U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/89016(DRSS)

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

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

Facility Name: Palisades Nuclear Power Plant

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: July 18-20, 1989

James P. Patterson

Inspector: James P. Patterson
Team Leader

7/31/89
Date

Tom Ploski

Tom Ploski

7/31/89
Date

William Snell

Approved By: William Snell, Chief
Radiological Controls and
Emergency Preparedness Section

7/31/89
Date

Inspection Summary
Inspection on July 18-20, 1989 (Report No. 50-255/89016(DRSS))
Areas Inspected: Routine announced inspection of the annual Palisades Emergency Preparedness exercise involving observations by four NRC representatives of key functions and locations during the exercise (IP 82301).
Results: The licensee demonstrated a good response to a simulated accident scenario involving loss of the start-up transformer and subsequent losses of diesel generator backup power. A small release of radioactivity was also simulated to be present. All objectives were demonstrated satisfactorily based on the scenario. No exercise weaknesses were identified. One Open Item was identified relating to training for the security officer position at the EOF and use of the proper implementing procedure for EOF security officer assignments.

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DETAILS

1. Persons Contacted

a. NRC Observers and Areas Observed

J. Patterson, Control Room (CR), Operational Support Center Emergency Operations Facility (EOF)
T. Ploski, CR and Technical Support Center (TSC)
G. Martin, TSC and EOF, Health Physics Activities and Dose Assessment
E. Podolak, EOF

b. Consumers Power Company (CPCo) Personnel

*G. Slade, Plant General Manager
W. Beckman, Radiological Services Manager
P. Loomis, Emergency Planning Administrator (CPCo)
A. Katarsky, Senior Nuclear Emergency Planner (CPCo)
K. Penrod, Emergency Planner (CPCo)
K. Haas, Reactor Engineering Superintendent
C. Kozup, Technical Engineer
M. Genrich, Shift Engineer
C. Axtell, Senior Staff Health Physicist
C. Reavy, Senior Health Physics Technician, Emergency Planning
S. Cote, Property Protection Superintendent
M. Nock, Property Protection Associate
N. Brott, Emergency Plan Coordinator
M. Savage, Public Affairs Director
D. Vande Walle, Confirguration Control Manager
R. Doan, Sr., Senior Plant Technical Advisor
M. Dawson, Nuclear Instructor, Emergency Planning
R. Beeker, Quality Assurance Audit Supervisor
K. Kobota, Senior Licensing Specialist

*All names listed above except the one designated by an asterisk attended the exercise exit meeting on July 20, 1989.

2. General

An exercise of the Palisades Plant Site Emergency Plan (SEP) and the Emergency Implementing Procedures (EIPs) was conducted on July 19, 1989. This exercise tested the licensee's response to a hypothetical accident scenario with a small release of radioactivity. An attachment to this report includes the scope and objectives and a sequence of events for the exercise scenario. This announced exercise was a utility only event with no participation from the State of Michigan or related counties.

3. General Observations

a. Procedures

This exercise was conducted in accordance with 10 CFR Part 50, Appendix E requirements using the Palisades SEP.

b. Coordination

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

c. Observers

Licensee observers monitored and critiqued this exercise as well as four NRC observers.

d. Exercise Critiques

The licensee held facility and controller critiques immediately following the exercise. The NRC critique was held at the plant site on July 20, 1989.

4. Specific Observations

a. Control Room

The first significant event occurred when lightning struck the startup transformer 1-2 with probable loss of the "R" bus. The Shift Supervisor (SS) received a message that there were frequency oscillation problems with the 1-2 diesel generator. He promptly contacted an Auxiliary Operator (AO) by radio and told him to inspect the location. The AO reported by radio that there was oil all over the floor around the 1-2 diesel. This diesel was then promptly shutdown. These actions were well conducted in this emergency mode. At 0840 the CR considered declaring an Alert. On further review of the EALs, they recognized that the conditions would only justify the Notification of Unusual Event (NUE). The NUE was correctly classified based on the miscellaneous category of EALs requiring an initiation of a plant shutdown according to technical specifications. Soon after, with the recognition of a steam generator tube leak, the SS and his crew correctly reviewed Off-Normal Procedure ON 23.2 to better ensure that all required actions were initiated for this leak.

The Alert was properly classified by the SS, however, the PA announcement did not include a short statement on the reason for the classification. This is recommended for any emergency classification. Notifications for both the NUE and the Alert were rather poorly completed, although they were made within the required times. Each

of the two AOs demonstrated some unfamiliarity with the dedicated phones in the CR. Neither one appeared to be comfortable using the automatic dialer. Their performance indicated a need for more "hands-on" experience. One AO erroneously called the EOF after the Unusual Event declaration. More hands-on training in a drill mode is recommended for the AOs assigned this task.

The SS coordinated efforts with the incoming TSC chemistry staff to ensure that "A" and "B" steam generators would be sampled to determine which (or both) had a primary to secondary leak. The SS correctly recognized that a reactor trip would necessitate a Site Area Emergency, as no source of AC power could be available within 15 minutes of a trip. There was an orderly and efficient transfer of command and control from the SS to the Site Emergency Director (SED) in the TSC shortly before 1000. It was recognized that a reactor trip would result in a loss of power to certain radiation monitors. As a precaution, the SS directed that a backup Area Radiation Monitor be made ready for the CR/TSC area.

At approximately 0900, plant personnel were instructed to go to the Radiation Protection, lower level, "bomb shelter" area due to the sighting of a funnel cloud. This required a large number of people to go outside during a severe weather condition, potentially exposing them to greater risk than if they took shelter nearer their primary work stations. This should have been considered as part of the decision for personnel to report to the bomb shelter area. The second announcement for people to return to their work stations somehow got misinterpreted as it was passed along. The message the assembled people received was to return to their normal assembly area. This accounted for several individuals walking into the CR/TSC. The procedure, which includes instructions for people to congregate if a tornado funnel or other severe weather is present, should be reevaluated and revised for certain groups who are currently instructed to go outside to reach their shelter.

Based on the above findings, this portion of the licensee's program was acceptable; however, the following items should be considered for improvement:

- Additional "hands on" training, preferably in a table-top drill format, should be provided to AOs to better familiarize them with the communications equipment and notification forms required to make emergency notifications.

- Procedures to provide guidance for employees or anyone onsite during severe weather conditions should be reevaluated and revised where necessary.

b. Technical Support Center (TSC)

Onsite assembly and accountability was completed within approximately 30 minutes after the siren actuated following the Alert declaration. Status boards were well maintained including one for sequence of events and a plant parameter status board. The timeliness of the updated data on the plant parameter status board improved as the exercise progressed. During the time that the SED was in command and control, he reviewed and revised, as appropriate, the updated messages to State and local officials before transmission. These updates were then copied onto several status boards.

At 0945 stack monitor readings increased indicating a release of radioactive material to the environment. However, notification message forms did not indicate that a release was in progress until approximately noon. It appeared that the rationale for not reporting the monitor increase as a release was that the resulting dose was calculated to be insignificant. However, any verified release of radioactive material during a declared emergency should be reported as a release regardless of the resulting dose.

Initial dose assessment results indicated noble gases of 1E-3 mR/hr and iodine of 1E-6 mR/hr. These results were based on a stack monitor reading of 1800 counts per minute. Projected dose calculations were made at approximately 1045 to determine the effect on doses, if the primary to secondary leak rate were to increase to 40 gallons per minute. Thus, dose assessments were being calculated even though amounts applicable were small.

Within 20 minutes of assuming command and control, the SED had decided to continue reactor shutdown until a 30% power level had been reached and to remain at that power level unless one other source of AC power would be available. He was well aware of the technical specification time limit to reach hot shutdown and his option to invoke 10 CFR 50.54(x). The SED ensured that his staff expedited OSC efforts to investigate and repair the 1-1 and the 1-2 diesel generators and the 1-2 startup transformers. The staff was told to keep him informed of estimated repair times and any new damage reports that would affect these time estimates.

By 1045 the SED and his group leaders had thoroughly discussed the likely increase in the primary to secondary leak rate and their inability to quantify the radioactive release rate using either a stack monitor or field teams if reactor power were lost. The field teams would have been ineffective because the plume would be over the lake. The Chemistry Support Team Leader kept the SED well informed of efforts to determine which steam generator had the primary to secondary leak. They correctly concluded by about 1115 that the leak was in the "A" steam generator. Further analysis of

samples confirmed this by 1145. The SED kept his EOF counterpart well informed of the damage assessments on both diesels, the startup transformer, the "R" bus and the determination that the "A" steam generator had the primary to secondary leak.

The Assistant SED and several group leaders did a very good job of convincing the SED to recommend the Site Area Emergency (SAE) declaration because there was no alternative but to invoke 10 CFR 50.54(x) by stopping the reactor shutdown at 30% power near 1200. An SAE could have been declared by 1130, since the SED had adequate information that he had no other viable alternative than to stop the reactor shutdown at about 1200. However, the SED did not recommend a SAE to the EOF Director until another 15 minutes had passed. Some of the delay was due to the orderly transfer of command and control to the EOF at 1137, while the SED and his support team leaders debated when the SAE should be declared. The EOF Director correctly declared the SAE at 1154. The TSC staff were promptly informed of this declaration and its basis.

A simulated evacuation of nonessential personnel was carried out at approximately 1204, with the SED first allowing for time to dispatch the Health Physics Technicians for deployment as radiation monitors and observers of the evacuees. The EOF informed the SED in the TSC that a 5 megawatt diesel generator would be onsite about 1700 to help relieve the power outage. Meanwhile the TSC correctly continued to give high priority to repairing the 1-1 diesel generator and the 1-2 transformer while considering how the portable generator should be utilized.

Based on the above findings this portion of the licensee's program was acceptable; however, the following item should be considered for improvement:

- During an emergency response situation, greater conservatism should be used in informing offsite officials of changes to the routine radiation release rates.

c. Operational Support Center (OSC)

The OSC was staffed and activated in a timely manner. The first of several plant status briefings was held at 1001. Throughout the exercise a good, coordinated effort was demonstrated by the OSC supervisors and staff, including the OSC Director, Health Physics Supervisor, Communicator and the Dosimetry Clerk. Status boards were well maintained and kept current including the main event board.

While still testing equipment during OSC activation, it was observed that the power supply for the radios had blown a fuse. New fuses were quickly obtained. As a backup source of power, a hookup was made with a 12 volt battery. This unplanned problem was efficiently handled to maintain operability with the two way radios.

A maintenance team was sent to evaluate diesel generator 1-2 and recommend possible repair and/or maintenance. The team demonstrated good resourcefulness including substituting a rubber hose for the ruptured oil line. Also, they planned to examine another segment called the "boot" while trying to get access to the rotor which they could then spin. These plans were not allowed to be carried out due to a message from the Controller which told them the bearings were frozen. The team then concluded that it would take several days to repair the turbocharger. The actions of this maintenance team were good examples of troubleshooting including an innovative method to attempt to restart the diesel generator.

From a radiation protection standpoint there was minimal activity throughout the exercise due to the scenario. Two teams were activated early into the event, i.e., before 1000. One team was sent along the lakeside to detect any radiation. The wind direction and projected plume were out over the lake and were based on real time meteorology which was used since before 1000. The second team was in standby in the plant parking lot waiting to be dispatched if there was a wind change. This team was later told to perform some precautionary monitoring measurements.

At 1155 the OSC Director chose to relieve the HP Supervisor with another person trained in that position. This change was made due to the lack of activity in that area and also to permit the original HP Supervisor to go home and get some rest. This would permit him to be available again on the late shift if he were needed. This was a good management decision and gave two individuals an opportunity to fill this position.

Based on the above findings, this portion of the licensee's program was acceptable.

d. Emergency Operations Facility (EOF)

The EOF Administrator gave his first briefing to the EOF staff at 1035. Support group personnel including the Plant Support Engineering (PSE) Reactor Physics, Health Physics and dedicated Communicators were represented. At 1056 with the EOF still not operational, the PSE was already contacting the TSC and making them aware of the "backfeed" procedure should the plant trip. The PSE group appeared well coordinated and were already taking steps to receive the portable generator to help with the power failure. At 1100 the General Office Response Team arrived from the corporate headquarters in Jackson, Michigan.

One dedicated telephone line from the TSC Coordinator to the EOF was out of order for over one hour. Other phone lines were quickly substituted without a serious delay in responding. After briefing the team leaders and getting briefed by them, the EOF Director discussed criteria needed for escalating the event to a Site Area

Emergency. The Health Physics group was setting up their dose assessment and other equipment and standing by for developments, which was all that could be done with the scenario conditions. At 1137 the Emergency Director officially took over command and control from the TSC. After concurrence and discussion with the TSC, the EOF Director officially declared the Site Area Emergency (SAE) at 1154.

At 1158 the Emergency Director contacted the State about the SAE. At approximately 1200 the 1145 message was amended to indicate that an SAE was declared, and also that the time of release was changed to 0930. The Emergency Director provided good leadership, utilized his support groups well and gave meaningful briefings to his staff. The PSE was well involved throughout the exercise and continually provided guidance and support to the TSC.

The security officer on duty inside the entrance to the EOF had an uncontrolled, unapproved, undated document in the security officer's kit titled "Security Officer Instructions." These instructions implied that there was only one security officer assigned to the EOF. Procedure EOF-10, Revision 4, titled "Property Protection Team," on page 6 of 7 has statements with instructions for three security officers, rather than one. However, at the bottom of this page is a statement under Note: "The number of officers needed will be determined at the time of EOF activation." Since the security officer arrived at 1024, the EOF staff had no opportunity to determine whether this was sufficient security coverage. Even if it was decided that three security officers were too many, some other security representative should have been present to relieve the one on duty and serve as liaison with the EOF staff.

Following the exercise, discussion with the assigned guard indicated that this person had not received any prior training on EOF-10 or any special considerations for providing EOF security during an emergency. A current copy of EOF-10, Revision 4, should be included in the officer's kit. Specific training should be provided to any security officer given this assignment. In retrospect, the security officer at the EOF was diligent and did a good job performing the security-related tasks. This is an Open Item No. 50-255/89016-01, until these security/emergency related items are addressed.

The EOF staff was instructed by the Emergency Director to consider recovery/reentry concerns and report back by group function. The exercise was then terminated at 1311. Following a time jump of nine hours recovery/reentry plans were discussed and recorded in coordination with two representatives from the TSC. The recovery plans were adequate considering the scope of the scenario, a minimum release and no reactor equipment damaged. Offsite sampling of water and milk was recommended as a precautionary measure. The SED from the TSC was assigned as the Recovery Manager. Other key support positions were also designated including licensing, which would deal also with the NRC for authorization to restart the plant.

Based on the above findings, with the exception of the one Open Item, this portion of the licensee's program was acceptable.

5. Scenario

The exercise scope and objectives and the complete scenario package were submitted in accordance with the established schedule. The licensee was responsive to the few technical questions raised by the NRC on the scenario data. Certain of the objectives relating to radiological controls, dose assessment and protective action recommendations were demonstrated but only to a limited extent due to the small release of radioactivity. There was no time at which the Technical Specification for this stack release was exceeded. One criticism was that the radiation protection inplant teams and offsite teams were not challenged sufficiently to provide a good test of their skills, but the scenario did provide other challenges.

Meteorological data was provided as real time data after about 0945. This included current and forecast data provided in 15 minute averages. This provided a more realistic challenge to the protective measures staff, even though the scenario did not include a simulated major release or a real need for protective actions. For the first time in an exercise, this licensee provided a roleplayer who represented the NRC in a response cell capacity. He portrayed an NRC Region III Section Chief and Branch Chief of the Division of Reactor Projects. The scenario developers felt these management levels would be contacted in addition to the Headquarters (HQ) Duty Officer as the scenario progressed. The NRC role playing was creative and challenging. However, in a real event the NRC Region III Incident Response Center would have been activated following the Alert declaration. Once the NRC had learned of the potential to involve 10 CFR 50.54(x), the level of NRC interest and attention would probably have included regional and HQ senior management, well above the Branch Chief level. Scenario developers should better anticipate the level of NRC response to scenario events if roleplayers are to be utilized to realistically portray NRC officials.

Participants were confronted with the scenario challenge of deciding whether to shut down the reactor in accordance with Technical Specifications or to continue operating the reactor at reduced power level by invoking the provisions of 10 CFR 50.54(x) due to the existence of postulated plant conditions that are beyond those circumstances covered by Technical Specifications. However, as the scenario progressed, the challenge confronting the participants was when they should officially decide that 10 CFR 50.54(x) became applicable and not whether it would be applicable to their emergency response efforts.

In summary, the scenario did provide challenges and events which tested the technical skills of plant management and staff. The basic emergency conditions had a great deal of realism to them including the diesel generator problems and the continuing primary to secondary leak in one of

the steam generators. These aspects, among others, kept the staff busy determining the best corrective actions available. However, as already described in this scenario, there was little involvement for the radiological assessment groups and the inplant and offsite teams.

6. Exit Interview

The inspection team met on July 20, 1989, with the licensee representatives denoted in Section 1 of this report. The team leader discussed the scope and evaluation of the exercise including preliminary inspection findings. There was initially a difference of opinion with the licensee on whether a release of radioactivity should have been acknowledged on the notification form early in the exercise. The licensee contended that this was a small stack release within Technical Specifications. Later in the exercise the EOF Director amended the notification form at the Site Area Emergency level to record the time of release as 0930 rather than a later time. The licensee informally agreed with the NRC team's contention that when a plant is in any declared emergency status any amount or level of released radioactivity should be identified as a release for the benefit of offsite support agencies and the NRC.

Another item discussed was the EOF's security officer's statement that training for this security position at the EOF was never received. Also, an unauthorized document for security officer instructions was found in the officer's duty kit. The procedure to be followed was from the General Office Response Team's Procedures for the EOF, specifically EOF-10, Revision 4. The Property Protection Superintendent agreed to take action to correct the situation. This security related finding was later identified, following this inspection, as an Open Item.

The licensee indicated that none of the items discussed were proprietary.

Attachments:
1. Exercise Scope and Objectives
2. Sequence of Events

1.0 SCOPE AND OBJECTIVES

1.1 SCOPE

PALEX 89 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. This is a utility-only exercise. The Joint Public Information Center will not be activated.

1.2 OBJECTIVES

The exercise will demonstrate the following items as dictated by the scenario:

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

   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. Trending of radiological data

   d. Formulation of appropriate protective action recommendations

   e. 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 approximately 30 minutes

c. Coordination with State of Michigan emergency response organization

d. Mitigation of operational and radiological conditions

e. Mobilization of emergency teams

6. Reentry and Recovery

a. Assessment of damage and formulation of draft recovery plan outline

b. Identification of constraints, requirements and organization to implement the plan

7. Exercise Control

a. Provision for adequate free play

b. Accurate assessment of player performance

PALEX-89
SEQUENCE OF EVENTS

Scenario Time	Event
- 0030	Initial Conditions - Normal Full Power
	Equipment Out of Service: 1-1 Diesel Generator
	Alarms: K-05 Ann 49, Diesel Gen Bkr 152-107 Trip K-05 Ann 51, Diesel Gen No 1-1 Trouble K-05 Ann 52, Diesel Gen No 1-1 Start Signal Blocked
	PCS Leak Rate (Most Recent Results): 0.08 gpm identified, 0.054 unidentified, 0.134 gpm total.
	Estimated Primary to Secondary Leak Rate: 0.02 gpm.

PALEX-89
SEQUENCE OF EVENTS

Scenario Time	Event
0000	A severe thunderstorm warning and tornado watch is received from Murray and Trettel.
0010	Lightning strikes Start-Up Transformer 1-2. "R" Bus de-energizes, 1-2 Diesel Generator starts.
0015	Plant shutdown at 12% per hour should be commenced due to failure to meet the requirements of Technical Specification Sections 3.7.2.b and 3.7.2.i, and an Unusual Event must be declared.
0020	Control room and switchyard relays indicate that Start-Up Transformer 1-2 tripped on ground overcurrent and differential.
0030	Weather conditions continue to deteriorate. Security reports that a funnel cloud has been sighted to the southwest. 1-2 Diesel Generator should be restarted if previously stopped, but not loaded, at this point (declaration of Alert is appropriate but is not required).
0040	1-2 Diesel Generator speed is noted to be erratic.
0045	Security reports that the funnel cloud has dissipated.
0050	Auxiliary Operator reports a severe oil leak on the 1-2 Diesel Generator Turbocharger bearing oil supply flex hose. Turbocharger is screeching; engine speed will not respond to control. 1-2 Diesel Generator should be stopped to stop the oil leak. 1-2 Diesel Generator is inoperable. Power reduction rate should be increased to 24% per hour, as Technical Specification 3.0.3 now applies (again, declaration of Alert is appropriate but is not required).
0100	Reports indicate no plant damage due to storm. No fire or damage evident to Start-Up Transformer 1-2. Control Room and switchyard relays can be reset. (If power was restored to the "R" bus, it would immediately be lost due to high differential; subsequent investigation will reveal a faulted primary winding on Start-Up Transformer 1-2.) An Alert should have been declared by this time.
0110	RIA-0631 in alarm at 30,000 cpm. Stack activity increases slightly (2,000 cpm on RIA-2326).
0150	Primary to secondary leak rate estimated at 0.15 gpm based on off gas sample.
0200	Repairs to 1-1 Diesel Generator are estimated to require 6 hours; operability testing will then require an additional

Scenario Time	Event
	8 hours, with 1-1 Diesel Generator capable of assuming Bus 1C loads approximately 2 hours into the test. 1-2 Diesel Generator Turbocharger is diagnosed as having failed bearing(s) due to loss of oil; repairs are estimated to require 2 days. No time estimate is available for 1-2 Start-Up Transformer.
0230	RIA-0631 count rate stable at 30,000 cpm. Gross gamma activities: 'A' S/G - 7.1 E-6 'B' S/G - < 5.6E-6
0300	Plant shutdown continues at 24% per hour. It should be evident at this point that continued compliance with Technical Specification 3.0.3 will result in complete loss of offsite and onsite AC power. The SED should choose one of two options: A. Reduce power to the lowest practicable level consistent with stable feedwater operation and maintain station power until repairs are complete to 1-1 Diesel Generator. This action will result in violation of Technical Specification 3.0.3, but is permissible under 10 CFR 50.54(x). (No increase in steam generator tube leakage will result from this option.) B. Trip the plant and line up to backfeed via the Main Transformer. This action will result in complete loss of offsite and onsite AC power for approximately 4 hours. (Selection of this option will result in a primary to secondary leak rate of 5 gpm and an unmonitored release of unknown magnitude.) Selection of either option is acceptable but must result in declaration of a Site Area Emergency.
0330	Course of action (Option A or B above) selected.
0400	Reactor stable at approximately 30% or tripped, depending on option selected.
0430	Initial offsite monitoring complete.
0445	Jump ahead to new plant conditions. Plant in Hot Shutdown with 1-1 Diesel Generator carrying basic loads, OR offsite power available via Main Transformer backfeed, depending on option selected. 'A' steam generator is isolated. Enter recovery phase.

PALEX-89
SEQUENCE OF EVENTS

Scenario Time	Event
0500	Commence plant cooldown.
0530	Secure from the drill.