U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No.	50-397/90-01
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 Site, Benton County, Washington
Inspection Conducted:	January 29-February 2 and February 12-16, 1990

Inspected by: _____ 3-9-90
G. R. Cicotte, Radiation Specialist — Date Signed

Inspected by: _____ 3-12-90
L. L. Coblentz, Radiation Specialist — Date Signed

Approved by: F. A. Wenslawski 3/12/90
F. A. Wenslawski, Chief — Date Signed
Facilities Radiological Protection Section

Summary:

Inspection during the period of January 29-February 2 and February 12-16, 1990 (Report No.50-397/90-01)

Areas Inspected: Routine unannounced inspection by two regionally based inspectors of occupational exposure, shipping, and transportation; radioactive waste systems, radiological environmental monitoring; and followup. Inspection procedures 30703, 83750, 84750, and 93702 were addressed.

Results: No cited violations were identified in two of the three areas addressed. In one area, a non-cited violation was identified regarding representative environmental sampling (Section 3.D). In another area, a weakness was identified in the area of radiological controls exercised over radioactive filter replacement, resulting in a violation for inadequate radiation surveys (Section 4). Overall, the licensee's programs appeared capable of meeting their safety objectives.

DETAILS

1. Persons Contacted

+G. C. Sorensen, Manager, Regulatory Programs
+*C. M. Powers, Plant Manager
*J. A. Baker, Assistant Plant Manager
*J. R. Allen, Health Physics (HP) Craft Supervisor
*J. D. Arbuckle, Compliance Engineer
+J. C. Bell, Manager, Health and Sciences
+*L. L. Bradford, HP Supervisor
+C. J. Card, Senior Health Physicist (Radiological Environmental Monitoring Program (REMP) Health Physicist)
+*R. G. Graybeal, HP/Chemistry (HP/C) Manager
*D. A. Kerlee, Principal Quality Assurance (QA) Engineer
*D. R. Kobus, Plant QA Manager
*R. L. Koenigs, Technical Manager
+*D. E. Larson, Radiological Programs and Instrument Calibrations (RPIC) Manager
+*R. F. Patch, ALARA Coordinator
*D. J. Pisarcik, HP Support Supervisor
*L. A. Pritchard, HP Craft Supervisor
+K. A. Smith, Radwaste Program Leader
*R. L. Wardlow, Radiological Services Supervisor
S. L. Washington, Plant Compliance Supervisor

NRC

+*C. J. Bosted, Senior Resident Inspector
C. A. Sorensen, Resident Inspector

*Denotes those present at the exit interview held on February 2, 1990.

+Denotes those present at the exit interview held on February 16, 1990.

In addition to the individuals identified above, the inspector met and held discussions with other members of the licensee's staff.

2. Occupational Exposure, Shipping, and Transportation (83750)

A. Audits and Appraisals

Several Non-Conformance Reports (NCRs), Plant Deficiency Reports (PDRs), Problem Evaluation Requests (PERs), and Technical Evaluation Requests (TERs), for 1989 and 1990, were reviewed. The NCR/PDR system had been replaced by the PER/TER form of problem identification and resolution. The licensee had significantly reduced the number of outstanding deficiencies from the older system. However, some of the resolutions approved for both the old and new systems did not appear to address the original concern as stated in the tracking document. See Section 3.D, below.

The licensee's audit of health physics activities, by the Licensing and Assurance Group, will be examined in a subsequent inspection, as it had not been completed at the time of the inspection.

B. Changes

No major changes in equipment or procedures had taken place since the last inspection of this program area. Some minor in-plant organizational changes were briefly reviewed.

C. External Exposure Control

Representative radiation and contamination survey records for November 1989 through February 1990 were reviewed. Radiation survey techniques were discussed with several health physics technicians (HPTs). With the exception of those noted in Section 4 below, no concerns were identified.

Use of personnel dosimetry was observed. Representative radiation exposure cards (RECs), in use for individual radiation dose tracking, were examined. Thermoluminescent dosimeter (TLD) issuance and use were reviewed. No concerns were identified.

D. Internal Exposure Control

Representative air sampling data log sheets for 1990 were reviewed. All of the 11 HPTs with whom air sampling techniques were discussed were in general agreement as to what constituted an adequate sample of the breathing zone for workers in areas containing potentially high airborne radioactivity. However, three of the HPTs with whom air sampling was discussed stated that they believed that air samples conducted during the breach of highly contaminated system boundaries would be representative of the airborne radioactivity concentrations resulting from subsequent disassembly or decontamination of internal components within those system boundaries. The inspector reminded the HPTs that the differing conditions described above could result in significantly different concentrations of airborne contaminants.

Representative records of bioassay for 1990 were briefly reviewed. No concerns regarding minimum detectable activity or the capability to detect significant uptake of airborne radioactivity were identified.

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

Tours of the Radwaste Building (RWB), Reactor Building (RB), and Turbine Building (TB) were conducted. Independent radiation surveys were performed with NRC ion chamber survey instrument model #RO-2, serial #022906, due for calibration on April 16, 1990.

Radiological postings, contamination control stepoff pads, and other access controls that were observed appeared to have improved over

previous inspections and were consistent with the licensee's procedures and TS requirements. Housekeeping appeared adequate. Only one area, on the 522' elevation of the RB, was observed to have significant accumulation of used contamination control materials left on the floor. However, some contaminated areas appeared to have increased in size. The condition of the traversing in-core probe (TIP) drive machine area appeared to be much improved, although the size of the contaminated area was unchanged. For a discussion of radiation surveys, see Section 4, below. For the areas toured, no concerns were identified.

F. Shipping of Low-Level Wastes for Disposal, and Transportation

Radioactive solid waste shipments for 1990 were reviewed. The records indicated that all the shipments had been conducted in accordance with licensee procedures and quality assurance requirements. The licensee stated that no transportation incidents had occurred during the 18 mile trip to the commercial disposal facility. No recent violations of transportation or waste disposal regulations had been identified by the State of Washington.

The licensee's program appeared fully capable of meeting its safety objectives. No violations or deviations were identified.

3. Radioactive Waste Systems, Radiological Environmental Monitoring (84750)

A. Audits and Appraisals

Corporate Licensing and Assurance Audit 89-490, "Radiological/ Nonradiological Environmental and Effluent Monitoring," was reviewed. The audit appeared to be thorough and of sufficient depth to adequately assess the program. Audit 89-500, "Radwaste Process Control Program," was also reviewed. The audit results showed marked improvement over the previous audit of this program area. The audit stated that the most significant findings were the high volume of solid waste generated, adherence to health physics work rules, and some program changes which had not been reviewed in accordance with procedure. Most of the program change reviews had been completed and procedural changes had been incorporated at the time of the inspection.

Responses to findings from the above audits were timely. No significant concerns were identified.

B. Changes

No major changes in procedures had taken place since the last inspection of this program area. However, some organizational changes in radiological support organizations had occurred. The RPIC manager was no longer responsible for environmental monitoring. Those duties had been assumed by the Manager, Health and Sciences, who reports directly to the Manager, Support Services.

The main condenser off-gas treatment system equipment had been upgraded such that it could be operated in sub-cooled mode. This provides more cleanup of gaseous effluents, by increasing the ability of the charcoal adsorber beds to adsorb radioactive noble gases and iodines.

C. Implementation of Radioactive Waste Programs

1) Solids

The licensee's program for determining the quantity and composition of solid wastes was reviewed. The licensee conducts dewatering operations through use of a contractor. However, the licensee recently incorporated contractor procedures into plant procedures, for review and control. This was done to address audit findings with respect to the level of review provided for contractor procedures. Dewatering activities were observed. No concerns were identified.

2) Liquid and Gaseous Effluents

The most recent Semiannual Radiological Effluent Release Report, for the period of January-June, 1989, was reviewed in Inspection Report 50-397/89-29. Approximately 30 representative radioactive liquid and gaseous release reports for 1989 and 1990 were reviewed. All the reports indicated that effluents were ALARA in accordance with 10 CFR 50 Appendix I and TS limits, and were much less than 10 CFR 20 Appendix B limits.

The licensee's Offsite Dose Calculation Manual (ODCM), delineates how doses are calculated, and describes the various methods for obtaining environmental and effluent information. See Section D, below, for further discussion.

No unmonitored release paths were identified as a result of this inspection. The magnitude of gaseous effluents had been reduced as a result of the change to the treatment system noted in Section B, above.

3) Instrumentation

Representative recent radioactive effluent monitor channel checks, channel functional checks, routine tests, and some corrective maintenance, were reviewed for the main steam line radiation monitors, radioactive liquid effluent monitors, and the air ejector off-gas post-treatment radiation monitors.

Effluent sample data indicated adequate agreement with effluent monitor readings. Instrument readouts had improved in readability. Operability of monitors was adequate, with few periods of unavailability for the effluent radioactivity monitors. No significant maintenance problems were identified.

4) Air Cleaning Systems

The inspectors reviewed the two most recent test records for charcoal adsorber and HEPA filtration units, including the standby gas treatment system. Also, tests of both the radwaste building and reactor building exhaust ventilation systems were reviewed. No concerns were identified. On February 12, 1990, the inspector observed that the control room intake ventilation units exhibited several small leaks or degraded access doors. When this was brought to the attention of the licensee, an operator was dispatched to examine the units and several deficiency tracking numbers were assigned to identify the problems.

Lab test results for charcoal adsorber media were briefly reviewed. The licensee had identified a situation in which the test requested had been inadvertently assigned commercial grade versus quality grade test criteria. However, the licensee's followup indicated that the same criteria had been used for both quality and commercial grade, and that only the reporting and warranty of results varied with the commercial/quality grade assessment.

D. Radiological Environmental Monitoring Program

The inspector observed the performance of Environmental Program Instruction (EPI) 12.4.8, "Drinking and River Water Sample Collection," by the Radiological Environmental Monitoring Program (REMP) technician. Samples were taken at the following locations: Station 26, surface water upstream (circulating water system intake); 27, surface water downstream (circulating water system blowdown (CWBD)); 28, drinking water near site (Hanford site "300" area); and 29, drinking water location (Richland Water Treatment Plant).

Although the composited samples which were observed were collected in accordance with the EPI, a review of licensee records and discussion with REMP personnel revealed that there had been disagreement within the licensee's organization as to whether the REMP was being conducted in accordance with the TS.

TS 3.12, "Radiological Environmental Monitoring," states in part that the radiological environmental monitoring program shall be conducted in accordance with TS Table 3.12-1. TS Table 3.12-1 states in part that the surface water samples shall be collected as composites, such that the quantity (aliquot) of liquid sampled is proportional to the quantity of flowing liquid and in which the method of sampling employed results in a specimen that is representative of the liquid flow. Sample aliquots are to be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly). According to footnote (a) of the table, deviations are permitted from the

required sampling schedule if specimens are unobtainable due to malfunction of automatic sampling equipment. However, if specimens are unobtainable due to sampling equipment malfunction, effort shall be made to complete corrective action prior to the end of the next sampling period.

The inspectors noted that Stations 26, 28, and 29 sample from lines in which the flowrate is relatively constant, and for which a timed-interval compositor is used. Flow in the CWBD, however, regularly changes by a factor of about 800 (typically 50 to 4000 gpm); Station 27 uses a compositor which varies the time interval in proportion to the CWBD flowrate. Sampling records indicated that the CWBD compositor had been subject to chronic failures, due to repeated pump failures, flow indicator malfunctions, and other similar causes. For example, the compositor could not collect representative samples during more than one third of 1989:

Month	Dates Compositor Not Sampling by Flow-Proportional Method	Total Days Out of Service
January	13th to 30th	17
May	10th to 30th	20
June	1st to 4th; 6th to 21st	19
July	12th to 31st	19
August	1st; 16th to 31st	16
September	entire month	30
October	1st to 5th; 28th to 31st	8
November	1st to 7th	7

Difficulty in obtaining a representative surface water downstream sample had been documented in two PERs, three TERs, NCR 288-0365, and the licensee's internal monthly REMP Status Reports for May to September 1989. During each of the above periods, REMP personnel obtained grab samples at the compositor sample point. The issue of whether manual grab sampling provided an acceptable alternative during times when the compositor was out of service had been a topic of frequent disagreement within the licensee's organization. NCR 288-0365, originated by the REMP Health Physicist in August 1988, included one of several clear statements by REMP personnel that grab sampling did not comply with TS 3.12.1. The "immediate disposition" block for this NCR was not approved until March 1989. Technical review and final disposition approval were not completed until February 1990.

The plant compliance supervisor (PCS) acknowledged that the TS requires the sampling technique to be flow-proportional. An Inter-Office Memorandum (IOM) from the PCS to the plant manager, dated December 13, 1989, stated that grab sampling did not meet this requirement. The PCS stated to the inspectors that, at the request of plant management, his department had agreed to revise the IOM to state that grab sampling satisfies the TS; however, he also stated that the revised IOM, when issued, would clearly state that TS Table 3.12-1 could only be satisfied if the grab sampling is frequent

relative to the compositing period, as required by footnote (f) of TS Table 3.12-1. In addition, the PCS stated that the grab samples obtained had never been performed for compositing, nor had they been obtained for the purpose of meeting the flow proportionality requirement.

At the exit interview, the HP/C manager and the plant manager stated that manual grab sampling is an acceptable alternative method for obtaining a representative sample when the compositor is malfunctioning. The plant manager acknowledged that the CWBD compositor problems needed to be addressed, and committed to a "speedy resolution" of chronic compositor failures, including consideration of the feasibility of obtaining a compositor of more reliable design.

The inspectors noted that deviations from the required sampling schedule are permitted by Footnote (a) of TS Table 3.12-1 only if the samples are unobtainable. The failure to obtain composited samples from aliquots proportional to the flow rate of the CWBD line appears to be a violation of Technical Specification 4.12.1 and Table 3.12-1. However, the violation is not cited because the criteria of Subpart V.A of the Enforcement Policy were met ((NCV)50-397/90-01-01).

The AEOR for 1988 was reviewed. Except for a certain lack of discussion of licensee plans for preventing recurrence of the compositor failures, no concerns were identified. See Section 5 below.

E. Meteorological Monitoring Program

Meteorological monitoring equipment maintenance records were briefly reviewed. Operation of the equipment was observed. No concerns were identified.

The licensee's program appeared fully capable of meeting its safety objectives. No cited violations or deviations were identified.

4. Onsite Followup of Events at Operating Power Reactors (93702)

A. Introduction

On January 10, 1990, while replacing radioactive resin filter elements for the equipment drain--radioactive (EDR) system, the licensee discovered an in-plant spread of contamination, which resulted in contaminated footwear and the need to decontaminate a large portion of the floor on the 507' elevation of the Radwaste Building (RWB). The licensee determined that the contamination spread was the result of poor contamination control during the filter element (septum) replacement work. After the NRC resident inspector asked the licensee what the airborne radioactivity exposure was, the licensee conducted further evaluation. On January 12, 1990, the licensee conducted whole body counts on the workers to confirm whether there had been exposure to high airborne

radioactivity. A chronology of events, based on review of records and interviews with personnel, follows:

January 9, 1990
(times are approximate)

0900 All work was conducted on Radiation Work Permit (RWP) 2-90-00043. Shielding plugs on the 507' RWB were removed, after which the EDR filter/demineralizer (F/D) vessel head was removed and the support plate with 50 long narrow cylindrical filter septums suspended from it was lifted up to the 507' RWB. The HPT took one contact gamma reading, recorded on the survey map as "20 mr" [20 milliroentgens per hour (mr/h)] with a geiger-mueller (GM) survey instrument [later found to be 225 mr/h], and recorded a large area smear with removable contamination of 500,000 disintegrations per minute (dpm). The inspector later noted that this was the upper limit of the highest meter range for the counting instrument used by the HPT.

1300 After observing the septum/support plate lift, a safety department representative informed the workers that work could not proceed until improvements in scaffolding/handrails were made. The HPT who was monitoring the job had the mechanical maintenance (MM) workers place the filter assembly back in the vessel. Work on the filters was delayed until the requisite handrail work was complete.

January 10, 1990

0800 The filter assembly was again removed from the vessel and brought to the 507' elevation, where half of the 50 individual elements were removed by hand from the support plate. The elements were placed in a wooden box located just inside the posted contaminated area. After decontamination and monitoring, the box was transported to the decontamination facility. The HPT obtained gamma radiation exposure rate measurements of 225 mr/h on contact, and 25 mr/h at 3 ft relative to the box. Further disassembly awaited the construction of another, larger box.

1230 The other 25 septums were removed and placed in a box located just outside the posted contaminated area. The HPT obtained gamma measurements with an ion chamber survey instrument of 50 mr/h on contact and 15 mr/h at 3 ft. According to the survey by the HPT, large area smears on the septums in the box measured 60 to 200 mrad/h.

1400 The two MM personnel, who had been providing support outside the posted contaminated area, caused portal contamination monitors to alarm. Surveys of the individuals revealed low level (less than the limit of 100 counts per minute) contamination on their shoes. No individuals were found to have skin contamination.

1500 The HPT who had controlled the job conducted a paper smear survey and found a maximum contamination level outside the posted contaminated area of 5000 dpm/100 sq cm, in the vicinity of the boundary. The HPT posted a larger area, reported the results of the

survey to the lead HPT, and ended the shift. Two other HPTs were sent by the lead HPT to perform followup surveys, and found small particles of contamination of up to 30,000 dpm/100 sq cm in several locations on the floor leading from the posted area to the elevator, an area of about 2800 sq ft. The area from the elevator to the F/D removal area, and the area itself, were barricaded and posted as contaminated until decontamination was conducted later in the shift. Decontamination and reinstallation of cleaned filter elements was conducted later using respiratory protection and contamination control techniques consistent with licensee procedure and the potential hazards. The HPTs who performed that decontamination effort informed the inspector that pre-decon readings had shown up to 400 mrad/h per large area smear on the floor next to the assemblies.

B. Licensee Evaluation

The inspector asked the licensee if their evaluation of the matter was complete. The HP supervisor stated that a Report of Radiological Occurrence (RRO) had been completed, that several performance issues for the HPT had been identified, and that some planning issues had also contributed to the incident. The licensee's RRO, dated January 12, 1990, and a "Category 3" root cause evaluation, made the following observations:

1) The HPT did not follow good HP job coverage practices.

2) Contamination control work practices were not followed.

3) Pre-job planning did not happen. The job was 'made up' as it went along (licensee emphasis).

4) HP supervision was told by the HPT that the job was not well coordinated, but did not feel it was out of control.

5) Specific job planning problems which resulted in the area becoming highly contaminated were listed as: the manner of handling and packaging septums, delays due to waiting for replacement septums, and allowing the old septums to dry out.

6) The HPT did not keep up with increasing contamination levels, due to lack of surveys inside and outside the area, resulting in loss of contamination control.

The RRO stated that the corrective actions taken to prevent a similar occurrence were to provide better Health Physics pre-job planning and to counsel the HPT.

The inspector discussed the evaluation with the HP supervisor, who had concurred in the RRO corrective action. The HP supervisor stated that the issues regarding job planning included the delay due to safety, that the wait for replacement septums had not been necessary, but had occurred due to miscommunication, and that as a result of the incident each involved department had participated in

a post-job review, with specific action needed by departmental management. The HP supervisor and the HP/C manager both stated that the method of counseling the HPT was still under review, but that the incident had clearly occurred due to failure of the HPT to conduct necessary contamination surveys.

C. NRC Review of Licensee Evaluation

The following licensee records and documents were related to the licensee's evaluation: RRO 2-90-001; RWPs 2-90-0043 (EDR system filter element replacement), 2-89-00432 (reactor water cleanup system (RWCU) filter element replacement), and 2-89-00419 (floor drain--radioactive (FDR) system filter element replacement); Health Physics Log, January 4-30, 1990. Other RWPs and associated ALARA program review records (APRR), were briefly reviewed, as appropriate.

The inspector made the following observations with respect to issues addressed by the licensee's evaluation:

1) The lack of survey referred to by the licensee was, according to the licensee, the exercise of bad judgment by the HPT regarding when and how extensively to take surveys, particularly for contamination control purposes. Licensee procedure (PPM) 11.2.13.1 requires the surveyor to exercise good judgment--strict verbatim compliance is not required. The licensee stated that they rely on the good judgment of their HP personnel, due to the difficulty of foreseeing every contingency regarding inaccessibility of areas to be surveyed, applicability of a particularly survey technique, and other similar aspects. The inspector reminded the licensee that reliance on the good judgment of personnel is fully effective only when personnel perform above the level required by their procedures. The licensee stated that the performance of the individual HPT was considered to be anomalous and thus an individual performance issue.

2) Although not iterated in the RRO or root cause analysis, the HP supervisor informed the inspector that a post-job review had been conducted specifically to address job planning issues, and that actions by MM department personnel had been specified, so as to prevent recurrence. The inspector discussed the matter with MM supervisory personnel who had been at the post-job review. The inspector asked them what method of tracking was being used to assure that the problems did not recur. They stated that their method of ensuring that similar jobs would have better engineering controls and be better planned was that everyone there knew about it and wouldn't forget.

D. Work Planning

Licensee procedure (PPM) 1.11.8, "Radiation Work Permit," Revision 2, dated March 20, 1989, states, in part:

> Pre-job briefings are required for all activities involving work within High Radiation Areas.
>
> The Job Supervisor...initiates an RWP as follows...Enter job description...Be specific...to give a clear understanding of work to be performed...Obtain an ALARA Scope Sheet and complete all but the shaded portion...Submit the RWP and ALARA Scope Sheet to Health Physics...for processing.
>
> [HP/C] Representative shall:...For jobs with work area exposure rates greater than or equal to 100 mR/hr, but less than 300 mR/hr,...Greater than 0.3 man-rem, but less than 5.0 man-rem total...the ALARA Coordinator ...will complete the evaluation, and document the ALARA requirements on an ALARA Program Review Record.
>
> [HP/C] Representative shall:...Determine radiological conditions and enter onto the RWP. Be specific to provide adequate information.... (i.e, radiation levels, contamination levels, hot spot locations and airborne activity, etc). Provide comments to warn or guide workers of radiological conditions.....Enter any special instructions or precautions as appropriate, including ALARA recommendations. Be specific, provide all Health Physics information required to control and guide the workers...
>
> The [HP] Supervisor or Designated Alternate shall:...Review the RWP and resolve any questions with the appropriate personnel...Sign and date the RWP indicating acceptance of the RWP requirements.

The inspector noted the following regarding the ALARA Scope Sheet, the ALARA Program Review Record, and the RWP:

1) The ALARA Scope Sheet contains an unshaded block titled: "Are there any other aspects of the work that are important for ALARA planning? Describe..." The block had been filled in with the word "none."

2) The ALARA Program Review Record contains a checklist of items to be considered. The inspector concluded that several of those items, if given more consideration than was apparent from discussion with personnel involved in

the work, could have prevented the problems encountered or otherwise mitigated the situation:

Item		Checklist
1.8	"Lessons-Learned" reviewed	yes
2.7	Radiological Controls:	
	Radiological Conditions Known and RWP Issued	yes
	Ventilation	[not applicable]
	Flushing/Filling	[not applicable]
	Decontamination	[not applicable]
2.8	Protective Equipment:	
	Respiratory Protection	yes [as required by HP]
	Face/Eye Protection	[not applicable]

3) The three records noted above did not contain discussion of decontamination efforts to be conducted on the filter housing, support plate, and other internals. The pre-job briefing documentation, required by the "yes" check on the review record, did not contain any reference to decontamination in the list of topics discussed.

4) RWP 2-90-00043, under "Special Instructions," stated in part:

> Respirators required in areas [greater than or equal to] 25% MPC or for job evolutions which could create airborne radioactivity as determined by H.P.

5) The HPT who had covered the job had also approved the RWP as HP supervisory designee. The HP supervisor stated that most of the senior HPTs are on the list of authorized individuals to sign RWPs. He further stated that HPTs will routinely come to him for guidance on specific matters pertaining to RWPs under pre-job review, but that they will still approve the RWPs themselves when those questions are resolved. The HP supervisor did not recall having been consulted regarding RWP 2-90-00043.

The lead HPT who had been in charge during the work, and whose responsibilities included oversight of HPTs assigned to tasks, stated that he had not visited the job site prior to the contamination instances. The lead HPT further stated that this was because the HPT had relayed the problems encountered, but had stated that he did not believe he had lost control of the work.

E. Health Physics Procedures

The inspector interviewed the personnel who had conducted the work, including supervisory and planning personnel. The inspector noted that several licensee procedures governing the work had recommendations or guidelines which were not followed. However, the

procedures did not require compliance, as they stipulated that individual steps were to be followed when appropriate in the judgment of, or at the discretion of, the procedure user. The procedures contained wording such as "guideline," "typically," "should," "appropriate," "normally," and "usually," as noted below.

PPM 1.11.11, "Entry Into, Conduct In, and Exit From Radiologically Controlled Areas," Revision 0, dated May 15, 1989, states in part that individuals exiting the radiologically controlled area should, if applicable, complete self frisking or proceed through the whole body frisking booths. One of the two individuals whose shoes caused the frisking booths to alarm stated he had not performed a subsequent whole body frisk. The inspector noted that this was contrary to an HP night order regarding response to frisking booth alarms.

PPM 11.2.4.1, "MPC-Hour Assessment and Documentation," Revision 4, dated April 26, 1989, states in part that the required RWP for areas entered shall provide adequate documentation for entries into and exits from such areas for the purpose of determining exposure times. Discussion with the workers on RWP 2-90-00043 revealed that only two of the workers were regularly in an area with a significant potential for high airborne radioactivity, and that they were in the area much less time than was indicated on the RWP entry record or their radiation exposure record cards.

PPM 11.2.12.2, "Selection of Protective Clothing," Revision 5, dated September 7, 1988, states in part that the radiological work conditions should be known prior to selection of protective clothing. Respiratory protection equipment is included in the listing of protective clothing. Table 1 to the procedure indicates that for smearable contamination levels of 10-30 mrad/h per 100 sq cm, a negative pressure air purifying respirator should be selected.

PPM 11.2.13.1, "Area Radiation and Contamination Surveys," Revision 4, dated November 14, 1988, states in part that the surveyor should ensure that the survey accurately and clearly portrays the radiological conditions present. The HPT who performed the pre-job survey and wrote the RWP indicated on the RWP that airborne radioactivity concentrations were: "assumed to be [less than] 7.5 x 10E-10 [microcuries per milliliter (uc/ml)] based on low contamination levels; airborne radioactivity will be determined during various job evolutions." The contamination survey did not include the internals of the F/D, as the system had not been breached at that time.

PPM 11.2.9.8, "Eberline Teletector Model 6112," Revision 3, dated April 10, 1989, states in part in the limitations section that the instrument is not normally used to set work area dose rates, that applications are for hard to reach areas, and that it is to be used as an "ALARA tool" to check dose rates once they have been established with an ionization chamber instrument. The survey instrument Model 6112 is a GM survey meter.

PPM 11.2.13.1 further states in part: "Do not use a GM survey instrument without an energy compensated probe to set dose rates except where high dose rates or location make it necessary to use a teletector." The procedure also states that direct beta and gamma exposure rate measurements, and maximum and typical dose rates that would be received by specified work crew activities, should be included. The procedure further states: "usually smears will be taken of the areas where contamination is most likely to be found or spread." The inspector noted that the surveys which were conducted on January 9 and 10, 1990, during the filter element work, did not include beta readings, that only a teletector was used until the filter element removal was more than half done, that no smearable contamination levels in the work area were indicated on the surveys, and that the survey performed on January 9, 1990, appeared to have been in error by a factor of approximately 10 lower than the actual gamma radiation dose rate on contact with the assembly.

11.2.13.8, "Airborne Radioactivity Surveys," Revision 1, dated May 23, 1989, states in part: "Ideally, air samples taken primarily for personnel protection should be representative of the air actually breathed (breathing zone samples). If breathing zone samples are not practical, samples that provide conservative results...may be used." From discussion with the HPT who conducted the surveys during the work, the inspector determined that the sampler location was such that it would not have been representative of the breathing zone during filter element disassembly, and would have provided non-conservative results. However, subsequent bioassay determined that no significant uptake occurred.

F. Conclusions

Based on a sequence of events as correlated between interviewed personnel, comparison with conduct of similar tasks, and review of practice versus recommendations of licensee procedures, the following concerns are summarized below:

All the job-specific RWPs in use at the time of the inspection had been approved by HPTs, as HP supervisory designees.

The MM engineer who had initiated RWP 2-90-00043 stated that the ALARA supervisor did not contact him to discuss the job during planning.

The HPT who had conducted the pre-job surveys also wrote the RWP, including statements that indicated a low hazard potential for contaminations or airborne radioactivity. The HPT who approved the RWP was not even the lead HPT. The lead HPT did not visit the job site, although significant problems were brought to his attention by the HPT who was providing job coverage.

The ALARA scope sheet, APRR, and RWP were vague or misleading in content. Although these forms contain provisions for

consideration of radiological hazards other than whole body penetrating radiation, those provisions were not used.

The licensee's HP procedures contained many generalizations, such as deferring to 'good judgment.' The procedures essentially did not require compliance.

One HPT with whom survey techniques were discussed was not aware of the special hazards associated with beta radiation. The licensee had done studies for beta penetration of the lens of the eye, but the studies did not include analysis of the specific close disassembly inherent in F/D filter replacement. Two other HPTs stated that although they would have required respiratory protective devices for workers on F/D septum replacement, they would only require respirators during breach of the F/D housing, and would use air sample results from the activity to determine whether later work could be done without respirators. Most of the other HPTs stated that they would have required several contamination control techniques, any of which would have contributed significantly to the safety of the task.

The failure to conduct surveys for beta radiation of the F/D filter septum assembly, adequate to fully assess the radiological hazards prior to or during work, appears to be a violation of 10 CFR 20.201, "Surveys." (50-397/90-01-02) The level of contamination recorded on a subsequent survey of the filter septums was 200 mrad/h of beta radiation per smear. A reading of 400 mrad/h of beta radiation had been obtained from the floor, subsequent to the work. No other violations or deviations were identified.

5. Exit Interview

The inspector met with those individuals denoted in Section 1, above, at the conclusion of the inspection on February 16, 1990. The scope and findings of the inspection were summarized. The inspectors reminded the licensee at the exit interview that the 1989 Annual Environmental Operating Report would be expected to contain the licensee's specific plans to prevent recurrence of failure to obtain a representative downstream surface water sample. The licensee acknowledged the inspectors' observations.

The licensee was informed at the exit interview on February 2, 1990, that several licensee procedures appeared to have not been followed with respect to the contamination incident described in Section 4, above. The licensee acknowledged the inspector's observations, although the licensee did not agree with all the inspector's conclusions as described at the end of Section 4.