

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/86002(DRSS)

Docket No. 50-255

License No. DPR-20

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palisades Site, Covert, MI

Inspection Conducted: January 7-10, 23-25, 29 and 30, and February 28, 1986

Inspectors: C. F. Gill *C.F. Gill*

3/14/86
Date

W.B. Grant

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3/14/86
Date

D.E. Miller

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3/14/86
Date

Approved By: *L.R. Greger*
L. R. Greger, Chief
Facilities Radiation
Protection Section

3/14/86
Date

Inspection Summary

Inspection on January 7-10, 23-25, 29, and 30, and February 28, 1986 (Report No. 50-255/86002(DRSS))

Areas Inspected: Unannounced inspection of the radiation protection program during a maintenance outage including: changes in organization, personnel, facilities, equipment, programs, and procedures; audits and appraisals; planning and preparation; training and qualifications of new personnel; internal and external exposure control; control of radioactive materials and contamination; surveys and monitoring; the ALARA program; open items; and licensee response to IE Information Notice No. 85-81. Also, a potential overexposure incident was reviewed, and a special inspection of the licensee's respiratory protection policy was made in response to a request by a worker's representative. The inspection involved 113 inspector-hours onsite by three NRC inspectors.

Results: One violation (failure to provide adequate radiation protection coverage for an entry into a high radiation area - Section 17) and no deviations were identified.

DETAILS

1. Persons Contacted

- D. Andersen, Lead QA Auditor
- +*C. Axtell, Health Physics Superintendent
- +*W. Beckman, Radiological Services Manager
- *N. Campbell, Senior Radiation Safety Supervisor
- *R. English, Corporate Health Physicist
- *H. Esch, Plant Administrative Manager
- *R. Fenech, Technical Engineer
- *D. Fitzgibbon, Licensing Engineer
- +*L. Kenaga, Staff Health Physicist
- *J. Lewis, Technical Director
- +*D. Malone, Licensing Engineer
- *D. Malone, ALARA Coordinator
- *R. McCaleb, QA Director
- *T. Neal, RMC Administrator

- *E. Swanson, NRC Senior Resident Inspector

The inspectors also contacted other licensee employees including radiation protection technicians and members of the engineering, maintenance, and human resources staffs.

*Denotes those present at the exit meeting on January 10, 1986.

+Denotes those present at the exit meeting on January 30, 1986.

2. General

This inspection, which began at 1:00 p.m. on January 7, 1986, was conducted to review the radiation protection program during a refueling and maintenance outage, including organization and management controls, qualifications and training, audits and appraisals, planning and preparation, internal and external exposure controls, ALARA program, control of radioactive material and contamination, open items, and IE Information Notice No. 85-81. Also, a potential overexposure incident was reviewed, and a special inspection was conducted of the licensee's respiratory protection policy in response to a request from a worker's representative. During plant tours, the inspectors noted no access control or apparent procedure adherence problems. Housekeeping was adequate and area postings were good.

3. Licensee Actions on Previous Inspection Findings

(Closed) Open Item (255/85004-03): Review frequency and requirements for at-power containment entries. The licensee has completed this review and instituted a repair and maintenance program in an attempt to reduce the frequency of future at-power containment entries.

(Open) Open Item (255/85010-01): Review technical specification change request concerning the organizational position of the Radiation Protection Manager (RPM). As discussed in Inspection Report No. 50-255/85010, the

licensee's technical specification change request dated January 11, 1985, states that the RPM, as defined in Regulatory Guide 1.8, will be either the Radiological Services Manager, the Health Physics Superintendent, or a Radiation Safety Supervisor. In response to inspector concerns regarding the potential appointment of a radiation safety supervisor as the RPM and the incorrect use of the Health Physicist title in Technical Specification 6.3.2, the licensee agreed to modify the change request as documented by a licensee internal memorandum dated October 4, 1985. This item remains open pending NRR resolution.

(Open) Open Item (255/85019-01): Take steps to prevent future flooding of the south radwaste building due to cooling tower overflow events. The licensee has initiated an engineering study which is scheduled for completion by June 30, 1986.

4. Changes

The inspectors reviewed changes in organization, personnel, facilities, equipment, programs, and procedures that could affect the outage radiation protection program.

During this outage, the station radiation protection technicians (RPTs), crewleaders, and duty health physicists are providing continuous coverage, seven days per week, by working twelve-hour days, five days per week. Four station RPTs are assigned as containment rovers on each shift. The containment rovers' duties include job coverage for station employees and monitoring the performance of contracted technicians. This scheme, combined with tours by RCT foremen, health physicists, and the ALARA Coordinator, appears to provide adequate oversight of contracted technician activities.

These changes appear to benefit the licensee's outage radiation protection program by providing the needed radiation protection coverage on all shifts and better oversight of contractor activities.

No violations or deviations were identified.

5. Radiation Protection Staff Stability

Radiation protection staff stability remains poor. All 25 station RPT positions are filled; however, seven RPTs were hired just before this outage. According to licensee personnel, these new employees are given duties commensurate with their experience, training, and qualifications; some contracted RPTs will remain after the outage until the recently hired station personnel are fully qualified. After the new employees are qualified, the number of station RPTs should be adequate to run a radiation protection program at a single unit PWR. Palisades, however, has a poor operating and radiological plant conditions (number of leaks and contaminated areas) record. This places a greater work load on the radiation protection staff, which necessitates a larger staff size. Until the material condition of the plant improves, and the experience level of new employees increases, it appears desirable for the station staff to remain augmented by contracted technicians.

The professional health physics staff of the Radiation Services Department (RSD) continues to undergo minor reorganizations, including: the Corporate Health Physicist is now part of the Corporate Nuclear Assurance Department; the dosimetry group has been relocated to corporate headquarters; an additional Senior Emergency Planning Coordinator position has been added to deal primarily with emergency notifications; and an additional Radiation Safety Supervisor position has been added to deal primarily with area surveys and postings. A significant portion of the professional health physics staff are relatively new to their positions at Palisades; however, in general, the background and experience of the staff seems sufficient to develop and maintain an effective radiation protection program.

No violations or deviations were identified.

6. Planning and Preparation

The inspectors reviewed the outage planning and preparation performed by the licensee, including: additional staffing, special training, increased equipment supplies, and job related health physics considerations.

The station's radiation protection group is augmented with 98 contracted radiation protection personnel for the outage. This includes one site coordinator, three crewleaders, 78 senior technicians, and 16 junior technicians. In part, because the licensee changed contractors for this outage, the ratio of junior to senior technicians was kept low. The new contractor was also able to supply a significant number of senior technicians who had been employed at the station by the previous outage contractor. The inspectors verified that those technicians not meeting ANSI N18.1-1971 selection criteria were not providing radiation protection duties without proper supervision. The effectiveness of the outage radiation protection program was also enhanced by 18 contracted workers who provided continuous containment decontamination services and 12 contracted workers who issued protective clothing and aided station personnel in the areas of exposure tracking and dosimetry.

Preoutage special training provided to station and contract workers includes mock-up training for certain high exposure work, ALARA briefings for each work group, and RWP program training. No problems were noted in this area.

The supplies of portable survey instruments, portable ventilation equipment, respiratory protection equipment, and protective clothing appear adequate for the outage.

Evidence that job planning and preparation is influenced by radiation protection includes containment decontamination and shielding prior to allowing outage work to begin, and radiation protection and ALARA participation in all planning and outage meetings.

No violations or deviations were identified.

7. Training and Qualifications of New Personnel

The inspectors reviewed the education and experience qualifications of new plant and contractor radiation protection and chemistry personnel, and training provided to them. Radiation protection training provided to other contractor personnel was also reviewed.

Training and qualifications of selected contractor radiation protection technicians were reviewed including conformance to ANSI N18.1-1971 selection criteria and regulatory Guides 1.8 and 8.27; no problems were noted. Senior technicians appear to meet or exceed the technician selection criteria in ANSI N18.1-1971. Junior technicians appear to have training and experience commensurate with their assigned duties. After selection, contract technicians are required to complete three days of general employee and site specific radiation protection training. Written and oral exams, and practical factors qualification are required. Selected training records were reviewed; no problems were noted.

No violations or deviations were identified.

8. External Exposure Control

The inspectors reviewed the licensee's external exposure control and personal dosimetry programs, including: changes in program to meet outage needs; use of dosimetry; planning and preparation for maintenance and refueling tasks including ALARA considerations; and required records, reports, and notifications.

Exposure records of plant and contractor personnel for May through November 1985, were selectively reviewed. No exposures greater than 10 CFR 20.101 were noted. Total exposure for 1985 was about 600 person-rems. A computer printout of worker doses is generated on a daily basis during routine operations and updated every shift during outages; a health physicist reviews these dose printouts. The licensee investigates exposures when either the primary or the secondary dosimeters are above 250 mrem and differ by greater than 25 percent. An investigation is conducted, a discrepancy report is written, a dose assessment is made, and an appropriate dose is assigned.

No violations or deviations were identified.

9. Internal Exposure Control

The inspectors reviewed the licensee's internal exposure control and assessment programs, including: changes to procedures affecting internal exposure control and personal exposure assessment; determination whether engineering controls, respiratory equipment, and assessment of individual intakes meet regulatory requirements; planning and preparation for maintenance and refueling tasks including ALARA considerations; and required records, reports, and notifications.

Whole body counting data, respiratory protection records, MPC-hour determinations, and air activity surveys for May 1985, to date, were selectively reviewed; no problems were noted.

The inspectors observed respirators being issued to ensure that procedures for verification of medical qualifications and mask fit test were followed; the technician on duty knew the requirements for issuing respirators, and the technicians stated that the practice of the worker leaving his Respiratory Protection qualification card as collateral when issued a respirator has been working well.

The inspectors discussed the routine and special air sampling program with radiation safety representatives. In general, the licensee appears to adequately sample air for RWP requirements. Air samples are normally analyzed for beta and gamma activity with ten percent also analyzed for alpha activity. Air samples taken from the reactor cavity or the steam generators are always analyzed for alpha, beta, and gamma activity. An isotopic determination is made of samples showing greater than 25 percent of beta-gamma or 10 percent of alpha MPC. No problems were noted.

No violations or deviations were identified.

10. Control of Radioactive Materials and Contamination

The inspectors reviewed the licensee's program for control of radioactive materials and contamination, including: adequacy of supply, maintenance, and calibration of contamination survey and monitoring equipment; effectiveness of survey methods, practices, equipment, and procedures; adequacy of review and dissemination of survey data; and effectiveness of methods of control of radioactive and contaminated materials.

The inspectors observed workers entering and exiting the radiologically controlled area (auxiliary building) on the 611-foot elevation. Workers entering the radiologically controlled area appeared to read and be familiar with the RWP they were working on. Questions about working condition, radiation levels, and protective clothing were asked by workers and answered by the duty HPs. Respirators, when required, were issued in accordance with established procedures. Workers exiting the radiologically controlled area appeared to use the friskers with diligence and according to acceptable techniques. Workers with contamination were assisted by HPs and the low levels of contamination found were removed using acceptable methods. No problems were noted.

The inspectors also observed workers entering, exiting, and working in the containment. Workers in containment appeared to be observing RWP conditions and wearing required protective clothing. Work practices were good and in compliance with RWP radiological conditions. Workers exiting containment used acceptable techniques for protective clothing removal and frisking. No problems were noted.

The inspectors selectively reviewed records of routine and special radiation and contamination surveys conducted during the outage to date. All surveys, routine and special, are reviewed by the duty HP for completeness and any unusual conditions. No problems were identified.

Although the laundry facility appeared able to adequately meet the outage demands for decontaminated (laundered) protective clothing, several problems were noted, including: (1) several times during this outage, both laundry drain tanks were filled at the same time, necessitating the closure of the laundry for up to five hours while the liquids in the tanks were sampled, analyzed, evaluated, and released; (2) during a plant tour, inspectors noted that the large contaminated protective clothing bin was filled to overflowing and housekeeping within the laundry facility was poor; (3) contaminated canvas shoecovers apparently were inadvertently mixed with decontaminated shoecovers and issued for use, resulting in the spread of contamination outside the radiologically controlled areas; and (4) as of January 10, 1986, the laundry monitor had been inoperable for several years resulting in the use of a station procedure for hand frisking folded protective clothing using a 3 mR/hr acceptance criterion rather than the unfolded, full-surface laundry monitor acceptance criterion of 1 mR/hr. The inspector discussed with licensee representatives the importance of an efficient laundry facility and the need for the proper decontamination of protective clothing to reduce the potential for personal contamination due to "fixed" contamination on protective clothing.

No violations or deviations were identified.

11. Maintaining Occupational Exposures ALARA

The inspectors reviewed the licensee's program for maintaining occupational exposures ALARA, including: changes in ALARA policy and procedures; ALARA considerations for maintenance and refueling outage; worker awareness and involvement in the ALARA program; and establishment of goals and objectives, and effectiveness in meeting them. Also reviewed were management techniques used to implement the program and experience concerning self-identification and correction of programmatic weaknesses.

The inspectors reviewed the ALARA organization, the qualification and experience of its members, and the effectiveness of the organization in continuing to institute dose saving programs during outages. The professional ALARA staff consists of an ALARA coordinator and four degreed technicians, all of whom seem to have the proper qualifications, experience, expertise, and dedication to establish and maintain an effective ALARA program. The location of the ALARA group in the station organization, consideration of ALARA principles by other station groups and departments and their working relationship with the ALARA group, management involvement, and the types and number of workers assigned to meet ALARA goals also seem conducive to the establishment of an effective ALARA program. A review of the person-remS expended during this outage compared to similar tasks during the previous outage indicates that, except for extenuating circumstances, the licensee has learned well from past experience and has realized significant dose savings by establishing and diligently maintaining an effective ALARA program. The ALARA group has recently compiled an extensive job history file for 140 tasks. This file contains the pre-job planning and preparation work records, including all RWPs and post-job ALARA meeting notes discussing dose savings lessons learned. The proper use of this file in pre-job planning and preparation should result in an overall reduction in personnel exposure for future similar tasks.

The licensee has established ALARA goals for 1985 including overall station and individual working group goals for total dose. The licensee's station goal for total dose in 1985 was 400 person-rems, considerably less than the average over the preceding five years of about 600 person-rems. However, because of unscheduled maintenance and underestimation of exposure for specific tasks between outages and during this outage, the total dose for 1985 was about 600 person-rems. The 1986 goal is 400 person-rems.

In addition to the exposure goals outlined above, it was a station goal that no individual receive more than 5 rems during 1985. This goal was met in 1985 and remains a goal for 1986.

The station's 1985 ALARA program did not include provisions for dose reduction by minimizing contaminated areas. The inspectors reviewed monthly contaminated area survey data for the auxiliary building from June to December 1985. During this time period, the percentage of the auxiliary building designated as contaminated increased from 37 to 61 percent. Plant tours and interviews with station personnel indicate that this increase in contamination is due to several factors, including: (1) a large number of minor equipment, component, and process leaks which remain unrepaired because of a large maintenance backlog; (2) recurrence of leaks after repair, which may indicate maintenance or surveillance program problems; and (3) a too small, and undertrained, decontamination staff. The station is required by Confirmatory Action Letter (CAL-RIII-85-15) to significantly reduce the maintenance backlog before startup; this should include the repair of most of the auxiliary building minor process liquid leaks; these leaks should remain repaired if the maintenance and surveillance program is effective. The present auxiliary building decontamination crew consists of two upgraded janitors who also have other duties to perform. According to licensee personnel, the 1986 proposed budget includes a proposal for three more decontamination crew positions. A proposed 1986 station ALARA goal will, if met, reduce auxiliary building contaminated areas by at least fifty percent and to maintain them at that level even during outages. It appears that this goal is achievable only if the minor leaks are repaired; the equipment in the cubicles properly maintained; and a dedicated, adequately trained and qualified crew of sufficient size is assigned to auxiliary building decontamination. The attainment of this ALARA goal is highly desirable. This matter will be reviewed further during a future inspection. (255/86002-01).

No violations or deviations were identified.

12. Audits and Appraisals

The inspectors reviewed reports of audits and appraisals conducted for or by the licensee including audits required by technical specifications. Also reviewed were management techniques used to implement the audit program, and experience concerning identification and correction of programmatic weaknesses.

The licensee's radiation protection/chemistry program receives audits, surveillances, appraisals, and activity inspections from several organizations, including INPO, station quality assurance and quality control, and corporate health physics and quality assurance. The last INPO audit was in September 1985, and the next is expected in September 1986. Corporate health physics has an ongoing program involving a number of onsite oversight reviews each year on specific topics. The station Quality Assurance Department has a comprehensive surveillance program and often assists the quality control inspectors during activity inspections. Corporate quality assurance audits are on an annual basis. The licensee audit surveillance and appraisal programs appear adequate to assess technical performance, compliance, and personnel qualification and training in the areas of radiation protection, plant chemistry, radwaste, and transportation. The licensee's responses to audit findings are in general, thorough, timely, and technically sound. No problems were noted during the selected review of audit and surveillance reports and the responses to recommendations, findings, observations, and deviations.

The inspectors also reviewed the qualification of the Quality Assurance (QA) auditors and Quality Control (QC) inspectors in the area of radiation protection. A review of the corporate QA audit records indicate that the majority of the auditors are well qualified; radiation protection specialists from Palisades and Big Rock Point often take part in audits of each other's facility. It was also noted that the lead QA auditor and the lead QC inspector at Palisades who audit radiation protection are well qualified for the station surveillance and activity inspection program.

No violations or deviations were identified.

13. Facilities and Equipment

The inspector toured radiation protection facilities, observed radiation protection equipment in use, and discussed plans for improving access control facilities and equipment with the health physics staff.

The station's access control facility has undergone a major refurbishment. The access control window has been replaced by a 14-foot counter which greatly facilitates communication and efficiency. With few exceptions, the dose card system has been replaced by a computerized Management Information System (MIS) for access, exposure, and other data processing. The MIS is an interactive system which, in part, verifies identification, RWP confirmation, allowable administrative dose, and additional dose before the secondary TLD must be read. The former frisker and inefficient portal monitors have been replaced by a new whole body frisking policy (eight frisking stations) and more efficient portal monitors. In addition, the access control frisking and protective clothing change areas have been tripled in size.

An additional dryer was installed in the laundry facility in October 1985, and two additional dry cleaning units were installed in the feedwater purification building just before the outage. Although this added equipment appears adequate to handle outage laundry, some problems with the use of

the facility are discussed in Section 10. It is station policy to wet-wash protective clothing which measures up to 10 mR/hr and to dry clean the more contaminated items. This policy appears to overload the wet-wash facility and under utilize the dry cleaning facility.

When the Midland project was cancelled, Palisades acquired some of their radiation monitoring equipment including 14 air samplers, 10 friskers, 19 survey meters, and an intrinsic Germanium detector. The acquisition of this equipment assured that the supply of radiation monitors for the outage was adequate. The station has had previous difficulty, as described in the latest annual corporate QA audit, maintaining the operability of certain survey instruments and continuous air monitors; therefore, the additional equipment supplied a sufficient safety margin.

In a letter dated September 30, 1985, the licensee informed the Regional Administrator that the corrective actions discussed in their letter dated June 20, 1985, in response to a violation (255/85010-04), were completed and full compliance achieved by September 30, 1985. In addition, the licensee stated that a door lock will be installed on Door 168 to prevent all egress from the Auxiliary Building with the exception of emergencies or preplanned evolutions. The inspectors verified that the licensee had completed the physical installation of the locked door.

No violations or deviations were identified.

14. Radiological Incident Reports (RIRs)

Radiological Incident Reports are written for violations of 10 CFR 20 or Palisades Radiation Protection Procedures. Forty-Seven RIRs were written at the station for 1985, and two have been written to date in 1986. RIRs were reviewed for significance, corrective actions, and timeliness of corrective actions. The reports appeared to have adequate and timely corrective action. Disciplinary action was taken on one occasion.

The inspectors reviewed RIR 86-01 regarding a worker who alarmed the portal monitor at the security building exit and continued on through. The worker was followed by several other workers who also exited through the alarming portal monitor. In an attempt to prevent recurrence, the licensee has stationed a health physics technician at the security building portal monitor during normal quitting times to reset alarming monitors and to assist workers in frisking themselves should they alarm the monitors.

No violations or deviations were identified.

15. IE Information Notice No. 85-81

The inspectors reviewed licensee action taken in response to IE Information Notice No. 85-81 concerning problems resulting in erroneously high readings with Panasonic 800 Series Thermoluminescent Dosimeters. Health physics personnel were aware of the contents of this notice. Procedures are being reviewed and will be revised if necessary to prevent this situation at Palisades. No problems were noted.

16. Special Inspection Regarding the Respiratory Protection Policy

In a letter dated October 22, 1985, the Recording Secretary, Local 150, Utility Workers Union of America, A.F.L.-C.I.O. requested that Region III conduct an inspection at the Palisades Nuclear Power Plant because of alleged violations of 10 CFR 20.103 with regard to the use of respiratory protection devices instead of implementing adequate engineering controls. In accordance with 10 CFR 19.16(a), a copy of the October 22, 1985 letter was provided to the licensee during the inspectors' entrance meeting on January 7, 1986. The two union members, whose names appear in the October 22, 1985, letter stated to the inspectors that they did not object to the release of their names to the licensee. A union member was involved in discussions and communications between the licensee and the NRC during this inspection.

During this inspection, an inspector met privately with a union representative (per 10 CFR 19.15) to obtain the details of specific allegations and concerns, interviewed members of the licensee's Radiological Services Department with regard to the specific allegations and concerns, and met together with a union representative, the Health Physics Superintendent, the Senior Radiation Safety Supervisor, and the ALARA Coordinator to discuss the union representative's allegations and the licensee staff response to the allegations.

Allegation:

According to the union representative, a September 26, 1978 memorandum from the Vice President of Consumers Power Company to all employees who may be required to wear respiratory protection devices states: "Both Federal regulations and Company policy require that respirator use be minimized. To the extent that ventilation or other engineering controls can reduce airborne concentrations of radioactive material to a level below which respirators are needed, those methods will be used. Company policy further requires that devices which seal in areas not involving the face, such as hoods with air supplies, be used instead of face masks where practicable. Only when ventilation and hoods both cannot achieve the required reduction in radiation exposure from inhalation of radioactive material will affected employees be asked to wear devices which produce a seal in the facial area."

The union representative indicated that this 1978 policy statement had not been properly implemented in recent years in that he did not believe adequate engineering controls were always used and worker requests for hoods with supplied air were sometimes denied in favor of face masks.

Licensee Response:

According to licensee representatives, the 1978 policy statement has been superseded; the current respiratory protection policy statement is contained in Section 5.2 of Health Physics Procedure No. HP 7.0, "Respiratory Protection Program," Revision 4, October 21, 1985. This policy statement is similar to the 1978 policy except that the criteria for selection of respiratory protection devices are not mentioned explicitly and provisions were added

to comply with the requirement of 10 CFR 20.103(c)(3) that the written policy on respirator usage contains a statement regarding period of respirator use and relief from respiratory use. The licensee representatives stated their engineering control and respiratory protection device selection criteria and answered many specific concerns and alleged examples of possible engineering control inadequacies raised by the union representative. The selection of engineering controls for a specific task is made by the ALARA Coordinator on the ALARA pre-job checklist, which is attachment 1 of Administration Procedure No. 7.02, "ALARA Program." The selection of required respiratory protection devices is made by the Duty Health Physicist in accordance with Health Physics Procedure No. HP 7.0, and the Duty HP enters the required engineering control/respiratory protection device on the RWP per Administrative Procedure No. 7.03, "Radiation Work Permit (RWP)." The inspectors reviewed these procedures; no problems were identified.

Discussion:

It appears that engineering controls are, in general, being used instead of respirators where practical, in accordance with 10 CFR 20.103 and the licensee's policy statement on respirator use. Neither that policy statement nor NRC regulations address use of hoods in place of face masks. No specific incident was brought to the inspectors' attention which indicated the licensee had violated their respiratory protection program policy statement or NRC regulations. However, members of the radiation protection staff should be more sensitive to the problem of respirator fatigue. The licensee should ensure that each respirator user is aware that they may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions, or any other condition that might require such relief. It is NRC policy that respiratory programs adequately limit the inhalation of airborne radioactive materials by application of practical engineering controls, keep respirator use duration to a minimum, and allow appropriate relief from respirator fatigue. A review of the licensee's whole body count records indicate that Palisades does not have significant internal contamination problems.

The communication of the management respiratory protection policy to the workers and the ALARA respiratory concerns of the worker to management appears to be weak. Although an ALARA problem form has been available to workers for several years, it reportedly has been used very sparingly. This matter was discussed with the ALARA coordinator and he agreed to increase his efforts to get better worker involvement in the ALARA program and to keep better records of ALARA concerns presented to the radiation protection staff by workers. The union representative was encouraged by the inspector and the ALARA coordinator to urge workers to use this existing system to express ALARA respiratory concerns.

No violations or deviations were identified.

17. Potential Overexposure Incident

The inspectors reviewed the licensee's investigation of the circumstances surrounding a potential radiation overexposure incident which occurred during a valve replacement operation in the purification filter room of the auxiliary building on January 21, 1986. The purification filter room is a high radiation area with some work areas of several hundred mR/hr and localized hot spots of several R/hr at contact. Upon completion of the above work activity, a worker's dosimetry devices indicated that he may have received an exposure as high as 4681 mrem. The inspectors reviewed the licensee investigation of this incident and the record of the investigation as reported in the Radiation Incident Report, conducted independent interviews with the workers involved in the incident, attended licensee meetings on the incident both as observers and participants, and accompanied licensee representatives during a verification radiation survey of the purification filter room.

On January 21, 1986, three plant workers (a welder, a welder's helper, and a radiation protection technician) entered the purification filter room to complete the installation of a replacement valve. The installation was completed by the welder within approximately 60 minutes with the assistance of the welder's helper and under the scrutiny of the contract radiation protection technician (RPT). Interviews by the inspectors and the licensee indicate that the welder and welder's helper were within view of the RPT almost continuously during the 60 minutes; however, after the welder and the RPT left the area, the welder's helper remained in the purification filter room, or its near vicinity, for approximately 30 minutes to clean-up the work area and act as a fire watch.

Each worker was supplied a 200 mrem Direct Reading Dosimeter (DRD), a 5 rem DRD, a primary TLD, and a secondary TLD. This dosimetry was placed in a zip-locked plastic bag which was taped to the chest of each worker. The RPT reportedly verified the proper placement of each worker's dosimetry and each worker stated that his DRDs were zeroed before entry into the radiologically controlled area (RCA). Upon exiting the RCA the workers recorded their DRD readings as 100, 250, and 200 mrem for the RPT, welder and welder's helper, respectively. Although the welder's helper noted that both his 200 mrem and 5 rem DRDs were above full scale, he stated that he reported his DRD exposure as 200 mrem because he believed the 5 rem DRD to be in error. Because station procedures require secondary TLDs to be read if the cumulative DSD exposure exceeds 150 mrem, the secondary TLDs were read at the station for the workers soon after they exited the RCA. The secondary TLDs indicated whole body doses of 93, 196, and 4681 mrem (average of two chips) for the RPT, the welder, and welder's helper, respectively. Because of the apparent overexposure of the welder's helper, he was immediately precluded from entering the RCA, his primary TLD was sent to the corporate headquarters for processing, a stop working order was issued forbidding further RWP work in the purification filter room, and an investigation into the incident was begun. The processed primary TLD for the welder's helper indicated 1995 mrem which represents the worker's cumulative dose for the quarter. Besides the large

discrepancy between the primary and secondary TLD readings, a steep dose gradient across the (four chips aligned in parallel) primary TLD badge was also noted. The resolution of these apparent anomalies were included in the licensee's subsequent investigation of the incident.

The inspectors attended a post-incident critique conducted by the licensee at 6:45 p.m. on January 22, 1986. In attendance were the corporate health physicist, plant health physicists and health physics manager, and the workers and technicians involved in the work in the purification filter room at the time. Based on the information presented at the critique, the licensee's investigation task force (corporate health physicist and members of the plant health physics managerial and supervisory staff) considered various scenarios which could account for the badge overexposure. The scenarios considered were: (1) the worker may have been subjected to an unidentified existing radiation field while in the purification filter room (Room 230 of the auxiliary building); (2) operation of the system(s) within the confines of Room 230 may have resulted in a temporary high radiation field to which the worker was exposed and which the RPT did not detect during the entry; (3) a "hot particle" may have attached itself to the worker's protective clothing in close proximity to his dosimetry package; (4) the worker and/or his dosimetry may have been exposed to a radiography or a calibration source; (5) the worker's dosimetry may have been exposed to a medical source of radiation when it was worn offsite; (6) someone else may have worn the workers dosimetry or may have "spiked" the worker's dosimetry; and (7) the worker may have intentionally "spiked" his dosimetry. The task force conducted extensive surveys and evaluations in their efforts to prove/disprove these scenarios. In particular, extensive efforts were made to eliminate the possibility of a previously undetected radiation source producing the dosimetry results, including several detailed surveys of Room 230 by radiation monitoring devices and TLD exposure studies and a thorough search for a "hot particle."

Based on the task force's evaluations, the various scenarios were eliminated except for the scenario of intentional "spiking" of the dosimetry. This conclusion was supported by data gathered by exposing test TLDs in Room 230 locations which were accessible to a zip-locked dosimetry package, but not to a person properly wearing the dosimetry on the chest. These data closely matches the dose gradient across the TLD badge recorded from the worker's dosimetry and the disparity between the primary and secondary TLD readings. In general, the inspectors found the licensee investigation to be thorough, conducted properly, and that the conclusions were reached in a logical manner. Independent interviews confirmed information gathered by the licensee's investigation task force. Also, licensee radiation surveys and special dosimetry studies of the purification filter room appear to be accurate, complete, and consistent with the results of surveys conducted in the room before the entry during which the apparent overexposure occurred. One inspector observed licensee representatives during a verification survey and confirmed the thoroughness of the survey and that the licensee accurately recorded the results.

After several meetings between licensee management and all parties involved in this incident, and presentation of investigation results to union officials, the welder's helper admitted that he had "spiked" his dosimetry when he was left alone in the purification filter room on January 21, 1986.

On February 28, 1986, an inspector interviewed the welder's helper, who had recently returned to work at his base work station after disciplinary time off without pay. The helper stated that when he was left alone in the purification filter room on January 21, 1986, he removed the dosimetry pouch from his chest and placed it behind lead shielding near the drain line for purification filter F-54A. According to the helper, he left the pouch there for about 15 minutes. He indicated that his actions were motivated by his desire to be assigned to another work location, preferably closer to his base work station (and his home) and with less overtime. (He indicated he had been working 12 hour days for several months.)

Based on a review of the inspectors and licensees investigation and the results of test dosimetry placed near the drain line, the welder's helper's description of the incident appears plausible.

The licensee estimated the actual whole body dose received by the welder's helper during the January 21, 1986, purification filter room work to be 200 mrem. Appropriate initial corrective action was taken by the licensee in this matter. Long term corrective actions will be reviewed during a future inspection.

During the licensee's investigation of the incident, a number of problems associated with this particular entry into Room 230 were identified by the licensee, including the procedural violations noted below. Corrective actions for these procedural violations will be reviewed during a future inspection. (255/86002-02)

- Health Physics Procedure 2.14 Section 5.3.e and Table 4 paragraph 5 states that air sampling is required: "When respirators are used for protection against the resuspension of radioactive material. . . ." Table 4 paragraph 1 states that air sampling is required: ". . .during radioactive work which is known to cause or is expected to cause airborne radioactivity." During the entry into the purification filter room on January 21, 1986, to weld valve CV-2056, no air sample was obtained.
- Palisades Administrative Procedure 7.03 Section 5.2.c states: "Changes in job scope should be evaluated by a Radiation Safety Supervisor and a determination made by him if the RWP is to be revised. . . ." On December 27, 1985, a change in job scope on RWP 851127 was made without an evaluation by a Radiation Safety Supervisor.
- Palisades Administrative Procedure 7.03 Section 7.3.a states Radiation Safety personnel shall: "Observe Sign In Sheet procedures for each specific RWP worked on dedicated coverage."

No record can be found that the health physics technician providing dedicated coverage signed the Sign In Sheet for RWP 851127.

- Palisades Administrative Procedure 7.04 Section 6.4.a states: "Personnel exiting the Protected Area on a routine daily basis shall. . . leave their dosimetry in the designated storage rack." On January 22, 1986, a worker was observed to have taken his Primary TLD off site during a lunch break.

Although not specifically identified by the licensee as procedural violations, several other concerns were identified by the licensee during the investigation of this incident which may be indicative of programmatic problems, including: several irregularities existed in the radiation work permit (RWP 851127) used for the valve installation work in Room 230; the post-incident survey sheet listed a non-existent RO-2A as the instrument used for the survey; the instrument used for the above survey was not signed out in the log book at access control; the worker did not notify Health Physics personnel that his 5 rem DRD was reading full scale; the RPT did not periodically check the dosimetry of the workers during the work in Room 230; several general concerns were identified with the TLD storage rack location and the ready access workers have to each other's TLDs; and several items of concern were raised regarding the adequacy of General Employee Training (GET), house and contract RPT training, and the Radiological Services Continuing Training Program. These matters will be reviewed further during a future inspection. (255/86002-03)

One additional regulatory problem was identified; this problem was identified by the NRC inspectors. The worker who admitted "spiking" his dosimetry was left unsupervised and unattended by the RPT at the end of the job. The stated purpose of the worker remaining in the room was to clean up the area and act as a fire watch. The length of time that the worker was not under the scrutiny of the RPT has been estimated by the licensee's investigation task force to be approximately 30 minutes. During this time, the worker was not issued radiation monitoring devices as specified by Technical Specification 6.12.1. Failure to provide either specified radiation monitoring devices or adequate RPT radiation protection coverage for an entry into a high radiation area, the purification filter room in this case, is a violation of Technical Specification 6.12.1. (255/86002-04)

One violation and no deviations were identified.

18. Exit Meeting

The inspectors met with licensee representatives (denoted in Section 1) on January 10, and 30, 1986. The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary.