



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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December 11, 2002

Stephen M. Quennoz, Vice President
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Portland General Electric Company
Trojan Nuclear Plant
71760 Columbia River Highway
Rainier, Oregon 97048

**SUBJECTS: (1) NRC UNRESOLVED ITEM NO. 50-344/0202-01
(2) CONFIRMATORY SURVEY OF CONTAINMENT**

Dear Mr. Quennoz:

This refers to the subject Unresolved Item that was identified during the May 13-16, 2002, inspection (NRC Inspection Report 50-344/2002-02) and the confirmatory survey that was conducted during the August 5-15, 2002, inspection (NRC Inspection Report 50-344/2002-03).

During the May 2002 inspection, the NRC reviewed your staff's downward reclassification of certain final survey units from the classification specified for these units in your approved License Termination Plan (LTP). Although your license prohibits you from reducing scan coverages for a given survey unit class, the License Termination Plan does not specifically address downward reclassification of survey units; a condition which directly impacts scan coverage for the reclassified survey unit. This issue was identified as an Unresolved Item. An Unresolved Item is a matter about which more information is required to determine whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation of NRC requirements.

In reviewing the Unresolved Item, the NRC conducted a detailed review of your LTP, associated implementing procedures, final survey results, NRC's confirmatory survey results as well as interviews with personnel. In addition, the NRC met with Portland General Electric Company (PGE) on July 10, 2002 to discuss the Unresolved Item and the issue of criteria for requiring prior NRC approval for future final radiological survey activities. In response to the NRC's concerns, your staff agreed to take several actions including providing NRC with advance written notification of a proposed downward reclassification of a survey unit. Details of this proposal were provided in PGE's letter to the NRC dated October 17, 2002. Consequently, based on our further review of this matter, and consistent with your October 17, 2002 letter, we consider Unresolved Item 50-344/0202-01 to be closed. A summary of our review of this item is included in Enclosure 1 to this letter.

During the August 2002 inspection, the NRC conducted a confirmatory survey of the interior of the containment structure. This survey was conducted by Oak Ridge Institute for Science and Education, Environmental Survey and Site Assessment Program (ORISE/ESSAP), on behalf of the NRC. As documented in the final ESSAP report, the confirmatory survey verified the

radiological conditions of containment as reported by PGE and indicated that survey units were classified appropriately as defined in NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), with one exception. NRC analysis of selected portions of the confirmatory survey are provided in Enclosure 2 to this letter, and the final ESSAP report is provided as Enclosure 3.

In the near future, PGE is expected to submit a final status survey report for the containment structure interior to the NRC for review. The information provided in that report, as well as information provided in the final ESSAP report and NRC inspections, will be used in the NRC's determination of whether to approve the release of the containment structure for unrestricted use. This decision will be provided to you under separate correspondence at a later date.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

If you have any questions concerning this inspection, please contact D. Blair Spitzberg, Ph.D., Chief, Fuel Cycle & Decommissioning Branch, at (817) 860-8191, or Mr. Robert J. Evans, Senior Health Physicist, at (817) 860-8234.

Sincerely,

/RA MRShaffer Acting for/

Ken E. Brockman, Director
Division of Nuclear Materials Safety

Docket No.: 50-344
License No.: NPF-1

Enclosures:

1. Unresolved Item 50-344/0202-01
2. Confirmatory Survey of Containment
3. Confirmatory Survey of the Containment Building,
ORISE/ESSAP Report

cc w/Enclosures 1 & 2:
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ENCLOSURE 1

UNRESOLVED ITEM 50-344/0202-01

During the May 13-16, 2002, inspection (documented in Inspection Report 50-344/2002-02), the NRC identified a number of concerns associated with the implementation of the final radiological survey program in the decontaminated portions of the Reactor Containment Building (Containment). The NRC determined that Portland General Electric (PGE) had reclassified 18 survey units from MARSSIM¹ Class 1 to Class 2, and designated the reclassification of these survey units as initial, even though the Trojan Decommissioning Plan and License Termination Plan (Trojan LTP) had already assigned an "initial" classification to these areas at the time of its approval by the NRC. An Unresolved Item was identified in order to determine whether the issues and approach used by PGE were acceptable practices, a deviation, nonconformance, or violation. In addition, the NRC initiated a series of confirmatory surveys in selected areas of the Containment and conducted an evaluation of the procedures implementing the related elements of the final status survey program.

The NRC confirmatory surveys were conducted by Oak Ridge Institute for Science and Education, Environmental Survey and Site Assessment Program (ORISE/ESSAP), under contract with the NRC, during the August 5-15, 2002, inspection (NRC Inspection Report 50-344/2002-03). The results of the confirmatory surveys indicated that the approved Derived Concentration Guideline Level (DCGL) was exceeded in one area of the Containment in which: (1) the survey unit classification had been down-classified because it was not expected to contain areas exceeding the DCGL; and (2) the final surveys had failed to identify the areas with elevated levels of residual radioactivity. The NRC was concerned because PGE's final surveys had failed to identify areas exceeding the DCGL and that the survey units did not meet the criteria for a change in classification. Details of the confirmatory survey are included in the ORISE report² which was issued in October 2002. A copy of the ORISE report is attached as Enclosure 3.

During the October 7-10, 2002, inspection (NRC Inspection Report 50-344/2002-04), PGE submitted to NRC inspectors additional information reflecting changes in final status survey procedures that were prompted by the results of the earlier inspections of May 13-16 and August 5-15, 2002. A review of the ORISE report along with information submitted by PGE, indicated that the staff had enough information to address the Unresolved Item.

The NRC has reconsidered PGE's justification for reclassifying several survey units located in Containment from a MARSSIM Class 1 to a Class 2 status in light of NRC confirmatory survey results indicating that some portions of the areas located in the Containment were still above the DCGL. The specific areas of concern to the NRC, as identified in prior inspection reports, are addressed separately below.

¹ Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, Revision 1, August 2000.

² Confirmatory Survey of the Containment Building, Trojan Nuclear Plant, Rainier, Oregon, ORISE/ESSAP, October 2002, performed under NRC contract.

Regarding classification of survey units, PGE has maintained that the classification may be assigned after remediation and prior to conducting final status surveys. The Trojan LTP allows changes in survey unit classification using approved plant procedures prior to the start of final status survey (LTP Section 4.2.4.4). The initial classification, listed in Table 4-4 of the LTP, reflects the plant's operational history and results obtained during characterization and remediation. One procedure (RP 451, "Final Survey Unit Design") addresses reclassification, but the focus is on initial and upward reclassifications using "professional judgment," along with other information that may indicate that another classification might be more appropriate. The process addressing upward reclassification was found to be acceptable and consistent with MARSSIM. Regarding downward reclassification (i.e., from Class 1 to 2, Class 1 to 3, Class 2 to 3, or impacted to non-impacted), the LTP does not identify any data quality objectives to be considered in the evaluation process.

The NRC maintains that any subsequent reclassification of plant areas should be identified as "revised" since the LTP (Section 4.2.4.3 and Tables 4-2 and 4-4) indicates that the classifications were the "initial" classifications. The classification of survey units is a critical decision because it determines how much of any survey unit will be scanned, and this determination carries more implications than sampling locations and number of samples taken for analysis. It can be seen that if a Class 1 survey unit were reclassified as Class 2 with insufficient radiological information and the scan coverage were reduced to less than 100 percent, there is the possibility that elevated levels of radioactivity could have gone undetected and, consequently, a survey unit could be released with radioactivity still above the cleanup criteria. In practice, radiological scanning provides the means to readily identify locations where residual contamination levels exceed the DCGL. Accordingly, surface scan coverage is one of the fundamental MARSSIM tenets and it should not be compromised.

MARSSIM specifically identifies criteria for assigning classifications. Sections 2.2, 2.5.2, and 4.4 of MARSSIM indicate that areas characterized by contamination levels that are above the DCGL prior to remediation; areas that were subjected to remediation or spills or leaks; or areas where contamination levels are unknown must be classified as Class 1. The NMSS Standard Review Plan (NUREG-1727, Appendix E, Section 1) reinforces this concept and further states that areas that are on the borderline between classes should receive the more restrictive classification. For these areas, PGE should have assigned the more restrictive Class 1 designation, rather than Class 2, to the areas of the Containment either contaminated at levels above the DCGL prior to remediation, or that were subjected to remediation or spills or leaks.

In response to recent inspections and discussions with NRC staff, PGE has proposed³ an alternative to provide the NRC with written notification prior to engaging in final surveys in survey units that have been reclassified from Class 1 to Class 2, Class 1 to Class 3, or Class 2 to Class 3, as compared to Table 4-4 of the approved Trojan LTP. In its notification, PGE will inform the NRC in no fewer than 14 calendar days prior to conducting any final status surveys in affected survey units. The notification will include background information as to the

³ Letter from Mr. Stephen M. Quennoz, Vice President, Power Supply/Generation, to the U.S. Nuclear Regulatory Commission, NRC Inspection Report No. 50-344/2002-02, Unresolved Item 50-344-0202-01, Final Survey Unit Reclassification, dated Oct. 17, 2002, VPN-056-2002.

operational history and radiological information for the survey unit as the basis supporting the change in classification. In support of that decision, PGE will take into account the fundamental MARSSIM tenets on downward reclassification (Sections 2.2 and 5.5.3). The tenets include: (1) a confirmation that no individual measurement would exceed the DCGL by using measurements that provide a high degree of confidence; (2) a verification that contamination profiles are absent of small areas of elevated activity; and (3) assigning a level of surface scan coverage that is proportional to the potential of finding areas of elevated activity. PGE has committed to revise the associated procedure (RP 451) in addressing the implementation of the alternative approach. Under these conditions, the Staff finds the alternative approach acceptable. In addition, the implementation of the revised procedure will be the subject of future NRC inspections.

Recognizing that PGE is assembling similar information for areas of the Containment that were not part of the confirmatory survey of August 5-15, 2002, the NRC staff will evaluate the related results once it receives the final status survey reports from PGE. Any questions identified during that review about sample results and removable surface activity levels will be handled as requests for additional information (RAIs). Accordingly, Unresolved Item No. 50-344/0202-01 is considered closed.

ENCLOSURE 2

CONFIRMATORY SURVEY OF CONTAINMENT

The NRC confirmatory surveys, conducted during August 5-15, 2002, focused on 25 out of 75 survey units located in the Containment. The 25 survey units were selected by the NRC based on information provided by PGE, discussions held with PGE's staff, and walk-down of the containment building. The NRC survey results indicated that, although most areas of the Containment were below the applicable Derived Concentration Guideline Level (DCGL), some measurements were found to be above the criterion. The survey results revealed that the DCGL was exceeded in 5 areas, with 11 direct measurements above the limit. Table 1 provides a list of survey units that were identified with small, discrete areas that exceeded the applicable DCGL:

Table 1

Results of NRC Confirmatory Surveys Conducted in the Reactor Containment Building ^(a)

Survey Unit	Section/Item	Size (m ²)	Class	Coverage (%) ^(b)	Range of Results ^(c)
S01044E	Sect. 17 & 18	591	2	50/60	0.2 - 2.3
S01044H	Sect. 11	82	1	100	0.8 - 1.4
S01044J	Sect. 13 & 14	81	1	22	1.2
S01044L	Sect. 12 & Floor	110	1	100/90	0.5 - 1.30
S01195C	Sect. 17 & 18	12	1	100/100	1.04

(a) The survey information is based on the final ORISE Report (Enclosure 3) and field data.

(b) Approximate percentage of area coverage by surface scan measurements.

(c) Rounded off results, expressed in multiples of the DCGL (22,000 disintegrations per minute per 100 square centimeters, dpm/100 cm²). The results have not been corrected for the presence of naturally occurring radioactivity in the materials and surfaces that were surveyed.

One Class 2 survey unit (S01044E) had a discrete area that exceeded the DCGL by a factor of about 2.3. By definition, a Class 2 survey unit is not expected to have contamination exceeding the DCGL. During the August 2002 inspection, the licensee confirmed the NRC's findings. The initial actions taken by PGE included separating the survey unit into two units. The area with the radioactivity above the DCGL was reclassified as a Class 1 survey unit, while the remainder of the survey unit remained a Class 2 survey unit. This approach was determined to be acceptable to the staff as a short term solution, pending the results of PGE's full investigation.

During the inspection of October 7-10, 2002, PGE submitted to NRC inspectors the results of its evaluation⁴ and corrective actions. PGE confirmed via additional measurements that these areas were indeed above the DCGL, a new Class 1 survey unit (S01044S) was carved out of the Class 2 survey unit with the offending results, survey unit specifications for the prior survey unit (S01044E) were revised to show this change, and a new survey was conducted in the new

⁴ PGE Memorandum from Mr. Larry Rocha to Ms. Gina Huey, NRC Inspection Follow-up Item (IFI) 50-344/0203-01, FS-017-02, October 8, 2002.

survey unit. The PGE survey results confirmed those of the NRC and reported yet other elevated levels in the same vicinity. The results reported by PGE were found to be similar to that of ORISE, ranging from 23,040 to 54,040 dpm/100 cm². The sizes of the areas with elevated radioactivity levels were reported to be very small, ranging from 0.01 to 0.8 square meters (m²) and corresponding to about 0.01 to 0.80 percent of the total area of each survey unit. In addition, smear samples taken in these area did not reveal removable surface contamination levels that were above the limit of 2,200 beta dpm/100 cm². The areas were evaluated against the elevated measurements comparison test and found to pass the associated criteria, using the Trojan LTP process and by applying As Low As Reasonably Achievable (ALARA) concepts.

Among its findings, PGE stated that a more thorough evaluation of its operational and final survey data might have concluded that an increase in scan coverage in the Class 2 survey unit that failed the DCGL would have been warranted. Also, PGE noted that more detailed instructions should have been given to the technicians who performed the final status surveys. As a lessons-learned, PGE committed to revise its procedure (RP 453, "Final Survey Data Processing") to reduce the risk of missing areas with elevated activity levels. Collectively, the NRC finds these corrective actions to be acceptable. The implementation of the revised procedure will be the subject of future NRC inspections.

During the confirmatory survey, ORISE obtained five concrete samples that PGE had collected and analyzed during the conduct of its own final surveys. Three steel samples (rebars) and one steel sample taken from the steel liner, were obtained for analysis by high resolution gamma spectrometry. In addition, 84 smears samples were taken on exposed surfaces. The results of the concrete, steel, and smear samples were evaluated by the NRC:

- Concrete samples - The results for the five concrete samples were found to be under or just above analytical detection limits. Radionuclide concentrations ranged from 0.27 to 0.84 picocuries per gram (pCi/g) for cobalt-57 (Co-57); from 0.24 to 0.80 pCi/g for Co-60; from 0.02 to 0.20 pCi/g for cesium-137 (Cs-137); and from 0.61 to 1.86 pCi/g for europium-152 (Eu-152). The results reported by PGE were noted to range from 0.188 to 0.772 pCi/g for Co-60, and from 0.69 to 1.88 pCi/g for Eu-152. PGE did not report Co-57 and Cs-137 results for these samples since Co-60 and Eu-152 were deemed to be the limiting radionuclides as defined in the derivation of the building-specific DCGL. A comparison of the results indicates that PGE radionuclide concentrations are in agreement with those of the NRC and below their respective DCGLs of 3.8 pCi/g for Co-60, 11 pCi/g for Cs-137, and 8.7 pCi/g for Eu-152, as adjusted for surrogates, hard-to-detect radionuclides, and the 10 percent rule in eliminating radionuclides (e.g., Co-57) with minimal impacts on dose. Accordingly, the NRC finds PGE's concrete sample results acceptable.
- Steel samples - The steel samples were analyzed by semi-quantitative screening using high resolution gamma spectrometry. The analysis focused on the detection of Co-57, Co-60, Cs-137, and Eu-152 using metal shavings collected from the bulk samples. All results were found to be under their respective analytical detection limits, ranging from 0.37 to 1.3 pCi/g. The results reported by PGE range from -0.23 to 0.19 pCi/g for Co-57, from -0.12 to 0.36 pCi/g for Co-60, from -0.15 to 0.04 pCi/g for Cs-137, and from -0.13 to 0.03 pCi/g for Eu-152. A comparison of the results indicates that PGE's

concentrations are in agreement with those of the NRC and below their respective DCGLs of 3.8 pCi/g for Co-60, 11 pCi/g for Cs-137, and 8.7 pCi/g for Eu-152, as adjusted for surrogates, hard-to-detect radionuclides, and the 10 percent rule in eliminating radionuclides (e.g., Co-57) with minimal impacts on dose. Accordingly, the NRC finds PGE's steel sample results acceptable.

- Removable surface contamination - A review of the smear/wipe data, indicates that the results, taken at 84 locations, were either non-detectable or under the removable surface contamination limit, i.e., $\leq 2,200$ beta dpm/100 cm² or ≤ 10 percent of the DCGL adopted in the Trojan LTP. The results ranged from -4 to 120 dpm/100 cm² for gross beta radioactivity, determined using an automated gas-flow proportional counter. Accordingly, the NRC finds that the approach used by PGE in demonstrating compliance with removable surface contamination levels produces results that are in agreement with its own results.