U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-397/92-13

License No. NPF-21

Licensee: Washington Public Power Supply System (WPPSS)
P.O. Box 968
3000 George Washington Way
Richland, WA 99352

Facility name: Washington Nuclear Project No. 2 (WNP-2)

Inspection at: WNP-2 Site, Benton County, Washington

Inspection conducted: April 27-May 1, May 10-15, May 18-22, 1992, and subsequent telephone discussions on May 13 and 26, 1992

Inspected by:

L.C. Carson II, Reactor Radiation Specialist — Date Signed 6/24/92

H.D. Chaney, Sr. Reactor Radiation Specialist — Date Signed 6/24/92

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Approved by:

James H. Reese, Chief, Reactor Radiological Protection Branch — Date Signed 6/25/92

Summary:

Areas Inspected:

These routine unannounced inspections covered the licensee's radiation protection activities during the refueling outage seven (R-7). These inspections included management controls, ALARA planning, occupational exposure control, respiratory protection, training, chemical decontamination, and radwaste management. Inspection procedures 83722, 83724, 83726, 83727, 83728, 83729, and 83750 were used.

Results:

During these inspections of the R-7 outage, one violation of NRC requirements was identified. The licensee did not establish procedures for calibrating installed personnel contamination monitors (IPM); this is further discussed in Section 3(E) of this report. Weaknesses were identified in the licensee's

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Radiation Work Permit (RWP), and Radiation Exposure Card (REC) systems; this is discussed in Section 3(C) of this report. The licensee's 10 CFR 50.72 report to the NRC involving the iodine-131 found in the storm drain pond will be an considered an inspector followup item.

The licensee's radiation protection and ALARA activities during the R-7 outage were effective. The licensee's radiation field reduction efforts, particularly the chemical decontamination and the reactor spray nozzle flushing were notably successful. Followup Item 50-397/91-26-01 was closed.

DETAILS

1. Persons Contacted

Licensee

* L. Oxsen, Director of Operations
* V. Parrish, Assistant Director of Operations
* J. Baker, Plant Manager
* L. Harrold, Assistant Plant Manager
* D. Pisarcik, Health Physics (HP)/Chemistry Manager
* M. Monopoli, Support Services Manager
* C. Mc Gilton, Operations Assurance Manager
* J. Bell, Plant Services Manager
* D. Walker, Health & Safety Fire Protection Manager
* W. Davison, Plant Quality Assurance Manager
* A. Hosler, WNP-2 Licensing Manager
* R. Haight, Radiological Safety Officer, Corporate
* A. Alexander, HP/Chemistry Support Supervisor
* L. Bradford, HP/ALARA Planning Supervisor
* R. James, ALARA Coordinator
* R. Wardlow, Radiological Services Supervisor
* L. Pitchard, HP Operations Supervisor
* C. Madden, Quality Assurance Engineer (QAE)
* D. Kerlee, Principle QAE
* P. MacBeth, Radwaste Supervisor
* L. Mayne, Acting HP Supervisor
* D. Werlau, HP, Chemistry and General Employee Training Manager
* J. Rhoads, WNP-2 Operations Event Assessment Manager
* M. Reis, Plant Engineering/Compliance Supervisor

(*) Denotes personnel who were present at one of the exit meetings held on May 1, 15, and 22, 1992. In addition to those individuals listed above, the inspectors met and held discussions with other licensee personnel.

NRC

D. Proulx, Resident Inspector
A. McQueen, Emergency Planning Specialist, Region V

2. Followup (92701)

Item 50-397/91-10-04 (Closed): This item identified that the licensee did not prescribe a fit test frequency, and write a formalized procedure for the respirator protection fit testing program. The licensee committed to re-evaluate the procedures for the fit testing program. During this inspection, the inspector reviewed Radiological Services Instruction (RSI) 8.2, "Quantitative Respirator Fit Testing Using Portacount Plus System." The procedure required that each person being fit tested have a current medical clearance. The inspector verified that Plant Procedures Manual (PPM) 11.2.11.3, "Issuance of Respiratory Protection Equipment," and PPM 11.2.11.4, "Use of Respirator Protection Equipment," established that the licensee's Training and Medical Records (TRAMED) implemented a program for biannually fit testing workers to maintain their qualifications. The

inspector had no further concerns in this matter.

3. Occupational Exposures (83750)

During this inspection period, the inspectors observed health physics activities associated with the licensee's R-7 outage including quality assurance (QA) surveillances, chemical decontamination, reactor vessel spray nozzle flush, control rod drive (CRD) work, and recirculation valves 67A&B work. Additionally, HP technicians and radiation worker practices were observed throughout the licensee's radiologically controlled areas (RCAs).

A. Audits & Appraisals (83722, 83729, & 83750)

[illegible] the R-7 outage, QA had increased its HP surveillance activities in [illegible] to NRC Inspection Report 50-397/91-31, which stated that QA had [illegible]ormed a comprehensive review of the HP program. The licensee [illegible]d the QA and HP surveillance program as a customer/supplier [illegible] where findings and corrective actions were jointly discussed and [illegible]d. The inspectors reviewed the following QA reports:

[illegible] Surveillance Report (QASR) 2-91-064: This QASR, dated March 13, 1992, covered the personnel neutron dose assessment program. Overall, WNP-2's neutron dose assessment capabilities were adequate. One quality deficient finding (QFR) was reported by QA.

* QA Audit Plan 92-594: This plan outlined QA's comprehensive review of the radiation protection program. The licensee's audit plan used the recommendations of NUREG-0855, "Health Physics Appraisal Program," the requirements of 10 CFR 20, and other HP standards as audit basis documents.

* The QA Audit 92-594 status: QA gave the inspector a listing of R-7 outage audit findings. The list, dated May 20, 1992 was comprehensive, and statused several PERs and QFRs that were written by QA auditors on R-7 activities.

The audits, QASRs, QFRs, and PERs provided the licensee with useful tools for measuring the quality and performance of radiation protection activities, during the R-7 outage. The licensee identified concerns related to workers adhering to good radiation housekeeping practice for preventing the spread of contamination, and accounting for their radiation exposures.

B. Maintaining Occupational Exposures ALARA during the R-7 Refueling Outage (83728, 83729 & 83750)

The inspectors held discussions with ALARA planners and supervisors concerning the work on the reactor recirculation (RRC) system gate valves (67A and 67B). ALARA preparations for the RRC 67A&B valve job included, but was not limited to, developing special shielding packages for general area radiation field reduction, and developing contamination containment tents. Prior to the RRC 67A&B valve work, a chemical decontamination of the RRC piping was performed, and after disassembling the valves the

internal surfaces were decontaminated with high pressure water. Discussions with several craft workers indicated they were knowledgeable of good ALARA work practices.

The R-7 outage ALARA exposure goal was 587 person-rem. As of May 22, 1992, day 34 of the 75 day R-7 outage, 251 person-rem were spent. The ALARA group tracked R-7 activities by observation and reviewing exposure data.

Seventy RWPs were in use at the time of this inspection including 49 RWPs assigned for R-7 work in the drywell. The control rod drive (CRD) removal and replacement work was completed, and spent 47 person-rem out of the projected 56 person-rem. So far, 147 person-rem were spent out of the 357 person-rem projected for seven major jobs. The inspector compared ALARA exposure goals of several other R-7 jobs to what was actually spent. The reactor vessel disassembly was projected to spend 11.5 person-rem; only 7 person-rem were spent. The chemical decontamination job projected to spend 9.8 person-rem; 8.7 person-rem were spent. The inspector noted that some jobs had ALARA successes, because workers completed their task ahead of schedule. The inspector concluded that the licensee's ALARA program was effective, so far, during the R-7 outage, and met the intent of 10 CFR 20.1.(c).

C. External Occupational Exposure Control (83724, 83729 & 83750)

The inspectors examined the radiation protection efforts, during the R-7 outage, for assuring compliance with 10 CFR 20, and Technical Specification (TS) 6.11 and TS 6.12. The inspectors did not find any problems with postings or high radiation area access controls. High radiation area controls conformed to licensee Plant Procedures Manual (PPM) 11.2.7.3, "Entry into & Egress from High Radiation Areas."

Reactor Drywell access was restricted, during the RRC system chemical decontamination, because of the possibility of dose rates changes due to highly radioactive CRUD burst. One job selected for observation involved worker entries into the reactor cavity during the reactor drain down (RWP 02-92-189) for removing the steam line nozzle dam in preparing for the reactor head reinstallation. Workers were adequately briefed and HPT coverage was satisfactory. The inspectors observed that multi-package, whole body, extremity, and digital alarming dosimeters were worn and used in accordance with licensee procedures and RWP instructions. The inspectors concluded that HPTs and workers were exercising good radiological practices.

(1) Dose Extensions and Management/Worker Awareness

The inspectors reviewed the HP supervisors file on individuals who were authorized administrative doses extensions. The licensee's requirements for dose extensions were found in 10 CFR 20.101, 20.102, and PPM 11.2.5.2, "Authorization to Exceed Administrative Exposure Guides." The dose extension records completed were reviewed by the worker, the worker's supervisor, and HP supervision. Supervisors kept daily and weekly updated listings of workers exposures; some groups tracked worker exposures using charts. This aspect of tracking worker exposures was adequate.

(2) Radiation Work Permits (RWPs) and Radiation Exposure Cards (RECs)

The inspectors examined the licensee's adherence to their RWP and REC programs. Procedural guidelines for the RWP and REC process were contained in the following:

* PPM 1.11.3, "Radiation Protection Program"
* PPM 1.11.8, "Radiation Work Permit"
* PPM 1.11.11, "Entry Into, Conduct In, and Exit from Radiologically Controlled Areas" [RCA]
* PPM 11.2.1.2, "ALARA Program Implementation"
* PPM 11.2.6.2, "Use of Direct Reading Pocket Dosimeters"

The inspectors were concerned that the ALARA and HP groups were not effectively tracking some percentage of worker exposures. Both the RWP signature list and RECs had a block where the worker was supposed to identify the type of task being performed under that RWP. The task classes were maintenance work orders (MWRs), periodic maintenance (PMs), surveillances, and engineering support. The inspectors reviewed a number of RWP signature lists and RECs, and found it rare that workers specified the MWR or specific task number on either document. The January 1992 ALARA report stated that since implementing a job task identifier system for specific work, less than 5 percent of worker exposures were untrackable. The inspector observed that ALARA planning tracked R-7 outage RWP exposures by task, and concluded that ALARA planning was able to effectively analyze worker exposures based on job task data.

(a) RWPs

The licensee's program required all personnel to sign on an RWP before entering a RCA. Depending on the radiological conditions, and the type of work (routine versus specific task) to be performed, the licensee used one of three classes of RWPs; Area, Group, and Specific. The inspectors observed health physics technicians (HPTs) and workers who were performing tasks using the three classes of RWPs.

Specific RWP tasks associated with the CRDs, Drywell shielding, main steam relief valves, the chemical decontamination, and reactor recirculation valves (67A & 67B) were reviewed by the inspectors. Generally, the HPTs and personnel followed the specific RWP instructions. However, there were exceptions as described in PER 292-381, dated April 23, 1992, which identified that workers were signed on the wrong specific RWPs for several Reactor Building jobs. On April 27 and May 19, 1992, the inspector found instrument & control technicians (I&CTs) who were not signed on specific RWP-2-92-184 for working around instrument racks that were located close to the high radiation area associated with the CRD SCRAM discharge piping. The I&CTs were signed on their group RWP-2-92-07, which was not supposed to used for surveillance calibrations, during the R-7 outage. Additionally, on May 19, 1992, the inspector toured the Reactor Building and arbitrarily asked fifteen individuals what RWP they were signed on. The inspector found that seven of the fifteen craft, engineers, and supervisors inappropriately signed on group RWPs or only signed on the general area RWP-2-92-01. During an inspection in March 1992, a licensee staff person incorrectly explained, to the inspector and HP operations

supervisor, that RWP-2-92-01 allowed touring the whole RCA routinely instead of using the group RWP. The inspector, also, noted that one supervisor routinely toured the Reactor Building on area RWP-2-92-01 between May 8-19, 1992.

The inspectors examined RWP-2-92-01; it was vague on the extent which general access was allowed into the WNP-2 RCA. The inspectors discussed these findings with licensee HP management, and they agreed that RWP-2-92-01 was only meant to allow workers to pass through certain parts of the RCA.

Licensee HP management pointed out that worker training and PPM 1.11.3 required the job supervisor to ensure that a task requiring a RWP was not started until the appropriate RWP was signed and understood by all workers involved in that task. The licensee concluded that RWP-2-92-01 was inappropriate, especially under R-7 outage conditions, and that managements expectations regarding RWPs and RECs may not have been effectively communicated to all personnel through training, procedures, memoranda, RWPs and RECs. On May 22, 1992, the licensee decided to resolve the group and area RWP problems by implementing the following:

* Effective June 8, 1992, RWP-2-92-01 will only be used as a special RCA visitor RWP.

* All RCA workers will sign on their respective group RWP at minimum.

* New group RWP requirements will be incorporated into training, memorandum, and procedures.

* Tougher HPT and supervisor RCA access controls will be instituted.

The inspectors had no further concerns in this matter.

(b) RECs

The Radiation Exposure Card (REC) was used to record a radiation worker's exposure after reading the indicated dose from their pocket indicating chamber (PIC). The HPTs then transferred the exposure reading into the Radiological Exposure Records (RER) system. Instructions regarding the use of the REC were listed in PPM 11.2.6.2. On April 29, 1992, the inspectors noted that several REC cards had incomplete and inaccurate data regarding individuals exposures. Upon further investigation, the inspectors found that HPTs wrote PER 292-069 in January 1992, which identified that 60 RECs, amounting to 335 mrem, were not recorded in the RER. The response to the PER required the HPTs to pull each REC card that was incorrectly completed and counsel the individuals before allowing that worker further access to the RCA. Also, an HP REC surveillance program was established. During the April 1992 QA Audit 92-594, QA wrote PERs 292-376 and 381, which identified other workers not filling out RECs properly. PER 292-376 pointed out that the corrective actions prescribed in PER 292-069 were ineffective. QA found examples where a total of 525 mrem was not recorded, and two workers did not account for 390 mrem. The inspectors reviewed the HPT REC Surveillance Log for the period of April 28 to May 19, 1992. The Log recorded the REC/PIC inaccuracies and assured that the individuals corrected the errors. The Log, also, asked

the individuals to indicate whether or not they were aware of the requirements for completing the REC/PIC data. The inspector found that approximately 50 percent of those individuals were unfamiliar with the requirements. The licensee found this number troubling, because radiation worker training provided the PIC/REC requirements, and the REC/PIC requirements were located in plain view at the RCA access points. Additionally, the plant manager distributed a memorandum on May 5,1992, stating WNP-2's expectations regarding RECs/PICs. The inspector noted that the licensee's system of tracking worker PIC exposure became even more prone to errors when HP moved the REC/PIC racks outside the HPT access control desk area. The licensee's response to the inspector's observations was that workers were personally accountable for ensuring they complied with the REC/PIC process. The inspector regards this REC/PIC issue as a problem in terms of ALARA tracking, and accurate RERs. Additionally, QAs finding, PER-292-376, on the two workers who collectively did not record 390 mrem brought into question the licensee's ability to status and disseminate worker's dose in a in a timely manner.

The inspectors will followup on the licensee's RWP/REC problems during a subsequent inspection (50-397/92-13-01).

Based on the above, the inspectors concluded that the licensee's administrative controls for disseminating dosimetry data (REC/PIC) and staying current on worker exposures were marginal for specific RWPs, marginal for group RWPs, and weak for area RWPs.

(3) PIC Readings Versus Thermoluminescent Dosimeter (TLD) Results

The inspector examined personal dosimetry (TLD/PIC) anomaly reports from 1991, and through March 1992. Anomaly Reports were licensee comparisons of differences between PIC and TLD results that were in the RER system. The inspector looked for discrepancies attributable to workers not recording their exposures on the RECs, or HPTs not transferring REC data to the RER system. The licensee's criteria for investigating a TLD/PIC anomaly was contained in procedure RSI 4.16, "Investigation of Exposure Anomalies." Generally, the TLD/PIC comparisons were within 5 percent. There were 33 TLD/PIC exposure anomalies reported in 1991 out of approximately 8000 TLDs processed. This aspect of the licensee's program indicated that exposure results were accurately recorded pursuant to 10 CFR 20.401 and 407, and Regulatory Guide 1.16, "Annual Exposure Report." The inspectors had no further concerns in this area.

D. Internal Exposure Control (83725, 83729 & 83750)

The inspector examined the respiratory protection program for meeting the internal exposure control requirements in 10 CFR 20.103. The inspector attended the licensee's basic respirator protection training and the respirator fit test, reviewed procedures and records, and inspected the temporary breathing air system. The inspectors verified the licensee's use of the following procedures:

* PPM 1.9.8, "Plant Breathing Air Quality"
* PPM 11.2.11.2, "Selection of Respiratory Protection Equipment"

* PPM 11.2.11.3, "Issuance of Respiratory Protection Equipment"
* PPM 11.2.11.4, "Use of Respiratory Protection Equipment"

(1) Training & Qualifications (83723, 83725, 83729 & 83750)

On May 20, 1992, the inspector attended the licensee's training 80-RDT-0608-HO "Basic Respirator Protection." The inspector noted that the class material was well presented, and class interaction was good. The inspector verified that the trainees passed the examination, and were qualified to take the respirator fit test, according to the completed RER training and medical record (TRAMED). The inspector observed the trainees being fit tested, and it was performed in accordance with procedures.

The inspector noted that the licensee's program still restricted the wearing of contact lenses with respirator. However, they were in process of relaxing that requirement in order to be consistent with the current industry standards that allow contact lenses. The inspector had no concerns in this area.

(2) Breathing Air and Respirator Protection Equipment (83725, 83750 & 92701)

It was bought to the inspector's attention that the plant control and service air system (CSAS) was out of service for the outage in order to replace the compressors. The licensee used two contracted air compressors as replacements. The inspector and the licensee's safety engineer, toured the area where the temporary compressors were located. The inspector observed a laborer stationed at the compressors monitoring operations, and a plant operator performing a compressor operations checklist.

The breathing air quality supplied to respirators must meet the grade D standard, according to the Compressed Gas Association Commodity Specification G7.1. The licensee used a more restrictive grade E standard. The inspector examined the results of previous air sample analyses. The inspector noted that the plant CSAS breathing sample frequency was on a quarterly basis, however, the safety engineer said the temporary compressors were sampled on a monthly basis. The inspector further noted that the temporary system lacked continuous air monitoring systems, such as carbon monoxide detectors. In both the plant and temporary systems the air compressing components were not oil lubricated. The results of previous air sample analysis results supported the licensee's technical position on air quality monitoring. The inspector had no regulatory concerns in this matter. The licensee's administrative controls met NRC requirements.

The inspector reviewed air supplied respirator issuance during the R-7 outage. The inspector verified that prior to issuing a respirator to workers, the HPT examined the workers qualification and limitations as identified in the RER/TRAMED. The inspector reviewed 74 respirator issue forms of workers who performed the CRD under vessel project per RWP-2-92-160 and 164. All forms were completed in accordance with PPM 11.2.11.3.

HEPA filter exhaust systems were used to reduce airborne radioactivity, which in turn reduced the number of respirators issued. All workers

observed donned and properly tested full face negative pressure respirators.

The licensee's program in this area of internal exposure control met NRC requirements, and was adequate to meet its safety objectives.

E. Control of Radioactive Materials, Radiation Fields, and Contamination (83726, 83729 & 83750)

The inspectors examined the licensee's conduct of radiological surveys, posting of areas, documentation of survey results, and performed independent measurements of radiation levels in various areas of the licensee's facility.

The inspectors utilized the following portable NRC radiation survey instruments during the inspection:

* Eberline RO2, Ionization Chamber, NRC Serial No. 009154, due for calibration July 28, 1992,

* XETEX, Model 305B, Digital Exposure Ratemeter, NRC serial No. 008329, due for calibration September 20, 1992,

* XETEX, Model 305B, Digital Exposure Ratemeter, NRC serial No. 008961, due for calibration September 31, 1992,

* Eberline Teletector, Model 6112B, Telescoping, High Range Exposure Ratemeter, NRC serial No. 017113.

Documented survey results and posting for the areas inspected agreed with inspector findings and measurements. The labeling of radioactive material packages met the requirements of 10 CFR Part 20.203. Surveys of high radiation areas and work areas were adequate and in accordance with PPM procedure 11.2.13.1, "Area Radiation and Contamination Surveys." The use of personal communication devices in work areas and high radiation areas was noted. Control of contamination via work practices, frequent monitoring, decontamination was evident and effective.

The inspectors examined efforts for controlling radiation fields, contamination, and radioactive material during the R-7 outage. The licensee chemically decontaminated the reactor recirculation (RRC) system discharge piping, flushed the reactor pressure vessel (RPV) nozzles, and was flushing some hot spots.

(1) Chemical Decontamination

The chemical decontamination was performed May 12-14, 1992. NRC Inspection Reports 50-397/91-45 and 50-397/92-08 addressed the licensee's plans to perform their first chemical decontamination, during the R-7 outage. The licensee expected to save 330 person-rem, during the R-7 outage, resulting from the chemical decontamination. The licensee's chemical decontamination implementation was successful.

(a) ALARA/Health Physics

The primary objective of the licensee's chemical decontamination was to lower the potential R-7 outage doses associated with reactor drywell work. The inspector examined the ALARA/health physics results of the chemical decontamination. To monitor the decontamination, the licensee performed a series of radiological surveys at 33 locations on reactor recirculation (RRC) discharge piping. The licensee used two types of radiation detection instruments; a Geiger-Mueller (GM) probe and ion chamber. The survey distances were at eighteen inches with the ion chamber, and contact with both the ion chamber and GM probe. The licensee took surveys at the RRC pipe locations before and after the chemical decontamination, and the ratio between the two was the decontamination factors (DF). The DFs using the shielded directional GM probe provided the best indication that the decontamination process had on the RRC piping. The average DF for the 33 locations was 4.05. The before total dose of the 33 locations was 12.6 rem; the after was 4.75 rem. This represented a RRC pipe contact dose reduction of 7.85 rem. The average DF obtained based on the ion chamber at 18 inches was 3.15. The before total dose of the 33 RRC pipe locations was 6.98 rem at 18 inches; the after was 3.26 rem. This represented a Drywell high radiation area dose reduction of 3.72 rem.

ALARA/HP had not completed analyzing the radiological results of the chemical decontamination. However, they were going to continue performing surveys of those 33 RRC location during future operations.

(b) Radiochemistry and Metallurgy

The total amount of radioactivity removed from the reactor recirculation (RRC) discharge piping was 44.5 Curies (Ci), during the four stage process. The maximum activity concentration was 2.1 microCuries per milliliter (uCi/ml), and the cumulative peak activity at that time (6.0 hours elapsed) was 29.1 Curies. The primary radioisotopic constituents in solution, during the first process, were as follows:

Isotope	uCi/ml	Percentage
Cobalt-60	1.4	67.0%
Zinc-65	0.35	20.0%
Manganese-54	0.11	5.0%
Cobalt-58	0.10	4.8%
Chromium-51	0.09	4.3%

During the peak oxidation layer removal process, the dissolved metals in solution in parts/million (ppm) were Iron (214 ppm), nickel (20.1 ppm), and chromium (16.4 ppm). The inspector compared the above results to a CRUD particulate isotopic analysis collected at RRC valve 67B, after the decontamination, on May 18, 1992. The RRC-67B valve sample activity was 1.55 uCi. The isotopic distribution was as follows:

Isotope	uCi/ml	Percentage
Cobalt-60	0.95	61.4%
Zinc-65	0.296	19.1%
Manganese-54	0.013	1.0%

Chromium-51	0.19	12.3%
Cobalt-58	0.05	3.2%

The particular chemical decontamination process the licensee applied, isotopic/elemental and dissolved/undissolved oxidation were representative of stainless steel RRC piping. The licensee was continuing to evaluate the radiochemical and metallurgical aspects of their results for future applications and recontamination remedial actions.

There were no radiological incidents associated with the chemical decontamination efforts, and the inspector had no concerns in this matter.

(2) Reactor Pressure Vessel Spray Nozzle Flushes

The licensee flushed the reactor pressure vessel (RPV) spray nozzle piping to save 40 person-rem, during the outage. The high volume, low pressure flush method utilized was suitable for reducing radiation levels and CRUD traps. ALARA mock-up training added to the overall success of the nozzle flushes. ALARA/HP performed pre and post radiation surveys at 21 RPV spray nozzle locations using techniques similar to the chemical decontamination surveys, but only using ion chambers. The ion chamber RPV spray nozzle contact results were as follows:

* The cumulative dose reduction for 21 locations was 39.84 rem/hr (PRE 52.32 rem/hr - POST 12.84 rem/hr)
* The cumulative DF was 62.44
* The average dose reduction of the 21 locations was 1.88 rem/hr (PRE 2.49 rem/hr - POST 0.61 rem/hr)
* The average DF was 2.97

The inspector noted that three RPV nozzles had contact dose rates of 10 rem/hr, and flushing reduced the doses rates to less than 1.5 rem/hr. The ion chamber measurements at 18 inches were more indicative of area radiation conditions, and these results were as follows:

* The average area dose rate reduction was 0.1 rem/hr (PRE 0.29 - POST 0.19)
* The average DF was 2.34

The inspector concluded that the RPV nozzle spray flush was successful in reducing radioactive material associated with localized radiation fields. The flush was successful in reducing dose rates.

(3) Scram Discharge Volume (SDV) CRD System Flushes

According to a licensee memorandum dated May 13, 1992, flushes will be performed on the CRD-SDV piping this R-7 outage, but a date was yet to be established. The licensee identified the CRD guide tubes as the source of the CRUD migrating to the CRD-SDV. During the R-7 outage, 30 CRD mechanisms were reworked, and 15 had components with an average contact dose rate of 200 rem/hr. The licensee plans to vacuum out the CRD guide tubes by the R-9 outage, and defer the proposed CRD-SDV ALARA modification (PMR-90-0100) to the R-9 outage or pending further evaluation. The inspector reviewed, from a radiological perspective, the CRD-SDV flush

procedure PPM-8.3.256, and the 10 CFR 50.59 Safety Evaluation. The inspector noted that the flush procedure had no acceptance criteria in terms of quantifying radiological goals for removing a specific amount of radioactivity or reducing the level the radiation to a specific dose rate

(4) Material & Contamination Control

During the R-7 outage the licensee established radwaste minimization marshal (RMM) positions, and some of the RMMs were management. The RMMs were empowered to challenge everyone concerning the material entering the RCA as a method to reduce radwaste. The inspectors observed these RMMs challenge individuals in the RCA, and at the access control points. Generally, radwaste minimization practices were good.

The inspectors observed Junior HPTs strictly adhere to the licensee's procedures for contamination frisking of tools and material before being free released. Contamination control appeared good at the plant access points. Facility floor contaminations were minimal despite several spills that occurred during the outage. PERs were generated to evaluate most of those spills.

As of May 22, 1992, 178 personal contaminations were reported compared to the R-7 outage goal of 188. Discussions with the contamination coordinator, HP and ALARA disclosed that the goal was very challenging. The inspector reviewed a listing of each contamination, and the reported causes. The list of contamination causes seemed to be evenly classified as isolated specks, loss of control, inadequate planning, and poor protective clothing removal. There were a few contaminations that indicated that general walkways were contaminated. The licensee implemented corrective actions prescribed in a memorandum dated April 27, 1992, which included the following:

* Perform analysis on more methods to decontaminate and reduce radioactive material.

* Increase the requirements for protective clothing in RWPs

* Discourage worker activities that contribute to spreading contamination through plant management's Radiological Performance and Accountability Program, otherwise known as the Personally Preventable Concept.

The inspectors had no regulatory concerns in this area.

(5) Installed Personal Contamination Monitors (IPM)

The inspectors examined the licensee's IPM program. The inspector reviewed procedures, records, observed functional testing of IPMs, and observed individuals being monitored by the IPMs. The procedures and instructions on IPM operations were as follows:

* Radiation Protection Instruction (RPI) 12.24, "Operation and Calibration of the IPM-7A Installed Personnel Monitor"

* Radiological Services Instruction (RSI) 12.24, " Operation and Calibration of the IPM Installed Personnel Monitor"

* RSI 12.25, " Release of Personnel Following a Whole Body Frisker Alarm"

* Plant Procedure Manual (PPM) 10.24.7, "PM Cal/Test - Calibration Guidelines

* PPM 11.2.10.10, "Operation and Functional Check of the Nuclear Enterprises Installed Personnel Monitor (IPM) and CM7A with DP5A Probe"

* "Instruction Manual for Installed Personnel Monitors"

(a) Radiological Support Service's IPM

During a review of RSIs and RPIs the inspector was unable to locate an approved copy of the procedure for calibrating IPMs. The RPIs and RSIs were procedures for the corporate radiological support services (CRSS) group. The CRSS was responsible for calibrating all WNP-2 "Portable" HP instruments, and providing all radiation protection for the CRSS operations. The inspectors, also, noted that an IPM calibration procedure was not listed in the RSI Table of Contents, nor was it listed in the licensee's document control computer data base. The inspectors informed the radiological support supervisor (RSS) that a calibration procedure for WNP-2 IPMs could not be located. The RSS provided the inspectors the Laundry Facility IPM calibration and functional test file for review. This file had a draft procedure, RPI 12.24 for calibrating IPMs. According to licensee records and the RSS supervisor, RPI 12.24 was never established as an approved procedure. The inspectors concluded that calibration of the Laundry Facility IPM had been performed using a draft procedure since February 1988.

The inspectors examined the functional check and calibration records on the Laundry Facility IPM dated from February 1988. The records were complete and demonstrated the IPM's operation. The licensee used a cesium-137 source for functional checking and calibrating the IPM. This was the only aspect the inspector found which deviated from the vendor manual's recommendations. The vendor manual recommended using an array of radiation sources. The inspector concluded that the licensee's PER 292-389 would evaluate whether a more representative source array was needed.

(b) WNP-2 IPMs

The inspectors examined WNP-2's IPM calibration and functional test program to assure the operability of plant IPMs. During the R-7 outage, WNP-2 had at least 12 IPMs in service. The inspectors verified by observation and record review that HPTs conducted IPM functional checks for operability in accordance with procedure PPM 11.2.10.10. The inspector noted that WNP-2 used two radiation sources for testing; cesium-137 and chlorine-36. The licensee gave the inspector two memoranda for review, "Installed Personnel Monitor Setpoint Recommendation," dated April 6, 1989, and "IPM-8 Alarm Checks on the Foot Monitors," dated November 28,

1990. The inspector concluded that these memoranda were the basis for WNP-2's IPM setpoints and source checks.

CRSS had stated that WNP-2 performed its own calibrations on IPMs, because IPMs were not considered portable HP instruments. The inspector noted from reviewing WNP-2 HP procedures that an IPM calibration procedure did not exist. The HP/chemistry department stated that it was the responsibility of the I&C department to calibrate the IPMs. The inspector discussed the program with I&C department supervision, which revealed the following:

* I&C procedure PPM 10.24.7, Section 7.4.4, stated in part that if no PPM was required for the instrument, that the manufacturers manual should be used for calibration.

* I&C stated that there were no calibrations for IPMs, because it was self diagnostic. If a parameter fails during the source check, the detector is replaced.

* Scheduled maintenance sheet (SMS) 2-HP-EQ-32779, performed the monthly IPM checks that included a visual inspection of the IPMs, detector replacement if necessary, and a check of electrical signal settings.

The inspectors examined the IPM manual to determine what the manufacturer recommended for verifying IPM operability. Section 5, of the IPM vendor manual recommended that periodic checks be made at intervals not exceeding six months. These checks were intended to test the IPM detectors response to specified sources. Additionally, the IPM manual provided a technical section on checking performance characteristics, calculation routines, limits of detection, and calculations of alarm levels.

The inspectors examined why WNP-2 was confident about their IPM's operability, despite not performing calibration. The licensee was confident in the PPM 11.2.10.10 daily functional test results, and the results of the I&C parameters check program for verifying operability. The operability issue was recently addressed during an Institute of Nuclear Power Operations (INPO) inspection.

The licensee successfully demonstrated IPM operability by measuring a contamination smear that was representative of the plant contamination mix. The inspector noted that the licensee was working on a contamination characterization study, and the results will be applied to the licensee's bag monitor, tool monitor, frisker, and IPM contamination programs. PER 292-389, written by the CRSS, subsequent to the inspectors findings, could resolve all IPM issues related to WNP-2 and CRSS.

Based on discussions with the I&C and HP/chemistry departments, reviews of IPM memoranda, SMSs and procedures, and observing HPTs performing the IPM functional tests, the inspector concluded that a WNP-2 IPM had not been calibrated in a manner consistent with the vendor manual since April 6, 1989. Additionally, WNP-2 never established a procedure specifically for calibrating IPMs.

(c) IPM Violation

RSI 0.1, "RSI Manual Administration," identified the individual responsibilities for review and approval of CRSS procedures and instructions. Section 5.1.3, required that a "Procedure/Instruction Approval Routing Sheet" be attached to a draft procedure such as RPI 12.24 for the RSS supervisor to approve. The RSS supervisor did not approve RPI 12.24 for calibrating the Laundry Facility IPM, and yet it was used as an unapproved document since February 1988.

PPM 1.2.1, "Plant Procedure Manual Description," required in part that WNP-2 procedures be developed, approved, and implemented to ensure that activities were conducted in accordance with Supply System and regulatory requirements. Neither the HP/chemistry department, nor the I&C department established a written and approved procedure specifically for calibrating WNP-2 IPMs.

The licensee not having approved procedures for calibrating IPMs was an apparent violation of TS 6.8.1, which requires that procedures be written, established, implemented and maintained covering the applicable activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, Section 1(e) Review and Approval of Procedures, Section 7(e) Radiation Protection Procedures for Contamination Controls, and Section 8(b) Specific Procedures for Radiation Monitor Calibrations (50-397/92-13-02).

One apparent violation was identified for WPPSS not having approved procedures for calibrating IPMs, and not calibrating the IPMs in accordance with vendor recommendations.

F. Radiation Protection: Organization & Management Controls (83722 & 83750)

Identification and Correction of Weaknesses

During this R-7 outage, the inspector observed a concerted effort by personnel in identifying radiological concerns, and taking corrective actions related to controlling radiation exposures, radioactive materials, radwaste minimization, and plant water chemistry. Strengths were noted by the inspector's in the mechanisms that the licensee used to identify concerns such as the PER process, Radiological Occurrence Reports (RORs), morning meetings, and the Management Review Committee meetings. The PER and ROR process, which allows all radiation workers to identify concerns, was openly supported by management. The inspector's observations and conversations with licensee personnel revealed a weakness in the PER and ROR process. A number of PERs and RORs were not resolved in a timely manner. Some licensee personnel the inspector talked to felt that these untimely and incomplete resolutions of PERs discouraged full participation in the process. A licensee letter dated May 22, 1992, addressed senior managements expectations for resolving these reports in a timely manner.

The inspector concluded that the licensee demonstrates it's abilities to identify issues, however, the process for timely and effective resolutions of issues was under management's attention. The inspector had no further

concerns in this matter. The licensee was capable of accomplishing its safety objectives.

4. Exit

The inspectors met with the licensee representatives identified in Section 1 of this report on May 1, 15, and 22, 1992. The scope and findings of the inspection were discussed. One violation of NRC requirements was identified for not establishing procedures for calibrating IPM personnel contamination monitors, and not calibrating the IPMs in accordance with vendor recommendations. The license acknowledged the violation. Weaknesses in the implementation basic worker radiation practices needed for tracking exposures were discussed. The licensee committed to restricting the use of RWP-1 to very special situations, and that all workers and staff would undergo training reenforcement on June 8, 1992. One open item will close of respirator fit testing (50-397/91-26-01).

Prior to the May 22, 1992, exit meeting the licensee's radiological services group reported the results of the Radiological Environmental Monitoring Program (REMP) finding. The REMPs group reported that the plant storm drain pond was found to State of Washington reportable levels of iodine-131, cerium-141, and cobalt-60; only the iodine-131 met the NRC reportable level. However, notification to the State required notification to the NRC per 10 CFR 50.72. The inspector will followup on the licensee's investigation and corrective actions during a future inspection (50-397/92-13-03).