SECY-97-244

October 24, 1997

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: WASTE CLASSIFICATION OF THE TROJAN REACTOR VESSEL

PURPOSE:

To request approval of the staff's approach for resolving issues related to the waste classification of the Trojan reactor vessel (RV).

BACKGROUND:

On July 25, 1997, staff transmitted SECY-97-164, to the Commissioners, suggesting an approach for reviewing a request from Portland General Electric Company (PGE), to allow a one-time, 2 million curie shipment of the Trojan Nuclear Plant (RV), including its irradiated internals, by barge, to the low-level radioactive waste disposal site in Hanford, Washington. The recommended approach is to consult with the State of Washington -- an Agreement State -- as to whether the RV, with its internals, is suitable for disposal at the U.S. Ecology

low-level waste site in Hanford, Washington. If the State of Washington determines that the RV, with its internals, is not suitable for disposal at the aforementioned site, staff will terminate its review and return PGE's application. If the waste classification of the RV with internals is appropriate for the U.S. Ecology site, staff will notice receipt of PGE's application in the Federal Register and perform a review of the transportation package.

On August 26, 1997, the Commission issued a Staff Requirements Memorandum approving the above recommended approach. This Commission Paper addresses the first step in the above approach -- the waste classification of the RV and its suitability for disposal.

On June 18, 1997, PGE provided information to NRC on questions related to the waste classification of the proposed shipment (Attachment 1). This information confirmed staff information that the core baffle plates, core former plates, and the lower core plate in the RV would be classified as Greater-Than-Class-C (GTCC) wastes if classified separately. In the submittal, PGE averaged the internals together with the pressure vessel and other activated components and concluded the waste would be classified as Class C waste.

In the June 18, 1997, submittal, PGE provided a dose analysis of the shipment, performed by U.S. Ecology, to demonstrate that the RV, with its internals, is suitable for disposal at the Hanford site. In the June 18, 1997, submittal, PGE indicated that the one-piece shipment of the RV, with the internals, would: (a) allow contact handling of the shipment; (b) would result in 39 to 44 fewer waste cans requiring storage at the Trojan site until a GTCC waste disposal site is developed; (c) reduce contamination control problems; (d) reduce occupational exposures from 134 to 154 person-rems to 67 person-rems (out of 591 person-rems estimated for the entire Trojan decommissioning); and (e) reduce waste shipments from 44 to 1.

Under the Low-Level Radioactive Waste Policy Amendments Act of 1985, the Federal Government is responsible for developing and operating a disposal facility for commercially generated GTCC. The U.S. Department of Energy (DOE) accepted this responsibility. Note that 10 CFR 61.55(a)(2)(iv) requires that waste not generally acceptable for near-surface disposal be disposed of in a geologic repository, as defined in 10 CFR Part 60, unless proposals for disposal of such waste in a disposal site licensed pursuant to 10 CFR Part 61 are approved by the Commission.

DISCUSSION:

Under 10 CFR 20.2006 and 10 CFR Part 20, Appendices F and G, low-level waste shipments must be classified in accordance with 10 CFR 61.55. The 10 CFR Part 61 waste classification system is used to define low-level wastes that are generally suitable for disposal at a near-surface disposal facility, such as the Hanford site. Wastes with a classification of GTCC are generally not suitable for disposal at a near-surface disposal site. Under 10 CFR 61.58, the Commission may approve other provisions for the classification and characteristics of waste, on a specific basis, if, after an evaluation of the specific characteristics of the waste, disposal site, or method of disposal, it finds reasonable assurance of compliance with the performance objectives in Part 61, Subpart C. The NRC role in this case is to ensure that PGE properly classifies its waste in accordance with 10 CFR 61.55. The State of Washington would be responsible for ensuring that the wastes are suitable for disposal at the U.S. Ecology site. The State of Washington has not yet made a final decision on the acceptability of the Trojan RV, with its internals, for disposal at the U.S. Ecology site.

In PGE's June 18, 1997, submittal, PGE classified the waste by averaging the pressure vessel and the internals together. The "Branch Technical Position on Concentration Averaging and Encapsulation" (BTP) was intended to provide guidance to licensees on how to determine the concentrations of nuclides in the wastes by averaging over the volume or mass of the wastes. Section 3.3 of the BTP provides specific guidance on averaging activated materials such as reactor internals. The guidance includes a series of ratio tests that are intended to limit intruder doses from individual activated metal shipments. Staff evaluated the waste classification of the core baffle plates, core former plates, and the lower core plate, and found that these components substantially exceed the ratios by up to a factor of over 1600 (see Attachment 2).

The BTP also accepts the use of alternative provisions, in Section 3.9. This section would accept alternative averaging approaches provided it is demonstrated, with reasonable assurance, that the performance objectives of Subpart C of Part 61 are met and, thus, the wastes are acceptable for near-surface disposal. The physical form of the wastes, the specific characteristics of the disposal site, and the method of disposal would be considered in specific evaluations performed under the aforementioned Section 3.9.

The pathway analyses provided in PGE's June 18, 1997, submittal was prepared by U.S. Ecology and submitted to the State of Washington. It addresses only groundwater impacts and direct exposure in a very general manner. Other intruder impacts from construction or residential scenarios were not addressed in a comprehensive manner. U.S. Ecology assumed that the pressure vessel would remain intact in the analyses, even though the critical nuclides -- Carbon-14 (half-life 5700 years), Nickel-59 (half-life 80,000 years), and Niobium-94 (half-life 20,000 years) -- will be present well beyond 10,000 years. Nickel-63 (half-life 92 years) is also a critical nuclide for waste classification purposes. Staff reviewed the groundwater analysis and performed an independent assessment. Staff agrees that there will be no groundwater hazard from the proposed disposal. Staff did not, however, prepare a comprehensive analysis of other intruder impacts. Accordingly, staff concluded that a more complete analysis is needed.

If the shipment and disposal of the Trojan RV, with internals, is implemented, the action could set an important precedent for other reactors that will be decommissioned in the future. The staff considers that its proposed approach to resolve the waste classification issues for the Trojan case should also be applicable to the review of similar requests and should ensure compliance with public health and safety objectives. Note that in the Environmental Impact Statement supporting the development of Part 61, and in the Generic Environmental Impact Statement supporting the 1988 decommissioning rulemaking, the staff did not consider the environmental impacts of disposing of intact reactor pressure vessels with all the internals in the same shipment. For these studies, it was assumed that the GTCC internals would be removed and disposed of at a future disposal facility designated for GTCC wastes. Note also that in previous communications with the public, staff indicated that GTCC reactor internals would not be expected to be disposed of at near-surface disposal facilities, but at the DOE GTCC disposal facility. More recently, reactor licensees have more fully investigated the practicality of one-piece RV shipment and disposal, and have concluded that cost and occupational exposure savings can be achieved. To address future cases, staff would request licensees to submit case-specific analyses of the disposal impacts of the pressure vessel and internals. Waste classification averaging approaches would be accepted for those cases where it is demonstrated, in a comprehensive and defensible manner, that disposal impacts are consistent with the performance objectives in Part 61 and, thus, that the wastes are within the envelope of the prior environmental reviews. Further, an Agreement State, such as the State of Washington, would continue to have authority and responsibility for assuring that wastes are suitable for disposal at a facility it licenses.

If a comprehensive and defensible pathway analysis is submitted, the Trojan RV would be defined as Class C waste by the Commission using its authority under 10 CFR 61.58. As Class C waste, the State of Washington would be free to accept the RV for disposal. However, Washington would not be required to do so. Under the Low-Level Radioactive Waste Policy Amendments Act of 1985, States are obligated to take only Class C wastes as defined effective January 26, 1983. The Act does not, however, prohibit States from accepting waste defined as Class C after January 26, 1983. Thus, Washington State (or any Agreement State facing a similar request from a reactor licensee) could decide not to accept the RV for disposal under the Act. Nonetheless, in view of the precedent-setting nature of this issue, disposal of the pressure vessel of reactors in decommissioning could become an issue in Agreement States including States with low-level waste disposal sites under development.

In a March 31, l997 submittal, PGE requested authorization to ship its reactor vessel with its internals intact. The licensee needed authorization by November 1997 in order to reserve a shipping slot in August 1998. Because of the identification of waste classification issues and the extensive package certification caseload, this review schedule was not feasible and the licensee was so advised. It is currently estimated that it could take 6-9 months to complete the NRC waste classification review and for Washington State to determine the acceptability of the package for disposal at the Hanford low level radioactive waste disposal site. If this finding is favorable, following the general approach outlined in SECY 97-164, the transportation review would begin and is estimated to take 9-12 months. Based on this sequential review schedule, PGE could receive approval in November 1999 in time to reserve a shipping slot in summer 2000. Staff will partially mitigate the delay caused by this sequential review by beginning the technical transportation review with contractor support. However, extensive staff resources will not be expended until favorable resolution of the waste disposal issue.

The staff requests that the Commission approve the following general approach for resolving the Trojan RV waste classification issue:

	Transmit the letter in Attachment 3 to the State of Washington, requesting that U.S. Ecology coordinate with PGE and provide a more comprehensive and defensible pathway analysis of the Trojan RV disposal impacts. Based on this information, if the analysis demonstrates that the disposal of the RV will be in conformance with the performance objectives of Part 61, the waste would be classified as Class C, in accordance with 10 CFR 61.55, 10 CFR 61.58, and the alternate averaging provisions of the BTP.

COORDINATION:

This paper has been coordinated with the Office of the General Counsel (OGC). OGC has no legal objection to this paper. The Office of the Chief Financial Officer has reviewed this Commission Paper for resource implications and has no objections. The Office of the Chief Information Officer did not have to review this paper as there were no information technology or information management implications identified.

RECOMMENDATION:

That the Commission:

Approve the general approach outlined above to transmit the letter in Attachment 3 to the State of Washington requesting that a more comprehensive and defensible pathway analysis be performed for the Trojan RV.

L. Joseph Callan
Executive Director for Operations

CONTACT: T. C. Johnson, NMSS/DWM
(301) 415-7299

Attachments: As stated

Mr. John L. Erickson, Director
Division of Radiation Protection
Department of Health
Airdustrial Center Building #5
P.O. Box 47827
Olympia, WA 98504-7827

Dear Mr. Erickson:

On March 31, 1997, Portland General Electric Company (PGE) requested the U.S. Nuclear Regulatory Commission to issue a Type B Certificate of Compliance under our transportation regulations to allow a one-time shipment of the Trojan Nuclear Plant's reactor vessel with its internals for disposal at the U.S. Ecology site in Hanford, Washington. Prior to beginning a full review of this transportation package application, it is our intent to address the waste classification of the waste shipment and make sure of its suitability for disposal. Under the 10 CFR 20 waste manifesting requirements, a waste generator must classify wastes in accordance with 10 CFR 61.55. It is our goal to ensure that the waste shipment is properly classified.

On June 18, 1997, PGE submitted responses to several of our questions relating to the classification of the waste shipment (Attachment 1). PGE acknowledges that some of the internals are Greater-Than-Class C (GTCC), but is proposing to classify the wastes by averaging the reactor internals with the pressure vessel. The core baffle plates, the core former plates, and the lower core plate substantially exceed the recommended ratios for classifying activated metals given in Section 3.3 of the Branch Technical Position of Concentration Averaging and Encapsulation dated January 17, 1995. However, PGE indicated that the one-piece shipment of the RV with the internals would allow contact handling of the shipment, would result in 39 to 44 fewer waste cans requiring storage until a GTCC waste disposal site is developed, would reduce contamination control problems, would reduce occupational exposures from 134 to 154 person-rem to 67 person-rem (out of 591 person-rem estimated for the entire Trojan decommissioning), and would reduce waste shipments from 44 to 1.

PGE also provided a pathway analysis performed by U.S. Ecology, which was previously submitted to the State of Washington. This pathway analysis addresses groundwater impacts and doses from direct exposure. Other intruder pathways such as construction and resident-farmer scenarios are not addressed, nor is there a justification for assuming that the package will remain intact over the hazard lifetime of the nuclides that are critical to the waste classification: C-14, Ni-59, Ni-63, and Nb-94.

The NRC staff will consider alternative approaches to waste nuclide averaging if it can be shown that the wastes will meet the performance objectives in 10 CFR Part 61 (see 10 CFR 61.58 and Section 3.9 of the Branch Technical Position on Concentration Averaging and Encapsulation). The evaluation should include a comprehensive and defensible pathway analysis that includes all relevant pathways. The draft Branch Technical Position on a Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities could be used as guidance for this analysis.

We request that your staff ask U.S. Ecology, in coordination with PGE, to perform a comprehensive and defensible pathways analysis to demonstrate the suitability of the proposed wastes for disposal at the Hanford disposal site. Specifically, the analysis should be based on intruder-construction and intruder resident-farmer scenarios carried out for a 10,000 year period.

If the waste package is assumed to be intact for a period greater than 500 years, justification needs to be provided. The draft "Branch Technical Position on a Performance Assessment Methodology for Low-Level Radioactive Waste Disposal Facilities" should be used as guidance. Sections 3.2.2, 3.2.3, 3.3.4, and 3.3.5 of this Branch Technical Position provide guidance on the time frames for the performance assessment, use of engineered barriers, and evaluation of waste forms for the performance assessment. After your review of this information, if you conclude that the reactor vessel with internals is suitable for disposal under the State of Washington's regulations, we will consider allowing the shipment to be classified under the alternative averaging provisions of the Branch Technical Position on Concentration Averaging and Encapsulation. We are also willing to provide any technical assistance you may desire for the review of the submitted pathway analyses.

Sincerely,
Richard L. Bangart, Director
Office of State Programs