

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-397/87-14

Docket No. 50-397

License No. NPF-21

Licensee: Washington Public Power Supply System  
P. O. Box 968  
Richland, Washington 99352

Facility Name: Washington Nuclear Project No. 2

Inspection at: WNP-2, Benton County, Washington

Inspection Conducted: May 13-22, 1987

Inspectors:

G. P. Yuhas for  
M. C. Cillis, Senior Radiation Specialist

6/18/87  
Date Signed

Approved by:

G. P. Yuhas  
G. P. Yuhas, Chief, Facilities Radiological  
Protection Section

6/18/87  
Date Signed

Summary:

Inspection on May 13-22, 1987 (Report No. 50-397/87-14)

Areas Inspected: Routine unannounced inspection by a regionally based inspector of occupational exposures during extended outages, ALARA program, external occupational exposures, control of radioactive material and contamination, internal exposure control and assessment, environmental monitoring, radiological controls during spent fuel movement, followup items and a tour of the licensee's facility. Inspection modules 30703, 25022, 25023, 83724, 83725, 83726, 83728, 83729 and 92701 were performed.

Results: Of the nine areas inspected, violations were identified in three areas: 10 CFR Part 20.203, "Caution Signs, Labels, Signals, and Controls," posting and control of radiation areas (paragraph 5); Technical Specifications, Section 6.12, posting and control of high radiation areas (paragraph 5); Technical Specifications, Section 6.8.1, documentation of personal clothing contamination occurrences in accordance with plant procedures (paragraph 2).

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## DETAILS

### 1. Persons Contacted

#### a. WNP-2 Staff

- C. M. Powers, Plant Manager
- \*J. W. Baker, Assistant Plant Manager
- \*R. G. Graybeal, Health Physics/Chemistry Manager
- \*V. E. Shockley, Health Physics/Radiochemistry Support Supervisor
- \*M. C. Bartlett, Plant QA Supervisor
- L. Bradford, Health Physics Supervisor
- J. Allen, Assistant Health Physics Supervisor
- \*J. D. Mills, Senior Health Physicist
- D. J. Pisarcik, Senior Health Physicist
- \*D. E. Larson, Manager of Radiological Programs and Instrument Control
- D. Elbert, Senior Health Physics Technician
- \*D. S. Feldman, Plant QA/QC Manager
- \*J. Landon, Plant Maintenance Manager
- \*C. Van Hoff, Senior State Liaison
- \*R. L. Corcoran, Operations Manager
- \*G. Oldfield, Supervisor of Radiological Assessment

#### b. Nuclear Regulatory Commission

- R. Dodds, Senior Resident Inspector
- \*C. Bosted, Resident Inspector

#### c. State of Washington, Office of Radiation Protection

- J. Erickson, Senior Health Physicist
- R. Andrew, Health Physicist

\*Denotes those individuals present at the exit interview on May 22, 1987.

In addition, the inspector met with other members of the licensee's and contractor's staff.

### 2. Occupational Exposures During Extended Outages

#### a. General

The licensee's planning, preparations and scheduling for the refueling outage were examined. The outage which started on April 13, 1987, is expected to complete in mid June 1987.

The examination focused on the licensee's radiation protection program that was implemented for refueling activities and other major repair work such as:

- ° Repair of A&B recirculation pumps

- In-service inspection (ISI)
- Snubber inspection and repair
- Valve refurbishment
- Turbine and condenser inspection and repair activities
- CRD removal and replacement activities
- Other miscellaneous repair activities

b. Organization

The examination disclosed that the licensee's radiation protection organization was augmented with members from the licensee's chemistry organization and contractor personnel.

The resumes of the contractor personnel were reviewed and the qualification of the chemistry staff assigned to assist the radiation protection organization were examined.

The review indicated that all individuals selected met or exceeded the qualifications for Health Physics Technicians (HPTs) as recommended by paragraph 4.5.2, American National Standards Institute (ANSI/ANS) 3.1, 1978, "Selection and Training of Nuclear Power Plant Personnel."

Discussions with the Health Physics Supervisor (HPS), Assistant Health Physics Supervisor (AHPS), Health Physics Foreman, and Senior Health Physics Technician (SHPT) staff revealed that the licensee was unable to augment the site staff with the numbers of contractor personnel desired.

The inspector noted that WNP-2 management was aware of the manning problems and controlled work activities accordingly during the outage. The inspector could not find any instance in which the radiological control program was compromised because of the manning shortage. The inspector verified that authorizations for overtime work were consistent with plant procedure PPM 1.3.27, "Overtime Control," and Technical Specifications, Section 6.2.2(f).

The above observations were brought to the licensee's attention at the exit interview.

No violations or deviations were identified.

c. Audits and Surveillances

The inspector reviewed audits and surveillances of the radiation protection program that were conducted by the licensee since the last inspection. The following surveillances that pertained to activities examined by the inspector during this inspection were reviewed:

<u>Surveillance No.</u>	<u>Date</u>	<u>Area Examined</u>
2-86-106	September 2, 1986	ALARA Program Control
2-86-161	December 16, 1986	Contamination Control and Decontamination
2-87-033	January 14, 1987	Radiation Exposure Records and Control
2-87-031	February 18, 1987	Personnel Exposure Monitoring/Dosimetry
2-87-032	March 13, 1987	Radiological Surveys
2-87-123	April 2, 1987	Radiation Work Permit Program
2-87-104	April 21, 1987	Personnel Exposure Monitoring/Dosimetry

The examination disclosed that the surveillance provided an in-depth review of the particular areas that were examined. None of the reports identified any violations of the regulatory requirements. Some surveillances identified several weaknesses, such as failure to follow station procedures. An observation by the inspector disclosed that most of the surveillances were conducted prior to starting the outage. This observation was brought to the licensee's attention at the exit interview. The inspector discussed the importance for scheduling audits and surveillances during both normal plant and outage operations. The licensee agreed to evaluate the inspector's observation.

No violations or deviations were identified.

d. Personnel Exposures

This is discussed in paragraph 4 and 6 of this report.

e. Outage Work Practices

Work practices associated with the scheduled work were observed during the tours conducted by the inspector (see paragraph 5). Particular attention was given to work performed associated with the drywell, turbine building, refueling and recirculation pump repairs.

Work practices appeared to be improved from the practices observed during the previous outage. The inspector noted that contamination control practices for recirculation pump work and refueling work were much improved.

The inspector concluded that work practices appeared to be consistent with the ALARA concept and Radiation Work Permits.



No violations or deviations were identified.

f. Personnel Contamination Occurrences

(1) Skin

Personnel skin contamination records for 1986 and 1987 were reviewed.

The review disclosed that a total of 73 skin contaminations were reported in 1986 and 42 were reported to date in 1987. Dose assessments were in the process of being determined for three skin contamination and two clothing contamination (see paragraph 2.f.2 below) events that were reported in 1987. The maximum skin contamination identified to date was reported as 2E5 dpm/probe area.

Plant Procedure, PPM 11.2.13.3, "Personnel Contamination Survey" requires that each skin contamination be reported and evaluated by the Health Physics Supervisor or his designated alternate. Additionally, in special circumstances the procedure requires that a Radiological Occurrence Report (ROR) be prepared pursuant to PPM 11.2.19.1, "Investigation of non-reportable Radiological Occurrences." The purpose for the ROR is to evaluate the event with the involved individual and their supervisor so that appropriate actions to prevent a recurrence can be implemented. All skin contamination events are included in the individual's permanent exposure records and are also maintained in the licensee's permanent plant record files.

The inspector's review of reported skin contamination logs revealed that the evaluations for at least five skin contaminations reported in 1986 were incomplete and were not included in the licensee's permanent record system. A search for the missing data was conducted by the licensee's staff. The data was subsequently found on May 22, 1987. The licensee's staff plans to complete the evaluations in accordance with station procedures.

No violations or deviations were identified.

(2) Clothing Contaminations

The licensee has not established a procedure for evaluating personnel exposures resulting from personal clothing contamination occurrences. However, a procedure, PPM 11.2.15.4, "Personal Clothing Decontamination" has been established for the purpose of providing instructions on actions to be taken for the decontamination of personnel clothing and shoes. Additionally, paragraph 11.2.15.4.6 states: "Record all conditions of personnel clothing contamination and decon or lack of decon in the Health Physics

Log Book for future use with Corporate Policy and Procedure (CPP) 1.4.416, "Loss of Personnel Property."

An examination was conducted for the purpose of determining the numbers of clothing contamination occurrences and the levels of contamination being reported. The examination included a review of Health Physics Log Books, Volumes 9, 10, 11 and 12, and completed copies of attachment 6.1 to CPP 1.4.416. Attachment 6.1 is used to reimburse personnel for damage to personal property.

Starting on or about April 15, 1987, the licensee's radiation protection staff changed the format for documenting clothing contamination occurrence in that a log sheet was generated to document the event. Procedure PPM 11.2.15.4 was not revised to reflect the change.

A clothing contamination reported on May 5, 1987, was documented on the new form that was established. It identified that an individual had received up to  $1.2E5$  dpm/probe area of contamination on the left knee area of his pants. The inspector asked the licensee's staff if a dose assessment for the individual had been initiated. The inspector was informed that current procedures do not provide instructions for performing dose assessments for clothing contamination occurrences.

The inspector noted that another entry made in the skin contamination log (see paragraph 2.f.1, above) on May 14, 1987, reported a clothing contamination occurrence involving an individual with contamination on his personal coveralls. The contamination levels reported were  $3E5$  dpm/probe area. A dose assessment of this occurrence was initiated.

The review of available records disclosed at least two instances involving clothing contamination occurrences dated May 9, 1987, and May 10, 1987, that were not documented in the Health Physics Log book or on the new form that was initiated on April 15. The inspector found two additional clothing contamination occurrences dated June 8, 1986, and August 1, 1986, that had not been documented in the Health Physics Log.

In many cases, the information recorded in the Health Physics Log book for remaining contamination occurrences failed to provide the necessary detail that may be required for performing a dose assessment.

The above observations were brought to the licensee's attention during the inspection. The licensee's staff attempted to locate any survey data or information related to the clothing contamination occurrences identified by the inspector. The licensee's staff was unable to locate any information after an approximate day and a half search.



The inspector noted that one individual had been reimbursed for three pairs of contaminated shoes and a contaminated shirt in a period of less than nine months. This information was also provided to the licensee's staff.

The licensee's Health Physics staff acknowledged that they were not following their procedures and that their program for handling personal clothing contamination occurrences was deficient. The inspector noted that the licensee's staff had started to develop a procedure for performing dose assessments involving personal clothing contamination occurrences. They expected to be similar to the procedure used for handling skin contamination occurrences.

The inspector informed the licensee that Technical Specifications, Section 6.8.1 requires certain procedures identified in Appendix A of RG, 1.33 - 1978 shall be established, implemented and maintained. Procedures identified in RG 1.33 Appendix, Section 6, as a minimum, includes procedures for personnel monitoring, surveys and contamination control. The inspector added that failure to comply with PPM 11.2.15.4 was an apparent violation (87-14-01).

### 3. ALARA

The inspector verified through discussions with the licensee's staff, record reviews and from personnel observations that the licensee's ALARA program was being effectively implemented.

Man-Rem goals for the refueling outage and year were established in accordance with the licensee's ALARA implementing procedures. The man-rem estimates were reviewed with the licensee's staff. The review disclosed that man-rem estimates for the following jobs were exceeded:

- ° In-Service Inspection (ISI)
- ° Snubber Inspection
- ° Repair of A&B Recirculation Pumps

The man-rem expenditures for repair of the recirculation pumps was expected to be more than double prior to completion of the work. The pumps' radiation levels were at least two-and-one-half times higher than previously experienced. Unexpected problems during the disassembly were also experienced. The inspector concluded that the licensee's action taken for the repair of the pumps, ISI inspections and snubber work were consistent with RG 8.8, "Information Relevant to Ensuring Occupational Radiation Exposures at...will be ALARA."

The review disclosed that remaining work will be performed at man-rem expenditures well below the original estimates. The examination of records disclosed that the experience gained from this outage was being documented. The licensee plans to use the information to improve their performance during subsequent outages.



The inspector concluded that ALARA awareness and management support of the ALARA program was consistent with RG 8.8.

No violations or deviations were identified.

#### 4. Internal Exposure Control and Assessment

An examination was conducted to determine the adequacy of the licensee's control of internal occupational exposures for consistency with 10 CFR Part 20.103.

Additional information related to this subject is discussed in other portions of this report and in Region V Inspection Report 50-397/87-05.

The examination included the review of applicable licensee procedures, personnel exposure records, survey reports and personal observations made by the inspector.

The inspector noted that better use of engineering controls to limit concentrations of airborne radioactive materials was made during this outage than what was previously observed.

The use of respiratory equipment was found to be consistent with 10 CFR 20.103 and NUREG 0041, "Manual of Respiratory Protection...Materials."

Procedures for assessing individual intakes of radioactive materials were being implemented and no abnormal results related to internal dose assessment were identified from the review of personnel exposure records.

Larger numbers of grab air samples were collected than the previous outage. Discussions with the Health Physics staff revealed that the noted increase of grab air samples taken resulted from an INPO inspection finding. The inspector also noted that some samples may not have been representative of the work that was performed. The inspector's observation was based on a comparison made between the sample collection time and the time and type of work activity that was performed. It appeared that some samples were diluted. The observation was discussed with the HPS who stated that the HPTs will be provided with appropriate guidelines for obtaining representative air samples.

The inspector also identified an error in plant procedure 11.2.13.8, "Airborne Radioactivity Surveys," Revision 0, dated May 11, 1987. Paragraph 11.2.13.8.6(A)(6) provided the following statement:

**"NOTE:** For short jobs, less than about four hours, Lo Vol samples will not meet the required detection limit of  $7.5 \text{ E-}10 \text{ } \mu\text{Ci/cc}$ . Hi vol samples must be used."

The record review disclosed that air samples of less than 4 hours were still being collected with Lo Vol samplers. The inspector discussed his observations with the licensee's staff. The discussions disclosed that most the staff had not read the recent change and that they disagreed with the statement. Based on the type of sampling equipment used, the licensee's staff and NRC inspector calculated that the minimum sampling

time required to meet the detection limit of  $7.5 \text{ E-}10 \text{ } \mu\text{Ci/cc}$  was four minutes. The licensee's staff determined that an error had been made and then issued a deviation to the procedure until such time that a permanent change can be made.

The inspector discussed the above observations at the exit interview. The inspector emphasized the importance for providing proper instructions in procedures and for assuring that personnel are made aware of these instructions.

No violations or deviations were identified.

#### 5. Facility Tour

Daily tours of the Turbine, Radwaste and Reactor Buildings were conducted during the inspection. The licensee's staff accompanied the inspector on several occasions.

Independent radiation measurements were performed by the inspector with the following instruments:

- ° Eberline, Model R0-2 ion chamber survey meter, Serial Number 2694 - Due for calibration on July 23, 1987.
- ° Keithly, Model 36100 X-Ray/Gamma survey meter, Serial Number 10444 - Due for calibration on October 14, 1987.

The following observations were made:

- a. Observed work practices were consistent with instructions provided on Radiation Work Permits and the ALARA concept as defined in 10 CFR Part 20.1(c).
- b. Portable instruments used for air sampling and radiation detection were in current calibration.
- c. A general improvement in housekeeping was noted in the areas toured.
- d. No unmonitored personnel were observed in the areas toured.
- e. An excessive amount of tools/equipment were observed in controlled areas. This was brought to the licensee's attention. The inspector was informed that the licensee plans to implement a new tool control program prior to the next outage. The new tool control program is expected to minimize the amount of tools used in a controlled area.
- f. Noted improvements in contamination control work practices for recirculation pump repairs and refueling work were observed.
- g. Posting of notices to workers were consistent with 10 CFR Part 19.11 requirements.

- h. Except for items (i) and (j) below, the licensee's posting and labeling practices were consistent with 10 CFR Part 20.203, "Caution Signs, Labels, Signals and Controls."
- i. On May 13, 1987, the NRC inspector identified that the north personnel access leading into the east valve gallery room on the 467' level of the Radwaste Building was not conspicuously posted even though whole body dose rates up to 10 mrem/hr were measured by the licensee and NRC inspector. The inspector noted that a radiation area sign installed on a swinging gate could not be seen. The gate which had spanned partially across the access opening had been moved aside and was turned around 180°, facing directly up against an adjacent wall.

The inspector notified the HPS of the observation. Immediate action was taken to conspicuously post the area in accordance with 10 CFR Part 20.203(b), "Caution Signs, Labels, Signals and Controls." The swing gate was subsequently replaced with a permanent barrier.

The inspector informed the licensee that failure to assure that the area was conspicuously posted was an apparent violation (87-14-02).

The NRC inspector also noted that a swing gate used in the west valve gallery was defective. The gate would not return to its normal position after used for access. The licensee took immediate action to repair the gate.

- j. On May 13, 1987, the NRC inspector noted that the inner personnel access doorway leading into a vacant work tent used for repairing the recirculation pump, having whole body dose rates up to 300 mrem/hr at 18", was not conspicuously posted as a high radiation area. The outer doorway entrance was appropriately posted as a radiation area pursuant to 10 CFR 20.203. Technical Specifications, Section 6.12 requires that each high radiation area shall be barricaded and conspicuously posted. The inspector noted that a sign was on a piece yellow and magenta rope. The sign which identified that the area was contaminated and a high radiation area did not span across the access opening. It was dangling in a manner such that it could not be seen because it was up against the tent wall.

The inspector informed the HPS of the observation. The licensee took immediate action to conspicuously post the area.

On May 18, 1987, NRC inspector noted the same condition existed. The inspector informed the licensee's staff of the observation. The licensee took immediate action to conspicuously post the area. The inspector informed the licensee of their responsibility for assuring radiation, high radiation areas and airborne radioactivity areas are maintained in accordance with Technical Specifications, Section 6.12 and 10 CFR Part 20.203.

The inspector discussed the observation at the exit interview. The inspector informed the licensee that failure to assure that the area

was barricaded and conspicuously posted was an apparent violation (87-14-03).

On May 18, 1987, the NRC inspector and a lead HPT from the licensee's staff conducted a tour of the drywell. Both the HPT and NRC inspector observed an area immediately adjacent to the "B" recirculation pump that was not conspicuously posted as a high radiation area. Radiation levels at 18" from the pump housing were 200 mrem/hr as determined from radiation measurements obtained by both the NRC inspector and licensee representative. A yellow and magenta rope spanning a distance of approximately 15'-20' contained only one sign at the extreme left end of the barrier. The barrier was at head height. The sign blended in with some equipment that was installed in the area. Entry to the location of the pump is normally made at the center point of the barrier. In discussions with the HPT who installed the sign, he stated he had installed the sign in a manner so that personnel would not be hitting their heads on it when they entered the high radiation area. The lead HPT moved the sign so that it would be readily seen by personnel entering the area. The lead HPT agreed that the sign, as originally installed, was not conspicuous.

The above observation was brought to the licensee's attention at the exit interview. The inspector emphasized the importance for following the instructions provided in plant procedures PPM 11.2.7.1, "Area Posting," and PPM 11.2.24.1, "Health Physics Work Routines." PPM 11.2.7.1 requires that radiation areas and high radiation areas be conspicuously posted with barriers and signs installed at approximately waist high. PPM 11.2.24.1 requires radiation and high radiation area barriers be checked shiftly.

#### 6. External Occupational Exposure Control and Personnel Dosimetry

The licensee's personnel dosimetry and control of external occupational exposure was examined for the purpose of assuring compliance with:

- 10 CFR Part 19.13, "Notifications and Reports to Individuals"
- 10 CFR Part 20.101, "Radiation Dose Standards for Individuals in Restricted Areas"
- 10 CFR Part 20.102, "Determination of Prior Dose"
- 10 CFR Part 20.104, "Exposure of Minors"
- 10 CFR Part 20.202, "Personnel Monitoring"
- 10 CFR Part 20.401(a), "Records of Surveys, Radiation Monitoring and Disposal"
- 10 CFR Part 20.408, "Reports of Personnel Monitoring on Termination of Employment or Work"

Licensee's procedures that were established for assuring compliance with the above requirements and selected personnel exposure records were reviewed.

Periodic tours of the licensee's facilities verified personnel were equipped with appropriate monitoring devices.

The examination disclosed that accreditation of the licensee's personnel dosimetry program was granted on August 20, 1986, under the National Voluntary Laboratory Accreditation Program (NVLAP) sponsored by the U. S. National Bureau of Standards.

The examination did not reveal any abnormal exposure levels. The inspector observed the use of alarming pocket dosimeters for work performed in high radiation areas. The inspector also observed that the licensee's program includes provisions for the use of multi-whole body dosimetry for working in nonuniform radiation fields.

The examination disclosed that the licensee's administrative controls of external radiation exposure were consistent with the regulatory requirements referenced above and were commensurate with the ALARA concept that is defined in 10 CFR Part 20.1(c).

No violations or deviations were identified.

7. Control of Radioactive Materials and Contamination, Surveys, and Monitoring

An examination was conducted to determine whether the licensee effectively controls radioactive materials and contamination, and performs adequate surveys and monitoring.

The inspection included a review of applicable procedures, surveillance reports, surveys and direct observations of contamination control practices.

Inspector observations related to this subject are also discussed in other portions of this report.

The licensee's Health Physics staff are responsible for monitoring all materials leaving controlled areas. The monitoring practices for materials leaving the controlled areas appeared to be consistent with IE Circular 81-07 and IE Notice 85-92. Licensee procedure PPM 11.2.15.7, "Release of Material from Radiologically Controlled Areas," provides the instruction for assuring all materials released from controlled areas are surveyed in accordance with the guidelines recommended in the Circular and Notice.

A review of a routine survey performed of site buildings within the protected area, but outside of the controlled area, disclosed that survey was performed with an Eberline Model E-120 survey meter. The inspector asked the licensee's staff why a more sensitive instrument, such as a micro-R meter wasn't used along with the Eberline Model E-120 survey meter. The inspector added that using the micro-R meter along with the

Model E-120 survey meter would provide better assurance that no radioactive material was inadvertently released from controlled areas. The licensee's staff agreed to evaluate the inspector's observation.

No violations or deviations were identified.

8. Collection of Collocated TLD Measurements

The results of WNP-2 and State of Washington environmental thermoluminescent dosimeter (TLD) measurements made in 1985 and 1986 from monitoring stations collocated with NRC TLD monitoring stations were collected pursuant to the instructions provided in Temporary Instructions (TI) 2500/22. The data was forwarded to the NRC Radiation Dosimetry Specialist, Region 1, for evaluation. This closes TI 2500/22.

No violations or deviations were identified.

9. Radiological Controls During Spent Fuel Movement

An examination of the licensee's radiological control program implemented for access to and for work performed in the drywell during spent fuel movements was conducted in accordance with the instructions provided in IE Manual, TI 2500/23.

The examination disclosed that a similar evaluation was performed by the NRC resident inspector staff.

The results of the NRC resident inspector's evaluation are documented in Region V Inspection Report 50-397/87-09. The information was reviewed and discussions were held with the HPS. Radiation measurements made in the drywell during fuel movement and a licensee instruction, dated April 18, 1987, established for fuel movement were reviewed. Personnel dosimetry records were also reviewed and a tour of the drywell was conducted.

Exclusion area signs and area radiation monitors installed in the drywell for fuel movement were observed during the tour.

The inspector concluded that the licensee fully understood the potential hazards from spent fuel movements and had taken appropriate action to protect the workers that are allowed access to drywell during fuel movements. TI 2500/23 is closed.

No violations or deviations were identified.

10. Exit Interview

The inspector met with the individuals denoted in paragraph 1 at the conclusion of the inspection on May 22, 1987. The scope and findings of the inspection were summarized. The licensee was informed of the violations discussed in paragraphs 2 and 5. The licensee acknowledge the violations stating that appropriate corrective actions would be taken to resolve the items.

The inspector discussed the significance for the violation discussed in paragraph 2. The inspector stressed the importance for performing dose assessments for clothing contamination events as well as skin contamination events.