

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/87012(DRSS)

Docket No. 50-255

License No. DPR-20

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

Facility Name: Palisades Nuclear Power Plant

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: May 18-20, 1987

Inspector: *J. Patterson*
J. Patterson
Team Leader

6/9/87
Date

G. M. Christoffer
G. Christoffer

6/10/87
Date

Approved By: *W. Snell*
W. Snell, Chief
Emergency Preparedness Section.

6/10/87
Date

Inspection Summary

Inspection on May 18-20, 1987 (Report No. 50-255/87012(DRSS))

Areas Inspected: Routine, announced inspection of the Palisades Nuclear Plant annual exercise involving observations by four NRC representatives of key functions and locations during the exercise. The inspection was conducted by three NRC inspectors and one consultant.

Results: No violations, deficiencies or deviations were identified as a result of this inspection. However, one weakness was identified relating to the Medical Drill. This is summarized in the attachment to the report's transmittal letter and in Section 4.d of the report.

DETAILS

1. Persons Contacted

NRC Observers and Areas Observed

J. Patterson - Technical Support Center (TSC), Operations Support Center (OSC) and Emergency Operations Facility (EOF)
G. Christoffer - Medical Drill
T. Lynch - OSC and Onsite Radiation Monitoring Teams
C. Anderson, Resident Inspector - Control Room and TSC

Consumers Power Company (CPCo) Personnel

W. Beckman, Radiological Services Manager
R. Rice, Operations Manager
R. Orosz, Engineering/Maintenance Manager
D. Joos, Administrative and Planning Manager
P. Loomis, Emergency Planning Administrator, Corporate
A. Katarsky, Exercise Coordinator, Corporate
D. Fugere, EOF, Health Physics Group, Corporate
K. Penrod, EOF Evaluator, Corporate
*K. Berry, EOF Director
*R. DeWitt, EOF Officer
J. Brunet, Emergency Planning Coordinator (EPC), TSC Lead Controller
M. King, TSC Controller
M. Dawson, Medical Drill Controller
G. Ellis, Radiation Protection Supervisor
T. Begin, Offsite Controller
S. Cote, Property Protection Supervisor
T. Anderson, Shift Supervisor (SS)
D. Malone, Nuclear Licensing Analyst
T. Neal, Staff Health Physicist
L. Kenaga, Staff Health Physicist
J. Alderink, Engineering and Maintenance, Staff Engineer

All names listed above, except those designated with an asterisk (*), attended the exercise exit meeting on May 20, 1987.

2. General

An exercise of the Palisades Plant Site Emergency Plan (SEP) and the Emergency Implementing Procedures (EIPs) was conducted on May 19, 1987. The exercise tested the response of the licensee to a hypothetical accident scenario, resulting in a major release of radioactive material to the environment. An attachment to this report describes the exercise scope and objectives and gives a sequence of events of the exercise scenario. This was a utility-only exercise; however, the State of Michigan participated on an informal basis at the EOF.

3. General Observations

a. Procedures

This exercise was conducted in accordance with 10 CFR Part 50, Appendix E requirements using the Palisades Nuclear Generating Plant Emergency Plan and associated implementing procedures.

b. Coordination

The licensee's response was generally coordinated, orderly and timely. If these events had been real, the actions taken by the licensee would have been sufficient to permit State and local authorities to take appropriate actions to protect the public health and safety.

c. Observers

Licensee observers monitored and critiqued this exercise along with four NRC observers.

d. Critique

The licensee held a critique at the Palisades Plant on May 20, 1987. The NRC critique followed immediately after the licensee's self critique. Personnel who attended this joint meeting are listed in Section 1.

4. Specific Observations

a. Control Room (CR)

The Shift Supervisor (SS) and his crew quickly responded to the first message at 0845, which reported a plane crash and damage to the security fence. The event was properly classified as an Alert and a PA announcement was made to the plant staff at approximately 0853. The NRC observers concluded that the PA voice reception was unclear due to poor audibility; even immediately outside the CR in the adjoining hallway. Another voice was heard cutting in on the announcement which contributed to the poor reception. Assembly and accountability was quickly initiated when the siren sounded. As the licensee was already aware that this siren could not be heard in the Support Building, a PA announcement was used in that area to assure adequate coverage. To assure consistent as well as efficient notification to all plant buildings and outside areas, both the siren system and the PA system should be thoroughly sound tested and adjustments made where indicated. The inspector learned from the licensee that some action is already underway on testing and improving the siren system and other mechanisms needed for emergency warnings. Until there is some evidence through drills and exercises of satisfactory reception of the emergency siren system, PA systems and other means to notify personnel in an emergency, this will be tracked as Open Item No. 50-255/87012-01.

Security procedures were obtained quickly from the Security Identification Station and used by the shift personnel as they responded to security involved events. The use of sound powered telephones between the SS's office and the TSC were well utilized and provided timely communications. CR personnel used these telephones to provide several good suggestions to the TSC later in the scenario.

The transition of command and control from the initial Emergency Director, the SS, to the Site Emergency Director (SED) in the TSC was accomplished efficiently and without undue delay.

b. Technical Support Center (TSC)

The SED made his initial announcement that the TSC was activated and prepared to take charge of the emergency activities from the Control Room at 0913. Just prior to this the Operations Support Group Leader in the TSC confirmed that communications were transferred to the TSC from the Control Room. Both actions were correctly taken in a proficient manner. The TSC support groups appeared well prepared and cognizant of their responsibilities. With the plane crash at 0845 and the resin cask overflow taking place at about 0925 there was considerable activity in the TSC, particularly in the Health Physics (HP) Support Group. Still, knowing that the resin spill occurred as a result of a resin transfer, no one was observed in either the HP Support Group or in the OSC asking for the Container Checklist for Resin Liner from HP Procedure No. 6.18. This checklist would have had radiation survey information on it. Also, a radioactive material tag should have been attached to the simulated resin cask. Determination of the curie content could also have been determined sooner if the players had asked about these sources of information.

When the Auxiliary Operator (AO) was dispatched to investigate the cause of the radiation alarm in the track alley area, he was not told where to meet the Radiation Safety Technician (RST). This resulted in some unnecessary delay. Information on the findings of the RST and the AO from the track alley area was slow in being communicated to the SS in the Control Room and to the TSC. The Dose Assessor could only produce on-line meteorology data from the plant's meteorology tower plus information from Weather Service International (WSI), since the dose assessment computer programs were based on gaseous releases, not a resin spill. A Security liaison was used throughout the exercise. He functioned between the TSC and outlying areas where there was a security concern, at the break in the perimeter fence along the beach, at the portal monitor alarming in the Security Building, and at other security-related events including the ambulance response to the injured man.

Good discussions, interactions and communications were observed between those at the TSC management table and the various TSC support groups. Management demonstrated good planning in considering what plant conditions could lead to an escalation of the emergency from the Alert status. The Site Area Emergency (SAE) was declared based on the possibility of the resin spreading to sewers and the water supply of nearby towns using the Miscellaneous EAL category. Notifications to State and local counties within the EPZ were made properly and within the 15 minute requirement for both the Alert and the SAE. Briefings by the SED were frequent and meaningful. Status boards were adequately maintained with few exceptions. Message flow as initiated by the clerical and administration group made a worthwhile contribution.

Through some communications error, a report of radiation levels of 500 mR/hour in the Support Building was forwarded to the TSC, which was cancelled a short time later. Meanwhile, the SED announced no eating or drinking onsite because of those levels. This appeared to be a Controller error.

c. Operational Support Center (OSC)

The OSC was activated in a timely manner without any noticeable flaws. The OSC Director wanted to be sure accountability was completed before deploying field teams as recommended by the TSC. The Radiation Protection Supervisor (RPS) authorized the first team of RSTs to receive 1 R/hour and provided dosimeters only to that level. When 900 mR/hour was measured at the boric acid tank room (0935) adjacent to the track alley, the team retreated to the stairwell for a 5-10 minute delay while dose histories were checked. These dose histories should have been available in the OSC prior to dispatching the teams to avoid a delay if greater radiation exposure were encountered. Also, the first team did not have high range radiation monitoring instruments or respiratory protection. Not knowing the extent of the resin spill, a higher reading monitoring instrument (e.g., reading up to 50 R/hour) and higher range dosimeters should have been issued initially. There did not appear to be any input from maintenance support personnel in determining how to remove the resin contamination. Air samples were not observed being taken in the track alley area. However, at the exit meeting, a Controller confirmed that air samples were taken at the beach.

The OSC Director left the floor several times for briefings at the TSC. Each time he should have announced his leaving to the OSC staff and designated a temporary replacement for OSC Director until his return. Due to the simulation utilized, it was difficult to

tell if the area outside of the track alley was secured for contamination purposes. (This is discussed further in Section 4.f.) The RPS effectively organized and directed the in-plant teams and the field teams near the plant boundaries.

Communications between the field teams surveying along the beach with their respective control points, namely the EOF and OSC, indicated that there may have been some duplication of effort. The EOF and OSC should have clarified which response facility was going to control the monitoring teams. The NRC observer concluded that the extent of the contamination was never well defined. Onsite contamination levels measured background to 30 mR/hour on the hill above the construction shacks, while the OSC considered that the general area was 5-8 R/hour. Initially, this 5-8 R/hour was considered to be "window open" at contact. Actually, it was "window closed" at contact. Beta-gamma contributions were not determined. After the sand was piled on top of the resin contaminated areas, no dose rate measurements were taken above the sand.

Before action was taken to contain the resin contamination, the NRC observers felt that there was too much discussion and deliberation on what approach to use to cover the resin and in trying to determine the extent of contamination. Decisionmaking was slow. Additional HP technicians from the nearby D. C. Cook Nuclear Plant were called for early enough after the resin spill to provide needed supplemental monitoring capability.

Based on the above findings, the following items should be considered for improvement:

- Basic radiation monitoring techniques with discussion of appropriate significances of "open window, closed window" readings, plus the use of appropriate radiation monitoring instruments for emergency conditions should be re-emphasized in mini-drills and practice sessions.
- Better coordination and quicker decisionmaking should be emphasized in practice drills involving the OSC, the TSC, and the EOF. Approaches for handling either a resin spill or other non-gaseous radiation hazards should be emphasized in training and drills.

d. Medical Drill

The medical drill was observed at both the site and the Memorial Hospital, St. Joseph, Michigan. Immediately after discovering the injured person, one of the RSTs contacted the OSC by radio to inform them that the injured person had been found on the trackway near the roll-up door in the Auxiliary Building. After this initial notification to the OSC, the two RSTs left the injured person and searched for a backboard on which to place him. Also during this

time, the RSTs appeared to be involved with other aspects of the resin spill. There were other times, also, when the injured person was left unattended. No actions were taken to assist the injured person, except to give reassurances that help was coming.

When the ambulance arrived, approximately 16 minutes after the injured person was discovered, members of the security force escorted the ambulance to an area in front of track alley. This location, while close to the victim, was also adjacent to the contaminated area. Another 16 minutes elapsed while the ambulance attendants awaited protective clothing before they could begin examining the injured person. During this time, an RST taped the wheels of the gurney to prevent loose contamination from adhering to the wheels. Palisades Emergency Implementation Procedure (EIP), EI-14: Medical Care/Treatment of Contaminated, Injured Personnel, Section 4.3, states that Radiation Safety Technicians should respond to an accident scene with the Emergency First Aid Kit, the Emergency Ambulance Kit and the Emergency Decontamination Kit. If only one technician is available, he should respond with the First Aid Kit and request assistance from the Control Room. During this exercise these kits were not brought to the accident scene until after the ambulance had arrived.

Procedure EI-14, Section 5.2.1, requires that preserving vital functions and providing emergency medical care takes precedence over contamination. The NRC observer concluded that contamination concern took precedence in this exercise. With all the expressed concern of the players, the victim's torso was never surveyed - only the head wound and the left cheek as identified earlier by the Controller. Impingement of resin beads in the victim's face was possible since he was lying face down in the resin spill.

Approximately 51 minutes elapsed from the time the injured person was discovered, until the ambulance had left the site for the hospital. This was much too long for trained responders.

Palisades Emergency Implementation Procedure, EI-3, "Communications and Notifications," requires that the notification of hospitals receiving contaminated injured victims should be performed using the Hospital Notification Form. This form was not used to notify the hospital.

The licensee Controller and the NRC observer had to go through normal egress portals at access control. Thus delayed, neither one could contribute to the medical drill at the hospital for some time. The injured person was already in the Emergency decontamination room when they arrived. Either the ambulance should be held up until they arrive at the exit gate or another Controller should be assigned to the hospital to be in position when the ambulance arrived. Yellow Herculite was used to cover the

ground from the ambulance to the examining room in addition to having this area roped off. A hospital representative was stationed at the outer entry way to this area, and requested proper identification before allowing individuals to enter. These were good examples of preparation and control of personnel in the emergency room area.

Step off pads were properly used in the examining room and contaminated site material was placed in the proper waste bags. Waste containers were returned to the Palisades site. Hospital personnel were properly attired in protective clothing and dosimetry.

Radiation level readings of the patient were taken by a Palisades RST and repeated to a nurse who documented the information. It should be noted that a large yellow plastic container was attached by a long tube to the drain of the table where the victim was lying. Liquid waste drained from the table into the container. However, when hospital personnel attempted to drain the liquid from the table, the tube was not properly secured in the drain and liquid spilled onto the floor. Greater care should be taken assuring that this equipment is properly secured and operable before being used.

Procedure EI-14, Sections 5.3.8 and 5.4.10, require that the SS and the Duty Health Physicist be briefed upon return to the plant. Also, 5.4.11 requires that appropriate entries be made in the HP logbook. These actions were not taken as observed by the NRC inspector.

In summary, the medical drill portion of this exercise was unsatisfactory and will be tracked as an Open Item (50-255/87012-02). The licensee should seriously examine their entire medical response system. This element of the exercise is designated as a reportable weakness and is further summarized in the enclosure to the cover letter to the licensee.

Reemphasis on training should be stressed for those individuals who would respond in a medical emergency onsite. This capability should be demonstrated through mini-drills and other training to include the coordination, teamwork and interactions of all concerned to respond in a timely, professional manner. EIP, EI-3 and EI-14 should be reevaluated to provide the most efficient means to assure better coordination and success in a medical drill.

e. Emergency Operations Facility (EOF)

Briefings by the Emergency Director were well done on a periodic basis of approximately every half hour. Due to the nature of this scenario, recovery aspects and projection of the damaging effects of the spread of the radioactive contaminated resins beyond the owner controlled areas were significant items of concern from the early

identification of the problem. The State of Michigan chose to participate in an unofficial capacity and served as a communications link to local and State government. The Michigan Department of State Police, Emergency Management Division and the Radiological Health Services Division of the Department of Public Health were represented and interacted with the EOF management from a separate location in an adjacent building, the Manor House. This facet of the emergency response was meaningful and illustrated good coordination between the licensee and these two critical State agencies. The exchange added to the realism of the joint effort, including a State decision made to cut off the South Haven Water Works drinking water intake. The State contacted the Department of Energy (DOE) to get an aerial survey of the area to locate the resin path in the water. The radiation safety monitoring teams from D. C. Cook were assigned areas to monitor.

As listed in Section 4.c, the EOF had to assume some responsibility for the mixup, in which plant site and offsite teams were reporting radiation monitoring information to the EOF, rather than to the TSC or OSC. Although the scenario did not lend itself to conventional dose assessment, the HP Supervisor improvised. He utilized radioactive inventories from the dose assessment code LADTAP, and scaled down the values to apply to the resin tank contents. This gave him an estimate of potential offsite doses due to inhalation, ingestion, and external radiation from activity released to the lake. Accurate information on radiation levels from various distances and geographical locations as related to the resin spill was lacking at times. From an observer's viewpoint it appeared that some radiation levels were given to represent an overall area in the direction of the resin spill, while others represented values within a few feet or near contact. Good questioning by EOF and TSC HP support groups often, but not always, clarified the significance of these radiation levels.

The EOF Director and his management support staff were intent on deescalating to an Alert. In this pursuit they should have referred directly to the Table of EALs in either the Site Emergency Plan (SEP) or the Emergency Implementing Procedures (EIPs), rather than rely on subjective reasoning. Guidance from NRC Headquarters specifies avoiding the emergency deescalation step, and instead, when there is assurance that the plant conditions have stabilized and the health and safety of the public is no longer in danger, change to a Recovery stage. Of course, whatever courses of action are pursued, the State should agree since they have the decision on offsite actions affecting the public.

Recovery plans were initiated by the EOF Director and EOF Officer by deciding on the team leaders for each supporting plant organization and the appointment of a Recovery Manager. Tasks were designated for each group to pursue. An outline of the main tasks and

subheadings were made up and distributed to the group leaders. Examples of specific steps included were additional decontamination, technical support, budget allocations, packaging of wastes, and actions to prevent recurrence. This represented a rather definitive approach to recovery/reentry. In retrospect, real time should have been allocated to have a "round table" discussion with all key recovery participants where each could present his input to the outline just described. The SED from the TSC and at least two of his support managers should have attended such a session. In summary, the recovery aspect was demonstrated sufficiently to indicate some preparation and planning.

f. Exercise Scenario and Control

This scenario was particularly different and challenging in centering around a resin spill outside the plant buildings. It was unique from all others previously held by the licensee, which in general related to equipment failure or electrical problems.

The exercise planners and the Emergency Planning Coordinator (EPC) were surprised that until about 1045 the TSC and OSC staff were not aware that the cracked corn in the track alley outside the jammed roll-up door represented resin. The Controller informed the initial RST responders. However, the technicians apparently did not pass this information back to the OSC or TSC. To facilitate a more appropriate response, the NRC Team Leader when requested gave permission to the EPC to inform the OSC and TSC what the cracked corn represented.

Normal radiation hazard rope and radiation labels should have been used to cordon off the contaminated area. This would have been more convincing and elicited greater respect to the hazard than what was substituted. Several disclaimer signs could have been hung from the rope stating that this was for drill purposes only. Also, if an empty resin cask could have been positioned near the simulated spill, more realism would have been created. These were two specific examples of lack of realism for this type of an emergency.

In summary, some of the indecision and excessive "jaw-boning" was due to this unusual type of emergency and can be understood to a certain degree. This exercise should stimulate concern for emergency responsibilities for those licensees with radiation waste and HP organizational authority to get more directly involved in the response.

5. Exit Interview

The inspection team held an exit interview the day after the exercise on May 20, 1987, with the licensee representatives denoted in Section 1. The NRC team leader discussed the scope and findings of the inspection and identified the medical drill as a probable exercise weakness. The

inspectors also discussed the probable content of the report to determine if the licensee considered that any of the information should be proprietary. The licensee responded that none of the information should be proprietary.

Attachment: Palisades Exercise Scope
and Objectives and Narrative Summary

1.0 SCOPE AND OBJECTIVES

1.1 SCOPE

PALEX 87 is designed to meet exercise requirements specified in 10 CFR 50, Appendix E, Section IV.F. It will postulate events which would require activation of major portions of the site emergency plan and response by offsite authorities. The exercise will be utility only. There will be no participation from state or local authorities. The Joint Public Information Center will not be activated.

1.2 OBJECTIVES

The exercise will demonstrate each item listed under the following categories:

1. Assessment and Classification

- a. Recognition of emergency conditions
- b. Timely classification of emergency conditions in accordance with emergency action levels

2. Communication

- a. Initial notification within specified time constraints (state and local - 15 minutes, NRC - 1 hour)
- b. Subsequent notification in accordance with procedure (state, local, NRC)
- c. Notification and coordination with other organizations, as required (other utilities, contractors, fire or medical services)
- d. Provision of accurate and timely information to support news release activity

3. Radiological Assessment and Control

- a. Calculation of dose projection based on sample results or monitor readings
- b. Performance of in-plant and offsite field surveys
- c. Objective deleted
- d. Trending of radiological data
- e. Formulation of appropriate protective action recommendations
- f. Contamination and exposure control

4. Emergency Response Facilities

- a. Activation, staffing and operation at appropriate classifications and within specified time constraints
- b. Adequacy of emergency equipment and supplies
- c. Adequacy of emergency communication systems
- d. Access control

5. Emergency Management

- a. Command and control with transfer of responsibilities from Control Room to Technical Support Center to Emergency Operations Facility
- b. Assembly and accountability within 30 minutes
- c. Coordination with State of Michigan emergency organization
- d. Mitigation of operational and radiological conditions
- e. Mobilization of emergency teams

6. Reentry and Recovery

- a. Assessment of damage and formulation of recovery plan
- b. Identification of constraints, requirements and organization to implement the plan

7. Exercise Control

- a. Provision for maximum free play
- b. Accurate assessment of player performance

3.0 SEQUENCE OF EVENTS

<u>Scenario Time</u>	<u>Event</u>
-0030	<p>Initial conditions - Normal full power</p> <p>Buses 13 and 14 crosstied; buses 77 and 78 crosstied</p> <p>Equipment out of service: Control Rod Drive 36, Air Blast Breaker 25R8, boric acid Pump A and the post-accident sampling monitor</p> <p>A resin transfer is in progress.</p> <p>Alarms: Control Rod Drive 26 seal leak off temperature and containment monitor RIA-1808</p> <p>PCS leak rate as of 0736 on 5/19/87: 0.6 gpm unidentified, 0.28 gpm identified, 0.88 gpm total</p> <p>Further historical data will be provided by Controller if requested.</p>
0000	<p>Exercise begins. A small plane crashes into the PM&MP building. The north security fence is damaged.</p>
0005	<p>Damage assessment reveals that the plane was destroyed on impact; there is no fire. The plane was apparently unoccupied as no bodies are found. Security fence down nearby.</p>
0015	<p>An alert is classified based on aircraft crash on facility. Accountability commenced.</p> <p>The Auxiliary Operators conducting the resin transfer have stopped the pump as the cask is almost full. They depart the scene when accountability begins. The track alley door has been jammed open for several days.</p> <p>Shortly after the departure of the Auxiliary Operators, the resin cask overflows due to depressurization of hoses. A resin spill is in progress.</p>
0030	<p>Resin spill causes alarm of volume reduction system radiation monitor. By now, the TSC and OSC are staffed. Word is received that the pilot of the plane had bailed out before the crash and has not been injured.</p>
0040	<p>Resin flow stops. T-100 has gone from 90% full to 5% full. It had been expected to fill the shipping liner after decreasing to</p>

Scenario
Time

Event

20% full. Thus, 15% of tank volume has spilled. T-100 surface dose rate was 68 R/hr when 60 to 100 Ci in 30 ft³ of resin.

0045 Severe winds strike plant. Herculite and spilled resins at transfer site are blown northward. Security building portals alarm. Security should notify the Control Room of condition.

0049 A RAD Technician dispatched to check radiological conditions slips and falls into the spilled resin. He sustains a head injury and is contaminated. The injury is reported to the Control Room.

0052 An ambulance is called. RAD Technicians decontaminate the injured party to the extent possible.

0055 Magnitude of resin spill and subsequent spreading becoming clear. Radiation monitor readings and visual evidence indicate spread of contamination beyond security fence and possibly site boundary. A site area emergency will be declared when dose levels are observed to be greater than 500 millirem per hour beyond site boundary. EOF activated, if not yet done.

0102 Ambulance arrives, either victim taken to ambulance or escort provided to reach victim. Control Room should notify hospital to prepare to receive and treat contaminated injury.

0130 Extent of contamination determined. They have been blown from original spill site north across plant and northward up beach beyond site boundary. Apparently resins have gotten into the lake.

Plant staff has reported to EOF.

0155 General Office Response Team arrives at EOF. Planning begins for cleanup of resin contamination. Contaminated area is isolated and posted.

0220 General Office EOF staff arrives.

Initial clean-up activity in progress.

0330 Clean-up plan completed. Portions will already have been implemented. Full personnel mobilization will not be requested. Players will be expected to mobilize numbers and types of personnel dictated by extent and type of contamination. Progress will be judged by controllers with appropriate results reported to clean-up crews. Some lake washup will occur. Plant and EOF staff will be expected to administratively set up the mechanics of a full-scale cleanup. These include contacts with

Scenario
Time

Event

companies, arrival times, waterborne contamination control,
long-term monitoring program, etc.

0500
to
0600

Exercise ends. Cleanup has been demonstrated adequately and
long-term plan formulated.