U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/85041(DRSS)

Docket No. 50-341 License No. NPF-33

Lisensee: The Detroit Edison Company
6400 North Dixie Highway
Newport, MI 48166

Facility Name: Enrico Fermi Atomic Power Plant

Inspection At: Fermi 2 site, Monroe, MI

Inspection Conducted: October 1-3, 1985

Inspectors: W. Snell
Team Leader — 10/21/85 Date

N. Williamsen — 10/21/85 Date

Approved By: M. Phillips, Chief
Emergency Preparedness Section — 10/21/85 Date

Inspection Summary:

Inspection on October 1-3, 1985 (Report No. 50-341/85041(DRSS))
Areas Inspected: Routine, announced inspection of the Enrico Fermi Atomic Power Plant, Unit 2 emergency preparedness exercise involving observations by seven NRC representatives of key functions and locations during the exercise. The inspection involved 105 inspector-hours by three NRC inspectors and four consultants.
Results: No violations, deficiencies, or deviations were identified; however, one exercise weakness was identified in the area of protective action decisionmaking.

DETAILS

1. Persons Contacted

NRC Observers and Areas Observed

B. Haagensen, Control Room
G. Arthur, Technical Support Center (TSC)
T. Essig, Operational Support Center (OSC), Inplant Teams
N. Williamsen, Emergency Operations Facility (EOF)
M. Phillips, EOF
J. Pappin, Offsite Radiological Emergency Teams
W. Snell, Control Room, TSC, EOF
P. Byron, SRI, NRC

Detroit Edison Company

W. Jens, Vice-President, Nuclear Operations
F. Agosti, Manager, Nuclear Operations
T. Randazzo, Director, Regulatory Affairs
E. Madsen, Principal Engineer, RERP
J. Mulvehill, EP Response Planner
J. Conen, Engineer
S. McCann, Technical Specialist
R. Eberhardt, Rad-Chem Engineer
R. Andersen, Supervisor, Rad Engineering
S. Bartman, Chemical Engineer
J. Tozser, Senior Engineer
J. Korte, Acting Nuclear Security Coordinator
S. Thomson, Assistant Director, Nuclear Security
R. Taylor, Nuclear Shift Lieutenant
K. Thompson, Senior Nuclear Training Specialist
S. Latone, Director, Nuclear Training
S. Pembleton, Work Leader
D. Johnson, Lead Simulator Specialist
J. Petoskey, Associate Nuclear Training Specialist
M. Hall, Nuclear Shift Supervisor
M. Batch, Supervisor, NFE
G. Ohlemacher, Technical Engineering Supervisor
C. Sexauer, Nuclear Production Administrator
M. Kluska-Vleik, Staff Assistant
D. Ferencz, QA Advisor
T. Barrett, Nuclear Training Specialist
L. Cook, Nuclear Training Specialist
D. Piening, Nuclear Training Specialist
G. Kenney, Senior Nuclear Training Specialist
R. Lenart, Assistant Manager, Nuclear Power
E. Preston, Operations Engineer, Nuclear Power
P. Lovallo, Engineer, Nuclear Power
B. Cummings, Radwaste Operations Engineer
M. Hoffmann, Senior Nuclear Operations Specialist
L. Layton, Supervisor, Nuclear Information

J. Piana, General Director, NOS
G. Trahey, Director, NQA
W. Colbert, Director, Nuclear Engineering
J. Kepus, Environmental Programs Coordinator
A. Wegele, Licensing Engineer
B. Wickman, Supervisor, M&M QA

All personnel listed above attended the exit interview on October 3, 1985.

2. General

An exercise of the licensee's Radiological Emergency Response Preparedness (RERP) Program was conducted at the Enrico Fermi Atomic Power Plant, Unit 2, on October 2, 1985, testing the response of the licensee to a hypothetical accident scenario resulting in a major release of radioactive effluent. Attachment 1 describes the Scope and Objectives of the exercise and Attachment 2 describes the exercise scenario. This was a utility only exercise.

3. General Observations

a. Procedures

This exercise was conducted in accordance with 10 CFR Part 50, Appendix E requirements using the Enrico Fermi Unit 2 RERP and RERP Implementing Procedures.

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.

c. Observers

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

d. Critique

A critique was held with the licensee and NRC representatives on October 3, 1985, the day after the exercise. The NRC discussed the observed strengths and weaknesses during the exit interview.

4. Specific Observations

a. Control Room

The Control Room Operators pursued accident mitigation actions throughout the exercise. They solved problems using a coordinated, teamwork approach and demonstrated tenacity in their attempts to find alternate methods of injecting water into the core.

Offsite notifications were conducted promptly and professionally with the declaration of the Unusual Event and the Alert emergency classifications completed within 15 minutes.

The major shortcoming identified in the control room was that the Control Room Operators were not aware that a release was in progress until 1 hour and 30 minutes from the time that the release had started. They had positive indications of a release from the standby gas treatment system effluent monitors (AXM and SPING monitors) but the operators did not realize that these conditions meant that a release was in progress. Effuent monitor readings of 4 x 10(E+4) µCi/cc (normal background reading was 1 x 10(E-5) µCi/cc) were not correlated with a release. This caused a delay in recognizing that conditions were appropriate for escalation to a General Emergency Classification. The fact that there was an on going major release in progress was finally recognized when the control room overheard the reports from offsite radiation monitoring teams showing high radiation levels offsite.

The inspector alsc believed that the Control Room staff took an unnecessarily long period of time to determine the magnitude of the unidentified leakage. It took 58 minutes from the time that the leak started and 31 minutes from the time that the Control Room staff realized that a leak existed, to compute a leak rate.

Assembly/accountability, which was initiated from the Control Room was completed within the required 30 minutes. In addition, the contaminated injured person scenario was coordinated and tracked carefully from the control room. Proper notifications were made to the hospital, plant security, the OSC, and EOF. The site public announcing system was used very effectively to inform personnel and to direct activities when such direction was warranted.

Control Room Operators continued to verify emergency classification decisions and protective action recommendations even after being relieved of the responsibility to make the classification and protective action recommendations. They were an excellent backup to the TSC and EOF teams throughout the exercise.

b. Technical Support Center (TSC)

The TSC was quickly and methodically manned and activated, and the Emergency Director made frequent and detailed status reports on the TSC internal public address system. The members of the TSC worked together effectively to solve problems and attempting to mitigate the emergency conditions.

Declarations of the Site Area Emergency and General Emergency were both made in the TSC. Notifications to offsite authorities as a result of those declarations were completed within 15 minutes. However, protective action recommendations (PAR) relating to those declarations were poor. Based on worsening plant conditions, a PAR of sheltering was provided to the State of Michigan, while still in

the Site Area Emergency. Since by definition, a Site Area Emergency does not warrant offsite PARs (see EP-545, Protective Action Guidelines Recommendations), this recommendation should have been accompanied or preceded by an escalation to a General Emergency based on these same worsening plant conditions. In addition, the recommendation of sheltering in the downwind sectors never gave consideration to the forecast of a changing wind direction. The inappropriateness of the downwind sectors selected for sheltering was compounded by the fact that the Emergency Director recommended protective actions for only two sectors when the wind direction was near the sector boundary. Had the more conservative approach of going to the four downwind sectors or picking a third sector in the direction towards which the wind was expected to change would have kept the PARs closer to what the conditions actually called for. These weaknesses in the area of PARs will be tracked as Open Item No. 341/85041-01. It was also noted that when making the notifications to the State of Michigan per EP-290, Emergency Notifications from the Control Room, Technical Support Center or Emergency Operations Facility, for the Site Area and General Emergencies, the PAR portion of Attachment 2 was never filled out as required. Instead the Emergency Director gave the PARs to the State by telephone.

Although information on status boards were generally maintained current, some information on the "Plant Status" board in the TSC was obviously out dated. For example, reactor power was still shown at 70% and decreasing at the end of the exercise.

c. Operational Support Center (OSC)

The OSC radiation protection staff demonstrated proper knowledge of health physics principles and practices. In particular, good ALARA practices were demonstrated by the in-plant teams.

The Post Accident Sampling System (PASS) operation went smoothly and was well within the 3 hour objective for this activity. The individuals collecting and analyzing the sample (RHR liquid) were knowledgeable of the procedures used. However, only a single individual from the chemistry group was involved with sample collection. The technique most frequently used at other facilities includes one individual calling out and checking-off completion of procedural steps (e.g., specific valve operations), while a second individual actually performs the operations. Although no problems were observed with the single person carrying out the task, observations of PASS operation at other facilities has shown the two-person approach can significantly decrease the chance of errors being introduced into the process.

All players were present in the OSC quickly following the PA announcement for all staff to report to their respective duty stations. However, it was not clear when the activation of the OSC was complete because no announcement was made relative to the OSC's readiness.

The leadership function in the OSC (the OSC Coordinator position) needs to be strengthened. In addition to the fact that there were no statements of OSC readiness issued by the Coordinator, no briefing of the staff with regard to the status of repair and other support activities were made during the exercise.

Although communication capability between in-plant team members while wearing a supplied-air breathing apparatus was demonstrated, the lack of voice amplifiers appeared to hinder communications via the plant PA system. Had the background noise been somewhat higher (which is quite possible in certain areas of the plant), team members would have had considerable difficulty understanding the briefing provided to RET No. 6 by the HP Technician at 1125, likely necessitating the use of voice amplifiers.

d. Offsite Radiological Emergency Teams

All equipment used by the offsite Radiological Emergency Teams (RET) were in good operating condition and within calibration dates. The teams did a good job of log keeping with all forms and labels adequately filled out.

Checklists were available and used during the initial equipment checkout. However, the RET kits were too large to fit into two of the three vehicles used by the teams. This necessitated disassembly of the kits which caused time delays.

Although the teams were knowledgeable of the duties and responsibilities and performed their tasks as assigned, their main weakness was in their lack of ability to look out for their own personal health and safety. For example, they did not analyze instrument readings themselves, but instead filled out the forms, and transmitted all the information on the forms back to the RET Coordinator for analysis while in the middle of the plume. This resulted in the team waiting in a high dose area for an excessive amount of time while communicating the information and waiting for the RET Coordinators response. If the teams were able to analyze the instrument readings themselves, they would know when to leave a high dose area and could avoid lengthy exposure times. This failure to follow ALARA considerations for the offsite teams is an Open Item, and will be tracked as Open Item No. 341/85041-02.

The teams made frequent checks of their self-reading dosimeters (SRD) and called the readings back to the RET Coordinator. However, in one instance a SRD malfunctioned (offscale high) and was replaced with another from the kit; but this was never reported to the RET Coordinator.

Radio communications with the RET's was good. Teams were frequently updated on plant and meteorological conditions.

e. Emergency Operations Facility (EOF)

The EOF was quickly and efficiently set up well ahead of the functional activation, including access control, dosimetry, and air sampling. Log-keeping was excellent, with a typist entering data and reports directly into electronic memory. The communications to the corporate headquarters in Detroit were prompt, via an electronic data link from the Emergency Officer's desk directly to corporate headquarters. This data link was also tied in to the log-keeping electronic memory.

The formal activation of the EOF was poorly done from two standpoints. First, there was no deliberate questioning of the various EOF section heads to ensure that each team was ready to accept their responsibilities, and secondly there was no two-way conversation between the Emergency Director at the TSC and the Emergency Officer at the EOF which would culminate with transfer of control. Instead, the EOF coordinator announced to his staff that the EOF was activated, and then telephoned the Emergency Director at the TSC to inform him that the EOF had taken control.

Status boards in the EOF were generally well used and kept up to date. However, although there were status boards for meteorological data, notification information, offside dose rates, and a log of emergency events, there was no status board for plant status, especially conditions necessary to make protective action recommendations based on care and containment conditions, and trending. This made it difficult for the staff to understand events happening at the plant. The failure to maintain adequate status boards to trend plant conditions affecting protective action recommendations on offsite releases will be tracked as Open Item No. 341/85041-03.

The dose assessors were knowledgeable of their duties. They properly verified their calculations with the dose assessment team at the Technical Support Center. However, the TSC and EOF dose projection was performed using the containment high range radiation monitor system readings instead of actual release rate information from the standby gas treatment system (SGTS) process monitors. Use of the SGTS monitors would have yielded more accurate dose projections. In addition, neither the TSC nor EOF aggressively pursued the determination of PARs using dose assessments based on projected plant conditions. Combining information on plant status with trending of data can lead to projections on time of release, release durations, and release magnitudes which can be used in dose projection to help determine future PARs. The EOF did pursue this late in the exercise, and what was done by both facilities was good, but it should have been pursued much earlier and to a greater extent.

The dose assessors had available to them procedures for both hand-calculated, and computer calculated dose rates, of which they used

the computer exclusively. However, the computer was not programmed to handle an anticipated transient without scram (ATWS), or any other calculation where the time of reactor shutdown was not prior to the time of the data point value. This caused a problem early in the exercise when the assessment team tried to input an accident time earlier than the reactor shutdown and the computer would not accept such data. Although this problem subsequently disappeared since the relatively small amount of radioactive release prior to shutdown became insignificant compared to the progressively larger releases during the scenario, the computer program should be modified to handle the ATWS type of scenario. Problems with the dose assessments code's ability to handle calculations with a future or no reactor shutdown time will be tracked as Open Item No. 341/85041-04.

The major problem in the EOF was that the protective action recommendations failed to take into account both the current wind direction and the forecast wind direction. Specifically, when the EOF became activated at 1010 hours, the existing PAR to the State was for sheltering in all sectors out to 2 miles, plus additional sheltering downwind in sectors M and N. That PAR had been made by the TSC at 0950 hours when the wind was indeed towards sectors M and N. However, at the time that the EOF became activated, the wind had already shifted towards sector R, and more important, the wind direction forecast had been entered on one of the status boards as becoming southwesterly (towards sectors B and C) after noon. The EOF failed to recognize either of these factors and upgrade the protective action recommendation. At 1024 the State telephoned to say that they were not accepting the PAR for sectors M and N but were ordering the 2 to 5 mile downwind sheltering for sectors Q, R and A, consistent with the then-existing wind direction. At that point the EOF properly recommended sheltering to 5 miles for all sectors, because of the highly variable wind direction and at 1035 hours it was announced that the State concurred with that recommendation. This failure to recognize the importance of both the current wind direction and forecast of wind direction is an exercise weakness and will be tracked as part of Open Item No. 341/85041-01 identified in Section 4.b.

Contamination control at the EOF was properly executed with all incoming personnel self-frisking and surveys of the EOF floor conducted repeatedly in order to monitor for any radioactive contamination.

Communications with the State of Michigan were good. Information was transmitted in both directions, so that the EOF was consistently informed as to whether the State had accepted the licensee's protective action recommendations and also whether the PAR had been accomplished.

There was good dispatch control from the EOF to the offsite monitoring teams. Radio communication was from an adjacent low-noise room and the teams responded properly to their instructions from the EOF.

5. Exercise Scenario and Control

The exercise scenario was very good in that it was above average in difficulty. Because of the particularly challenging aspect of the scenario that dealt with determining protective action recommendations in conjunction with meteorology, an important weakness in the licensee's capability was identified. A certain amount of credit is due the licensee for their willingness to challenge themselves with a difficult exercise as a means to uncover these types of weaknesses.

The scenario anticipated most player actions which enabled it to stay on schedule with little controller intervention. The use of the simulator for the Control Room staff added a significant amount of realism to the exercise and was well run by the controllers. No cases of controller prompting were observed.

Data for the exercise was generally detailed and comprehensive. Only two areas were noted where more data would have been helpful. The first was that beta radiation data (window open readings) were lacking for all in-plant locations. Team members were noted on several occasions to request these data. Secondly, the radiation levels associated with the various samples collected by in-plant teams were not available. Exposure rates associated with handling of PASS samples and air samples would have been helpful.

6. Exit Interview

The inspectors held an exit interview the day after the exercise on October 3, 1985, with the representatives denoted in Section 1. 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 was proprietary. The licensee responded that none of the information was proprietary.

Attachments:
1. Fermi Exercise Scope and Objectives
2. Fermi Exercise Scenario Outline

SECTION 3 - SCOPE, OBJECTIVES, AND SIMULATIONS FOR FERMEX 85

3.1 DETROIT EDISON

3.1.1 INTRODUCTION

FERMEX 85 was scheduled as a "Licensee-Only" exercise to be evaluated by the NRC. However, Monroe County has requested to participate to exercise their newly completed EOC. Since it is not a scheduled year for local participation, the local Emergency Response Organization will not be evaluated by FEMA. As a result, the State of Michigan will function as an "answering service", not a participant, to pass through the information needed by the County to exercise their response organization.

Additionally, Canada has requested to participate informally from the Fermi 2 EOF to exercise their emergency response plans for the communities that lie closest to the Fermi site.

Edison has completed its permanent Emergency Response Facilities, (OSC, TSC, EOF), including the closed-circuit television in the TSC, and has established the permanent Emergency Response Organization. The Emergency Response Information System (ERIS), which includes SPDS, plant parameters and trends, dose assessment, and real-time meteorology is installed but will not be functional until Decemb. 1985. Since FERMEX 84, Edison has completed the installation of its Simulator.

FERMEX 84 demonstrated that the ERFs were adequate and operational, the RERP Plan and Procedures were in place, and Emergency Response Organization personnel were trained and capable of responding to a radiological event at Fermi 2 without ERIS functional.

3.1.2 SCOPE

FERMEX 85 will simulate an emergency at Fermi 2 that will result in a radiological event that will require response from Monroe County and the Province of Ontario, Canada Emergency Response Organizations. The exercise is designed to test Edison's response to various plant emergencies; to establish the communications and coordination between Edison and the local offsite governmental Emergency Response Organizations and Facilities; and address the specific responsibilities, capabilities, and interfaces of the majority of the organized elements of the Fermi 2 RERP Plan and Implementing Procedures.

A simulated abnormal radiological incident at Fermi 2 escalates to a GENERAL EMERGENCY. The emergency then deescalates to the Reentry and Recovery Phase where it terminates.

As the capabilities of Edison and the various participating offsite governmental response organizations are brought into play, the effectiveness and efficiency of the Fermi 2 organization's response will be independently evaluated by the NRC.

3.1.3 OBJECTIVES

The overall objective of FERMEX 85 is to demonstrate the following capabilities from the Fermi 2 Simulator Control Room:

1. The adequacy of the RERP Plan and its Implementing Procedures and the proficiency of the Emergency Response Organization to select and use the appropriate procedures for response to the emergency.

2. To demonstrate the response of Control Room operators to a radiological incident at Fermi 2 by manipulating the simulator controls with a minimum of exercise messages and Controller interfaces

3. To demonstrate the adequacy of the Simulator Control Room communications system to conduct an emergency exercise.

4. The adequacy and effectiveness of the permanent emergency communications network between Fermi 2, local, and Canadian agencies and the NRC's Emergency Notification System.

5. To demonstrate proficiency in recognizing, understanding, and applying the Emergency Action Levels in classifying emergency conditions.

6. The capabilities of the Simulator Control Room personnel to properly use procedures and forms provided for notification of State, local and Canadian (when required) governmental agencies within 15 minutes of classification of the event and to notify the NRC within 1 hour.

7. The capability of the TSC and EOF to properly notify State and local governmental agencies within 15 minutes of classification of the event and to notify and maintain contact with the NRC within 1 hour.

8. The capability of the Emergency Response Organization to provide follow-up reports to State, local agencies, and to the NRC on a periodic basis.

9. The capability to activate the Joint Public Information Center and to produce public information releases and respond to public inquires on a timely basis.

10. The capability to perform timely offsite dose assessments, including lake breeze conditions, based on the use of a microcomputer.

11. The capability to recommend to the responsible State officials protective actions for the general public in the 10-mile EPZ based on plant conditions, potential and/or actual radiological releases, and meteorological data on a timely basis (within 15 minutes of declaring a GENERAL EMERGENCY).

12. The capability of the Offsite RETs to locate the plume, to obtain air samples, to collect environmental samples and deliver them to the EOF Laboratory for analysis.

13. The capability of Health Physics personnel to perform in-plant surveys and to issue personnel dosimetry for the entire Emergency Response Organization in the OSC, TSC, and EOF.

14. To maintain 10CFR20 exposure limits to emergency response personnel unless authorized by the Emergency Director.

15. The capability to obtain AXM iodine grab samples, analyze, and integrate the results in offsite dose assessment.

16. The capability to obtain and analyze PASS samples if requested.

17. The capability to respond to a medical emergency using off-site assistance from Seaway Hospital.

18. To perform Assembly and Accountability of personnel in the protected area within thirty minutes.

3.1.4 SIMULATED CONDITIONS

1. Simulator

Fermi 2 is a licensed operational facility. For purposes of FERMEX 85, the simulated power level history and other aspects such as nonoperational equipment are defined in the scenario summary by the initial Simulator conditions.

There are conditions the Simulator is not programmed to provide as described below:

a. The area radiation monitor (ARM) channels will respond and indicate offscale. The ARM readings are simulated within the plant according to the location of the release and the area of concern.

b. Stack effluent radiation monitors for SGTS, Turbine, Radwaste, and Reactor Building stacks are not available from the Simulator. Releases to the environment are simulated according to accident conditions.

2. Other

a. The capability to take chemistry samples for analysis will be demonstrated. The analytical results are simulated according to accident conditions.

b. Potassium Iodide distribution.

FERMEX 85 EVENT SUMMARY - OCTOBER 2, 1985

SCENARIO 24 HOUR CLOCK TIME	SCENARIO TIME HR: MIN	SIMULATOR MALFUNCTION TIME HR: MIN	KEY EVENTS
0600	0000	0000 Simulator Initial Condition IC-17	Initial conditions o Reactor operation at 100% power; end of life fuel cycle core exposure (Simulator IC-17).
		E21-063-02 (0%) E21-F005B valve Fail Shut	o Standby feedwater system inoperable.
0615	0015	-	Electrical System Supervisor requests a 150 MWE load decrease NSO begins to insert control rods to reduce power.
0620	0020	0020 B31-076-01 1% Recirculation Loop "A" Leak	Small leak develops in the unisolatable section of the reactor recirculation suction piping.
0635	0035	-	Control Room annunciator DRYWELL FLOOR DRAIN SUMP LKG (2D95) actuates. Drywell floor drain sump pump cycles. Reactor Power level reduced to 94%.
0650	0050	-	Nuclear Shift Supervisor (NSS) declares an UNUSUAL EVENT based on EP-101, Tab 9, Reactor coolant system leak rates greater than those specified in Tech Spec 3.4.3.1 as indicated by Annunciator 2D95 and unidentified leak rate greater than 5 gpm. Notifications are made according to EP-290. NSS assumes position of Emergency Director (ED). Reactor power level reduced to 86% (150 MWE decrease)

EERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SCENARIO TIME HR: MIN	SIMULATOR MALFUNCTION TIME, HR: MIN	KEY EVENTS
			Emergency Director may direct Control Room operator to begin reducing plant load to comply with Technical Specification Action Statement 3.4.3.2 Reactor Coolant System Leakage.
0800	0200	0200 B31-076-01 2% Recirculation Loop "A" Leak	Leak rate increased slightly to greater than 50 gpm.
0815	0215	-	Control Room annunciator DRYWELL FLOOR SUMP LEVEL HIGH-HIGH (3 D92) alarms. Torus water management system pump(s) trip if running and isolation valves close.
0830	0230	-	The Emergency Director declares an ALERT in accordance with EP-101, Tab 9, unidentified leak rate greater than 50gpm with both drywell sump pumps running. Notifications are made in accordance with EP-290. Emergency Director sounds siren and announces assembly and accountability. The TSC and OSC personnel assemble in their respective Emergency Response Facilities Non-essential personnel assemble in their respective assembly areas. When Emergency Director announces "assembly complete", non-essential personnel will report to their work locations and TSC and OSC will activate (Missing personnel will be located prior to declaring assembly complete).
0915	0315	-	TSC is functional and assumes control from the Control Room.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SCENARIO TIME HR: MIN	SIMULATOR MALFUNCTION TIME, HR: MIN	KEY EVENTS
0920	0320	0320 B31-076-01 3% Recirculation Loop "A" Leak	Control Room annunciator PRIMARY CONTAINMENT PRESSURE HI/LO (3D81) alarms.
0922	0322	0322	Control Room annunciator PRIMARY CONTAINMENT HIGH PRESSURE CHANNEL TRIP (3D85) alarms. Reactor scrams on high drywell pressure.
		B31-076-01 100% - Recirc loop "A" break S22-142-21 480V Bus 72CF T50-201-01 1% Primary to Secondary containment leak	Reactor scram causes a transient resulting in a major recirculation suction line break o Reactor water level decreases rapidly. o Primary containment temperature increases. o Primary and secondary containment isolate. o SGTS auto starts. o Low Pressure Coolant Injection (LPCI) pumps start and select recirculation pump B for injection. o All EDCS systems receive initiation signals. o Core spray pumps Auto start o Core Spray Div II injection valve E21-F005B fails to open due to mechanical binding. (Prevents injection from core spray pumps B & D).
		B21-081-01 10% Fuel Clad Failure S22-141-11 4160V Bus 64B Trip	480V bus 72CF trips on a ground fault disabling both LPCI injection valves and reactor recirculation valves. 4160V Bus 64B trips and locks out due to electrical phase-to-phase short removing RHR pump A and Core Spray pump A from service.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SCENARIO TIME HR: MIN	SIMULATOR MALFUNCTION TIME, HR: MIN	KEY EVENTS
			Feed Water admitted to Reactor Pressure Vessel from condensate and feedwater system through the startup level control valve.
		-	Reactor water level indicates less than 2/3 core coverage. Area radiation monitors in sub-basement rapidly increase and alarm
			Core uncovered; fuel clad failure
			Drywell pressure and temperature increases.
			Annunciator DIV I/ DIV II CONTAINMENT AREA RADIATION MONITOR TROUBLE (3D43) alarms CHRRM reading 4.6×10^{4} R/hr.
			Electrical penetration fails due to high drywell pressure, causing a leak from drywell to Reactor Building.
0924	0324		Level Restored by Core Spray and feedwater system to greater than 2/3 core coverage.
0930	0330		Annunciator EFFLUENT PROCESS RADIATION MONITOR TROUBLE (3D44) alarms - Operator verifies on CT-2B that channels 07-05 and/or 08-05 and 07-07 and/or 08-07 (depending on which Division of SGTS is running) are in alert alarm status indicating exceeding 10 Times Technical Specification limits.
0940	0340		Annunciator EFFLUENT PROCESS RADIATION MONITOR TROUBLE (3D44) alarms. Confirmation on CT-2B indicates 07-07 (07-08) is High alarm status. Channel treads 1.1 u ci/cc and the A X M has been activated.
0945	0345	-	Emergency Director declares a SITE AREA EMERGENCY in accordance with EP-101, Tab 9, Reactor Coolant leakage rate greater than 5000 gpm. NOTE: Emergency Director may declare a GENERAL EMERGENCY if he suspects fuel cladding failure.
			Notifications are made according to EP-290.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SCENARIO TIME HR: MIN	SIMULATOR MALFUNCTION TIME, HR: MIN	KEY EVENTS
			Loss of feedwater flow. Reactor vessel level decreases below 2/3 core coverage, Drywell pressure and temperature increase.
1000	0400	-	CHRRM monitor reading decreasing (2.8×10^4 R/HR).
		-	NSS directs OSC Coordinator to dispatch Damage Control Teams to: Team 1 - Division I switchgear room (Auxiliary Bldg) to investigate and repair 4160V bus 64B. Team 2 - Reactor Building second floor to MCC 72F-42A to investigate and effect repairs on valve E21-F005B. Team 3 - Reactor Building second floor 480V Bus 72CF to investigate and effect repairs. Team 4 - Reactor Building first floor RHR valves E11-F015 A/B to manually open.
1005	0405	-	Reactor Building ARMS are off scale on Floors 1 through 5. A X M channel 04 (Low range) reads 1.8×10^1 u ci/cc.
1010	0410	-	Health Physics technician with Team 2 reports radiation levels greater than 14 R/hr on second floor Reactor Building. OSC Coordinator requests TSC to evaluate the stay times for the teams and possible permission to exceed exposure limits. Permission granted for teams to work 10 min at a time, if necessary, until repairs complete. (Stay time for each individual is 12 min. at 14 R/hr without exceeding exposure limits).
1014	0414	-	Team 2 granted permission to enter Reactor Building to investigate the E21-F005B valve.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SIMULATOR TIME HR: MIN	MALFUNCTION TIME HR.: MIN	KEY EVENTS
1015	0415	-	Team 1 reports 4160V Bus 64B has indications of phase-to-phase short on bus side of breaker B6. May require 3 hours to fix. Radiation levels not excessive. Team 3 reports that the 480V bus 72 CF bus has short to ground . May require 3 hours to fix. (Stay time for this team is also 12 min. without exceeding exposure limits) Team 4 scene leader reports hissing and water dripping from electrical penetration above the drywell southwest equipment hatch. Difficult to ascertain size of leak.
1020	0420	-	Team 4 reports that Radiation levels are greater than 200 R/Hr in the area of the E11-F015 A/B valves. Stay times are requested. Team 2 reports that E21-F005B packing gland has cooked severly binding valve stem
1030	0430	-	Emergency Director declares GENERAL EMERGENCY - according to EP-101, Tab 9, loss of three fission product barriers (if he has not already done so). Control Room is taking action to reduce drywell pressure to reduce leak rate from electrical penetration.
1037	0437	-	EOF is functional (if not already functional) and assumes offsite responsibility from TSC. Offsite Field teams dispatched. A X M channel 07-04 and/or 08-04 is reading 2.4×10^{1} u Ci/cc noble gas. Chemistry requested to obtain a grab sample of iodine from AXM.
1045	0445	-	Team 4 Scene Leader reports that a team member has fallen while attempting to manually open the E11-F015 and has a compound fracture of his right leg and Health Physics technician reports the member is contaminated (greater than 150 cpm) due to torn anti-C-s from the fall.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SIMULATOR TIME HR: MIN	MALFUNCTION TIME HR.: MIN	KEY EVENTS
			Note: At this point several decisions will have to be made by the combined CR/OSC/TSC regarding which repairs to accomplish. Scenario may diverge from this summary. Regardless, there will be a medical drill with Mercy-Memorial Hospital.
			OSC Coordinator informs NSS and Emergency Director. OSC Coordinator dispatches rescue team to bring victim to ambulance. Control Room calls ambulance service to pick up and dispatch victim to Mercy-Memorial Hospital.
1115	0515	-	Ambulance arrives on scene.
1125	0525	-	Ambulance leaves site for Mercy-Memorial Hospital.
			A X M channel 07-04 (08-04) reads 3.0 x 10^1 M ci/cc noble gas.
			Team 2 reports it may require 2 to 3 hours more to affect repairs and manually open E21-F005B.
			Other three teams report little progress in effecting repairs.
1148	0548	-	NOTE: Depending on Actions taken, either E21-F005B or E11-F015 valve will be opened and water injected to the reactor vessel via Core Spray (E21-F005B) or LPCI (E11-F015).
1150	0550	-	Drywell pressure decreasing. CHRRM reading decreasing (1.6 x 10^4 R/hr). OSC Coordinator requests Team 2 assess leak in electrical penetration and effect repairs.
1212	0612	-	480V bus 72CF repaired. A X M Channel 07-04 and/or 08-04 reading 2.8 x 10^1 u Ci/cc noble gas. (Leak from penetration decreases as drywell pressure decreases)
1220	0620	-	4160V Bus 64B repaired.

FERMEX 85 - EVENT SUMMARY

SCENARIO 24 HOUR CLOCK TIME	SIMULATOR TIME HR: MIN	MALFUNCTION TIME HR.: MIN	KEY EVENTS
1235	0635	-	A X M Channel 07-04 and/or 08-04 reading 3.0×10^{1} u Ci/cc noble gas.
1252	0652	-	Team 2 reports electrical penetration sealed. Radiation levels on the SGTS begin to decrease.
1324	0724	-	SGTS effluent radiation monitors reading background. (This is compressed time) to terminate exercise).
1400	0800	-	Offsite MET Team readings in 10 mile EPZ background. Onsite Recovery and Reentry organization convenes.
1430	0830	-	Exercise terminated.