning Plan is complete.

The current rate filing includes approximately $24.1 million for the scope of work proposed for this project, if it were to be performed during Prompt Decommissioning beginning in 1998. This amount is based on projected radwaste disposal rates. The same scope of work performed in 1994-95 would be $18.5 million ($12.5 million for PGE's share). This amount is based on firm radwaste disposal rates and fixed price proposals from subcontractors. Use of PGE resources will be evaluated and may result in further cost savings over the fixed price proposals from subcontractors.

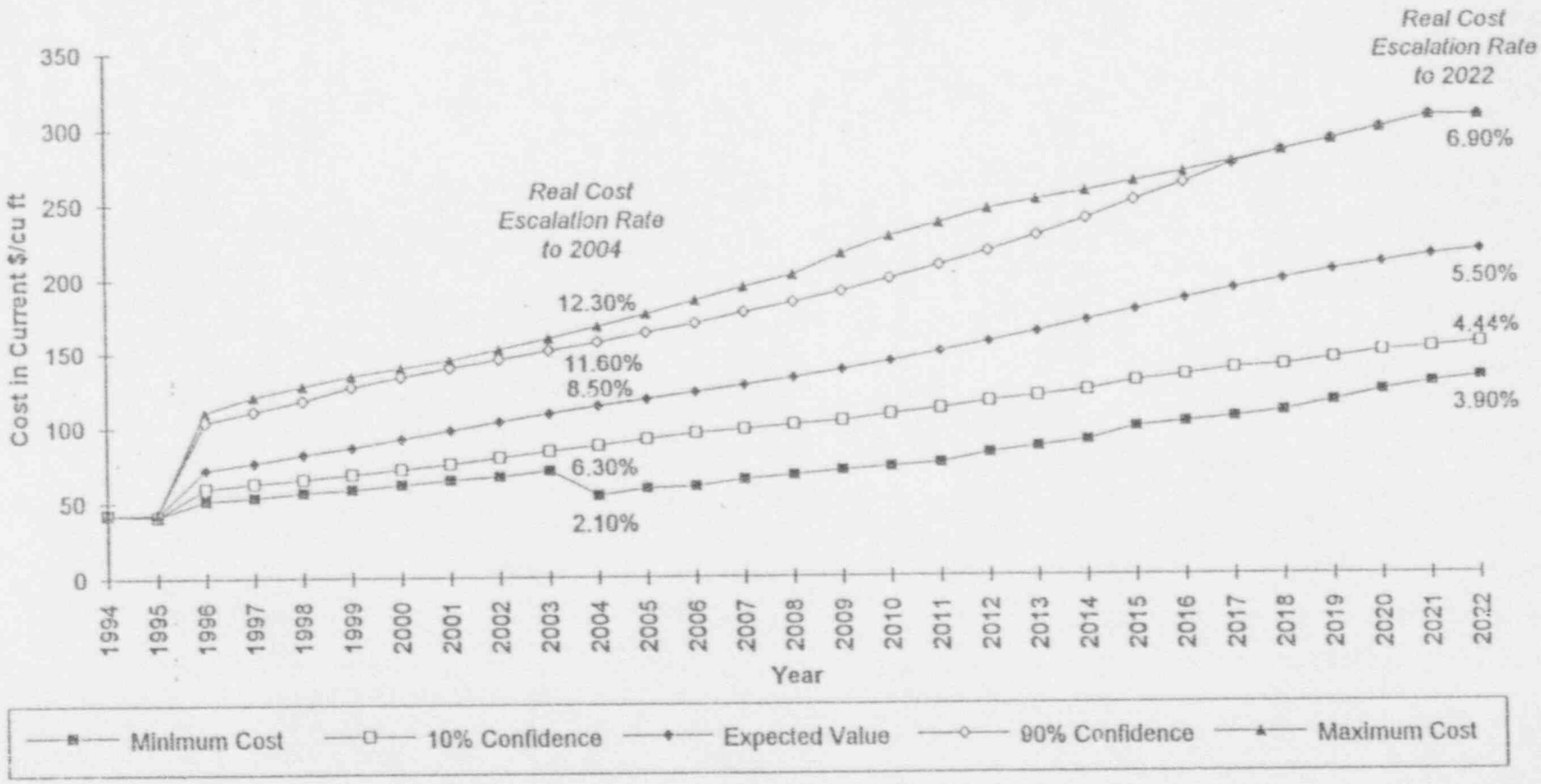
Shareholder risk is lowered by performing this work now when costs are more certain. Delay may result in unanticipated higher costs in the future.

Base Disposal Rate History

Hanford Site



Estimate of Low-level Nuclear Waste Disposal Costs



Risk Analysis of Low-level Waste Burial Costs

The following is an analysis to determine the anticipated low-level nuclea burial costs which is included in the determination of the preferred plan for plant decommissioning. The analysis is inclusive of several key drivers including the cost of disposal at the site, taxes and government regulations. As a result of a somewhat complex interaction of these variables a spread sheet model was constructed that could evaluate the resulting price of burial of low-level waste incorporating possible changes to key drivers.

The following is a discussion of the model and the mechanics of how the final price was determined. In understanding the model, it is significant to understand that there is not a single anticipated price, but rather a possible range that can result with different conditions. The following describes the drivers and assumptions that were used in the model:

Disposal Cost at the Hanford Site

The computation of disposal rates at Hanford are based upon total site required revenues and anticipated volumes delivered to the site. Disposal costs for 1994 and 1995 are based upon PGE anticipated deliveries of 10,000 and 45,000 cubic feet, respectively and include a 5% curie surcharge. As a result of a recent settlement with US Ecology, PGE will receive a 25% discount in burial rate over the rate paid by others over this period. The rates in 1996 and later were estimated assuming PGE delivers 85,000 cubic feet to the site.

Probability of cost adjustment as a result of a change in waste volume

Beginning in 1996 to 2005, an accumulative probability was included that waste volumes would decrease at Hanford, increasing the cost by 25%.

Beginning in 2003 and continuing, a 2.2% probability exists annually that the site may accept low-level waste from non-northwest facilities reducing the cost of burial in a single year by 50%. This probability is applied to Hanford specific cost of service and does not apply to alternate site costs, taxes or regulatory costs.

Price based upon cost of service or alternative site costs

Probability of adopting alternate site price

In 1996, there exists a 25% probability that the costs at Hanford can increase to a rate based on "value of service", and are based on rates at the Barnwell site. The cost at the alternate site can increase between 0 and 10% annually beginning at $70/ cu. ft to a maximum cost of $100/cu ft ('93$).

Probability of price based upon curie level

The 5% additional charge to Hanford rates included for 1994 -95 may increase an additional 15% thereafter. The accumulative probability of the 15% increase occurring was included to be 40% and was assumed to occur before 1999.

Continuation of 1994 -1995 discount in 1996 and subsequent years

The potential to receive a discount on burial costs as is granted in the 1994 and 1995 rates was included at a 25% probability and would be established in 1996.

Increase due to government regulation

This cost is in addition to costs paid for burial at the site. This cost is equal to approximately 4% of the site costs and is anticipated to increase annually at an exponential rate. From this calculation, the amount of increase in the second year is equal to the site charge times (1.04*1.04 - 1) or an increase in costs due to government regulation of 8.16% of the site cost.

Government taxation and administration fees on burial costs

These costs are in addition to base rate specific costs and are a result of additional taxation. The taxation and administration fees begin at $10.55/cu ft in 1994 and can increase annually from between 0 and 20% in '94 dollars (uniform probability) from the previous year. The amount of increase can increase every year and potentially result in a large increase in taxation costs. The maximum amount of government taxation and administration fees was set at $100/cu ft.

Ceiling amount

This amount is based upon a level at which another alternative would likely exist. (note! this level $400/cu ft was not attained using the assumptions described).

Reduction in costs due to metal-melt compaction of material when a cost savings would result.

The cost savings is expressed as an equivalent reduction in the burial rate (actual is volume reduction at the same rate). 40% of the total waste is compactible using the metal-melt process. When compacted, the volume is reduced by 75%. The cost of compaction is $75/cu ft. The point at which compaction becomes economic is $100/cu ft (cost = savings or 40%*$75=40%*$100*75%).

Given the previously described inclusion of costs, the resulting distribution of price was forecast over future periods. As time increased, the range of the potential price increased. The attached chart displays the resulting range of the price for burial in future years and includes the resulting mean values, the 10% confidence interval, and the extremes to annual prices.

The results indicate that the minimum long-term equivalent rate (real) of increases in burial costs from '94-95 levels is 3.9%, the expected value is 5.5% and the highest price (inclusive of savings from compaction) is 6.9%. In the near-term, rates are somewhat predictable until 1996, when rates could increase substantially above current levels. As indicated on the graph, a slight probability exists in 2002 of a cost reduction resulting from the site accepting higher volumes of waste from non-northwest sites. The associated probability of this is very small and does not appreciably effect the expected cost.

The distribution of prospective prices are not symmetric, since the benefit of compaction and the ceiling of some costs limit the ultimate price from becoming more excessive. The potential range of burial cost given these escalation rates, as indicated in the table, range from $131/cu. ft. to $310/cu. ft. ('93$) by the year 2021. The focus on the dollar impact is important and illustrates the effect of compounding the different escalation rates over time.