

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-295/90020(DRSS); 50-304/90022(DRSS)

Docket Nos. 50-295; 50-304

Licenses No. DPR-39; DPR-48

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

Facility Name: Zion Nuclear Generating Station, Units 1 and 2

Inspection At: Zion Station, Zion, Illinois

Inspection Conducted: September 10, 24-28, and October 18, 1990

Inspector: *William Snell for*
D. M. Barss

11/8/90
Date

Accompanying

Personnel: (September 10, 1990)
J. Foster
A. Bongiovanni

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

11/8/90
Date

Inspection Summary

Inspection on September 10, 24-28, and October 18, 1990 (Reports No. 50-295/90020(DRSS); 50-304/90022(DRSS))

Areas Inspected: Routine announced inspections of the Zion Nuclear Generating Station Emergency Preparedness (EP) program including the following areas: follow-up of licensee actions on previously identified items (IP 92701); followup on actual emergency plan activations (IP 92700); and operational status of the emergency preparedness program (IP 82701). This inspection involved three inspectors on September 10, 1990 and one inspector September 24-28, and October 18, 1990.

Results: Two violations were identified during this inspection: (1) a failure to maintain emergency plans and implementing procedures up to date; (2) a failure to complete and/or document completion of inventories in accordance with program requirements. One non-cited violation was issued for a failure to notify the NRC upon termination from an Unusual Event. One open item was identified for a concern with completeness of NARS forms used during

actual event notifications. A mini-exercise was observed which demonstrated a marked improvement in OSC and TSC performance. Five previously identified open items were closed, one of which was an exercise weakness for a failure to complete assembly/accountability in a timely manner. An apparent inconsistency in the use of emergency action levels was identified and two recommendations for improvement were provided.

DETAILS

1. Persons Contacted

- *T. Reick, Technical Superintendent
- *L. Lanes, Emergency Preparedness Coordinator
- R. Chrzanowski, Regulatory Assurance Supervisor
- O. Lee, GSEP Trainer
- L. Holden, On-Site Program Administrator
- G. Cole, Radiation Protection Technical Health Physicist

All of the above listed individuals attended the NRC exit interview held on September 28, 1990.

*These personnel attended an informal exit briefing conducted on October 18, 1990.

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

2. Mini-Exercise Observation

On September 10, 1990, a mini-exercise was conducted at the Zion Station to redemonstrate, in part, the licensee capability to activate and coordinate activities in the Operational Support Center (OSC) and the Technical Support Center (TSC). This redemonstration was conducted at the licensee's volition following the July 18, 1990 exercise in which performance in the TSC and OSC was judged to be minimally successful. (See Reports No. 50-295/90012(DRSS); 50-304/90014(DRSS) for details.)

The licensee's controllers and evaluators monitored and critiqued this exercise along with three NRC observers. Attachment 1 to this report describes the scope and objectives of the mini-exercise. Attachment 2 describes the mini-exercise scenario. The following is a summary of observations made by the NRC observers: J. Foster in the TSC and OSC, A. Bongiovanni in the TSC and Control Room (CR) and D. Barss in the OSC and decon facility.

a. Technical Support Center (TSC)

Office space adjacent to the actual Control Room is currently utilized for the Technical Support Center (TSC) at Zion. This space is relatively small and not conducive to the efficient layout of a TSC. A new facility is under construction for the Zion TSC, and should be operational in early 1991.

The Shift Engineer declared the Alert at 0815 hours. The last response organization manager to assemble in the control room/TSC area arrived at 0851 hours. Command and control was assumed by the TSC at 0915 hours. Other TSC personnel assumed their roles on entry into the area. The briefings by the station managers were complete and very detailed.

The licensee properly declared a Site Area Emergency at approximately 0910 hours. All personnel were accounted for approximately 25 minutes later. One person, who was in a trailer located within the protected area, did not hear the alarm; however, he was notified by security and proceeded to the assembly area. An announcement was made at 0937 hours that all personnel were accounted for.

Identification of drill players positions was not evident; position labels had been placed on desk surfaces, but were almost totally obscured by documents, printouts, and supplies in use. Position labels could be converted to stand-up signs or suspended from the ceiling, and this would make them more visible and serve to maximize desk space.

At approximately 0950 hours, discussion in the TSC indicated that a General Emergency (GE) should be declared based on dose projections of more than one Rem at the site boundary. The decision to upgrade to the General Emergency was promptly and properly made. Resulting Protective Action Recommendations (PARs) were discussed for several minutes, as it was realized that the release plume was based on a finite amount of radioactivity released from the damaged fuel assembly. As such, TSC personnel realized that the intensity of the plume would begin lessening in the very near future.

A two hour default was utilized for the off-site dose projection performed, and it was not clear that this value was justified. Standard default release times utilized by other midwest utilities range from four hours to eight hours, with four hours being the most common. It is recommended that the default release time incorporated into the off-site dose projection software be reevaluated. The printout from the dose projection software also did not provide information as to the input values. This made assessment of the validity of the completed dose projection difficult. It was not clear whether the input values included an iodine component.

The Nuclear Accident Reporting System (NARS) form for the GE declaration was transmitted to the State of Illinois at approximately 1004 hours, within the required fifteen minutes of the emergency classification change.

At 1011 hours, a staff update was provided to TSC personnel. This update briefing was excellent, detailing plant problems and efforts being made to mitigate the accident. It was noted during the update briefing that a (simulated) site evacuation was in progress.

b. Operations Support Center (OSC)

At 0824 hours, the first personnel began arriving at the Operations Support Center (OSC). These personnel referred to the procedure defining the OSC layout (EPIP 210-1, Revision 0) and began setting up the facility as designated on the layout diagram (Attachment E). The exact directional layout of some tables is not clear in the procedure, but responding personnel appeared aware of correct table

positions. Remodeling of the room utilized for the OSC is currently in progress, so the finalized chair and table layout was not exactly as that provided in the procedure, but differences were minimal and unavoidable.

At 0832 hours, the bulk of the OSC responders, including the OSC Director, arrived at the facility. Radios, survey instruments and other equipment was rapidly set up, and a quarterly inventory checklist was utilized to assure that required supplies were available. Digital dosimeters were assigned, and a check point was established. All set up actions were rapidly and professionally performed.

At 0837 hours, the OSC Supervisor provided the first of a number of OSC staff briefings via the OSC public address system. Briefings were considered excellent, being concise and informative.

The OSC has several status boards: an "in OSC" board provides a listing of available manpower, color-coded by discipline; an "out on task" board provides the status of active teams; and "priorities", "facilities activated", and Emergency Action Level (EAL) boards provide other needed information. The "out on task" board accounted for personnel already present in the plant when the drill began, a point often overlooked.

By 0857 hours, the total manning list had been completed, and as of 0900 hours, two tasks were being assigned, with first priority determined to be getting health physics personnel into the containment building to determine ambient dose rates. Information flow was good, with OSC personnel aware, as of 0903 hours, that there had been a (scenario) dropped fuel assembly in the containment building.

The OSC Director made a good determination that an environs team should be sent out to monitor onsite dose levels. This recommendation was passed to the Control Room.

A new card reader is available in the OSC. The OSC Director directed accountability to start when the assembly/accountability announcement was not heard in the OSC. The public address system was later turned up, but plant pages were still barely audible in the OSC. OSC personnel reported to the card reader, by table, in an unhurried and professional manner.

At approximately 1030 hours, a sump pump in the crib house actually failed (not a part of the drill), and water levels in the crib house began to rise. At approximately 1040 hours, the Station Director indicated that the actual crib house flooding was sufficiently significant to warrant increased attention, and the drill had progressed to a point where the major objectives had been demonstrated. The drill was then halted. A good critique was held after the drill, and controllers/participants actively critiqued their actions.

Overall, TSC and OSC performance was acceptable and much improved from the July 18, 1990 exercise.

No violations or deviations were identified.

3. Licensee Actions on Previously Identification Items (IP 92701)

(Open) Open Item No. 295/87005-02; 304/87005-02: Review acceptability of the Technical Support Center (TSC) Ventilation System. These items will remain open pending a future inspection following completion of the new TSC.

(Open) Open Item No. 295/88006-01: Repair and periodically test the EOF emergency ventilation system and PING monitor. Procedure 1M-OR-AR19 is to be revised by 12/1/90. This item will remain open pending a further evaluation during a future inspection.

(Open) Open Item No. 295/90012-01: The failure of the TSC to aggressively pursue and receive plant parameter updates from alternate sources in a timely manner. This was not demonstrated in the mini-exercise and will remain open pending a future inspection.

(Closed) Open Item No. 295/90012-02: The failure of the TSC to demonstrate the ability to calculate offsite dose projections. As discussed in section 2a. above, the licensee successfully demonstrated the ability to calculate offsite dose projections. This item is closed.

(Closed) Open Item No. 295/90012-03: The failure of the licensee to successfully perform assembly/accountability in a timely manner. This was an exercise weakness. As discussed in Section 2a. above the licensee successfully performed assembly/accountability in a timely manner. This item is closed.

(Closed) Open Item No. 295/90012-04: There was no procedural guidance for a preplanned set up of the OSC instructing personnel on the set up and activation of this facility. As discussed in Section 2b above, EPIP 210-1 has been revised to provide procedural guidance for the set up and activation of the OSC. This was successfully demonstrated during the mini-exercise. This item is closed.

(Closed) Open Item No. 295/90012-05: Failure of the OSC to coordinate and dispatch teams in a timely manner. During the mini-exercise the licensee successfully demonstrated the ability to coordinate, establish priorities, and dispatch teams in a timely manner. This item is closed.

(Closed) Open Item No. 295/90012-06: The failure of radiation protection technicians to adequately and fully perform all aspects of personnel decontamination including identification of the contamination source and follow up with proper bioassay procedures. During the mini-exercise the licensee adequately demonstrated personnel decontamination methods and follow up activities including investigation of source and consideration of follow up bioassay evaluations. This item is closed.

4. Emergency Plan Activations (IP 92700)

Licensee and NRC records of actual emergency plan activations for the period of February 1989 through September 1990 were reviewed. During this time period the licensee had a total of 21 GSEP activations. From this total, three events were classified at the Alert level and the remainder as Unusual Events (UE).

The three Alert classifications were all due to a loss of annunciators in the Control Room resulting from power supply fuse problems. Two of these events occurred on the same day, July 7, 1990.

The eighteen UEs were declared for a variety of problems as described below.

- Two for potentially contaminated injured persons who required transportation to an offsite medical facility.
- Four for various miscellaneous problems:
 - A fire which required offsite assistance,
 - Crib house flooding which required offsite assistance,
 - A malfunction of the Control Room annunciator horn,
 - A miscalculated offsite release rate.
- Twelve events were associated with shut downs required by Technical Specifications.

Seven of the Technical Specification shut downs involved excessive primary coolant system leak rates. Though all seven of these events appeared to be very similar in nature, four were classified as UEs in accordance with Emergency Action Level (EAL) 2E, "Reactor coolant system leakage requires initiation of a plant shut down per Technical Specification and power decrease for reactor shut down has commenced". The other three events were classified as UEs in accordance with EAL 9A, "A condition that warrants increased awareness on the part of State and/or local offsite officials". This appears to be an inconsistency in the use of EALs 2E and 9A. Complete background information for these events was not available for detailed evaluation by the inspector. It is recommended that the licensee consider evaluating this apparent inconsistency.

For the twenty one events which were declared the notification of State and Federal officials was generally timely. The licensee did self identify one event for which the declaration was delayed one and a half hours. In this instance a memorandum was distributed to appropriate station personnel to reemphasize the necessity of timely GSEP event declaration. This delay was a deviation from the licensee's normal practice of declaring an event when power reduction for a reactor shut down has commenced. It was determined that in this instance the power reduction was not for a reactor shut down but rather ALARA concerns.

The licensee did not properly inform the NRC Headquarters Operations Center (HOC) in a timely manner on one occasion when a UE was terminated. This event occurred on September 10, 1990, at 1133 hours. The licensee declared an UE in accordance with EAL 6B, "Damage is such that off-site assistance is required to prevent further degradation of the level of safety of the facility," due to a crib house sump pump failure which resulted in flooding of the crib house. Additional pumping capacity was requested from several offsite agencies. By 1700 hours the same day, the flooding had been controlled and the UE was terminated. The licensee notified the NRC HOC at 1209 hours of the UE declaration but failed to notify the NRC HOC of the UE termination as required by 10 CFR 50.72(C)(1)(iii). The NRC HOC questioned the licensee on the morning of September 11, 1990, of the status of the UE and was informed by the licensee at that time that the event had been terminated at 1700 hours on September 10, 1990.

The licensee had not completed an evaluation and determination of corrective actions for this event. The operating crew on shift at the time of the event termination has been reminded during a regularly scheduled training session of the requirement to notify the NRC upon an event termination. This same subject is planned to be discussed with all operating crews during regularly scheduled training. Because this was considered to be an isolated Severity Level V violation, and the licensee had initiated corrective actions before the end of the inspection, this will be considered a non-cited violation based on the enforcement criteria of 10 CFR part 2, Appendix C, V.A. (Open Item No. 50-295/90020-01).

The licensee conducted a GSEP event review for most of the GSEP activations. This review included gathering copies of applicable documents such as Shift Engineer's Logs, Nuclear Accident Reporting System (NARS) forms, Emergency Notification System (ENS) notification worksheets, Deviation Reports and Licensee Event Reports (LER). An evaluation was then made to determine if the classification was pertinent, notification timely and if the GSEP and associated procedures were properly implemented. Problems identified through these reviews were corrected by the licensee. This practice of self evaluation following real activations helps the licensee improve their emergency plan program.

The inspector reviewed the records packages maintained for GSEP events. No package was available at the time of the inspection for the July 7, 1990 Alert declarations. The inspector noted that for many of the events the NARS forms had not been completely filled out. Ten examples were identified where NARS forms did not contain the name of the person contacted and the time of the notification to State officials. This failure to accurately complete NARS forms is an Open Item (No. 50-295/90020-02). The licensee had previously identified this problem and a memorandum was sent to all effected personnel on July 14, 1990 requesting they review instructions for completion of NARS forms.

One violation was identified, as discussed above, during the review of this program area. No deviations were identified; one open item was identified; and, one recommendation for improvement was made concerning the review of consistency in the use of EALs.

5. Operational Status of the Emergency Preparedness Program (IP 82701)

a. Emergency Plan and Implementing Procedures

There has been one minor revision, Revision 6b, to the licensee's generic Generating Station Emergency Plan (GSEP), and one minor revision, Revision 6a, to the GSEP Zion Annex since the last routine inspection. These revisions did not decrease the effectiveness of the approved emergency plan. Revision 7 to the generic GSEP is still in the review process and has not yet been issued. When it is issued, the GSEP Zion Annex will then be reviewed and revised as appropriate. The GSEP Zion Annex has been reviewed annually as required by procedure.

The inspector noted while reviewing the GSEP Zion Annex, (Controlled Copy No. 501), that pages ZA 4-2 and ZA 4-5, Revision 6, appear twice. Both pages contain the identical information. This problem was also noted in the GSEP manual maintained in the Control Room, (Controlled Copy No. 521). Also noted while reviewing the Zion Annex, (Controlled Copy No. 501), was that pages ZA 4-3 and ZA 4-4, Revision 6, had not been removed from the book when they were superseded by Revision 6a. The generic GSEP, Section 8.5, Step 6, specifically requires that old pages be destroyed when new pages are added.

Five additional copies of the Zion Annex were checked to verify that revisions had been made as required. Two copies maintained in the Radiation Protection office, (Controlled Copy Nos. 541 and 518), were found to not have been updated with Revision 6a, dated June 1989. Also one copy of the generic GSEP, (Controlled Copy No. 541), was found to contain a GSEP Telephone Directory dated 4th Quarter 1988. This telephone directory is required to be updated every quarter in accordance with the generic GSEP Section 8.5, step 8. Since the current telephone directory revision is 3rd Quarter 1990, this manual has not been updated for almost two years and has missed nine quarterly updates.

Several Emergency Plan Implementing Procedures (EPIP) were reviewed and the following problems were noted:

- EPIP 099-1, Revision 3, dated 6/17/87 refers to several Radiation Protection procedures by incorrect procedure numbers. These numbers were changed during the February to November 1987 time period. EPIP 099-1 was last reviewed on March 31, 1989 and these corrections were not identified.
- EPIP 100-1, Revision 11, dated 8/30/90, incorrectly references EPIP 360-1, which was deleted February 1, 1990.
- EPIP 110-1, Revision 13, dated 1/11/90, and EPIP 170-1, Revision 2, dated 8/25/88 reference EPIP 360-1, which was deleted February 1, 1990.

- EPIP 410-1, Revision 3, dated 10/14/87 incorrectly identifies in step F.4.a the location of the Operational Support Center (OSC).
- EPIP 440-1, Revision 5, dated 9/8/88, incorrectly identifies in step F.1.b(1) the NRC Region III Duty Officer as the individual to acknowledge monthly Emergency Notifications System (ENS) phone checks.

10 CFR 50.54(q) requires the licensee to follow and maintain an emergency plan. Section 8.5 of the Generating Station Emergency Plan (GSEP) states the provisions to be employed to ensure the emergency plan and implementing procedures are maintained up to date. As discussed above, the licensee failed to maintain all controlled copies of the GSEP up to date and several examples of out of date EPIPs were discussed. This is a violation (Open Item No. 50-295/90020-03).

Letters of agreement maintained by the licensee with local support agencies were reviewed. The licensee identified six agencies with which they maintain agreements. Only three letters of agreement were on file. After discussion with cognizant licensee personnel it was determined that four agencies of the City of Zion which are listed separately in the Zion Annex of the GSEP are actually all incorporated into one blanket letter of agreement which was on file.

The licensee's records pertaining to the transmittal of emergency plan implementing procedure (EPIP) revisions to affected procedure holders were reviewed. This review indicated that revisions have been sent as appropriate including copies to the NRC within 30 days of the changes.

Current copies of the emergency plan and implementing procedures were found to be maintained, notwithstanding the above discussed problems, and readily available in the emergency response facilities and the control room.

One violation was identified, as discussed above, during the review of this program area. No deviations were identified in the review of this program area.

b. Emergency Facilities, Equipment, Instrumentation and Supplies

An inspection tour was conducted through the Technical Support Center (TSC), Operational Support Center (OSC), Emergency Operations Facility (EOF), and the Control Room (CR). These facilities were found to be as described in the Zion Annex of the Generating Station Emergency Plan (GSEP).

The TSC is a multiple use facility and was found to be generally clean, orderly and acceptably ready for use. A supply of GSEP logs and message forms are maintained for use in the facilities. Telephone communication equipment is left connected and positioned at labeled locations to minimize the facility set up time.

Radiological survey meters stored in the TSC were found to be calibrated and ready for use. A check source is also available to verify meter operability. Each meter was checked and found to be satisfactory.

In the CR, telephones dedicated for emergency use were clearly labeled and positioned to be readily accessible. Appropriate procedures and notification forms were also found to be readily accessible and sufficiently stocked for use in the CR.

The OSC is established when necessary in the new Administration Building sixth floor auditorium. This is a new location for the OSC and differs from that described in the Zion Annex. This new facility is an improvement over the area originally designated as the OSC. This change should be reflected in the next revision of the GSEP Zion Annex.

Emergency supplies are stored in lockers in a corner of the OSC. The contents of these emergency lockers were checked and found to be as described by procedures. One dose rate meter was found to have a dead battery; this was corrected immediately by the licensee. A count rate meter was found to have been stored in the locker which was not included in the locker inventory. This meter was observed to be used during recent drills and exercises and should be included in the facility inventory listing.

Air sampler equipment stored in both the OSC and TSC were found to have "O" ring seals which showed signs of deterioration and should be replaced. Also in the OSC, TSC and EOF, thermoluminescent dosimeters (TLD) which are stored for emergency issue did not have a control TLD designated as required by procedures.

The EOF is a dedicated facility and was found to be clean, orderly and ready for use. A review of general administrative supplies maintained in the facility revealed a shortage of paper supplies for use with copy machines; this was corrected during the course of the inspection.

The GSEP Van was inspected and found to be adequately maintained and ready for use.

Emergency communications systems surveillance records for the emergency response facilities were reviewed and found to be complete and thorough. These surveillances are conducted monthly and include the Nuclear Accident Reporting System (NARS) phones, GSEP radios, GSEP microwave phone system connections, NRC ENS and Health Physics Network (HPN) phones and other inplant phone system extensions maintained for emergency use and not used in normal work activities.

The licensee's inventory records for emergency supplies were reviewed and found to be poorly maintained and disorderly filed. After additional reviews it was determined that several records documenting completion of inventories, (seven quarterly inventories, ten post

drill inventories, and three monthly inventories) required by licensee procedures could not be located. (The licensee was provided a list of records identified as missing during the inspection.)

10 CFR 50.54(q) requires a licensee to follow and maintain an emergency plan. Section 8.6 of the Generating Station Emergency Plan (GSEP) states that the operational readiness of emergency equipment and supplies are ensured by quarterly inventory and inspection required by each Station's procedures. Zion Emergency Plan Implementing Procedures (EPIP) 420-1, 450-1, 450-2, 550-1, 550-2 and 550-6 provide required emergency equipment inventories and surveillance frequencies. As discussed above, the licensee could not provide evidence to compliance with the requirements delineated in various EPIP's and the GSEP. This is a violation. (Open Item No. 50-295/90020-04)

One violation was identified, as discussed above, during the review of this program area. No deviations were identified in the review of this program area. The following item is recommended for improvement:

- Count rate meters stored in the OSC and TSC could be plugged in to an AC power supply to allow trickle charging of the internal battery.

c. Organization and Management Control

It was learned through discussion with cognizant licensee personnel that there have been three changes made in the licensee's organizational structure which affected emergency planning. All three changes are viewed as positive enhancements to the ^D program. The Control Room (CR) operating crew structure was modified to provide a unit supervisor and designated nuclear station operators for each unit. There was no net change in the number of personnel available on shift, only a reorganization and designation of supervisory functions.

Chemistry and Radiation Protection has been divided into two separate functions. This division has benefitted emergency planning by focusing more specialized training on each group. For example, the chemistry technicians now are responsible for operating the high radiation sample system (HRSS) and radiation protection technicians are assigned to environmental monitoring and sampling. This focusing of responsibilities has improved performance in both areas.

The licensee has not yet revised the GSEP Annex to reflect the division of Chemistry and Radiation Protection. This revision is planned to be made after Revision 7 of the Corporate GSEP is issued.

The Emergency Preparedness Coordinator (EPC) reporting chain was changed. Instead of reporting to the Services Director the EPC now reports to the Technical Superintendent. A new individual was appointed as the EPC effective September 24, 1990.

No violations or deviations were identified.

d. Emergency Preparedness Training

The current GSEP onsite training program was reviewed with a GSEP Training Instructor and the Emergency Preparedness Coordinator, including a review of the training matrix requirements, selected lesson plans, training records and ongoing improvements to the program.

The inspector reviewed the training records of 18 individuals randomly selected from the licensee's emergency response organization (ERO). All of the records reviewed indicated that ERO members had completed required training in accordance with the established training matrix or an equivalent course.

The licensee has been using a cumbersome manual tracking method to review and verify completion of training requirements. The EP Coordinator and the GSEP Trainer are currently developing a computerized data base to replace the existing manual system. This should greatly improve the efficiency and enhance the records review process for tracking EP training requirements.

The training program is being improved by an effort to standardize most of the GSEP training across the six Commonwealth Edison stations. The trainers from each of the stations meet quarterly to discuss the training programs.

Training is also enhanced by including relevant findings originating from drill and exercise critiques in the annual retraining program.

Records of the 1989 and 1990 emergency preparedness drills were reviewed. All 1989 health physics, medical, post-accident sampling, communication, environmental monitoring, assembly/accountability and shift augmentation drill requirements were successfully met. The 1990 drills have not been completed but they are scheduled appropriately. There were a few minor licensee identified findings associated with the drills and these problems were corrected in a timely manner.

No violations or deviations were identified.

e. Independent Reviews/Audits

Records of the Quality Assurance (QA) Department audits and surveillances done in 1989 and 1990 which focused on the emergency preparedness program were reviewed. All records were readily available and complete.

Several onsite QA Surveillances were conducted which evaluated various drills, exercises and callout lists. Two onsite QA Audits were conducted, Report No. QAA 22-89-20 for 1989 and QAA 22-90-15 for 1990. Both of these audits were conducted by a team of qualified auditors. A prepared and approved audit checklist was used to ensure adequate depth and scope of the audit.

An offsite QA Audit, Report No. 22-89-11/III, was conducted of the Zion Station EP program for 1989. This audit was performed by one individual using a generic checklist developed for the GSEP area. This generic checklist consisted of 78 key items of which only 31 were evaluated. This audit was adequate to satisfy the requirements of 10 CFR 50.54(t). The audit results were documented: no findings, observations or open items related to EP were identified. A brief summary of these results were distributed to both Corporate and Plant management and made available to State and local authorities. The offsite audit for 1990 was in progress at the time of this inspection and was not reviewed by the inspector.

No violations or deviations were identified. However, the following item is recommended for improvement:

- The size and experience level of the offsite audit team could be improved. Also, more of the 78 key items identified in the generic GSEP audit checklist could be covered.

6. Exit Interview

The inspectors met with licensee representatives denoted in Paragraph 1, on September 28 and October 18, 1990. The inspectors reviewed the scope and findings of the inspection and indicated that certain licensee activities regarding the maintenance of emergency plan and implementing procedures; the completion and documentation of program required inventories; and the timeliness of notification to the NRC upon emergency event termination; were apparent violations. The incompleteness of NARS forms was identified and the concern over the inconsistency in the use of EALs was also discussed.

The licensee indicated that the information discussed was not of a proprietary nature.

Attachments:

1. Zion Nuclear Power Station 1990 GSEP Mini-Exercise Objectives
2. Zion Nuclear Power Station 1990 GSEP Mini-Exercise Narrative Summary and Event Summary

ZION NUCLEAR POWER STATION
1990 GSEP MINI-EXERCISE
SEPTEMBER 10, 1990

OBJECTIVES

PRIMARY OBJECTIVE:

Commonwealth Edison will demonstrate the ability to implement the Generating Station Emergency Plan (GSEP) to provide for protection of the public health and safety in the event of a major accident at the Zion Nuclear Power Station. The September 10, 1990 demonstration will be conducted during the hours which qualify as a daytime Exercise in accordance with NRC Guidelines.

SUPPORTING OBJECTIVES:

- 1) Assessment and Classification
 - a. Given information provided by the Exercise Scenario, demonstrate the ability to assess initiating conditions which warrant a GSEP Classification within fifteen (15) minutes.
- (TSC)
 - b. Demonstrate the ability to determine which Emergency Action Levels (EALs) are applicable within fifteen (15) minutes of determination of the initiating conditions warranting classification.
- (TSC)
- 2) Notification and Communications
 - a. Demonstrate the ability to correctly fill out a NARS form in accordance with EPIPs or EOF procedures.
- (TSC*)
 - b. Demonstrate the ability to make applicable notifications to offsite State and local organizations within fifteen (15) minutes of making an Emergency classification.
- (TSC)
 - c. Demonstrate the ability to correctly fill out an ENS Notification Worksheet in accordance with EPIPs or EOF procedures.
- (TSC)
 - d. Demonstrate the ability to notify the NRC immediately after the State notifications and within one (1) hour of the Emergency classification.
- (TSC)

NOTE: "*" DESIGNATES A PREVIOUSLY NOTED PROBLEM OR DEFICIENCY.

2) Notification and Communications (cont'd)

- e. Demonstrate the ability to provide information updates to the States at least hourly and within thirty (30) minutes of changes in monitored conditions.
- (TSC)
- f. Demonstrate the capability to contact appropriate support organizations that would be available to assist in an actual emergency within one (1) hour of conditions warranting their assistance.
- (TSC*)
- g. Demonstrate the ability to maintain an open-line of communication with the WRC on ENS upon request.
- (TSC)
- h. Demonstrate the ability to maintain an open-line of communication with the WRC on HPW upon request.
- (TSC)
- i. Demonstrate the ability to provide information updates to the WRC at least hourly and within thirty (30) minutes of changes in monitored conditions.
- (TSC)

3) Emergency Facilities

- a. Demonstrate the ability to staff and activate the TSC and OSC within thirty (30) minutes of the Alert Classification in accordance with EPIPs.
- (TSC, OSC)
- b. Using information supplied by the Exercise Scenario, demonstrate the ability to record, track and update information on Status Boards at least every thirty (30) minutes.
- (TSC, OSC*)
- c. Demonstrate the ability to document and track all Operations and Maintenance Team activities in logs and on appropriate Status Boards.
- (TSC, OSC)

4) Emergency Direction and Control

- a. Demonstrate the ability of the individuals in the Emergency Response Organization to perform their assigned duties and responsibilities as specified in Generic GSEP and position-specific procedures.
- (TSC, OSC)
- b. Demonstrate the ability of the Managers and Directors to exert Command and Control in their respective areas of responsibility as specified in Generic GSEP and position-specific procedures.
- (TSC, OSC)
- c. Demonstrate the ability to prioritize Operations and Maintenance activities during abnormal and emergency situations.
- (TSC, OSC)
- d. Demonstrate the ability to requisition, acquire and transport emergency equipment and supplies necessary to mitigate or control unsafe or abnormal plant conditions.
- (TSC)
- e. Demonstrate the ability to brief and dispatch the Environs Teams within forty-five (45) minutes of determination of the need for field samples.
- (TSC*, OSC*)
- f. Demonstrate the ability to control/coordinate Environs Team's activities in accordance with ED and EG procedures.
- (TSC)
- g. Demonstrate the ability to direct coordination of Environs Team's activities in accordance with Station EIPs and EOF procedures.
- (TSC)
- h. Demonstrate the ability to assemble and account for all on-site personnel within thirty (30) minutes of sounding the Assembly Alarm.
- (TSC*)
- i. Demonstrate the ability of Emergency Response Facility Management to provide briefings and updates concerning plant status, event classification and activities in progress at least every thirty (30) minutes.
- (TSC, OSC*)
- j. Demonstrate the ability to keep Field Teams informed of changing plant conditions as appropriate.
- (TSC*)

5) Radiological Assessment and Protective Actions

- a. Demonstrate the ability to trend plant radiological survey information for conditions presented in the scenario.
- (TSC, OSC*)
- b. Demonstrate the ability to collect and document all radiological surveys taken for conditions presented in the scenario.
- (OSC*)
- c. Demonstrate the ability to take appropriate protective actions for on-site personnel in accordance with Station EPIPs.
- (TSC*, OSC*)
- d. Demonstrate the ability to issue and administratively control dosimetry to the teams dispatched from the OSC in accordance with established policies and Station procedures.
- (OSC)
- e. Demonstrate the ability to establish radiological controls in accordance with established Health Physics policies and plant procedures.
- (OSC*)
- f. Demonstrate the ability to monitor, track and document radiation exposure to Inplant Operations and Maintenance Teams in accordance with established policies and plant procedures.
- (OSC)
- g. Demonstrate the ability to establish radiological monitoring and controls of Assembly areas in accordance with established policies and plant procedures.
- (OSC)
- h. Using information provided by the Exercise scenario, demonstrate the ability to calculate Offsite Dose Projections in accordance with appropriate procedures, programs and guidances.
- (TSC*)
- i. Demonstrate the ability to make appropriate Protective Action Recommendations (PARs) within ten (10) minutes of determining an Offsite Dose Projection or using an Emergency Classification flowchart.
- (TSC)

5) Radiological Assessment and Protective Actions (cont'd)

- j. Demonstrate the ability to perform decontamination of radioactively contaminated individuals in accordance with established policies and procedures.
- (OSC*)
- k. Demonstrate the ability to collect field samples in accordance with Environmental Sampling procedures.
- (Field Teams)
- l. Demonstrate the ability to perform field sample analysis in accordance with Environmental Sampling procedures.
- (Field Teams)
- m. Demonstrate effective contamination control techniques for the handling and storage of environmental samples.
- (Field Teams*)
- n. Demonstrate the ability to document, trend and assess field sample results in accordance with Environmental Sampling procedures.
- (TSC*)

6) Relocation Objectives

- a. Demonstrate the ability to identify and designate non-essential personnel within a half an hour after deciding to evacuate the site.
- (TSC*)
- b. Demonstrate the ability to explain the evacuation route, properly brief non-essential personnel prior to the start of site evacuation and arrange for traffic control.
- (TSC*)

ZION NUCLEAR POWER STATION
1990 GSEP MINI-EXERCISE
SEPTEMBER 10, 1990

NARRATIVE SUMMARY

INITIAL CONDITIONS
(Prior to 0800)

UNIT 1 -

In Day 9 of a 10 week refueling outage. The Refueling Cavity is flooded and the fuel shuffle is in progress. The 1B RHR pump is running for shutdown cooling. The 1A RHR Pump and train are Out-of-Service (OOS) for repairs to the air supply line to the recirc valve 1RHFCV-610. Both U-1 RWST level instruments are OOS for modification and calibration. Decontamination crews are working in containment on the 568' level floors and the Seal Table room. Preparations are being made inside the Missile Barrier for Eddy Current testing of the 1A and 1C Steam Generators starting next week after refueling operations are complete. Main Condenser tube sheet cleaning is in progress and expected to be completed on day shift. Repairs to the Main Turbine Governor and Reheat valves are in progress. The Main Generator has been purged for insulation checks of the PMG starting today. The following equipment is OOS for administrative control: 1A and 1C Charging Pumps; 1A and 1B SI Pumps; all RCPs; all Accumulator Discharge Valves; and 1SI8811A and B.

UNIT 2 -

Mode 1 for the last 78 days maintaining 98-100% power during the days and load swings to 80-85% at night. A tube leak on the 2A Steam Generator has been trended at 2-3 gpd for the last 10 days. Primary makeup does not operate in Auto and has been operated in manual for the last two shifts. Instrument Maintenance investigation revealed a problem with the switch on the MCB. A switch replacement is being planned by the Work Analysts. The 2B C/CB Pump is OOS for motor bearing replacement and the 0A Primary Water Makeup pump has been isolated due to excessive leakage.

ALERT

(0800 - 0930)

At 0800 the Shift Engineer (Response Cell) will call the Operating Engineer and inform him that the 1B RHR pump was tripped due to cavitation when the 1RH8701 valve closed. 1RH8701 was reopened about a minute after the pump was tripped. The Refueling Foreman will report that the level in the SFP and Refueling cavity is decreasing rapidly. The SFP low level alarm annunciates at 0805. At 0810, the feeder breaker to Bus 138 will trip on an internal fault and power will be lost to the bus and associated MCCs. Significant equipment affected by the power loss includes the 0B Aux Bldg Exhaust Fan, the ENS/INARS/NAWAS phones, the U-1 stack SPING vacuum pump, 1MOV-RH8702 (suction valve from RCS), 1MOV-RH8700B (B RHR Suction valve), 1MOV-SI8811B (B RHR pump suction from Containment recirc sump), the U-1 Purge Rad Monitors and the Purge system. At 0815 the level in the Refueling Cavity will reach the Tech Spec (3.13.10.A) limit at 613 feet 2 inches. An Alert will be declared per EAL #5C (Fuel Pool level decreases below the Tech Spec limit) by the Shift Engineer. If the OE has not already ordered entry into AOP-6.2, Refueling Cavity/Spent Fuel Pit/Transfer Canal Uncontrolled Loss of Level, the SE will initiate a containment evacuation of non-essential personnel and start placing the in-transit fuel assemblies in safe storage. Two personnel from the decontamination crews will be wet and contaminated when they exit the containment and provide information on the location of the RHR leak. Fuel assemblies will be "parked" either in the core or in the SFP per AOP-6.2. At 0900, while performing AOP-6.2, a fuel assembly (X60B) will be dropped over the core and land on the Reactor vessel flange and be leaning against the refueling cavity wall. Upon impact the assembly will be bent and break open several fuel rods releasing Noble Gas and Iodine to the atmosphere. As Radiation levels increase rapidly, the Refueling crew will evacuate the Containment. Ventilation flow from the Containment, through the Fuel Building to the Aux Bldg stack will provide the release path.

EXPECTED ACTIONS

Operations personnel will be dispatched to investigate the 1RH8701 valve closure at the breaker and check the RHR pump for damage. The OE will discuss and may declare the ALERT classification per EAL #3F (Equipment is degraded such that only one system or means is available for achieving or maintaining a Mode 5 condition (Cold Shutdown) except during controlled, planned evolutions.) with the Shift Engineer, or the Alert will be declared per EAL #5C (Fuel Pool level decreases

below the Tech Spec limit.) by the Shift Engineer at 0815. Initial State and NRC notifications will be made by the Control Room (Response Cell). Operations and Electrical Maintenance personnel will be dispatched to investigate the loss of Bus 138. The TSC and OSC will be staffed and activated through the established Security callout procedure.

SITE EMERGENCY

(0930 - 1045)

As the Refueling Cavity level continues to decrease, radiation and airborne levels in the Containment will increase. At 0930 the Containment rad levels will rapidly increase above 400 R/hr as the dropped fuel assembly is uncovered. The noble gas release rate will increase to $1.1E7 \mu\text{Ci/sec}$ which will provide a boundary Whole Body dose rate $> 50 \text{ mrem/hr}$. The Nuclear Duty Officer / Manager of Emergency Operations (Response Cell) will partially staff the EOF but will not have minimum staffing to take Command and Control within the time scope of the scenario.

EXPECTED ACTIONS

The Station Director will declare the Site Emergency classification on EAL #2P (Primary Containment radiation Levels $\geq 400 \text{ R/hr}$) OR EAL #1U (As a result of releases from the site, confirmed field team measurements are greater than or equal to 50 mr/hr). EAL #9I (A condition that warrants the activation of the EOF AND monitoring teams OR a precautionary notification of the public near the site) may also be applicable. Projected dose rates at the site boundary may also lead to a General Emergency classification.

RECOVERY

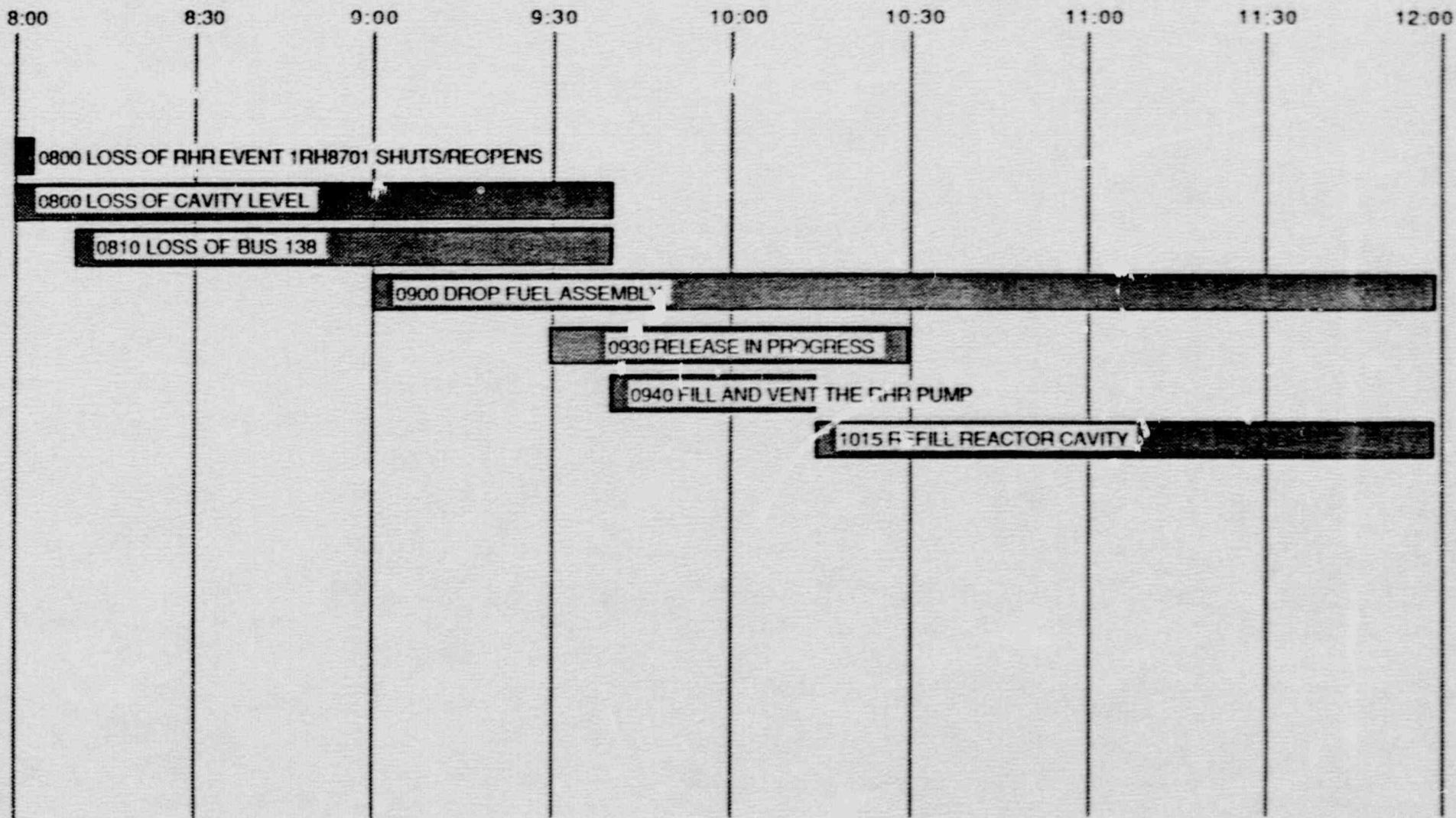
(1045 - 1200)

At 0940, power will be restored to Bus 138 by replacing the feeder breaker with a spare breaker. Operations will then close 1RH8701 (if not previously closed) and 1RH8702 to isolate the leak. The RHR system will then be lined up for suction from the Containment Recirc sump. Venting of the RHR pump will be completed at 1015 at which time refilling the Refueling cavity can be started. At 1045, containment radiation levels will decrease below 400 R/hr.

EXPECTED ACTIONS

Once Refueling cavity level starts to increase, the TSC will be forced to make plans for a long term recovery. Of major concern to them is the realization that the volume of water in the containment recirc sump will only be able to supply water for about two hours. At that time, RHR cannot be realigned for recirculation due to the location of the leak. Inovative methods will need to be explored to establish a recirculation flow path.

ZION MINI-EXERCISE TIMELINE



EVENT SUMMARY

EVENT: LOSS OF RHR

DESCRIPTION:

At 0800 the 1A RHR Pump suction valve 1RH8701 inadvertently closes causing the pump to cavitate. The Control room stops the pump, reopens the valve and reports to the Operating Engineer. When the valve closes, a rupture occurs on the upstream side causing a loss of water level in the Refueling Cavity and Spent Fuel Pool. At 0805, the Cavity low level alarm is initiated. At 0815, the low level Tech Spec for the Spent Fuel Pool is reached. U-1 RWST level instruments are both OOS.

CHALLENGING ASPECTS:

The Operating Engineer will be challenged with determining the cause of the loss of RHR, finding a method to re-establish core cooling, and classification of the event. With the conditions presented to him, the OE should consider activating the TSC for assistance in determining plant conditions.

EXPECTED ACTIONS:

The Op Engineer will discuss the situation with the Shift Engineer and may classify the Alert on EAL#3F (Equipment is degraded such that only one system or means is available for achieving or maintaining a Mode 5 condition (Cold Shutdown) except during controlled, planned evolutions.), or the Alert will be declared per EAL #5C (Fuel Pool level decreases below the Tech Spec limit.) by the SE at 0815. Initial State and NRC notifications will be made by the Control Room (Response Cell). The TSC and OSC will be activated through the established Security callout procedure. The volume of water available in the RWST is unknown and primary makeup capacity is limited.

EVENT SUMMARY

EVENT: LOSS OF BUS 138

DESCRIPTION:

At 0810 the feeder breaker to Bus 138 will trip on an internal fault. Loss of the bus and its associated MCCs will affect the following major equipment: the 0B Aux Bldg Exhaust Fan; the ENS/NARS/NAWAS phones; the U-1 stack SPING vacuum pump; the U-1 Purge Rad Monitors; the containment purge system, 1MOV-RH8702(suction valve from RCS), 1MOV-RH8700B (B RHR Suction valve) , and 1MOV-SI8811B (B RHR pump suction from Containment recirc sump).

CHALLENGING ASPECTS:

Restoration of Bus 138 should become the highest priority task for the TSC and OSC. Determination of the release (both path and quantity) will challenge the TSC with determining appropriate Protective Action Recommendations. Alternate phone lines will be needed to make contact with the State(s) and NRC. RH8702 requires power to isolate the RHR leak. Water for core cooling will be available in the recirc sump, but cannot be lined up until power is available for closing RH8700B which is interlocked for opening SI8811B.

EXPECTED ACTIONS:

Priority will be given to restoring power to Bus 138 so the leak can be isolated and refilling the cavity can be accomplished. Field teams will be dispatched to monitor the offsite downwind sectors close to the plant. Commercial phone lines will be used to establish required notification and communications. The source term and release path determination will be determined by inplant monitors and off-site sampling methods.

EVENT SUMMARY

EVENT: CONTAMINATED PERSONNEL

DESCRIPTION:

Two members of the decontamination crews will evacuate the containment in wet anti-Cs with skin contamination and potential internal contamination. A simulated hot particle will be used on one of the individuals. Information on the RHR leak location will be provided by these personnel.

CHALLENGING ASPECTS:

RPTs will be challenged with determining the doses, evaluating internal contamination and providing decontamination of these individuals.

EXPECTED ACTIONS:

The contaminated individuals will be decontaminated and given a whole body count. The hot particle will be identified and removed as a priority to skin contamination. An investigation of where they were working will provide information on the location of the RHR leak.

SUCCESS/FAILURE PATHS:

If a thorough survey is not completed, the hot particle will not be identified and removed. An assessment of the dose received by the individuals must also be accomplished.

EVENT SUMMARY

EVENT: DROPPED FUEL ASSEMBLY

DESCRIPTION:

At 0900, while performing AOP-6.2, a fuel assembly (A00B) will be dropped over the core, land on the Reactor vessel flange and be leaning against the refueling cavity wall. Upon impact the assembly will be bent and break open several fuel rods releasing Noble Gas and Iodine to the atmosphere. Ventilation flow from the Containment, through the Fuel Building to the Aux Eldg stack will provide the release path.

CHALLENGING ASPECTS:

The decreasing water level in the Refueling cavity will expose the dropped assembly at 0930. Increasing radiation and airborne levels will be experienced. The TSC will be challenged with determining alternate methods of reflooding the Refueling Cavity to cover the assembly. After Bus 138 restoration and the refill of the cavity is started, a long term method to provide core cooling will still need to be explored. Water will be available from the Recirc sump for only about 2 hours.

EXPECTED ACTIONS:

Several methods will be explored to stop the RHR leak and establish a path to refill the Cavity. Research will reveal that Bus 138 will allow a refill lineup with the RHR system. Long term cooling methods will also be explored until a core cooling solution is found.

SUCCESS/FAILURE PATHS:

Restoring power to Bus 138 will allow realigning the RHR system to the recirc sump to refill the cavity.

EVENT SUMMARY

EVENT: RELEASE PATH

DESCRIPTION:

Air flow through the FHB/AB will extract the noble gas from the containment and out the stack. The Unit 1 Stack SPING monitoring will be lost with the loss of Bus 138, but the Unit 2 will be monitoring. The equipment hatch will not be able to be closed due to seal repairs.

CHALLENGING ASPECTS:

The TSC will be challenged with either reflooding the cavity to cover the exposed assembly or isolation of the containment will be necessary to stop the release to the environment. Personnel attempting to close the equipment hatch will be in a high radiation and high airborne area.

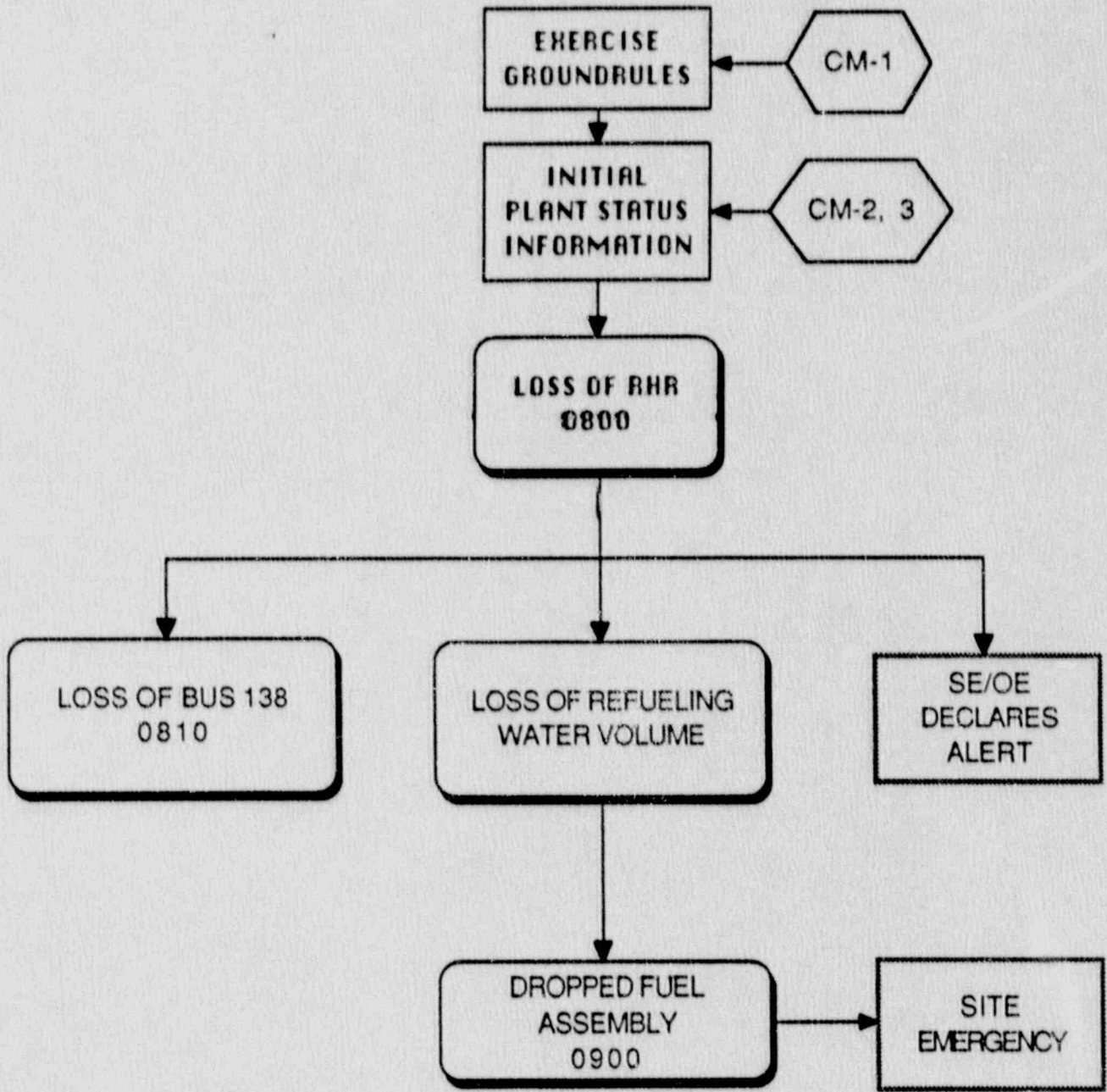
EXPECTED ACTIONS:

Field teams will be dispatched to track the plume in the environment. The TSC will pursue restoring power to Bus 138 as the highest priority. Ops and maintenance may be dispatched to investigate closing the equipment hatch.

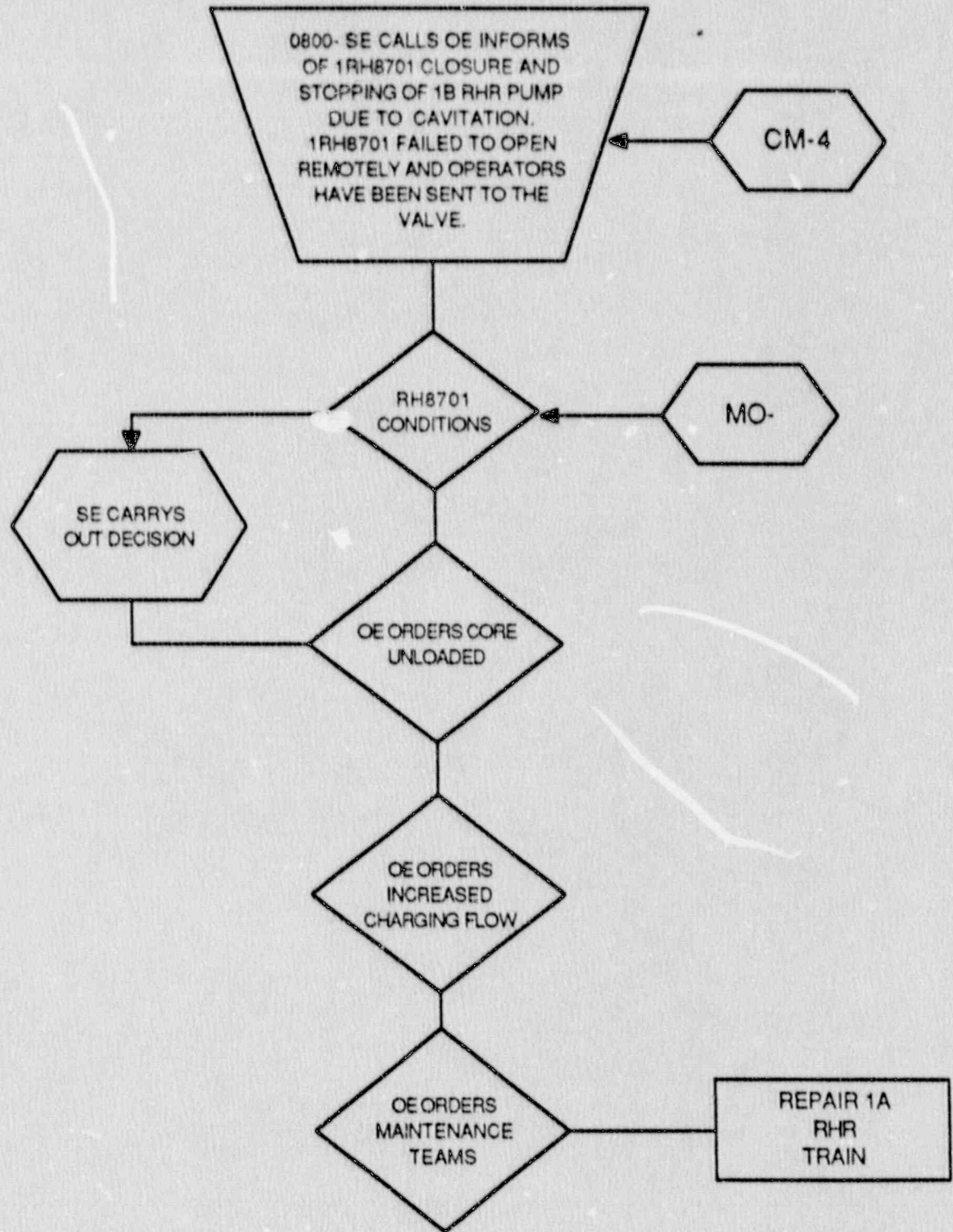
SUCCESS/FAILURE PATHS:

The only method available to minimize the radiation levels and the release is to reflood the Refueling cavity.

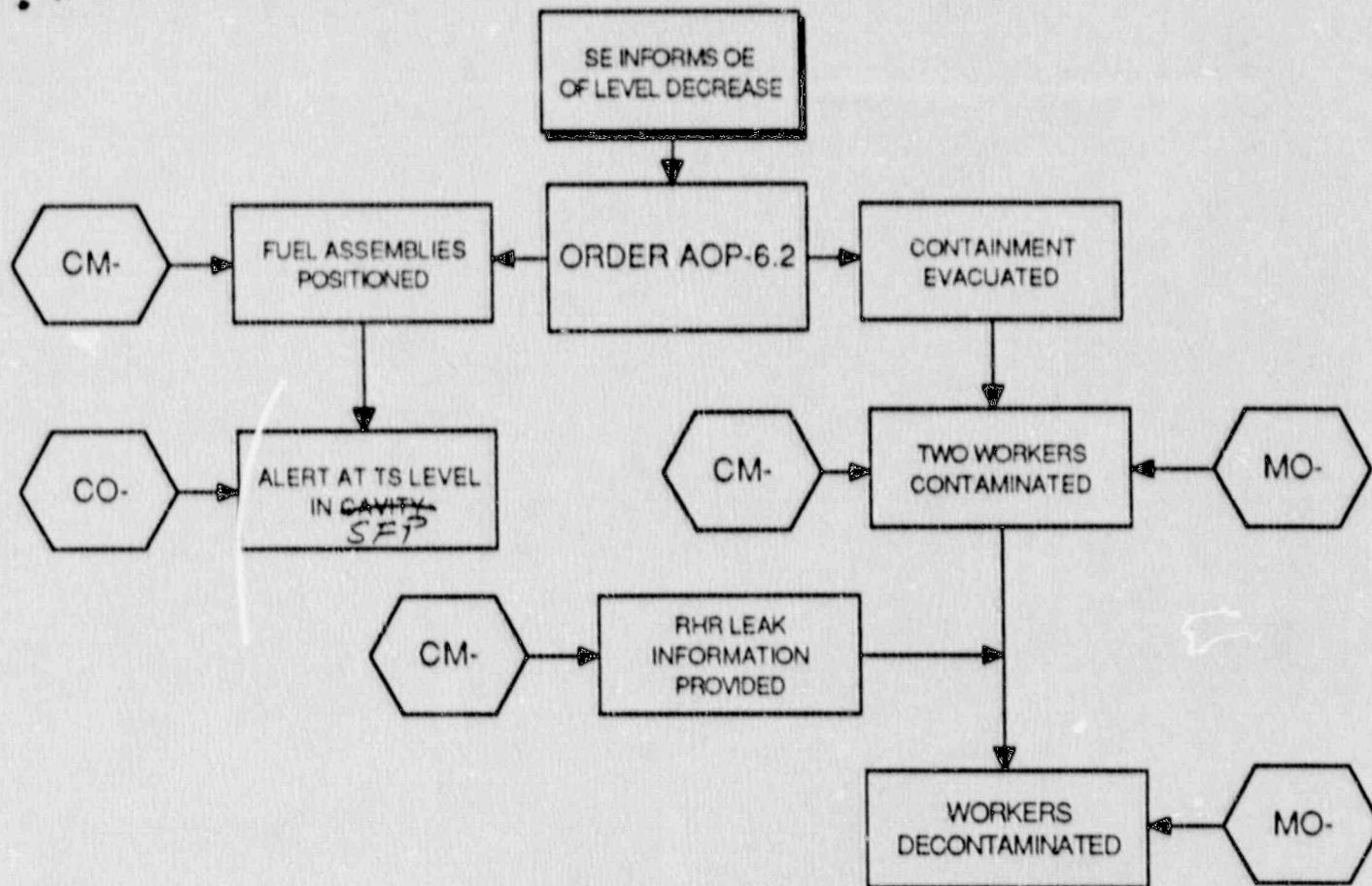
ZION MINI-EXERCISE



LOSS OF RHR



LOSS OF REFUELING WATER VOLUME



DROPPED FUEL ASSEMBLY

