U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-255
License No:	DPR-20
Report No:	50-255/98009(DRS)
Licensee:	Consumers Energy Company
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	May 4 - June 1, 1998
Inspectors:	R. L. Glinski, Radiation Specialist R. A. Paul, Senior Radiation Specialist
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EXECUTIVE SUMMARY

Palisades Nuclear Generating Plant
NRC Inspection Report 50-255/98009

The purpose of this inspection was to review the control of plant radiological conditions, the development of Radiation Work Permits (RWP), and the planning to ensure that radiation exposure during the recent refueling outage (REFOUT98) was As-Low-As-Is-Reasonably-Achievable (ALARA). In addition, radiation worker practices and various outage activities were observed, and corrective actions for past violations were verified. The following conclusions were reached:

- The Chemical and Radiological Services (C&RS) staff effectively controlled and monitored airborne, discreet particle, and general contamination resulting in minimal skin dose. Improved housekeeping reduced the generation of radwaste. Controls for water clarity and tilt pit drain line contamination were greatly improved. Although ventilation use was effective, one Non-Cited Violation (NCV) was identified for the failure to label the power cords to prevent inadvertant unplugging (Section R1.1).

- The development of ALARA plans and RWPs was greatly improved over past outages. ALARA initiatives for REFOUT98 saved approximately 6.1 rem and staff conducted In-Progress ALARA reviews well before the threshold dose to better determine the source of the unexpected dose. Although 8% higher than estimated, the REFOUT98 dose was 20% below the previous outage and included minimal rework dose (Section R1.2).

- The licensee successfully completed crud bursts during an earlier cold shutdown in 1998 and in REFOUT98, which reduced the primary coolant system (PCS) source term by approximately 500 curies. However, the reduction of steam generator dose rates was less than expected. The use of new resins improved PCS lithium removal and installation of 0.1 micron PCS filters should further reduce the source term (Section R1.3).

- Overall, radworker practices were acceptable. However, there were several instances of inappropriate radworker practice during both normal operations and REFOUT98 which indicated a poor understanding of radiation protection requirements and expectations. The C&RS staff was proactive in identifying and correcting problems in the field. Two NCVs were identified for a downed high radiation area barricade and unauthorized high radiation area work on an incorrect RWP (Section R4.1).

- A review of REFOUT98 radiological incidents and condition reports, and interviews with health physics technicians, indicated that there was inadequate oversight of outage activities - particularly for work conducted by contract personnel. Two violations (with multiple examples) of basic radiation protection requirements were identified. Although the immediate corrective actions were adequate, the number of incidents indicated that the C&RS needs to be more proactive in communicating and implementing the radiation protection program at the station (Section R4.2).

- The ALARA/work planning and implementation for the hot spot retrieval from the reactor floor vacuum was well done. The pre-job brief was thorough, the work control was effective, and the task was accomplished for 55% of the dose estimate (Section R4.3).

- Although there was not a substantial potential for excessive radiation exposures, the staff failed to effectively communicate important radiological information, failed to establish a radiological hold point, and failed to ensure a common understanding of the radiological conditions for a filter basket transfer task. Although radiological controls prevented any regulatory dose limits from being exceeded, the staff missed several opportunities to improve the process (Section R4.4).

- Since documentation of past industry events in NRC Information Notices refer to previous problems raised about communication problems between operations and radiation protection, the failure of the operations and contractor staff to effectively coordinate or communicate the movement of irradiated in-core instruments with C&RS was evidence of continuing communication problems, and indicated a weakness in the work planning process (Section R4.5).

Report Details

IV. Plant Support

R1 Status of Radiological Protection and Chemistry (RP&C) Controls

R1.1 Control of Radiological Conditions During the Refueling Outage (REFOUT98)

a. Inspection Scope (IP 83729)

The inspectors reviewed the applicable Radiation Work Permits (RWPs) and the plans for maintaining radiation exposure As-Low-As-Is-Reasonably-Achievable (ALARA), and conducted walkdowns throughout containment and the auxiliary building. The inspectors also interviewed station and contract staff regarding radiological controls.

b. Observations and Findings

The inspectors observed good control of potentially contaminated material, noting that items were within the designated boundaries or were appropriately bagged and labeled. Early in the inspection period, the inspectors noted that housekeeping in the containment building was significantly improved over the previous outage (REFOUT96); however, the housekeeping and bagging of items deteriorated in the latter stages. The volume of radwaste generated during REFOUT98 was approximately 2600 cubic feet, which was 5% below the estimate, and was partially due to improved housekeeping. The water clarity of the reactor cavity was significantly improved through the use of the spent fuel pool demineralizers in addition to the Tri-Nuk filters that were utilized in past outages.

The Chemical and Radiological Services (C&RS) staff effectively controlled containment access. The inspectors noted that health physics technicians (HPTs) at the Radiation Controlled Area (RCA) access control and the containment access control points questioned workers regarding their tasks and instructed workers about radiological conditions. The C&RS staff established control points at the refuel floor equipment hatch, outside the steam generator platforms, and at the 590' level to provide greater control of work activities. Additionally, the station positioned large signs denoting low dose waiting areas throughout containment and the inspectors noted that station staff consistently utilized these areas.

Monitoring for potential airborne radioactivity was extensive. The inspectors observed a number of continuous air monitors (CAMs) and air samplers (to collect grab samples for specific tasks) throughout containment. In addition, many air samples were collected by lapel air samplers worn by radworkers during their activities. The inspectors reviewed numerous air sample results, which indicated that airborne radioactivity levels were much lower than REFOUT96. As examples, lapel air samplers detected maximum levels of 23.5 derived air concentrations (DACs) and 109 DACs of transuranics for in-core flange removal and fuel pool tilt pit work, respectively. Throughout containment, transuranic levels were well below the concentrations detected in REFOUT96 and were partially due to a greater emphasis on controlling airborne radioactivity. A decreased source term, as

evidenced by preliminary smear data which indicated lower levels of the fission products associated with gross fuel failures, also contributed to lower airborne levels.

The lower airborne transuranic levels resulted in less internal dose, as the assigned internal dose was nearly 30% less than the previous outage. Most of the internal dose resulted from work in the reactor cavity. Although the airborne levels were effectively controlled, on May 20, 1998, after the reactor cavity had been drained, eight air samples indicated airborne levels from 0.13 - 8.26 DACs composed of both beta/gamma particulates and transuranics. The 649' refuel floor was subsequently posted and controlled as an airborne radioactivity area.

Although REFOUT98 involved limited primary system breaches, the controls for potential airborne hazards were much improved. In particular, airborne radioactivity control was improved by the addition of two high efficiency particulate air (HEPA) filters on the 649' level. These units were operated at 2500 cubic feet per minute (cfm) and were used to control airborne levels in the reactor cavity and on the refuel floor. In addition, HEPAs were required by RWP for primary system breaches or work in high contamination areas (See Section 1.2). However, the inspectors identified that staff failed to label the power cords for several HEPA units. Station Procedure HP 11.2, "Control and Use of Containments and Ventilation", requires that staff label the HEPA power cords to prevent inadvertant unplugging. This failure constitutes a violation of minor significance and is not subject to formal enforcement action (NCV 50-255/98009-01). There were no instances where HEPA units were unplugged inadvertently and the C&RS staff promptly labeled the HEPA power cords, which was verified by the inspectors.

Historically, the plant has experienced a challenge to control hot (or discreet) particles. Although several areas in containment were conservatively controlled as hot particle areas, C&RS surveys did not identify a sufficient amount of hot particles to meet the criteria for a hot particle area. The C&RS staff stationed "rhino rugs" outside the steam generator (S/G) areas, on the upper guide structure (UGS) lower platform, and at the equipment hatch exit to prevent the spread of any particles. Due to effective controls for discreet particle and general contamination, only five skin contaminations were identified which required skin dose assessments. The total assigned skin dose was 5.9 rem.

The licensee has also historically found hot spots with very high contact dose rates in the spent fuel pool heat exchanger room after refueling outages. These hot spots were lodged in the fuel pool tilt pit drain line during the gravity drain of the pit. In REFOUT98, the staff installed a three micron filter in the drain and used a booster pump to drain the pit. To date, no hot spots have been found in the tilt pit drain line.

c. Conclusions

The C&RS staff effectively controlled and monitored airborne, discreet particle, and general contamination resulting in minimal skin dose. The improved housekeeping reduced the generation of potential radwaste. Controls for water clarity and tilt pit drain line contamination were greatly improved. Although HEPA use was effective, one NCV was identified for the failure to label the power cords to prevent inadvertant unplugging.

R1.2 ALARA Initiatives, ALARA Planning, and RWP Development to Control Outage Dose

a. Inspection Scope (IP 83729)

The inspectors reviewed the applicable procedures, ALARA pre-job checklists, Total Effective Dose Equivalent (TEDE) evaluations, and RWPs. In addition, the inspectors interviewed station staff responsible for the oversight and development of the ALARA initiatives, ALARA plans, and the RWPs.

b. Observations and Findings

Considering past outage performance, the licensee set a very aggressive dose goal of 180 rem for REFOUT98 and this dose goal was continually discussed by all work groups throughout the outage. Licensee staff estimated that the actual REFOUT98 would probably be 204 rem. The historically low dose values were partially based on a limited work scope and the completion of piping modifications prior to the outage.

To achieve the aggressive dose goal, licensee staff implemented several ALARA initiatives and selected individuals to function as ALARA liaisons to interface with various work groups to achieve dose savings. The following list presents ALARA initiatives for REFOUT98: (1) dose reduction workshops, (2) "fish string" shielding for the reactor head, (3) increased shielding on the reactor cavity floor over the annulus, (4) use of a gamma camera to identify sources of dose, (5) shielding between the S/G "B" platform and the letdown regenerative heat exchanger, (6) new S/G manway shield doors, (7) a new S/G manway lift device, (8) a new reactor cavity seal, (9) new type of shielding for the incore instrumentation (ICI) flanges, and (10) four new "pan+tilt" cameras to allow more observations of work from low dose areas. Although difficult to determine, a conservative estimate indicated that a dose savings of at least 6.1 rem was achieved by these initiatives.

In particular, the inspectors reviewed Temporary Shielding Request (TSR #9833) for shielding the "B" S/G platform and the dose rate reduction achieved. The TSR, which requested 3600 pounds of lead blankets in two layers, was reviewed and approved by engineering and C&RS staff. The shielding was installed for only 78 mrem and reduced general area dose rates by a factor of three. Lead blankets were placed on the reactor cavity floor to shield the gamma radiation originating from the annulus. This task expended 376 mrem (well below the 1000 mrem for past outages) and the general area dose rates were reduced by 50%. The dose savings for these ALARA shielding initiatives was estimated to be greater than one rem.

The ALARA planning and RWP development for REFOUT98 was a concerted effort of the ALARA staff, the ALARA Liasons, and the Duty HPs. The ALARA staff/liasons used previous RWPs and ALARA reviews, radiological data from previous jobs, post-job ALARA reviews from past outages, and the work order to develop the ALARA plans. The staff also reviewed the work scope with the cognizant craft personnel. The ALARA plans and RWPs were then reviewed and discussed with the Duty HPs and cognizant work groups before being finalized.

The inspectors noted several improvements over REFOUT96. The ALARA staff currently utilized a new TEDE ALARA evaluation form to determine whether respiratory protection or other engineering controls should be used to control airborne radioactivity. HEPA units were required by RWP for system breaches and any work on contaminated valves, and guidance was provided to ALARA staff regarding engineering controls or decontamination required to control contamination levels encountered in specific tasks. The inspectors noted that respirators were worn by the plant personnel for appropriate work in potential airborne areas, such as S/G bowls.

Another measure to improve dose control was the development of a greater number of RWPs for specific work activities, and there was an increased awareness to revise RWPs when work conditions changed. For example, the RWP for latching the upper guide structure was developed for two feet of water in the reactor cavity. When the conditions were changed to a dry cavity, the work was put on hold and the TEDE ALARA evaluation and RWP were revised to require respiratory protection to prevent internal dose. Also, the RWP for containment valve work stated that the grinding and welding were not within its scope, such that a new RWP would be developed to govern that additional work scope. The Duty HPs, who were required to review radiological survey data, were responsible to inform the ALARA/RWP staff of changes in radiological conditions in the plant. The shielding placement for each job was verified by the dedicated HPTs during their post-shielding surveys.

Another change for REFOUT98 was the practice of having the applicable work groups participating in the In-Progress ALARA reviews. Specific work groups were initially contacted when the their job reached 75% of the original dose estimate, and the In-Progress ALARA reviews were conducted well before the required 125% of the dose estimate was reached. The inspectors reviewed several In-Progress ALARA reviews and noted that these reviews were done in accordance with station procedure. The reviews conducted early in REFOUT98 noted that pre-job planning, scheduling, and coordination were unsatisfactory.

The collective dose for REFOUT98 based on ED data was approximately 220 rem, which was 20% lower than REFOUT96. Higher dose rates, emergent work, and problems with equipment contributed to unexpected dose. Rework dose (which was nearly 19 rem in REFOUT96) was greatly improved, as less than two rem was identified as due to rework.

c. Conclusions

The development of ALARA plans and RWPs was greatly improved over past refueling outages. The ALARA initiatives for REFOUT98 saved approximately 6.1 rem. To better determine the cause of the unexpected dose, staff from work groups and the C&RS conducted In-Progress ALARA reviews well before the threshold dose. Although 8% higher than estimated, the REFOUT98 dose performance was expected to be 20% below the previous outage and included minimal rework dose.

R1.3 Results of the Source Term Reduction (Crud Burst)

a. Inspection Scope (IP 83729)

The inspectors reviewed the applicable procedure, the shutdown chemistry controls, and crud burst data. The inspectors also interviewed the chemistry supervision regarding the results of the primary coolant system (PCS) source term reduction.

b. Observations and Findings

The plant performed an early boration and hydrogen peroxide (H_2O_2) addition to the PCS during REFOUT98. This chemical treatment process was initiated during initial cooldown by raising the boron concentration to 1900 parts per million (ppm) boron which created an acid-reducing condition to facilitate the cleaning of the PCS. After approximately 28 hours, this process was then reversed through the addition of H_2O_2, which generated an acid-oxidizing environment that resulted in a large release of corrosion products (crud burst). The crud burst was removed from the PCS by the 0.2 micron purification system until the concentration of cobalt-58 was less than 0.05 microcuries per milliliter (approximately 48 hours), in accordance with station procedure and guidance from the Electric Power Research Institute (EPRI). The licensee subsequently removed the PCS filter from service and replaced it with a 0.1 micron filter to further improve the removal of contaminants during normal operations.

The inspectors noted that the operations and chemistry departments coordinated efforts to implement the procedure CH 3.38, "Primary Coolant System Shutdown Chemistry Control". The procedural prerequisites were established, the maximum coolant flow rate was maintained throughout, and sign-off sheets indicated that the shutdown chemistry controls were properly implemented. The chemistry department estimated that approximately 270 curies (Ci) of activated corrosion products, primarily consisting of cobalt-58, were removed during this evolution. Although this was less than the previous refuel outage amount (447 Ci), this boration/peroxide process had been conducted earlier in 1998 during a cold shutdown, at which time approximately 230 Ci were removed. Because the licensee utilized a new resin bed for the REFOUT98 lithium removal, the resin decontamination factor (DF) remained high and the staff avoided the problems of lithium removal experienced in REFOUT96.

C&RS staff conducted radiation surveys after the crud burst to determine the degree of radiation dose rate reduction achieved. In comparison to REFOUT96, the results were as follows: steam generator (S/G) A cold leg -10%, S/G A hot leg -28%, S/G B cold leg +14%, and S/G B hot leg +10%. These mixed results, with an average reduction in S/G dose rates of 3.5%, were thought to be attributable to operating the plant at a higher PCS pH (7.4) than past cycles. Licensee staff will continue to review possible causes for these mixed results. In order to accomplish further source term reduction, the licensee has discussed conducting either a PCS or limited system chemical decontamination. A chemistry supervisor attended a meeting on chemical decontamination to determine the feasibility of this process for the station.

c. Conclusions

The licensee successfully completed crud bursts during an earlier cold shutdown in 1998 and in REFOUT98, which removed approximately 500 Ci of activated corrosion products from the PCS. The results were comparable to past outages, but the reduction of S/G dose rates were mixed. Use of new resins improved lithium removal over the previous outage and the installation of 0.1 micron filters should further reduce station source term.

R4 Staff Knowledge and Performance in RP&C

R4.1 Radworker Performance for Normal Operations and Outage Activities

a. Inspection Scope (IP 83750, IP 83729)

The inspectors observed outage work activities and reviewed condition reports (CRs) initiated by C&RS observations. The inspectors also interviewed station HPTs and contract health physics technicians (CHPTs) regarding radworker practices and radiological controls.

b. Observations and Findings

The inspectors observed that radworker practices were generally good. The radworkers consistently utilized low dose waiting areas, wore protective clothing (PC) and dosimetry properly, conducted hand/foot and whole body surveys appropriately, and cooperated with HPTs regarding radiological briefings and work control. However, the inspectors did observe several instances of workers wiping their faces, adjusting their glasses, and using the equipment hatch telephone without removing the outer rubber gloves. These practices did not meet station expectations and resulted in several personnel contamination incidents (PCIs). The licensee had established a goal of 225 PCIs for the outage. Toward the end of REFOUT98 the C&RS had logged 212 PCIs (6% below the outage goal) of which 5 PCIs (or about 2%) resulted in skin dose assessments totaling 5.9 rem. Therefore, most of the PCIs experienced involved either low levels of skin contamination or contamination only on clothing.

The inspectors noted that HPTs, CHPTs, and Duty HPs conducted thorough rounds in containment. During these rounds, the staff effectively identified and corrected several RP issues. As an example, at approximately 7:50 p.m. on May 5, 1998, a CHPT discovered that the rope gate barrier at the entrance to the high radiation area (HRA) around the reactor head was down. Technical Specification 6.7.1 requires that each HRA area be barricaded. The C&RS staff later determined that this particular barrier had been down for approximately 3.5 hours, and that the rope gate had either fallen down or was left down by station electricians. The HRA postings and other boundaries were still in place. In response, the CHPT immediately replaced the rope gate and C&RS staff placed a swing gate at this entrance, reviewed the boundary requirements with the C&RS staff, and counseled the work group. This non-repetitive, licensee-identified, and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-255/98009-02).

Prior to REFOUT98, station HPTs on rounds in the auxiliary building identified instances of poor radworker practices. As an example, the C&RS identified that HRA work was conducted on an incorrect RWP, which precluded the required RP coverage. On March 3, 1998, a Consumers Energy employee from another facility was onsite to conduct Non-Destructive Testing (NDT). This individual completed NDT on the spent fuel pool crane auxiliary hook on a general RWP and exited the auxiliary building to complete the documentation. This individual did not recall being informed at the pre-job briefing that separate RWPs were required for the different tasks. He then informed the HP desk that he would conduct other NDT work (although no HPT recalled this conversation) and proceeded to West Safeguards to do a penetrant test on welds. In West Safeguards, a fire watch told the NDT worker that the welders were required to have RP coverage and suggested that he should check with the Duty HP to ensure that this RP coverage would be provided. However, the NDT worker dressed out in PCS and entered the West Safeguards overhead area which was posted "High Radiation Area in Overhead - Contact HP" and conducted the NDT on the welds. The electronic dosimetry (ED) recorded a maximum dose rate of 40 mrem/h and the total dose was less than 10 mrem.

An HPT on rounds observed staff removing welding equipment from West Safeguards and knew that this equipment was only removed after the NDT was completed. The HPT was unaware of any NDT work and made further inquiry at the HP desk, where C&RS staff were unaware of any NDT work in West Safeguards. The C&RS staff then determined that the NDT worker had entered the HRA without HP coverage and on an incorrect RWP. Administrative Procedure No. 7.13, Revision 7, "Radiation Controlled Area Access", requires that staff entering the RCA determine the proper RWP for each entry, read and sign onto the RWP, obtain authorization to use the RWP, and check with the Radiation Safety Crewleader prior to the start of each job. In addition, this procedure also requires that a member of the Radiation Safety Department be present and provide coverage for entries into an HRA. The NDT worker failed to comply with these station requirements.

In response, the C&RS revoked this individuals access to the RCA, instructed the Mechanical Maintenance Lead Supervisor to re-enforce the expectation for a pre-job briefing prior to each job, and the NDT supervisor reviewed this incident with all the NDT staff regarding the need to have a questioning attitude for RP requirements. This non-repetitive, licensee-identified, and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (NCV 50-255/98009-03).

c. Conclusions

In general, radworker practices were acceptable. However, there were several instances of inappropriate radworker practice during both normal operation and REFOUT98 which indicated a poor understanding of radiation protection (RP) requirements and expectations. The C&RS staff proactively identified and corrected RP problems in the field, such that two NCVs were identified regarding: (1) a downed HRA barricade and (2) unauthorized work in an HRA.

R4.2 Inadequate Oversight of Contractor Activities

a. Inspection Scope (IP 83729)

The inspectors reviewed the circumstances surrounding three violations of station requirements involving contract personnel. Interviews with C&RS management, station HPTs, and CHPTs were also conducted regarding the oversight of contractor activities.

b. Observations and Findings

On April 29, 1998, a contract crew was installing scaffolding and lead shielding in the 607' Mainsteam room, and the door was posted as a "Radiation Controlled Door" (RCD). Due to radiation levels in excess of 1000 millirem per hour (mrem/h) in the 607' Mainsteam room, access was governed by TS 6.7.2 which requires that; (1) the door be locked or continuously guarded to prevent unauthorized entry and (2) the door remain locked except during periods of access by personnel. In addition, procedure HP 2.20 requires that RCDs be locked and controlled by Radiological Services personnel. After briefing the crew about the radiological conditions for this scaffolding task, a CHPT with the RCD key escorted the workers into the room, departed, and verified that the door was locked.

Soon afterward, a worker decided to leave the room to retrieve more supplies and upon exiting the room this worker propped open the RCD with a roll of duct tape. Several minutes later, the CHPT with the RCD key and another CHPT (who was escorting the scaffolding crew foreman) arrived at the door. One CHPT controlled the door while the other went into the room and spoke with the crew. The worker who propped the RCD open returned shortly thereafter and admitted his mistake. A CHPT then called HP access desk from the 590' control point, the Duty HP ordered a stop work, and the CHPTs ushered the contract work crew out of containment. The C&RS management held a debrief with the work group and their supervisor, and the responsible contract radworker was denied RCA access for the remainder of the outage. TS 6.7.2 requires that areas with radiation levels greater than or equal to 1000 mrem/h be provided with locked or continuously guarded doors to prevent unauthorized entry; the failure to have the RCD to the 607' mainsteam room locked or guarded for several minutes was an example of a violation of TS 6.7.2 (VIO 50-255/98009-04a).

At approximately 9:00 p.m. on May 28, 1998, a CHPT and a station electrician entered the RCD into the clean waste receiver tank room to access primary coolant pumps from the 607' catwalk. The radiation levels on the 607' level ranged up to 1200 mrem/h by the letdown regenerative heat exchanger. The CHPT had signed out the RCD key, and after they unlocked the door and entered the room, the electrician closed the door. However, the CHPT was primarily responsibility to verify that the RCD was locked as Procedure No. HP 2.5, "Use of Radiation Controlled Doors", requires that the RCD key holder have positive control of the RCD at all times by assuring that unauthorized personnel may not gain access through the RCD. The responsible CHPT did not close the RCD or verify that the RCD was closed. After completing the work, these radworkers exited 607' through another door. At approximately 9:25 p.m., an HPT on rounds discovered that this RCD was neither closed, locked, or guarded, due to sticking problems with the door.

Although the double verification of RCDs had been reinstated by the day shift Duty HP, this information was not communicated to the evening shift. However, the CHPT whose primary duty it is to implement the radiation protection program should have taken the initiative to ensure positive control of this RCD, rather than depend on a radworker. TS 6.7.2 requires that areas with radiation levels greater than or equal to 1000 mrem/h be provided with locked or continuously guarded doors to prevent unauthorized entry. The failure to lock or guard the clean waste receiver tank room RCD, which provided access to the 607' level with radiation levels up to 1200 mrem/hr, for approximately 30 minutes was another example of a violation of TS 6.7.2 (VIO 50-255/98009-04b).

The licensee implemented several immediate corrective actions. A work order to repair the RCD was initiated. Only the Duty HPs will be allowed to issue the RCD keys and they are to instruct the staff on the use and expectations for RCDs. Both the HPTs and a crew member are now required to sign the RCD keys in and out, and double verification of RCDs was reinstituted for the containment and auxiliary buildings. Finally, a third person verification will be conducted by HP within 30 minutes of the use of any RCD and all RCDs will be verified once per shift, but these latter requirements will not pertain to containment RCDs after criticality is achieved.

On May 19, 1998, two contract personnel involved in the final ICI insertion had apparently moved the HEPA trunk and the lead CHPT covering this job proceeded to the lower UGS platform to instruct these workers to call HP to move this radiation protection engineering control. While on the lower UGS platform, the CHPT observed one worker place his hands under his face shield and remove his safety glasses (which were fogging up) while wearing his outer gloves; and the other worker did not have safety glasses. The one worker then placed the safety glasses on the platform. As the lower UGS platform was highly contaminated, the CHPT suspected that this worker's face was now contaminated.

The CHPT took the safety glasses, proceeded to the equipment hatch control point, and called the Duty HP to inquire as to whether safety glasses were required for this task. The Duty HP replied that safety glasses were required and he issued a stop work order. A CHPT on the reactor cavity catwalk established eye contact and gave verbal instructions and hand signals to the work crew on the lower platform, approximately 15 feet below, to stop the job. However, these contract employees spent at least another five minutes removing the ICI prior to leaving the UGS.

After exiting containment, these workers were counseled by their supervision regarding the lack of eye protection, the poor radworker practice of removing the safety glasses, and the failure to follow instructions from HP staff. However, these workers stated that they were uncertain as to the message that was being conveyed to them by HP. C&RS also denied RCA access to the contract lead for this task, reiterated that there were no exceptions to HP stop work instructions, and developed a specific hand signal to indicate an immediate work stoppage. Station Administrative Procedure No. 7.13, "Radiation Controlled Area Access", requires that radworkers promptly obey "Stop Work" instructions of Radiological Services personnel. Therefore, the failure of the contract staff to promptly stop the work on the lower UGS platform was an example of a violation of Procedure No. 7.13 (VIO 50-255/98009-05a). Also, by moving the HEPA trunk and removing (and not wearing) their safety glasses, these

Also, by moving the HEPA trunk and removing (and not wearing) their safety glasses, these contract workers displayed poor radworker practice. The worker who removed his safety glasses had distributed contamination of 25,000 counts per minute on the side of his nose. The C&RS staff decontaminated this worker and the skin dose assessment resulted in an assignment of 136 mrem.

On May 22, 1998, at approximately 1:00 a.m., a contract crew of five workers entered the reactor cavity to install lead shielding on the annulus and remove reactor head heater blankets. The radiation survey revealed that the reactor cavity floor was an HRA with dose rates ranging from 200-300 mR/h at chest height, and 200-500 mR/h on the reactor head flange. Due to these high dose rates, the crew members were placed on the Remote Monitoring System (RMS) and were monitored by HP staff. As this crew exited at 4:00 a.m., one worker could not log his RMS-ED out of the Management Information Systems (MIS). A Duty HP then discovered that this individual had not logged his RMS-ED into the MIS prior to the work; and therefore this contractor was in the reactor cavity without ED alarm capability and without being monitored for dose control by HP staff.

Prior to entering the RCA on the RMS, each worker is responsible to log their ED into the MIS and then proceed to the RWP office and verify that their name and RMS readings are present on the RMS computer screen. The contract worker who failed to log into the MIS had used the RMS previously during REFOUT98 and was familiar with the dosimetry requirements. In addition, the HP staff failed to ensure that this worker was logged onto the MIS and was displayed on the RMS computer screen. The fact that there were several crews on RMS working in the reactor cavity, the tilt pit, the S/G platforms, and on the mast camera contributed to the failure of C&RS to recognize this contract worker was not on RMS. The licensee assigned this individual 150 mrem for this entry, which was equivalent to the highest dose recorded by another crew member.

Administrative Procedure No. 7.13, "Radiation Controlled Area Access" requires that personnel entering the RCA log their entry into the MIS computer terminal for the purpose of dose tracking. The failure of the contract worker to log his ED into the MIS for dose tracking is another example of a violation of Procedure No. 7.13 (VIO 50-255/98009-05b).

At approximately 4:00 p.m. on May 27, 1998, a CHPT was instructed to replace the temporary postings used in containment during outages with the placard postings used during power operations. The access ladder to the reactor cavity floor was locked and this access point had been posted as an RCD, a high contamination area (HCA), and an HRA during the outage. Because an HCA placard was not available, the reactor cavity postings were not exchanged at this time. Later, another CHPT replaced the temporary posting with the placard HCA posting, but mistakenly thought that the RCD posting and locking of the access ladder were sufficient to alert staff of the radiological hazard. The survey data showed that the general area radiation levels in the reactor cavity ranged up to 150 mrem/h.

While reviewing Radiological Status Sheets at approximately 7:00 p.m. on May 27, 1998, a Duty HP noted that the reactor cavity ladder was not listed as an HRA and an HPT verified that the access to the reactor cavity was not posted as an HRA. As an

immediate corrective action, C&RS posted this access as an HRA and required double verification for all posting changes. In addition, all HRA postings will be verified daily, and all other postings will be verified weekly.

10 CFR 20.1902(b) requires that the licensee post each HRA with a conspicuous sign bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA". Pursuant to 10 CFR 20.1003, a high radiation area means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 100 millirem in 1 hour at 30 cm from the radiation source or from any surface that the radiation penetrates. Therefore, the failure to post the entrance to the reactor cavity HRA was a violation of 10 CFR 20.1902(b) (VIO 50-255/98009-06). The failure to post HRAs has been a recurrent problem for the station (See Inspection Reports 97015 and 97016)

During walkdowns, the inspectors observed the presence of many personnel in containment and questioned C&RS regarding their control of contractor activities. In addition to these observations and the examples of poor contract radworker performance stated above, interviews with HPTs and CHPTs indicated that there was inadequate oversight of contract personnel involved in refuel floor and scaffolding activities. In particular, these staff did not observe strong control of either contractor work control or crew size. Various HPTs stated that there were no issues associated with the contractor personnel involved in the S/G work. The inspectors discussed this issue with C&RS management who subsequently reviewed REFOUT98 CRs and identified a number of significant CRs related to contractor activities. The C&RS supervision then initiated a Significance 1 Level CR (requiring a team investigation of root causes) which identified the common elements of poor communication between work groups and interfaces with contract personnel.

c. Conclusions

A review of REFOUT98 radiological incidents and CRs, and interviews with health physics technicians, indicated that there was inadequate oversight of outage activities - particularly for work conducted by contract personnel. Two violations, both involving multiple examples of basic radiation protection requirements, were identified. Although the immediate corrective actions were adequate, the number of incidents indicated that the C&RS needs to exercise greater control of work activities and be more proactive in communicating and implementing the radiation protection program at the station.

R4.3 Successful Retrieval of a Hot Spot from a Tri-Nuk Vacuum

a. Inspection Scope (IP 83729)

The inspectors observed ALARA/work planning, attended the pre-job briefing, and observed HPT and radwaste handler job performance in the retrieval of particles which generated a significant hot spot in a Tri-Nuk reactor cavity vacuum.

b. Observations and Findings

On May 20, 1998, a radiation survey of the reactor cavity discovered a 250 R/h hot spot in a drain line of a Tri-Nuk filter unit used to vacuum the reactor cavity floor. This hot spot generated dose rates of 1-3 R/h in the vicinity of the vacuum. In order to accomplish the reactor cavity decontamination and other cavity activities ALARA, C&RS staff decided to remove this hot spot from the vacuum. The inspectors noted that the pre-job briefing included a detailed review of the work plan, a thorough review of radiological conditions and radiation protection controls, and contingency plans if the attempt was unsuccessful. Attendance at this meeting was mandatory for all staff involved in this task. An existing RWP was appropriately revised to establish radiological controls for this task.

The inspectors observed that a lead blanket was placed over the vacuum to decrease the area dose rates. The radworkers wore the proper PCS, were monitored by RMS, wore respirators, and the dedicated HPT was fitted with a lapel air sample. The radworker who removed the drain line endcap effectively used the extended handle wrench to maximize his distance and he used the filter housing as shielding. The hot spot was not completely dislodged when the endcap was removed. Therefore, another radworker retrieved the remainder with a extended-handle swab and the entire hot spot was subsequently captured in a bucket which was covered with lead blankets.

The RMS-ED data revealed that the staff accomplished this task for approximately 220 mrem which was well below the 400 mrem estimate. Post-job surveys demonstrated that there were no particles remaining in the Tri-Nuk vacuum drain line.

c. Conclusions

The inspectors determined that the ALARA planning and implementation of the hot spot retrieval from the reactor floor vacuum was well done. The pre-job brief was thorough, the C&RS work control was effective, and the task was accomplished for 55% of the dose estimate.

R4.4 Weak Planning, Communications, and Implementation for a Tri-Nuk Filter Basket Transfer

a. Inspection Scope (IP 83729)

The inspectors reviewed the circumstances surrounding the transfer of a Tri-Nuk filter basket. The inspectors interviewed staff, reviewed RWPs and relevant HP procedures, and observed the area where the task occurred. The inspectors also reviewed the C&RS evaluation of the event which discussed lessons learned, root cause, and corrective actions to prevent recurrence.

b. Observations and Findings

On May 11,1998, a pre-job meeting discussed the transfer of a Tri-Nuk filter basket during the shift. The underwater surveys indicated up to 75 Roentgen per hour (R/h) on

the filters and previous outages indicated basket radiation fields of 15-30 R/h. Based on survey data, C&RS staff decided that the task would be stopped and re-evaluated if dose rates greater than 15 R/h were encountered. The RMS-ED dose rate alarm was to be set at 1.5 R/h and the entry dose limit (EDL) at 300 mrem. However, this transfer evolution was postponed due to scheduling conflicts and was then scheduled for the following day.

On May 12, 1998, the licensee had initially intended to transfer the filter basket by raising it from the reactor cavity, letting it drain, and then transporting it to a cask with a nylon bag already placed inside. However, because the basket's trip lever was sensitive and could drop the highly radioactive filters onto the refuel floor, the staff decided to use a past practice of placing the nylon bag over the basket before its transfer to the cask. The placement of the bag over the basket would also prevent the spread of contamination during the transfer. During a first attempt at performing this transfer on the morning of May 12, 1998, staff surveyed the basket when it was lifted from the water and found radiation levels of about 30 R/h an contact and 7 R/h at 30 centimeters (cm). However, because the rigging was too low to place the basket into the cask (which was up on the trolley) this transfer was canceled and the basket was lowered back into the cavity. The drained filters then floated out of the basket and C&RS staff later recovered and returned the filters to this basket.

Later on May 12, 1998, a pre-job brief was held with another work crew before a further attempt to transfer the basket to the cask. During this briefing, C&RS staff discussed the RWP requirements, indicated that the filter basket was 7-9 R/h with no reference to distance, and informed the workers that the filter basket would be wrapped with a nylon bag before the transfer (instead of transferring the basket into a cask with the bag already inside). The CHPTs understood that the dose rates discussed at the pre-job briefing meant 7-9 R/h on contact with the basket, which was contrary to the survey information discussed at the pre-job meeting conducted on the previous day. It was also stated at the May 12, 1998, pre-job brief that there was no dose rate hold point for this task, unlike those that were established at the May 11 pre-job brief. The RFW had his EDL set at 150 mrem and the dose rate alarm was set at 300 mrem/h. It was discussed that the ED dose rate alarms and the refuel radiation monitor alarms would occur.

During this task, the RFW who bagged the filter basket wore an RMS-ED, the CHPT monitoring the job wore a headset and was in constant contact with another CHPT who was monitoring the RMS from the equipment hatch access control point. As the basket was draining, the CHPTs survey indicated 25 R/h on contact, which was unexpectedly high. Also while the filters were draining, the RFW was holding a tether line attached to the filter basket while standing in a 5 R/h field. The CHPT instructed the worker to back away; however, the tether kept the RFW in a field of 500-700 mR/h. Therefore, the RFW accumulated about 65 mrem on his ED before he attempted to place the bag around the filter basket. This dose was not anticipated during the pre-job briefing and the CHPT covering the job was not aware of the accumulated dose. Because there was no dose rate hold point, the CHPT instructed the RFW to bag the basket. Shortly into the bagging process, the CHPT was informed over his headset that the RFW's EDL alarmed. The RFW left the area immediately as instructed by the CHPT, and the CHPT completed the bagging. The filter basket was then transferred to the cask liner.

The MIS showed that a maximum dose rate of 32 R/h was encountered by the RFW while he was bagging the basket. In addition, the RMS printout showed that the RFW was in a field of 12-21 R/h for 40 seconds while bagging the basket and he accumulated about 280 mrem for the entire evolution. Due to the bagging problems and the high dose rates encountered, a subsequent basket was transferred to the cask with the nylon bag already in cask.

The inspectors review noted the following problems regarding the work process:

- The May 11, 1998, pre-job meeting discussed survey data from previous baskets indicating dose rates of 15-30 R/h. As a result, it was decided to raise the dose rate alarm to 1.5 R/h and the EDL to 300 mrem for the RFW, and to suspend the operation if radiation fields greater than 15 R/h were observed. This information was not communicated to the crew on May 12, 1998, and the planning aspect of the job did not include discussions of radiological hold points and contingencies in the event unplanned conditions were encountered. Although the radiological control of the activity was left to the judgement of the CHPTs covering the job, they felt limited in aborting the job because there was no pre-established hold point.

- Although the decision to bag the filters was based on the potential of the basket lever to fail, the technique of having the filter basket with high dose rates in close proximity to an individual rather than transporting it directly to the cask increased the probability for unexpected personnel dose.

- The cask to which the basket was transferred was located on the trolley at the equipment hatch, which is a considerable distance from the reactor cavity. This placement of the cask at the equipment hatch door rather than adjacent to the reactor cavity increased the probability of a radiological problem during the transfer.

The licensee's investigation, conducted by a C&RS supervisor, indicated that the root cause was poor communications resulting in: (1) the failure to discuss important information between work groups and (2) the failure to assure a common understanding of the radiological conditions. Immediate corrective actions included transferring the basket to a cask placed next to the reactor cavity, and development of a comprehensive work instruction that would improve the communication of expected radiological conditions and ALARA work practices.

c. Conclusions

The inspectors concluded that there was not a substantial potential for radiation exposures in excess of regulatory limits. However, for this particular activity, the staff failed to effectively communicate important radiological information, failed to establish a radiological hold point, and failed to ensure a common understanding of the radiological conditions. Although the radiological controls prevented any regulatory dose limits from being exceeded, the C&RS staff missed opportunities to improve this filter basket transfer.

R4.5 Poor Communication by Operations Staff to C&RS Concerning the Movement of Irradiated Incore Instrumentation (ICI)

a. Inspection Scope (IP 83729)

The inspectors reviewed the circumstances surrounding the existence of radiation fields on the UGS that were several times higher than expected after the reactor cavity was drained to the 630' level. The inspectors interviewed operations and C&RS personnel regarding the unexpected radiation fields, and reviewed the CR and survey data.

b. Observations and Findings

On May 13, 1998, a radiation survey of the UGS with the reactor cavity water at the 630' level indicated the radiation fields ranged between 500-700 mrem/h on the upper platform and 5-6 R/h hour on the lower platform. These dose rates were several times higher than historically observed for the 630' water level, but the area radiation monitors did not alarm. The C&RS staff then secured and posted the HRA, access to the UGS lift rig was posted with a red flashing light in accordance with TS requirements, and work on the refuel floor was restricted. After discovering that irradiated incore probes had been lifted higher than initially planned, the operations staff refilled the cavity to approximately the 637' level to reduce the radiation fields to acceptable levels. The licensee suspended refuel floor work, held a meeting that included C&RS, contract, and operations staff to discuss current conditions and proposed actions to continue the ICI reinsertion.

The licensee's preliminary evaluation of the unexpectedly high dose rates indicated that with the water level the 644' level, two of the incore detectors were pulled up about two feet from their normal position to prevent the wetting of electrical connections. In past outages, the licensee had replaced the used irradiated incore detectors. However, for REFOUT98, they chose to reinsert the ICIs used during the previous power cycle. As such, this ICI reinsertion work was essentially a first time evolution. There were no revisions to the procedure covering the movement of irradiated ICIs (Westinghouse Procedure CPAL-RMF-003 REV. 0) and C&RS supervision was neither consulted or notified about the lifting of the ICIs prior to the cavity drain down. There are several NRC Information Notices which address the issue of significant changes in radiological conditions resulting from the movement of irradiated incore probes, all of which identify the lack of communication between work groups as a contributing factor to the problems.

Given the numerous documented industry events associated with the movement of irradiated incore probes causing significant changes in radiological conditions, the inspectors review noted the following problems regarding the work process:

- The radiological characterization of the ICI strings from power cycle #12 showed that there was approximately 450 Ci per ICI string; and therefore, the failure of contract and operations staff to consult or inform C&RS supervision about lifting irradiated ICIs indicates a continuing problem of recognizing the potential for operational evolutions to significantly alter radiological conditions in the plant (See Inspection Report 97016 and Section R8.4),

- As a first time evolution, the failure of contract and operations staff to consult or inform C&RS supervision about lifting irradiated ICIs indicates a continuing problem in communications between station departments (See Sections R4.2, R4.4, R8.4 and Inspection Report 97016), and

- As a first time evolution, the failure to make procedural revisions to include and address the potential for significant radiological changes by moving ICIs indicated a weakness in the planning process.

c. Conclusions

The documentation of past industry events in NRC Information Notices (86-107, 88-63, and 88-63 Supplements 1 and 2) refer to previous communication problems between operations and other departments. Therefore, the inspectors concluded that the failure of the operations and contract staff to coordinate or communicate the movement of irradiated ICIs with C&RS was evidence of continuing problems of understanding the potential radiological impacts of operational actions and communications between station departments. This event also indicated a weakness in the work planning process.

R8 Miscellaneous RP&C Issues

R8.1 (Closed) VIO 50-255/97015-01: failure to post the high radiation area in the Clean Waste Filter Transfer Room. The licensee determined that the HRA in the Clean Waste Filter Transfer Room was not posted from approximately 11:30 a.m. on September 15, 1997 to 4:00 a.m. on September 16, 1997. The following corrective actions have been implemented: (1) a comprehensive walkdown of all Radiological Status Sheets was conducted to verify their accuracy, (2) all radiological boundaries and posting were re-verified, (3) the appropriate C&RS staff were disciplined, (4) a stand down meeting with all C&RS personnel was conducted to discuss communication issues and performance expectations, (5) C&RS was restructured to allow the Duty HP supervisor more time in the plant for observations, (6) HPT performance expectations for postings and boundaries were developed and communicated to C&RS staff, (7) the Management Observation Program (MOP) within C&RS was enhanced to improve HPT performance, and 8) an assessment of the C&RS MOP was conducted to determine compliance with plant management expectations.

The inspectors reviewed the training mock-ups for postings and boundaries and reviewed the HPT performance expectations which were developed to address these issues, and determined that these actions provided sufficient guidance to C&RS staff. The inspector reviewed the notes from the stand down meeting and interviewed various C&RS staff, both of which indicated that expectations and standards were communicated to the staff. The C&RS MOP field observations of technical issues increased and the self-assessment of the MOP indicated a goal for further MOP improvement. The inspectors determined that these corrective actions were well implemented and this item is closed.

R8.2 (Closed) VIO 50-255/97015-02: failure to be aware of dose rate levels prior to entry into a high radiation area. The licensee determined that an HPT entered the unposted HRA

in the Clean Waste Filter Transfer Room at approximately 13:00 on September 15, 1997, without being aware of the dose rate levels. As corrective actions, the licensee disciplined the individual HPT and developed and communicated HPT performance expectations. In addition, the station procedure HP 2.8, "Radiological Services Response to Unusual Radiological Occurrences", was revised to provide appropriate guidance for C&RS staff response to an ED alarm. The inspectors verified the implementation of these corrective actions and this item is closed.

R8.3 (Closed) VIO 50-255/97015-03: failure to comply with radiological survey requirements. The NRC determined that C&RS staff did not conduct radiological surveys in support of the clean waste filter transfers as required, and C&RS staff did not forward these radiological survey data to the Duty HP for review and signature. The following corrective actions have been implemented: (1) the C&RS department was restructured to allow the Duty HP more time in the plant for observations and monitoring, (2) HPT performance expectations and standards for boundaries and postings were developed and communicated to C&RS staff, (3) the MOP within C&RS was enhanced to improve HPT performance, and (4) an assessment of the C&RS MOP was conducted to determine compliance with plant management expectations.

The inspectors reviewed the training mock-ups for postings and boundaries, and reviewed the HPT performance expectations which were developed to address these issues. These actions provided sufficient guidance to C&RS staff to address performance issues. The inspectors also reviewed the notes from the standdown meeting and interviewed various C&RS staff, both of which indicated that expectations and standards were communicated to the staff. The C&RS MOP field observations for technical issues increased and the self-assessment of the MOP indicated a goal for further MOP improvement. The inspectors determined that the corrective actions were well implemented and this item is closed.

R8.4 (Closed) VIO 50-255/97016-01: failure to post the high radiation area in the waste gas surge tank (WGST) room. On January 7, 1998, two radwaste handlers entered the waste gas surge tank room (which was posted as a radiation area) to conduct decontamination. One radwaste handler approached the tank and received an ED alarm at 102 mrem/h. These personnel left the room and immediately contacted C&RS. Subsequent radiation surveys indicated that the WGST room had become an HRA, with maximum dose rates of 120 mrem/h. Upon further review, plant staff discovered that the operations staff vented fresh reactor coolant gas from the volume control tank (VCT) to the WGST without notifying C&RS personnel. This venting caused the dose rates in the WGST room to increase significantly.

The following corrective actions have been implemented: (1) operations staff were briefed on this event and the potential impact of operational activities on the plant's radiological conditions, (2) this event was reviewed by C&RS staff and used as a case study for discussion, and (3) C&RS supervisors reviewed various areas down-posted from HRA to determine whether there were other locations with the potential to become HRAs as a result of operational evolutions. In addition, the procedure SOP-2A, "Chemical and Volume Control System", was revised to include instructions for control

room operators to contact C&RS when the VCT is vented and a placard has been placed next to the VCT vent valve control switch which states, "Contact HP Prior to Venting VCT While Reactor is Critical". The inspectors determined that the implemented corrective actions were appropriate and this item is closed.

R8.5 (Closed) IFI 50-255/97010-01: evidence of equipment leaks and poor housekeeping in radwaste treatment rooms. The inspector previously viewed videotape of the F54 A/B purification filter room, and both materiel condition and housekeeping concerns were identified. The inspectors determined that the licensee completed the following work in these rooms: (1) the patio lids were sealed and no further incursion of rainwater has occurred; (2) damaged pipe insulation was replaced; (3) the control valve CV-2023 body-to-bonnet leak was repaired by the installation of a new gasket and stem packing; (4) the piping was examined by the system engineer and no materiel condition concerns were identified; and (5) a 0.1 micron filter was installed in F54A. During normal operations, the 0.25 micron filter in F54B filter will be used only if differential pressure dictates the need for another filter. The inspectors also conducted a walkdown of the filter purification room and did not identify any housekeeping issues. The inspector determined that these actions were appropriate and this item is closed.

X1 Exit Meeting Summary

The inspector presented the inspection findings to members of licensee management during an interim exit meeting on May 8, a final exit meeting on May 21, and a telephone conference on June 1, 1998. Plant personnel did not indicate that any materials examined during the inspection should be considered proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Banks, C&RS, Manager
J. Beer, Technical Support Supervisor
J. Burnett, Dosimetry
W. Doolittle, Technical Support HP
J. Fontaine, Outage Duty HP
K. Haas, Director of Engineering
R. Margol, Chemistry Supervisor
J. McElrath, Senior Chemistry Engineer
T. Neal, Environmental Supervisor
T. Palmisano, Site Vice President and General Manager
J. Giebel, System Engineer
C. Plachta, Radiation Protection Manager, Radiological Services Supervisor
D. Rogers, General Manager Plant Operations
K. Schneider, Outage Duty HP
D. Smedley, Licensing Supervisor
G. Sturm, ALARA Coordinator
D. Watkins, Duty HP Supervisor

NRC

J. Lennartz, Senior Resident Inspector, Palisades
P. Prescott, Resident Inspector, Palisades

INSPECTION PROCEDURES USED

IP 83729 "Occupational Exposure During Extended Outages"
IP 92904 "Followup - Plant Support"

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-255/98009-01	NCV	Failure to label HEPA power cords to prevent inadvertent unplugging.
50-255/98009-02	NCV	Failure to barricade the high radiation area around the reactor head.
50-255/98009-03	NCV	Failure to comply with procedural and RWP requirements for entry into the high radiation area in the West Safeguards overhead.
50-255/98009-04	VIO	Failure to lock or guard Radiation Controlled Doors accessing areas with radiation levels in excess of 1000 mrem/h.
50-255/98009-05	VIO	Failure to comply with station procedural requirements for appropriate radiation protection practice.
50-255/98009-06	VIO	Failure to post the reactor cavity high radiation area.

Closed

50-255/97015-01	VIO	Failure to post the high radiation area in the Clean Waste Filter Transfer Room.
50-255/97015-02	VIO	Failure to be aware of dose rate levels prior to entry into a high radiation area.
50-255/97015-03	VIO	Failure to comply with radiological survey requirements.
50-255/97016-01	VIO	Failure to post the high radiation area in the waste gas surge tank room.
50-255/97010-01	IFI	Evidence of equipment leaks and poor housekeeping in radwaste treatment rooms.
50-255/98009-01	NCV	Failure to label HEPA power cords to prevent inadvertent unplugging.
50-255/98009-02	NCV	Failure to barricade the high radiation area around the reactor head.

50-255/98009-03	NCV	Failure to comply with procedural and RWP requirements for entry into the high radiation area in the West Safeguards overhead.

ACRONYMS USED

ALARA	As Low As Is Reasonably Achievable
CAM	Continuous Air Monitor
cfm	cubic feet per minute
CHPT	Contract Health Physics Technician
Ci	curie
C&RS	Chemical and Radiological Services
CR	Condition Report
CT	Chemistry Technician
DAC	Derived Air Concentration
ED	Electronic Dosimeter
EDL	Entry Dose Limit
EPRI	Electric Power Research Institute
HEPA	High Efficiency Particulate Air
HP	Health Physics
HPT	Health Physics Technician
HRA	High Radiation Area
ICI	In-Core Instrumentation
IFI	Inspection Followup Item
MIS	Management Information System
MOP	Management Observation Program
mrem	millirem
mR	milliroengten
mR/h	milliroentgen per hour
NCV	Non-Cited Violation
NDT	Non-Destructive Testing
PC	Protective Clothing
PCI	Personnel Contamination Incident
PCS	Primary Coolant System
ppm	parts per million
psig	pounds per square inch gauge
R/h	Roentgen per hour
RCA	Radiologically Controlled Area
RCD	Radiation Controlled Door
RMS	Remote Monitoring System
RP	Radiation Protection
RWP	Radiation Work Permit
TEDE	Total Effective Dose Equivalent
TS	Technical Specifications
TSR	Temporary Shielding Request
UGS	Upper Guide Structure
VCT	Volume Control Tank
VIO	Violation
WGST	Waste Gas Surge Tank