U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/92019(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 Plant

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: August 31- September 3, 1992

Inspectors: J. E. Foster
Team Leader — Date 9/22/92

for A. Markley — Date 9/22/92

Accompanying Personnel: T. Loneragan
E. Hickey
D. Passehl
M. Gamberoni

Approved By: J. W. McCormick-Barger, Chief
for Emergency Preparedness and Non-Power
Reactor Section — Date 9/22/92

Inspection Summary

Inspection on August 31 - September 3, 1992 (Report No. 50-255/92019(DRSS))
Areas Inspected: Routine, announced inspection of the Palisades emergency preparedness exercise involving review of the exercise scenario (IP 82302), observations by six NRC representatives of key functions and locations during the exercise (IP 82301), and follow-up on licensee actions on previously identified items (IP 92701).
Results: No violations, deficiencies or deviations were identified. The licensee demonstrated a good response to a hypothetical scenario involving a steam generator tube rupture event, equipment failures and a large radiological release. One exercise weakness related to failure to classify one of the initial events (high reactor coolant activity) as an Alert was identified (section 6.a). A number of communications problems were observed. This was the first time the licensee had utilized their plant simulator in an exercise, greatly adding to realism for the reactor operators.

DETAILS

1. NRC Observers and Areas Observed

J. Foster, Control Room, Technical Support Center (TSC), Operations Support Center (OSC), Emergency Operations Facility (EOF)
T. Markley, Control Room, TSC, OSC, EOF
T. Lonergan, OSC
E. Hickey, EOF
D. Passehl, Control Room
M. Gamberoni, Control Room, TSC

2. Persons Contacted

Consumers Power Company

*N. Brot, Emergency Preparedness Coordinator
*J. Brunet, Licensing
*A. Clark, ALARA Program Coordinator
*M. Dawson, Nuclear Instructor II
*D. Donnely, Plant Safety and Licensing Director
*J. Kuemin, Licensing Administrator
*R. McCabe, Performance Specialist
*M. Mitchell, GOEP Senior Emergency Planner
*T. Neal, HP Support Superintendent
*K. Osborne, Systems Engineering Manager
*K. Penrod, Nuclear Operations Analyst
*C. Reavy, Senior HP Technician
*M. Savage, Public Affairs Director
*J. Schepers, Performance Specialist
*G. Slade, Plant General Manager
*J. Warner, Property Protection
*J. Werner, Quality Assurance

*Denotes those attending the NRC exit interview held on September 3, 1992.

The inspectors also contacted other licensee personnel during the course of the inspection.

3. Licensee Action on Previously Identified Items (IP 92701)

a. (Closed) Open Item No. 255/90011-01: During the 1990 annual exercise, the licensee failed to adequately coordinate Operational Support Center/Maintenance Support Center (OSC/MSC) activities at a supervisor or director level. There was no adequate method to identify and track inplant teams. The layouts of the OSC and MSC were revised so that the former MSC is essentially a staging area for maintenance and chemistry technicians. A status board was added to the TSC so that the status of inplant teams can be monitored. This organization and system of tracking functioned well during the 1992 exercise. This item is closed.

b. (Closed) Open Item No. 255/91013-01: During the 1991 annual exercise, OSC/MSC functions had improved, but were still considered inadequate as to the methodology of tracking inplant teams, and setting of team task priorities. As noted above, significant changes were made for the 1992 exercise in terms of facility organization, status boards, and tracking of teams and tasks in the TSC. While some improvements can still be accomplished, the system functioned well. This item is closed.

c. (Closed) Open Item No. 255/92005-01: This item tracks the failure to hold a successful augmentation test. The licensee addressed this in Deviation Report D-PAL-91-159, and modified augmentation call-in procedure EI 2.2. Evaluation revealed that much of the problem was related to the call-in systems' (telecomputers) difficulty in recognizing positive responses (tone dialing is not available in all areas). The current procedure calls for one individual to make calls along with the three telecomputers. Records reviewed indicated that the last semi-annual test was considered successful. This item is closed.

4. General

This was an announced, daytime exercise of the Palisades Emergency Plan, conducted at the Palisades Nuclear Plant. The exercise tested the licensee's and offsite agencies emergency support organizations' capabilities to respond to a simulated accident scenario resulting in a major release of radioactive effluent. The state and local counties participated fully, except for Berrien County, which participated partially (Berrien County participates fully with the Donald C. Cook plant). Attachment 1 describes the Scope and Objectives of the exercise and Attachment 2 describes the exercise scenario.

5. General Observations

The licensee's response was coordinated, orderly and timely. If the scenario events had been real, the actions taken by the licensee would have been sufficient to mitigate the accident and permit state and local authorities to take appropriate actions to protect the public's health and safety. Activities by state and local authorities were observed by a team of Federal Emergency Management Agency (FEMA) evaluators. FEMA will be issuing a separate report.

6. Specific Observations (IP 82301)

a. Control Room (CR)

This is the first year that the licensee has utilized a plant simulator for Control Room staff use during an exercise. The use of a simulator greatly enhances the realism of an exercise scenario for operators, but also causes some exercise artificialities. Such exercise artificialities include loss of direct contacts with Control Room staff (the simulator is onsite but distant from the plant) and for full participation exercises such as this, the ability to closely monitor operator actions and prevent actions which would compromise the offsite scenario.

Pre-exercise briefings were thorough and well conducted. Operations personnel appeared to be very knowledgeable of their craft. Changes and trends in parameters monitored by active systems were readily recognized. Use of procedures and technical specifications to evaluate and respond to plant status changes were excellent. Procedure EOP - 1.0, "Post Trip Actions" was performed very well.

The initial event (high reactor coolant system activity) was not assessed nor classified within fifteen minutes. Operators properly consulted plant Technical Specifications, and were aware that coolant activity levels placed them in a 72-hour Limiting Condition for Operation (LCO). However, the Emergency Action Levels (EALs) were not consulted to determine if this event was classifiable as an emergency. A controller prompted the Alert declaration to preserve the offsite scenario timeline. The Alert was declared 20 minutes after Primary Coolant System (PCS) activity exceeded the EAL requirement for the declaration of an Alert. This will be tracked as Inspector Followup Item No. 255/92019-01.

Communication with state and local governments was done promptly after the Alert declaration. There was good use of the Emergency Action checklist. Some ambiguous communication occurred during attempts to sample the containment sump and Primary Coolant System (PCS) at 0929 hours. It was not clear that the various parties understood whether the sump or the PCS or both were being sampled.

No violations or deviations were observed.

b. Technical Support Center (TSC)

The Technical Support Center (TSC) was rapidly activated and assumed responsibility for command and control of the utility response to the accident within goal timeframes.

In general, the existing facility was well utilized. With the confined space, the existence of small rooms and room dividers allowed separation of groups and minimized distractions. The TSC was somewhat crowded and was compact, which contributed to apparent initial confusion. At times, noise levels were high.

Although the activities in this facility initially appeared to be somewhat confused and lacking focus, periodic management briefings conducted by the Site Emergency Director (SED) provided the requisite focus. Command and control became evident.

Good control by the SED at the Directors' briefings was evident throughout the drill. The SED ensured all Directors were present, asked for status from each Director and appropriately solicited suggestions and recommendations for actions such as plant shutdown, operation of atmospheric dumps versus code safety valves, repair of code safety valves and minimization of releases.

In the early stages of the scenario, there were good briefings from the various area Directors (i.e. Health Physics, Maintenance) to their staff following the Directors' meetings with the SED. This did not seriously decline during the exercise but it was not as obvious in the later stages, possibly because of saturation of information.

The decision to commence an orderly shutdown should have come sooner due to the unidentified source of fuel element failures. Although the scenario dealt with mechanical fretting due to vibration, the cause could easily have been loose parts in the reactor vessel.

Offsite authorities did not provide a location where the licensee could direct evacuated non-essential site personnel. The licensee responded well, evaluating the plume pathway and the acceptability of possible relocation centers. This evaluation process did consume some time, possibly delaying other actions.

Emergency Action Level information was continuously reviewed. There was a good response to the decline in overall plant conditions and the characterization of this situation as a General Emergency. The evaluation of emergency classification upgrade from Alert to General Emergency included good discussion, specifically regarding the basis for classification.

The communications group had good discussions with the Emergency Operations Facility (EOF) in preparation for turnover from the TSC to the EOF. The communications group ensured that the EOF had all the correct telephone numbers.

Acceptance of command and control by the EOF was deliberately delayed until several actions, initiated by the TSC, were completed, and this appeared to be a proper decision. When command finally changed from the TSC to the EOF, shift of responsibility was made clear. The SED called the EOF, made an announcement and asked his Directors if they had turned responsibilities over to their EOF counterparts.

There was some uncertainty between the EOF, the TSC and the Control Room regarding the status of the code safety valves. Otherwise there was excellent, continuous communications between the Control Room and the TSC. Activation of the Emergency Response Display System (ERDS) was unsuccessful, and the cause of the failure was unknown.

Status of some of the inplant teams dispatched was unclear later in the drill. For example, the status board showed more than one team dispatched to work on the "R" electrical bus.

Meteorological information was updated and posted throughout the exercise. Downwind sectors were utilized to determine the radius for evacuation (for those sectors).

The board showing plots of plant conditions (i.e. Steam Generator trend) did not appear to be utilized or prominent. However,

updates from the Control Room via telephone kept the SED and staff informed of these critical parameters.

Overall, the TSC performed well in the areas of accountability, TSC and plant announcements, and communications with offsite personnel.

No violations or deviations were observed.

c. Operational Support Center (OSC)

The OSC was activated in an efficient and timely manner and in accordance with Emergency Implementing Procedure EI.4.2.

Telephones, sound powered telephones and radios were expeditiously placed in service and communication was quickly established with the Control Room, the TSC and offsite monitoring teams.

The initial and subsequent routine habitability surveys of the OSC were conducted in a timely and thorough manner. A radiation survey (frisker) station as well as stations for dose and equipment control were established at the entrance of the OSC within ten minutes following initial announcement of the Alert.

Accountability in the OSC was conducted by verbal roll call. Crafts personnel were then quickly relocated to the OSC holding area across the corridor in the locker room.

The OSC director provided timely and adequate updates on the status of the emergency to the OSC occupants. OSC crafts personnel located in the OSC holding area (locker room) heard each update by means of an intercom system between the OSC proper and the holding area.

Several inplant teams were observed from the time of their selection through briefings, team planning, the donning and removal of protective equipment, the selection of primary and/or alternate routes to the work site, and during the conduct of assigned tasks at the work site. The participants in all teams observed demonstrated serious concern for the accomplishment of their assigned tasks and a proficiency in the exercise of good general safety and health physics practices.

Some instruments did not comply with procedure AD 7.01 in that operational checks had not been performed on instruments taken from storage. Some instruments were taken from operational use and had operational checks performed.

Elevated noise levels in the OSC proper appeared to add stress to the conduct of operations, particularly during the briefings and debriefings of OSC teams. The failure to efficiently use the space which was available in the OSC, i.e., the space between the

vending machines, resulted in crowding and the increase of noise levels in the limited space directly in front of the HP Supervisor's station and the OSC Director's Station and their associated communicators. It was in this area that most of the team briefings and debriefings were conducted. A more forceful demand by the OSC Director for maintenance of low noise levels would have reduced the stress during the briefing and debriefing of teams.

OSC personnel organized, dispatched and tracked 29 onsite teams and 2 offsite teams during this exercise. As many as 9 teams were committed at one time, although some of the teams consisted of only one person. All teams were designated by a number on the OSC Team Tracking Status Board. In the above case where 9 teams were in the field they were identified on the OSC status board by team numbers 1 through 9. However, when a numbered team completed its assigned task it was removed from the team status board and a subsequently assigned team would be assigned the same number. Thus during the exercise several teams, each with a different assigned task and composition, could be designated by the same team number. The use of such a system of team designations could lead to confusion in communications in an actual emergency.

At one point it was determined that a particular team would be required to use self contained breathing apparatus (SCBAs). Records of those qualified for the use of SCBAs were not available in the OSC. An HP player was dispatched to the HP control point to obtain a printout of those individuals currently qualified for use of the SCBAs. Due to the simulated contamination between the OSC and the HP Control Point, the HP player was required to dress out in anticontamination clothing, introducing an unnecessary delay into the teams' dispatch. Consideration should be given to ensure that printouts of all such pertinent qualification records be included with the initial equipment kits brought from the HP Control Point to the OSC upon activation.

Although the briefings and debriefings observed during this exercise appeared adequate and were documented on "form 40" message forms, this information was sometimes cryptic. The development and use of a single page briefing and debriefing form for the documentation of essential team guidance in briefings and the documentation of team actions taken in debriefings could provide a useful tool and expedite both the briefing and debriefing process. The use of such a form would also ensure that essential guidance would be provided to each team.

No violations or deviations were observed.

d. Emergency Operations Facility (EOF)

The Emergency Operations Facility (EOF) was set up and ready to assume Command and Control within one hour of the decision to activate the facility. The facility was not prestaged in any way and the actual setup, which included plugging in phones, moving tables and chairs, and hanging status boards was performed in an

efficient manner by the Consumers Power Conference Facility staff. A decision to postpone transfer of command and control from the TSC to the EOF was made to allow the TSC to complete the decision and notification process for upgrading to the General Emergency. This postponement caused the actual activation of the EOF to take approximately 1 hour and 20 minutes. In general, command and control of the event from this facility was very good. The decision making processes were also very good.

The EOF Director quickly established command of the EOF upon arrival and found out what plant status was and the status of the EOF activation. He maintained control of the facility throughout the exercise, although the Emergency Officer (EO) frequently performed duties delegated by the Director.

The EOF Director and the EO performed well as a team. Between the two, they managed, controlled and directed the EOF. Information flow between the two was excellent and allowed each of them the ability to work without too much distraction.

Adequate updates to the EOF staff were made by the EOF Director. In addition, the EOF Director frequently met with the EOF Team Leaders to obtain status of the various activities going on in the EOF.

Although the EOF is 10 miles distant from the plant, the EOF Director was aware of potential habitability problems (since the EOF was potentially in the release plume). Dosimetry was issued to the staff and potassium iodide (KI) was simulated as being given out.

The PAR chart in procedure EI-6.13, attachment 1 needed to be revised to unambiguously state what the criteria were for specific recommendations. There were several different interpretations of the meaning of "consider evacuation if there are no constraints". This wording should be revised and those responsible for making or assisting in the PAR decisionmaking process should be trained on how to use the revised PAR chart. This was considered as an Inspector Followup Item (No. 255/92019-02).

For the most part, communications in the EOF and between other facilities and offsite organizations was adequate; however, there were four communications problems noted:

(1) The EOF was notified that a General Emergency (GE) had been declared at 1017 hours and that information was put on a status board; however, the EOF Director and EO were not immediately aware of this. They found out that the GE was declared through conversations with state personnel.

(2) Most technical information from the TSC was adequately communicated to the EOF; however, there were several occasions where it appeared that the TSC had known valuable or critical information and had not passed it on to the EOF. For example, the EOF did not know until well after the fact

that an auxiliary pressurizer spray system valve had failed closed.

(3) There was some confusion about what protective action recommendations (PARs) were given to the state and the actions that the state had implemented. The EO had to call the state on several occasions to find out what the PAR status was.

(4) Direct radio communications with the offsite field teams did not work, nor was communication with the backup cellular phone adequate. Because of this, the OSC had to maintain contact with the offsite teams and give them directions from the EOF and transfer data back to the EOF. This delayed some dose assessment efforts.

No violations or deviations were observed.

e. Field Monitoring Teams

Field monitoring teams were not directly observed during this exercise.

It was noted that there were considerable radio communications problems with offsite field monitoring teams. The licensee was aware of this problem prior to the exercise, as documented in Deviation Report PAL-92-218, dated August 4, 1992. The radio system manufacturer (Motorola) had been contacted, and evaluated the performance of the system as acceptable. Contact with the Federal Communications Commission indicated that there was another utility whose transmissions could be causing radio interference. Alternate frequencies in the 450-451 MHz band are being considered and will be tested to determine if they are acceptable.

No violations or deviations were observed.

7. Recovery

Following the exercise, a tabletop demonstration of initial actions which would be taken during the Recovery phase of an accident were demonstrated. This included the selection of primary and alternate personnel to fill positions in the Recovery organization and the listing of initial considerations, immediate actions to be taken, and items needed to be considered in subsequent planning. The Recovery procedure was modified since the last exercise and now covers the expected needs of the NRC as well as other considerations. Initial Recovery discussions were considered excellent.

No violations or deviations were observed.

8. Exercise Objectives and Scenario Review (IP 82302)

The licensee submitted the exercise and scope and objectives and a draft scenario package for review by the NRC within the established timeframes. Scenario review did not indicate any significant problems,

and the licensee adequately responded to the questions raised during the scenario review. The scenario package was adequate in scope and content to ensure ease of use and contained enough information so that licensee controllers could control the exercise. Backup information was available in the event that the plant simulator, utilized to "drive" the exercise, failed.

The licensee's scenario was sufficiently challenging for a full participation exercise, including a large offsite release of radioactive materials, multiple equipment failures, and assembly/accountability. The degree of challenge in an exercise scenario is considered when assessing observed exercise weaknesses.

No violations or deviations were observed.

9. Exercise Control

Overall, exercise control was considered adequate. There were adequate controllers to control the exercise, and they were knowledgeable regarding their tasks. No instances of unrequired controller prompting were observed.

No violations or deviations were observed.

10. Licensee Critiques

The licensee held a Controller exercise critique, and a critique where the Controller/Evaluators presented their findings to the players. NRC personnel attended some of these critiques, and determined that significant NRC identified exercise deficiencies had also been identified by licensee personnel.

11. Inspector Followup Items

Inspector Followup Items are matters which have been discussed with the licensee which will be reviewed further by an NRC inspector and which involves some actions on the part of the NRC or licensee or both. An Inspector Followup Item disclosed during this inspection is discussed in Paragraph 6.d of this report.

12. Exit Interview (IP 30703)

The inspectors held an exit interview on September 3, 1992, with the representatives denoted in Section 2. The NRC Team Leader discussed the scope and findings of the inspection. The licensee was also asked if any of the information discussed during the exit interview was proprietary. The licensee responded that none of the information was proprietary.

Attachments:
1. Palisades 1992 Exercise Scope and Objectives
2. Palisades 1992 Exercise Scenario Outline

PALEX-92 SCOPE AND OBJECTIVES

SCOPE

PALEX-92 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 State and local governments. The exercise will include participation by Allegan County, Berrien County, Van Buren County and the State of Michigan. The State of Michigan will demonstrate ingest pathway planning for the Federal Emergency Management Agency. The Joint Public Information Center will be activated during the exercise.

OBJECTIVES

The following objectives will be demonstrated as dictated by the exercise scenario.

1. Assessment and Classification

    a. Assess conditions which warrant classification within fifteen minutes of being provided those conditions.

    b. Classify posed conditions in accordance with Emergency Action Levels within fifteen minutes of determination that conditions warrant classification.

2. Communications

    a. Upon making an emergency classification, complete initial notifications within fifteen minutes to the State and locals and within one hour to the NRC using the Notification form.

    b. Complete subsequent notifications to the State, locals, and NRC on a routine fifteen minute basis or as mutually agreed.

    c. Contact other organizations such as contractors, utilities, fire or medical support within one hour of recognizing that conditions exist that warrant their assistance.

    d. Provide accurate press release information on plant conditions within one hour after occurrence.

    e. Provide updates between appropriate Emergency Response Facilities at least every 30 minutes.

3. Radiological Assessment and Control

    a. Collect, analyze, document and trend radiological survey data.

b. Analyze plant radiological conditions and implement protective actions for site personnel in accordance with procedures.

c. Prepare and brief personnel for activities required in high radiation areas.

d. Monitor, track and document radiation exposure to maintenance, operations, and monitoring team personnel.

e. Calculate dose projections based on sample results or monitor readings.

f. Identify appropriate protective action recommendations.

g. Perform environmental monitoring in accordance with procedures and as directed by the Controller.

4. Emergency Response Facilities

a. Staff and activate onsite Emergency Response Facilities within approximately 30 minutes of an Alert classification.

b. Staff and activate the Emergency Operations Facility within about an hour of the Site Area Emergency declaration.

c. Update status boards at least every 30 minutes.

d. Document field team activities in logs and on appropriate status boards.

e. Track and prioritize status of key in plant jobs.

5. Direction and Control

a. Command and control all Emergency Response Facilities in accordance with assigned functions.

b. Coordinate maintenance activities.

c. Take appropriate measures to secure emergency equipment, supplies, and support.

d. Dispatch field teams in accordance with procedures.

e. Direct and monitor field team actions.

f. Transfer Command and control in accordance with the Site Emergency Plan.

g. Perform accountability within approximately 30 minutes of the Alert classification.

h. Control site access and site evacuation as directed.

i. Brief Emergency Response Facility staffs approximately every 30 minutes on changes in plant status, emergency classification, field team progress, and offsite actions as appropriate.

j. Effectively coordinate with State and local governments as appropriate.

k. Demonstrate reentry and recovery in accordance with procedures.

6. Exercise Control

a. Allow adequate free play for players to demonstrate their capabilities.

b. Accurately assess performance of exercise players and controllers.

SCENARIO SUMMARY:

PALEX-92 is a Steam Generator Tube Rupture event with coincident loss of startup power. It loosely follows the analysis described by the FSAR, Section 14.15 and includes additional complications suggested by the Ginna Steam Generator Tube Rupture event of January 25, 1982.

The Control Room simulator will be used, and to the extent possible, will be run in real time mode. Data sheets have been prepared and will be used if needed.

SEQUENCE OF EVENTS:

-0030/0800 Initial conditions are provided to Players:

The reactor is operating at full power at the end of core life.

Equipment degraded/out of service:

- Radwaste Evaporators M-59A and M-59B
- Limited radwaste storage capacity
- Miscellaneous Waste Transfer Pump P-92A
- Letdown flow indicator FIC-0202
- Containment Sump Level Indicator LIA-0359

Alarms:

- Annunciator EK-11-60, "Radwaste Panel C-105 off-normal"
- Annunciator EK-13-68, "Radwaste Panel C-40 off-normal"
- Annunciator EK-07-71, "Volume Control Radiation Monitor High Radiation"

PCS leak rate (most recent results): 0.08 gpm identified, 0.044 gpm unidentified, 0.124 gpm total.

Estimated primary to secondary leak rate: 0.001 gpm.

0000/0830 The exercise begins with receipt of PCS activity sample results indicating a small amount of failed fuel. An **ALERT** should be declared.

0030/0900 Site Emergency Plan activation complete. A small seal leak develops on CRD-17. A Service Water leak in Containment develops on Containment Air Cooler VHX-3. Progressive fuel rod failures commence.

0115/0945 PCS activity levels greater than permitted by Technical Specifications (confirmed by sample).

0130/1000 A double-ended rupture of a single tube in Steam Generator E-50B occurs, resulting in Reactor trip and loss of Startup power.

0135/1005 **GENERAL EMERGENCY** should be declared.

0145/1015 Operators commence cooldown, resulting in first release at low S/G 'B' activity levels. Auxiliary Spray CV-2117 fails.

0225/1055 The ability to drain S/G 'B' to radwaste is lost.

0325/1155 The second release at high S/G 'B' activity levels commences.

0425/1255 (Estimated)
Time jump conditions are provided to players; recovery planning begins. Players not involved in recovery planning begin critiques.

0630/1500 Recovery planning is completed; the exercise is terminated.

NARRATIVE SUMMARY:

0800 (-0030)

A. The plant is at full power at the end of core life (11.1 GWD/MTU). No Technical Specification surveillance activities are in progress.

B. The plant will commence coast down shortly, with shutdown for refueling outage scheduled for next weekend. Based on current PCS activity trends, Reactor Engineering anticipates finding approximately 5 leaking fuel assemblies during the refueling (all burnt assemblies are to be inspected during the shuffle).

C. Operators are unaware that various additional fuel rods within a single reload "L" fuel bundle are in the process of failing due to vibration-induced mechanical fretting.

D. Plant radwaste capability is extremely taxed. Both radwaste evaporators and the VRS are currently out of service, and just enough clean waste holdup capacity is available to support operation to the weekend and subsequent shutdown and boration.

E. Management expectations as conveyed to operators are that, due to high system demand created by the unseasonably early warm spring weather, every attempt consistent with safe plant operation shall be made to adhere to the scheduled weekend shutdown and that no testing or evolutions which have the potential to jeopardize this goal are to be authorized (the reason for this admonition is that an attempt to perform turbine valve testing the previous weekend to check out new DEH controls had resulted in an unanticipated derate to 60%).

F. Equipment in a degraded mode:

1. Radwaste Evaporator M-59A has been out of service for one month due to non-availability of obsolete parts.

2. Radwaste Evaporator M-59B is out of service to replace "rocked up" recirculation pump discharge lines.

3. The Volume Reduction System is out of service while repairs are made to the extruder.

4. Miscellaneous Waste Transfer Pump P-92A is tagged out for pump rebuild and motor replacement and is completely disassembled.

5. Letdown Flow Indicator FIC-0202, while in service, is out of calibration and reads approximately 5 gpm too low. A work request has been submitted.

6. Containment Sump Level Indicator LIA-0359 is out of service due to failed meter movement. A replacement meter is on order. (This malfunction is necessary due to simulator modeling limitations.)

G. Radwaste Systems tank status:

Clean Waste System:	Dirty Waste System:
T-64A CWRT Level 95%	T-92A Misc Waste Tk Level 97%
T-64B CWRT Level 95%	T-92B Misc Waste Tk Level 98%
T-64C CWRT Level 56%	T-92C Misc Waste Tk Level 75%
T-64D CWRT Level 0%	T-94A Clean Conc Tk Level 98%
T-96 RBAT Level 10% 15,200ppm	T-94B Clean Conc Tk Level 97%
	T-95A Dirty Conc Tk Level 97%
	T-95B Dirty Conc Tk Level 98%

H. Existing Alarm Conditions:

1. Annunciator EK-11-60, "Radwaste Panel C-105 off-normal"

2. Annunciator EK-13-68, "Radwaste Panel C-40 off-normal"

3. Annunciator EK-07-71, "Volume Control Radiation Monitor High Radiation" has just been received. Chemistry has been directed to sample the PCS for activity and is in the process of obtaining the sample.

I. Meteorological Conditions are as follows:

1. Unusually warm and dry spring conditions exist, with sustained winds from the southwest.

   a. Wind Speed: 2-4 mph

   b. Wind Direction: 225 degrees

   c. Stability: D/E

   d. Ambient Temperature: 80-90 degrees Fahrenheit

J. Primary and Secondary Chemistry

1. Primary System Chemistry (prior to sample in progress)

   a. pH: 7.07

   b. Boron: 5 ppm

c. Dissolved Oxygen: less than 0.002 ppm

d. Hydrogen: 25 cc/kg

e. Total Beta Gamma Activity: 2.04 µCi/ml

f. Iodine Dose Equivalent: 0.053 µCi/ml

g. Total PCS Gas Activity: 15.2 µCi/ml

h. PCS Xe-133 Specific Isotope Activity: 40.0 µCi/ml

2. Secondary System Chemistry

a. Primary to Secondary Leak Rate: 0.001 gpm

b. Offgas Xe-133: 5.42E^{4} µCi/ml

c. Condenser Air In-leakage: 1 scfm

d. A and B Steam Generator Gross Gamma Activities: Less than 5.6E µCi/ml

K. PCS Leak Rate (most recent results)

1. Identified: 0.08 gpm

2. Unidentified: 0.044 gpm

3. Total: 0.124 gpm

0830 - 0900 (0000 - 0030)

A. The exercise begins with the hot lab Chemistry Technician reporting initial PCS activity results of 30 µCi/gm Iodine dose equivalent I-131. Subsequent backup samples will yield similar results, ie, results that permit continued operation for up to 72 hours under the LCO of Technical Specifications 3.1.4.b and c (which are designed to accommodate possible Iodine spiking phenomenon resulting from thermal power excursions such as the previous weekend).

B. Expected Actions:

1. Conclude that fuel damage may be indicated and refer to ONP-11.1, "Fuel Cladding Failure" and Emergency Plan Implementing Procedure EI-1.

2. The Shift Supervisor will assume the Site Emergency Director (SED) position and:

   a. Classify an **"ALERT"** based on "Primary Coolant Iodine-131 Dose Equivalent Concentration greater than 25 µCi/gm."

   b. Directs a public address announcement on the situation and sounding of the emergency siren.

   c. Delegates actions and notifications identified in EI-1 and marked on EI-2.1 Attachment 1, including emergency staff augmentation; personnel accountability; activation of the Operational Support Center (OSC) and Technical Support Center (TSC); dose assessment; and activation of the Emergency Response Data System (ERDS).

   d. Directs completion of the emergency notification forms of EI-3 and NOD Form 3160.

   e. Commences 15 minute notifications per EI-3.

3. The PCS Sample requirements for isotopic Iodine analysis of Technical Specification Table 4.2.1 will be invoked.

0900 - 0930 (0030 - 0100)

A. Activation of the Site Emergency Plan continues.

B. "Rod Drive Seal Leakoff High Temperature" Alarm is received (EK-09-54) due to a small (approximately 0.1 gpm) increase in seal leakage on CRD-17.

C. "Containment Sump High Level" Alarm is received (EK-13-51) due to a Service Water leak of approximately 15 gpm which has developed on Containment Air Cooler VHX-3. (**NOTE:** Due to simulator modeling limitations, indicated Containment Sump Level will ramp to 10% and remain there for the duration of the exercise, rather than respond as expected to attempts to drain the sump.)

D. Progressive fuel rod failures in the affected Reload "L" fuel bundle commence.

E. Expected Actions:

   1. Complete staffing of the OSC, MSC and TSC and turnover responsibility.

   2. Continue PCS activity samples via NSSS sample system while considering implementation of EI-7.0, Emergency Post-Accident Sampling Decision Process.

3. Alarm Response Procedures will force players to consider the possibility of a PCS leak, although the two alarming conditions (Rod Drive Seal Leakoff High Temperature and Containment Sump High Level) are actually unrelated. No other corresponding symptoms are present, and it would be appropriate to consider a Containment entry, although containment conditions are somewhat suspect. Also, performance of a quick (one hour) PCS leak rate calculation would be prudent (if performed, an increase of approximately 0.1 gpm due to the leaking CRD-17 seal would be indicated).

4. Players will attempt to obtain a sample of Containment Sump contents to assist in determining leakage source. If successful, high sodium will be indicated, symptomatic of a Service Water leak.

5. Players will recognize that the Containment Sump leakage represents a new dirty radwaste source (greater than 21,000 gallons/day) that will quickly expend remaining dirty waste storage capacity and will attempt to identify alternate storage options and maintenance activities to increase radwaste processing capability (eg, expedite repairs to "B" evaporator).

6. Repairs will be expedited to Letdown Flow Indicator FIC-0202.

0930 - 0945 (0100 - 0115)

A. JPIC is operational.

B. PCS activity levels increase as the Reload "L" fuel bundle rods fail.

C. Players make preparations to transfer radwaste to alternate storage locations using available equipment and temporary modifications as necessary. Meanwhile, dirty radwaste activity levels continue to increase due to CRD seal leakage to the Containment Sump and NSSS sampling activities.

D. Control Room personnel continue activities to identify and quantify the containment water source.

E. Expected Actions:

1. Players will identify adequate radwaste storage capacity to accommodate dirty waste and permit continued operation. Acceptable options include:

a. Treated Waste Monitor Tanks T-66A and T-66B (10,800 gallons capacity).

b. Filtered Waste Monitor Tanks T-63A and T-63B (5,400 gallons capacity).

c. Laundry Drain Tanks T-70A and T-70B (1,100 gallons capacity).

d. Temporary modifications, valve lineups and procedures are required for all options identified.

2. The containment water source will be identified as service water and the LCO of Technical Specification 3.4.2 will be entered.

3. Players will not elect to retain water in the Containment Sump due to negative implications for various accident analyses.

4. Players may decide that they cannot support continued operation and commence plant shutdown. This is permissible, although unnecessary at this point, but if undertaken it must be controlled to as slow a rate as possible ("to minimize fuel effects") since scenario data sheets will not reflect the shutdown until 0945 (0115).

0945 - 1000 (0115 - 0130)

A. The latest PCS activity sample indicates 50 µCi/gm Iodine dose equivalent I-131. This is confirmed by a second sample.

B. Expected Actions:

1. Commence plant shutdown to conform to Technical Specification 3.1.4.c.

1000 - 1007 (0130 - 0137)

A. A double-ended rupture of a single tube in Steam Generator E-50B occurs, resulting in a primary to secondary leak which exceeds the capacity of the Charging Pumps.

B. Operators trip the Reactor, or an automatic trip on Thermal Margin/Low Pressure occurs.

C. Two seconds after the Turbine Generator trips and busses 1A and 1B fast transfer to Startup Transformers 1-1 and 1-3, respectively, the 'R' Bus trips due to failed sudden pressure relay 486X-11 on Startup Transformer 1-1, deenergizing Busses 1A and 1B and supplied loads (Primary Coolant Pumps and Condensate Pumps).

D. An Iodine spike generated by the trip (spiking factor = 500) occurs.

E. Auxiliary Feedwater Automatic Actuation occurs due to low level in the 'A' Steam Generator and commences feeding both S/G's.

F. Five minutes after the trip, Safety Injection is automatically initiated at 1605 psia. Flow to the PCS begins approximately fourteen minutes after the trip.

G. Expected Actions:

1. EOP-1.0 standard post-trip actions will be commenced.

2. A **GENERAL EMERGENCY** will be declared due to loss of all three fission product barriers, as all Atmospheric Dump Valves automatically open on the trip for core heat removal.

1007 - 1015 (0137 - 0145)

A. EOP-1.0 standard post-trip actions are completed.

B. The Pressurizer, which had emptied shortly after the trip, begins to refill from Safety Injection flow.

C. Expected Actions:

1. The EOF will be declared operational and assume responsibilities for Protective Action Recommendations.

2. EOP-5.0, "Steam Generator Tube Rupture" will be invoked (EOP-9.0, "Functional Recovery Procedure" is also acceptable, although unnecessary).

1015 - 1055 (0145 - 0225)

A. Operators implement EOP-5.0 actions and, since no Primary Coolant Pumps are operating and the Turbine Bypass valve is disabled by low condenser vacuum, commence steaming both Steam Generators via the Atmospheric Dump Valves to provide uniform PCS cooling. This creates a direct release path via 'B' Steam Generator Atmospheric Dump Valves.

B. The faulted Steam Generator is readily recognized as E-50B, but isolation is not permitted until the PCS is cooled below 525 degrees Fahrenheit as forced circulation does not exist.

C. Since PCP's are not is service, PCS depressurization is attempted using Charging Pumps and Auxiliary Spray CV-2117; however, CV-2117 is failed in the closed position due to a burned up solenoid (position indication is still operable). This will hamper pressure reduction and place reliance on Safety Injection throttling to minimize the d/p across the failed S/G 'B' tube, which will not be effective in preventing the S/G from filling solid and challenging the code safeties.

D. Expected Actions:

1. Operators will terminate Auxiliary Feedwater to S/G 'B' (it will continue to fill via the Failed Tube).

2. The PCS will be cooled below 525 degrees fahrenheit using Atmospheric Dump Valves and Auxiliary Feedwater to S/G 'A' and S/G 'B' will be isolated. The release via the S/G 'B' Atmospheric Dump Valves will thus cease for the present.

3. Protective Action Recommendations will be made to the State recommending evacuation of affected sectors in Van Buren and Allegan counties.

1055 - 1145 (0225 - 0315)

A. 'B' Steam Generator, although isolated, continues to fill rapidly via the ruptured tube due to the high primary-to-secondary dP created by the inability to adequately reduce PCS pressure (Note: The fill rate will be artificially adjusted on the simulator such that the 'B' S/G and connecting steam piping will fill solid in one hour.)

B. Operators continue to cool down as rapidly as possible under natural circulation conditions using the unaffected 'A' Steam Generator (approximately 50 degrees Fahrenheit/hr).

C. Expected Actions:

1. Operators will attempt to combat the rapidly increasing S/G 'B' level by transferring Miscellaneous Waste Hold Tank contents to a Clean Waste Receiver Tank to make room to drain S/G 'B' to Miscellaneous Waste (requires jumpering by I&C of S/G Blowdown Monitor RIA-0707); however, this attempt will result in the remaining Miscellaneous Waste Transfer Pump, P-92B, failing due to motor overheating. Alternate drain paths will not be identified.

2. Area surveys will identify affected plant sectors, and access will be restricted/controlled as appropriate.

3. Operators may attempt to regain forced circulation by backfeeding the Main Transformer; this option will not be permitted until after 1145 (0315) to hamper PCS pressure reduction efforts. (Also, the simulator does not currently model backfeed.)

1145 - 1245 (est) (0315 - 0415) (est)

A. 'B' Steam Generator level is greater than 100% and is filling the connecting Main Steam piping.

B. 'B' S/G contents are now highly radioactive with PCS fission products.

C. Players are faced with two choices:

1. Permit steam piping to fill solid and hope for the best.

2. Steam S/G 'B' to cool it and reduce its level to prevent challenging Main Steam safeties.

D. Election of either option of C above will result in a release to the atmosphere (if players permit steam piping to fill solid, either a code safety will open and fail open or an overstressed piping section will yield and fail, depending on how successful players have been at reducing 'B' S/G pressure previously).

E. Expected Actions:

1. Players will elect to Steam 'B' Steam Generator as necessary to maintain level indication on scale until such a time as 'B' S/G pressure is below safety valve setpoints and then permit steam piping to fill solid. This action permits planned releases that can be coordinated with evacuation and other Protective Action Recommendations and offsite monitoring efforts.

2. Protective Action Recommendations will be revised as appropriate.

3. The release of this phase of the exercise may be continued as long as necessary to demonstrate exercise objectives.

1245 (est) - 1500 (0415 (est) - 0630)

A. Players are provided new plant conditions. Personnel not involved in recovery planning terminate participation and conduct critiques.

B. Approximately 8 hours have elapsed from the time of the plant trip. Forced circulation has been regained by backfeeding the Main Transformer and restarting PCP's P-50B and P-50C. Shutdown Cooling is in service, the Pressurizer is filled solid, and PCS cooldown is in progress at 40 degrees fahrenheit/hr.

C. 'B' Steam Generator is re-isolated (or steaming to atmosphere slowly if the piping break option was necessary) and is filled solid.

D. Expected Actions:

1. Implement plans for reentry/recovery.

2. Continue to cool down at the maximum permitted rate.

3. Implement appropriate radiological controls for both primary and secondary systems high fission product contents.

4. Consider options to minimize release from the steam line break (if the piping break option was necessary), eg, temporary barriers/enclosures.

1500 + (0630 +)

Terminate exercise.