U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/92008(DRSS)

Docket No. 50-255 License No. DPR-20

Licensee: Consumers Power Company
Palisades Nuclear Generating Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: February 6 through 20, 1992

Inspector: W Snell for A. W. Markley 3/20/92
Senior Radiation Specialist Date

W Snell for D. G. Nelson 3/20/92
Radiation Specialist Date

Accompanying Inspector: S. K. Orth

William Snell
Approved By: William Snell, Chief 3/20/92
Radiological Controls Section Date


Inspection Summary

Inspection on February 6 through 20, 1992 (Report No. 50-255/92008(DRSS))
Areas Inspected: Special, announced inspection of the radiation protection, radwaste and transportation programs, including: management controls and training for contract radiation protection technicians, solid waste and transportation (IP 83750, 84750, 86750). Also reviewed was an unresolved item associated with radioactive waste processing and storage facilities (IP 84750, 86750).
Results: One violation associated with a spent fuel rack shipment was identified. The violation was for a failure to establish a 24-hour emergency response telephone number which was monitored at all times and a failure to document this number on the shipping papers.

A follow up evaluation of the radioactive waste processing and storage facilities resulted in the identification of four additional examples of failures to perform a safety evaluation in accordance with 10 CFR 50.59 for which a previous Notice of Violation had been issued.

## DETAILS

1. Persons Contacted

@ P. Bruce, Safety Evaluation Coordinator
# N. Campbell, Senior Health Physicist
*#@ P. Donnelly, Director, Safety and Licensing
# J. Fontaine, Senior Health Physicist
*# M. Grogan, Radwaste Coordinator
*#@ K. Haas, Radiological Services Manager
# J. Hadl, Senior PA Consultant
@ C. Hillman, Licensing Coordinator
# R. Kasper, Maintenance Manager
# L. Kenaga, Health Physics Superintendent
*#@ J. Kuemin, Licensing Administrator
# P. Loomis, Performance Specialist
# D. Malone, ALARA Supervisor
# R. McCaleb, NPAD Specialist
M. Mennucci, Senior Health Physicist
#@ T. Neal, Radioactive Materials Administrator
# K. Osborne, System Engineering Manager
# T. Palmisano, Administration and Planning Manager
# R. Philips, NECO Engineering Programs
# T. Popp, General Health Physicist
# R. Rice, Operations Manager, Acting Plant Manager
# D. Rogers, Training Administrator
# P. Rigozzi, ES Training Administrator
* G. Slade, Plant Manager
# K. Toner, Manager, Electrical, I&C, and Computer Engineering

J. Heller, Senior Resident Inspector
* @ R. Roton, Resident Inspector

The inspectors also interviewed other Licensee and contractor personnel during the course of the inspection.

* Denotes those present at the interim exit meeting on February 6, 1992.

# Denotes those present at the interim exit meeting on February 14, 1992.

@ Denotes those present at the telephone exit meeting on February 20, 1992.

2. General

This inspection was conducted to review a transportation incident involving the shipment of a spent fuel storage rack, review the licensee's evaluation of an NRC identified unresolved item regarding the implementation of general design criteria for radioactive waste processing and storage facilities, and radiation protection and ALARA preparations for a scheduled refueling and maintenance outage. The inspection included tours of radiation controlled areas, containment, auxiliary building, radwaste facilities, observations of licensee

activities, review of representative records and discussions with licensee personnel.

3. Spent Fuel Storage Rack Transportation Incident

a. Event Chronology

During the 1981 time frame, this spent fuel storage rack was placed in the Spent Fuel Pool. As reported by the licensee, this rack was not used to store spent fuel. In 1982, the rack was removed from the pool, hosed down with clean water, wrapped in plastic, crated and stored in an upright position at the East Radwaste Building (ERW). Prior to February 5, 1992, the licensee had made arrangements with the Quadrex Recycle Center in Oak Ridge, Tennessee to ship the rack to their facility for decontamination, volume reduction and eventual salvage. Quadrex agreed to provide a specially designed sea/land container for the shipment.

On the morning of February 5, 1992, radwaste personnel readied the rack for loading into the sea/land container. The rack was rotated from a vertical to a horizontal position. During the maneuver, however, the weight of the rack (26,000 pounds) put a strain on the wooden crate which caused the bottom of the crate to detach. At this time, workers noticed that a small amount of water was leaking from the open end of the crate. The water appeared to come from the front or top of the rack. Samples of the water were frisked and placed in a PCM-1B portal monitor but no activity above background was detected. The licensee indicated that water continued to drip from the rack for approximately 10 - 15 minutes. The rack was held in position for an additional hour after the dripping had stopped. The carrier's driver arrived during this period and noticed that water had leaked from the rack and that the rack was being allowed to drain.

The inside of the sea/land container was equipped with a heavy duty tarp which completely covered the back, sides and bottom of the container. The front section of the tarp was a flap type device similar to a tent opening. The flap was secured to the top of the container but had openings at both front corners. The licensee placed approximately 200 pounds of Spedi-Dry absorbent over the bottom of the sea/land container and set the crated rack into the container. The bottom of the crate was not reattached and was left in the licensee's ERW. The lid was placed on the sea/land container, the flaps secured and shipping papers completed and distributed. The loaded truck left the Palisades Plant at approximately 12:00 PM Eastern Standard Time.

Approximately an hour later the truck driver pulled into a Sawyer, Michigan truck stop for lunch. Upon returning from lunch, the driver noticed that approximately two to three gallons of water had leaked from the sea/land container onto the flatbed, the tires and onto the truck stop parking lot. The driver immediately called his dispatcher and requested the truck stop management notify the local authorities that a spill had occurred. The driver indicated that

his dispatcher accepted responsibility for notifying the licensee. The dispatcher was unable to make contact with the licensee's radioactive materials coordinator. The driver's "Instructions to Carrier" did not specify a telephone number to call in the event of an emergency or the name of an individual to contact in the event of an emergency. The dispatcher also did not have the driver's instructions regarding proper actions to take in the event of an emergency. The dispatcher was able to contact the receiver, Quadrex, regarding the spill. Truck stop management called the local police who in turn contacted the State Of Michigan and the Donald C. Cook Nuclear Power Plant. The local police apparently understood that the shipment had originated from the Donald C. Cook Plant. Licensee personnel at Palisades learned of the spill at 2:35 PM when a Quadrex employee called the plant to confirm that a spill had occurred.

By approximately 2:30 PM, the Berrien County Emergency Response Team had arrived on the scene and had roped off the area surrounding the truck. Also present were several members of the local sheriff's office, a Radiation Safety Team sent from the Donald C. Cook plant and several reporters from the local press. The Palisades Radwaste team arrived at 3:40 PM and immediately began to clean up the spill and collect samples for analysis. These samples were analyzed at both the Donald C. Cook laboratory and the Palisades laboratory. The truck, tires and collected liquids were all surveyed and found free of activity. Preliminary results were immediately reported to the NRC by Palisades personnel.

At approximately 5:00 PM, the results of "no detectable" activity above background were received based on the laboratory analysis conducted at the Donald C. Cook plant and reported to all the parties involved. At this point, the Berrien County Emergency Response Coordinator released the truck to return to Palisades. The Radwaste team prepared the load for the return trip to Palisades. The sea/land container door seams were taped. This area was covered with plastic sheeting which was fastened to the shipping container. Absorbent towels were placed inside the plastic sheeting to absorb any residual leakage. At 6:30 PM, the truck arrived at Palisades and was secured inside the fenced area of the ERW.

The next morning, February 6, 1992, radwaste personnel noticed that small amounts of ice had formed on the trailer near the front door of the sea/land container and the absorbent towels placed around the door were very wet. At 11:30 AM, two NRC inspectors arrived on site to investigate the incident, collect samples for analysis and take surveys of the truck, bed and tires. At approximately 12:00 PM, the lid of the sea/land container was removed. The bottom of the container had several areas of standing water and pockets of wet Spedi-Dry.

Approximately two and a half liters of water were collected. Subsequent analysis of all water samples, Spedi-Dry samples and smears displayed a similar pattern. Water samples showed Co-60 activity of up to 2.56E-6 uCi/ml and Cs-137 activity of up to

9.08E-6 uCi/ml inside the sea/land container. These levels are low enough to qualify for release to the environment per NRC regulations and low enough that the water is not considered radioactive material per DOT regulations. Smear survey results indicated that no radioactive contamination was found on the exterior of the shipping container. One smear, taken on the lower support piece of the rack indicated approximately 12,800 dpm/100 square centimeters. Analyses of the Spedi-Dry in the bottom of the shipping container indicated activities approximately 10 to 20 times higher than the activity of the water. There was little if any activity detected in the Spedi-Dry near the release points. The licensee's evaluation indicated that the Spedi-Dry filtered the water and concentrated the isotopes. The licensee's analyses of the leaking water outside of the shipping container indicated that no radioactive material leaked out of the package.

On February 8-9, 1992, licensee personnel inspected the rack to determine the source of the water. The rack was composed of a matrix of hollow spaces surrounded by approximately 50 individual cells that contain neutron absorbing material. Each cell had a vent hole drilled at the top. According to the licensee, these holes were drilled to vent gases while the rack was in the spent fuel pool. It appears that water entered the cells and little if any evaporation occurred following removal from the pool. Since the rack was stored in an upright position, the contained water appears to have remained undetected. However, after the rack was turned horizontal for shipping, it appeared that air entered the cell and allowed some of the water to escape. Further examination showed that almost all of the vent holes had "rust smears" and several were blocked with debris. If the rack was subjected to mechanical shock and vibration, such as normally incident to transportation, it appears that this would significantly facilitate the release of water. The licensee confirmed this by placing the rack on its side with a slight downward angle, applying a mechanical shock and observing water leaking from several of the vent holes. They also heard sucking sounds from one of the cells followed by a relatively large discharge of water.

The licensee concluded that the rack cells must have partially filled with water while submerged in the spent fuel pool in 1981. When removed and stored in an upright position the rack was never allowed to drain. Licensee personnel estimate that the rack could have contained as much as 80-100 gallons of water.

b. Discussion of Leakage

Licensee personnel acknowledged that the shipment should not have been made when water was observed leaking from the rack. The licensee indicated that they have had several spent fuel rack shipments over the last ten years with no occurrences of leakage. Since the water that leaked out of the container was not radioactive, there was no radiological significance to this event. In addition, based on discussions with NRC Headquarters and DOT, it was determined that there was no violation related to the water leaking from the shipment since the water that leaked was not radioactive.

c. Emergency Instructions

In the licensee's "Instructions to Carrier" under "Emergency Instructions", the driver is instructed to notify his dispatcher, local and/or State police and the shipper if an emergency or accident occurs enroute. If conditions warrant, such as obvious leakage or apparent breach of a shipping container, the driver is also required to advise the shipper to notify the DOE Radiological Assistance Office. The document goes on to describe the kind of information to provide to all parties contacted and provide generic on-site emergency procedures.

The shipping papers did not identify an emergency number for contacting the shipper (licensee) or an emergency point of contact. The document did not instruct the driver to immediately identify the nature of the accident (radiological, chemical, etc) or how to handle a non-response from the switchboard. The driver called his dispatcher. The dispatcher accepted responsibility, according to the driver, for contacting the shipper. When the dispatcher called the licensee, he was advised that the radioactive materials shipping coordinator was unavailable. The dispatcher then notified the receiver (Quadrex) of the incident and reported that he had been unable to notify the shipper. At approximately 2:35 PM (EST) or about one and a half hours after the driver spotted the spill, Palisades was informed by the receiver that the spill had occurred.

The licensee has a procedure, HP 6.20, Radioactive Material Shipment - Nonwaste, which describes the actions required of the carrier during an emergency, required notifications, and the response required of Palisades personnel. Unfortunately, these instructions to the carrier were not included in the shipping documents. "In house" procedures detailing steps to be followed in the event of a shipping incident were never written. Responsible individuals and numbers where they could be reached were not assigned for radioactive material shipments. Procedures should have been written and utilized to respond to a transportation incident especially in light of the requirements set forth in 49 CFR Subpart G.

The licensee stated that they train all of their switchboard operators to respond to transportation incidents and have provided the operators with a notification form to be used in the event of an incident. The form lists seven pieces of information the operator must obtain before notifying plant management about the incident. The operators are then instructed to call one of the six individuals listed on the form and convey the information collected. The inspectors also noted that a form that listed contact personnel was out of date and included an individual who had transferred approximately two years earlier. The operator on duty the afternoon of February 5, 1992 remembers receiving the call from the shipping company. The individual asked to talk to the individual named as shipper. When told that this individual was unavailable, the caller hung up. The operator never knew that an accident had occurred until Quadrex called and asked for information on the "spill". The operator assumed that "spill" meant a chemical spill and transferred the called to the Chemistry Department who in turn notified the Radiological Services Department management.

The licensee failed to establish a 24-hour emergency response telephone number which was monitored at all times or was accessible to an individual who had comprehensive emergency response and incident mitigation information. The licensee also failed to document the emergency response/contact telephone number on the shipping papers. This is a violation of 10 CFR 71.5 and 49 CFR 172.604(a). (Violation 255/92008-02)

d. Corrective Actions

The licensee initiated corrective actions to address the causes of the spent fuel transportation incident and emergency instruction problems prior to completion of the inspection. The implementation of these corrective actions will be evaluated during a future inspection.

The corrective actions for emergency instruction problems include: (1) revising procedures to ensure adequate instructions for emergencies are provided to carriers of radioactive material shipments, (2) providing required emergency instruction information on shipping papers, (3) assigning a trained individual as the emergency contact, (4) requiring the emergency contact to wear a pager to ensure contact capability during transport of radioactive materials, (5) revising switchboard operator instructions, and (6) training designated emergency contact personnel regarding duties and requirements.

The corrective actions to address the causes of the spent fuel rack transportation incident included: (1) revising procedures to ensure that the radioactive material containers and materials are inspected for free standing liquids prior to transfer to storage or shipping, (2) providing additional instructions for performing container surveys, (3) requiring signed verification that a container does not contain free liquids, and (4) training responsible personnel to implement inspection requirements.

Two violations were identified.

4. Radioactive Waste Processing and Storage Facilities (IP 84750, 86750)

Inspection Report No. 50-255/91022(DRSS) dated November 29, 1991, identified and discussed a Notice of Violation for a failure to perform an adequate 10 CFR 50.59 evaluation regarding the reactivation of the South Radwaste Building (SRW) for radioactive material storage, and an Unresolved Item associated with apparent failures to implement general design criteria and Final Safety Analysis Report (FSAR) commitments for both the SRW and the East Radwaste Building (ERW). The inspectors reviewed the licensee response to the Notice of Violation and their evaluation of the Unresolved Item. In addition, the inspectors performed a detailed evaluation of the licensee's design basis documents, original and updated FSARs, pertinent regulations that were effective during the requisite time frames, Atomic Energy Commission (AEC) Safety Evaluation Reports, Regulatory Guides, Standard Review Plans, Integrated Plant Safety Assessment Report, I&E Circulars, Generic Letters, previous inspection

reports, and applications for a Full Term Operating License and for approval for disposal of radioactive materials in situ near the SRW. These documents were reviewed to determine the licensee's obligations to the General Design Criteria (GDC) of 10 CFR 50, Appendix A and the regulatory basis for evaluating the licensee's radioactive waste processing and storage facilities.

This review indicated that the licensee had committed in their original FSAR and subsequent request for a Full Term Operating License, to the "proposed GDC" issued by the AEC in 1967. Further review determined that the licensee had adequately addressed all applicable GDC for their radioactive waste and processing facilities while these activities were located in the auxiliary building and the radwaste addition to the auxiliary building. This included the seismic criteria that the licensee committed to implement for facilities that contained permanent processing equipment. These facilities and functions were described in the original FSAR and subsequent revisions. As such, the process of performing safety evaluations as defined in 10 CFR 50.59 was applicable to the radioactive waste processing and storage facilities.

This review also indicated that evaluation of applicable design criteria implementation for the radioactive waste processing and storage facilities at Palisades had been performed for initial licensing. The documentary evidence reviewed indicated that efforts since initial licensing had been focused on reactor safety.

As a result of NRC reviews, a review of the licensee's evaluation, interviews and discussions with the licensee, it was determined that the licensee failed to perform safety evaluations in accordance with 10 CFR Part 50.59 for the following activities:

a. The relocation of solid radioactive waste processing from the auxiliary building to the SRW building in 1978.

b. For temporary storage of radioactive waste in the ERW building. Temporary storage of radioactive waste commenced in this facility in 1980 and continues to the present.

c. For modification and expansion of the ERW building in 1988.

d. For the relocation of solid radioactive waste processing from the SRW building to the ERW building in 1988.

These are violations of 10 CFR 50.59. However, inasmuch as these violations are additional examples of failures in the licensee's program for which a previous 10 CFR 50.59 violation has been cited (Inspection Report 50-255/91022 (DRSS)), no Notice of Violation will be issued at this time. The licensee has initiated corrective actions as noted in their January 10, 1992 response to the previous Notice of Violation. These corrective actions will help determine the scope of radioactive waste processing and storage as well as radioactive material storage problems at Palisades. The licensee's evaluations of these facility changes must consider compliance with applicable regulatory requirements, such as 40 CFR 190, 10 CFR 20,

10 CFR 50, Appendices A and I, and 10 CFR 100. The licensee's evaluation addressing design criteria and guidance in response to the Notice of Violation were inadequate to address the four additional facility changes noted above.

No violations or deviations were identified.

5. Management Controls and Training for Contract RP Technicians (IP 83750)

The inspectors reviewed the licensee's management controls and training program for contract radiation protection technicians (CRPTs), including: selection of staff, training program requirements, testing of knowledge and skills, and verification of technician experience. The licensee has significantly upgraded its CRPT program since the completion of the Steam Generator Replacement Outage (SGRP). Procedures have been revised to specifically identify responsibilities for this program and to improve consistency of performance. The inspectors reviewed the resumes of technicians who were accepted for service by the licensee, the knowledge level examinations, and the efforts made by the licensee to verify CRPT qualifications. Overall, excellent performance was noted, particularly in the efforts made to verify the qualifications of CRPTs. The knowledge level (screening) test was also very good. The test was comprehensive and had a suitable range of difficulty in the types of questions utilized. Although the licensee provided the CRPTs with an equation sheet, the CRPTs did have to know how to apply and utilize this information. Three individuals failed the screening examination. Two of these individuals' employment was terminated. The remaining technician was evaluated and determined to be acceptable in accordance with the licensee's procedures.

No violations or deviations were identified.

7. Plant Tours (IP 83750, 84750)

The inspectors performed several tours of the containment, auxiliary building, radwaste facilities, and radiologically controlled areas (RCA). Housekeeping was generally very good. Personnel access and exit from the RCA was in accordance with procedures.

Good practices that were noted included: (1) utilization of a continuous play video in the dressout room that provided instructions on the proper technique for wearing protective clothing, and (2) utilization of a quiz during the logging in with the electronic dosimetry system. These questions covered specific radiological information identified on the radiation work permit (RWP). Failure to answer the question correctly resulted in termination of access to that RWP until the individual reread his RWP and answered the question correctly. One minor contaminated area posting problem was identified in the containment near the B reactor coolant pump. Licensee personnel implemented corrective actions for this upon notification.

No violations or deviation were identified.

8. Exit Interview (IP 86750)

The inspectors met with licensee representatives (denoted in Section 1) following the inspection on February 20, 1992, to discuss the scope and findings of the inspection.

During the exit interview, the inspectors discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. Licensee representatives did not identify any such documents or processes as proprietary. The following items were specifically discussed with the licensee.

a. The violation associated with the incident involving transportation of a spent fuel storage rack. (Section 3)

b. The additional examples of a violation associated with the failure to perform safety evaluations for the SRW and ERW buildings. (Section 4)