U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/89018(DRSS); 50-455/89020(DRSS)

Docket Nos. 50-454; 50-455 Licenses No. NPF-37; No. NPF-66

Licensee: Commonwealth Edison
P.O. Box 767
Chicago, IL 60690

Facility Name: Byron Nuclear Generating Station, Units 2 and 3

Inspection At: Byron Site, Byron, Illinois
Byron Emergency Operations Facility, Dixon, Illinois

Inspection Conducted: December 5-8, 1989

Inspectors: J. Patterson
J. Patterson
Team Leader

1/3/90
Date

J. Foster W. Snell for

1/3/90
Date

Accompanying personnel: R. Sutphin
D. Barss
R. Van Niel
T. Lonergan

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

1/3/90
Date

Inspection Summary

Inspection on December 5-8, 1989 (Reports No. 50-454/89018(DRSS); No. 50-455/89020(DRSS))
Areas Inspected: Routine, announced inspection of the Byron Station's emergency preparedness exercise involving observations by six NRC representatives of key functions and locations during the exercise (IP 82301).
Results: No violations, deficiencies or deviations were identified. The licensee demonstrated an adequate response to a hypothetical scenario involving equipment failures and a large radiological release. This was a two-day ingestion pathway exercise with full participation by offsite authorities.

The exercise scenario was challenging in several ways, which included: increased containment pressure later resulting in a release path through containment penetration locations; loss of one of two reactor coolant pumps; and two stuck control rods. Also it was observed that less simulation and more use of mock-ups was evident with in-plant teams compared to previous exercises.

## DETAILS

1. NRC Observers and Areas Observed

J. Patterson, Control Room, and Emergency Operations Facility (EOF)
R. Sutphin, Control Room
J. Foster, Technical Support Center (TSC)
T. Lonergan, Operational Support Center (OSC)
D. Barss, Field Monitoring Teams
D. Van Niel, EOF

2. Persons Contacted

Commonwealth Edison*

*R. Ward, Technical Superintendent
*T. Gilman, Emergency Planning Supervisor
*S. Sober, GSEP Coordinator
*W. Stobaugh, Scenario Coordinator
*T. Lechton, Emergency Planning, Senior Administrator
*J. Coppelman, Emergency Management, Scenario Coordinator
*S. Wilson, Chemistry Supervisor
*A. Javorik, Assistant Technical Staff Supervisor
E. Cremens, Maintenance Director
S. Swanson, OSC Director
L. Colehour, Assistant Office Supervisor
J. Capp, Assistant GSEP Coordinator

*Denotes all those licensee representatives who attended the NRC exit interview held on December 9, 1989.

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

3. General

An announced, daytime exercise of the Byron Nuclear Generating Station Emergency Plan was conducted at the Byron Station on December 6, 1989. The exercise tested the licensee's emergency support organizations' capabilities to respond to a simulated accident scenario resulting in a major release of radioactive effluent. This was a full-participation, ingestion pathway exercise. State and local counties participated fully, with a second day to the exercise testing the offsite agencies abilities to deal with radioactive deposition within the fifty-mile ingestion pathway around the site. Attachment 1 describes the Scope and Objectives of the exercise and Attachment 2 describes the exercise scenario.

4. General Observations

a. Procedures

This exercise was conducted in accordance with 10 CFR Part 50, Appendix E requirements using the Commonwealth Edison Generating Stations Emergency Plan (GSEP), the Byron annex to the GSEP, and the Byron Station Emergency Plan and Emergency Plan Implementing Procedures.

b. Coordination

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

c. Observers

The licensee's observers monitored and critiqued this exercise along with six NRC observers. Representatives of the Federal Emergency Management Agency (FEMA) observed and evaluated the adequacy of offsite actions, and their findings will be presented in a report issued by FEMA.

d. Exercise Critique

A critique was held with the licensee and NRC representatives on December 8, 1989, the day after the exercise. The NRC discussed the observed strengths and weaknesses during the exit interview.

5. Specific Observations (IP 82301)

a. Control Room (CR)

The Shift Engineer (SE) correctly declared a Notification of Unusual Event (NUE) at 0658 based on failed fuel monitor alarms which indicated activity at >0.22 μCi/ml, which was indicative of 0.1% fuel failure. The Emergency Operating Procedures (EOPs) and the Emergency Action Levels (EALs) were properly utilized for this and subsequent activities in the exercise. Abnormal Operating Procedures (AOPs) and Technical Specifications were also observed to be used as applicable. The Station Control Room Engineer (SCRE) personally instructed the CR Communicator on how he wanted the initial Nuclear Accident Reporting System (NARS) message sent by telephone. The Communicator demonstrated adequate knowledge of the NARs; however, since the NUE was the first event to be recorded, the SCRE did not want any errors in transmission.

The Alert was declared at 0720 which was approximately an hour ahead of the anticipated time according to the scenario. The NRC evaluator felt that this was an unrealistically early declaration. However,

licensee scenario developers considered the response satisfactory based on a critique of the pre-exercise practice drill in which the CR crew was viewed as having delayed a declaration unrealistically. As the event proceeded, this early Alert declaration did not adversely effect the exercise's time schedule. The Alert was based on data similar to that which constituted the NUE, except that the RCS activity was now indicative of 1% fuel failure rather than 0.1% fuel failure. In actual conditions, these failed fuel monitors and the increased RCS activity, as determined by chemistry results, would be conditions which would initiate a reactor shutdown; however, the Lead Controller reminded the SE and SCRE that they could not initiate a reactor shutdown due to exercise scenario conditions. The SE and his support staff wanted the Lead Controller and the NRC evaluator to be aware that these conditions at the Alert in reality would have resulted in reactor shutdown by the Control Room crew.

Good coordination and cooperation between the SE and the SCRE was quite obvious as the exercise proceeded. At 0743 there was a public address (PA) announcement made by the Nuclear Systems Operator (NSO) to request any personnel in the Unit One penetration area to leave the area due to high radiation levels (>100 mR/hour). This was an excellent use of the PA; and, after the exercise, the NRC evaluator confirmed that this announcement was clearly heard in the area of concern.

Briefings by the SCRE were infrequent in the early stages of the exercise, however, they did increase later. All announcements for the NUE, Alert and Site Area Emergency (SAE) were correctly made by the SCRE. The SAE was officially announced in the TSC and repeated in the CR. Transfer of command and control from the CR to the TSC was well done, and when concluded the SE announced the transfer to his entire CR crew. The CR efficiently performed their portion of the assembly/accountability drill as directed by Security personnel without any missing participants. Habitability checks were conducted periodically by a Radiation Protection Technician (RPT). Besides radiation level monitoring, smears were taken at the CR entrance door, and personal dosimetry of participants were read to determine if any increased exposure levels had occurred. This phase of emergency preparedness was well conducted.

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

b. Technical Support Center (TSC)

The Technical Support Center is a dedicated facility located on the lower levels of the turbine building. The facility is equipped with five ceiling mounted display units utilized for Unit 1 and 2 Safety Parameter Displays, meteorological data, Prime Computer data, and overall plant status. The Prime Computer Display was available to trend parameters in an exercise mode and was utilized extensively.

The TSC was quickly and efficiently staffed following the Alert declaration. A plant PA announcement at 0725 advised of the activation of the TSC, which was declared fully activated at 0750. A formal announcement was made to advise TSC staff that the Station Director had command and control of the response to the simulated emergency.

Throughout the exercise, noise levels were considered good, and status board updates were adequate. Personnel assigned TSC duties displayed excellent exercise decorum at all times. A board listing teams dispatched from the Operations Support Center supplemented boards depicting plant parameters, sequence of events, and other information. Sufficient notes and logs (including message forms and an electronic status log maintained by an assigned individual) were kept to allow reconstruction of actions taken and decisions made during the simulated emergency.

The Station Director (SD) and supporting specialty Directors (Operations, Maintenance, Technical, Rad-Chem, Security, Administrative, Stores, Environs) conducted frequent and informative staff briefings. Briefings by support directors, especially the Operations Director, relieved the Station Director of some of the burden of staff briefings and served to advise him of significant events. Briefings kept the TSC staff well aware of inplant and offsite events.

The TSC staff actively followed plant events, sought methods of mitigating the accident scenario, and continuously looked for events which would require a change in emergency classification. In the early stages of the scenario, TSC Operations and technical staff properly questioned why the plant was not reducing power in response to degrading conditions in the reactor coolant system (the plant stayed at power to preserve the scenario timeline and radioactive source term). Later, the increase in containment pressure was quickly noted; and following the Safety Injection (on high containment pressure), it was immediately identified that the containment spray system did not function. Considerable technical discussion took place as to the location of the source of the radioactive release, which was finally identified by the process of elimination.

Prior to activation of the Emergency Operations Facility, two field monitoring teams were dispatched and directed by the TSC. The teams were well directed and were provided with periodic updates as to plant status and meteorological forecasts.

The Site Area Emergency (SAE) was properly declared at 0854, per the Emergency Action Level scheme. SAE notifications via the Nuclear Accident Reporting System (NARS) line were clear, concise, and were made well within the fifteen minute goal. A communicator maintained contact with simulated NRC personnel.

Two individuals, simulating NRC personnel responding to the accident, arrived at the TSC at approximately 1015. The Station Director provided the "mock NRC" with a personal briefing on the overall sequence of events and current plant status. The inclusion of the "mock NRC" personnel enhanced the realism of the exercise. It was noted, however, that there was no co-location of responding NRC personnel (adjacent working positions) with TSC staff which would be done in a real event.

Assembly and accountability of plant personnel in response to the Site Area Emergency was reported to the TSC as completed at approximately 0926, well within the 30 minute goal. According to licensee records, approximately 900 individuals participated in accountability via accountability card readers. Four individuals, initially identified as missing, were located within a few minutes. The Station Director paid particular attention to the subsequent evacuation of non-essential personnel from the site, selecting evacuation routes and times so that evacuees would receive minimal exposure to the release plume. Evacuees were released to go to the Dixon relocation center in groups of fifty so that evacuation routes would not become clogged.

The Radiation/Chemistry group was very active in this exercise, including insuring the habitability of the TSC through periodic surveys and issuance of thermoluminescent and self-reading dosimeters. The scenario provided for high radiation levels in many areas of the Auxiliary Building, and considerable attention was given to authorization for several inplant teams to exceed radiation dose limits in order to perform emergency evolutions. Need for the actions, maximum protective equipment required, and medical effect of the elevated dose levels were all considered.

Actions which should receive priority attention were highlighted by Technical and Operations Directors. However, these items were not listed; and, at times, it was not clear exactly what was the highest priority for completion of the various actions either in progress or planned. A small status board listing problems, related tasks, and their relative priority would be useful.

After a (scenario) time jump, TSC personnel demonstrated some of the planning which would go into a Recovery effort. The various Directors were polled for their input into the list of items to be considered/planned for during Recovery. In addition, the "mock NRC" individuals expressed the NRC's needs for sequestering of failed equipment until NRC personnel could be present to participate in equipment fault determination, retention of all records or documents, and provision for the extensive NRC accident investigation to follow. When the list of concerns/items to be planned for was developed, discussions were held with EOF management. Procedure EPZ 310-6, Revision 0, dated May, 1988, "Guidelines for Recovery" was utilized as the basis for this effort. This procedure should include additional guidance information as to when Recovery can be declared and be consistent with State policy on the Recovery phase.

Based upon the above findings, this portion of the licensee's program was acceptable; however, the following item is recommended for improvement:

- A status board or a section of a status board should be utilized to list tasks to be accomplished and their relative priority for accomplishment.

c. Operational Support Center (OSC)

The OSC was staffed and became operational in an efficient and orderly manner within minutes following the PA announcement of activation of the TSC and OSC. A step-off pad was installed at the single entry point, and hand and shoe surveys with a portable radiation survey instrument were required prior to entry. Initial arrivals promptly set up the OSC in accordance with the configuration suggested in the current implementing procedure (BZP-100-A1, Revision 0).

The OSC Director and OSC Supervisor appeared to work well together throughout the exercise. Timely briefing of OSC participants of plant status and exercise conditions, on and offsite, were provided.

The OSC Director's initial explanation of the location, function and method of operation of the OSC (e.g., dosimetry, exposure control, team briefing, sign-in, sign-out, and debriefing) provided for the orderly assignment of tasks and the dispatch and control of teams. This ensured the participants were made aware of the traffic pattern in the OSC, which was followed throughout the exercise.

The OSC demonstrated an ability to assign and control a relatively large number of teams. As many as five teams were deployed at one time. Records indicated that nineteen tasks were designated and assigned. Team tasks were generally well defined, and team composition appeared to be based on knowledge of participants' experience and capabilities in the area of concern.

Team briefings and debriefings were thorough and in accordance with current EPIPs, BZP-100-T-17, and T-19, respectively. Emphasis was placed on exposure control, particularly in high radiation areas. The turnback dose rate and turnback dose was carefully explained to each team and was documented on the briefing form. In addition, consideration was given to equipment needs, entry and exit routes, radiation levels in areas of concern, as well as reminders of routine and special RWP requirements.

Health Physics practices observed in the OSC were, in general, good. Rad Chem participants took an active part in the health physics aspects of the planning and conduct of team tasks. The observance of access control in the plant proper, the donning and removal of protective clothing, the conduct of individual personnel contamination surveys, and decontamination were satisfactorily demonstrated.

Although OSC habitability surveys were recorded on EPIP form BZP-100-T21, Revision 0, the inspector was not able to observe the conduct of this monitoring due to other commitments at that particular time.

The communication equipment operators and flow of information between the OSC and other emergency facilities appeared to be adequate to the demands of this exercise.

The plant status board indicated the plant to be in an Alert status for a period of approximately 20 minutes after the OSC was informed that the plant was in a Site Area Emergency status. This item was also identified by the licensee during the post-exercise facility critique.

Although the HP access control status board was informative and well maintained throughout the exercise, the inspector did not observe the use on the document form of the space for entry of estimated time of team return. This item was also identified by the licensee in their critique.

The requirement to conduct hand and shoe surveys at the step-off pad at the entry to the OSC was generally observed throughout the day. However, the inspector observed at various intervals that the time spent by some individuals in the conduct of such surveys was extremely short, e.g., 7 to 10 seconds, not sufficient for a satisfactory survey.

Survey results at various locations and of specific items in the field appeared to be recorded in no uniform method and on any available paper. The inspector did not observe the use of a form or sketch map for the field documentation of survey results. Although this may be the result of the requirement to relay scenario levels in the exercise situation, the reliance on informal notes and memory for subsequent documentation in an actual emergency is not recommended. This item was also identified by the licensee during their critique.

The use of the phrase "this is an exercise" was used as required in initial communications by OSC participants. However, as the exercise progressed, the use of "this is an exercise" in radio and phone communications was observed to range from intermittent to non-use in such transmissions.

The OSC Controllers' critique/debriefing was quite thorough. Opportunity was provided for all to participate. Controllers were quite candid and voiced a number of significant observations. Controllers were required to complete forms designed to document their observations of specific exercise objectives.

The total OSC critique provided by the lead OSC Controller was quite thorough, as were the comments of the OSC Director. Both individuals provided an opportunity for participant questions.

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

d. Emergency Operations Facility (EOF)

The facilities and equipment at the EOF were adequate to perform the functions required. There was effective security control and no problems of congestion or disturbing noise existed.

The EOF was activated in a timely manner, with initial staffing beginning following the Alert declaration. The facility was manned with the appropriate staff to perform the assigned functions, and the players demonstrated knowledge of their duties and responsibilities. An organization chart was prepared to identify the players assigned to the various EOF functions. Strong command and control was evident in the operation of the EOF.

Plant procedures were effectively used to determine the appropriate emergency action levels for the existing conditions. Communications were good, and chronological logs were kept at the key functional areas. There was good use of status boards to allow all players an indication of the current status of scenario events.

There was an immediate and concentrated effort in determining the source of release and the release path by the Technical Director's group and the Health Physics Director. Several possibilities were pursued and good interchanges of information and ideas were demonstrated in a joint coordinated effort in concert with the (MEO) Manager of Emergency Operations.

The flow of information, both verbal (by frequent briefings and face to face discussion) and through the use of plant status sheets and NARS forms, added to the successful EOF operation. Administrative support to the EOF personnel was well managed.

Dose assessment was performed well, with effective use of actual offsite measured values to confirm calculated dose projections. Plant status was factored into the analysis in determining possible offsite doses. Current and forecast meteorology was available and considered in the overall analysis.

Protective action decisionmaking was conducted effectively. The staff considered plant status, possible release duration, weather conditions, and the relative benefits of sheltering versus evacuation. Notification to the State was timely and accurate using the Illinois Nuclear Accident Reporting System (NARS) forms. Good communications channels were maintained throughout the exercise among the State and local response organizations, the EOF, TSC, and the field monitoring teams.

There was good interaction between the State representatives and the EOF staff in discussing plant status, possible degradation of current conditions, and any proposed protective action recommendations. While in several cases the State amplified on the licensee protective action recommendations by including additional sectors, no technical faults were evident at that time in the initial licensee recommendations.

Recovery discussions actually began while the reactor conditions still were classified as a General Emergency. The MEO and his support managers, in conference with their TSC counterparts, agreed not to downgrade from the General Emergency on the basis that only one Residual Heat Removal (RHR) pump was available and containment spray was not yet restored. These were two of the main reasons for not downgrading. With a 24 hour time jump and restoration of the second RHR pump and the three penetrations in containment successfully plugged, recovery plans were formulated. Recovery discussions were adequate and followed the Recovery procedure; however, more aspects could have been addressed than just the engineering and mechanical problems. The TSC was included, by conference call, in these discussions.

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

e. Field Monitoring Teams

Both teams (gold and black) upon arrival at the GSEP vans proceeded to carry out necessary equipment checks which included verifying that radiological monitoring equipment were calibrated and adequately passed a response check, ensuring an adequate inventory of supplies, radio communication checks, and vehicle operability checks. The portable generator was started, and each air sampler tested to ensure that adequate air flow could be obtained. The equipment check noted that the right turn signal of one GSEP van did not function. However, when the vehicle check list was completed, this information was not recorded as a discrepancy.

Within 30 minutes of arrival at the GSEP vans, both teams were ready to be dispatched on assignments. Field teams were kept well informed of current plant conditions, emergency status, anticipated events, and meteorological conditions. When primary system leakage was detected, field monitoring teams were asked to be alert to increasing dose rates.

Soil sampling techniques were observed to be adequate for both teams. For each sample, an appropriate area was selected, measured and the sample was carefully packed into a sample container. Sample labels were completed with necessary data and affixed to each sample. A marker was left to identify the exact sampling location. Sample data was recorded in logs and reported to the EOF. Omitted from sample logs was information concerning the nature of the terrain, vegetation cover, and nearby trees as directed by procedure EG-11 Step F.5.D.

Vegetation sampling techniques of each team was observed. Each team appropriately selected a suitable sampling area adjacent to designated sampling points. One team failed to obtain adequate sample volume. Procedure EG-11 Step F.6 instructs that the sample container be filled and packed tightly, and this was not accomplished. One sample consisted of only a few blades of grass.

Air sampling techniques of both teams were also observed. Air samples were correctly placed facing the station approximately three feet above the ground. Start and stop times and flow rates were observed and correctly recorded. A standard volume of 30 cubic feet of air for each sample was collected. Contrary to procedure EG-11 Step F.2.d, both the particulate filter and silver zeolite cartridge were placed in the same sample bag. This would have cross contaminated the cartridge with particulates and greatly reduced the validity of the iodine sample. Additionally, the particulate filter was not placed in an available petri dish as required by procedure. This was considered as an Open Item (No. 454/89008-01).

Survey techniques for the plume were observed to be adequate. Dose rate meters were continuously monitored while traveling from one area to another. At each location, readings were taken at six feet, three feet, and six inches, both open window and closed window readings. The meter was correctly positioned outside the vehicle to monitor dose rates at designated sample points.

There was a discrepancy between procedure EG-2 Step E.2, which directs teams to exit the plume when dose rates approach 100mR/hr, and procedures EG-3 and EG-11 Step D.5.c, which directs teams to remain in the plume unless directed by the Environs Director to exit the area. This should be addressed by the licensee.

Generally, for the samples observed, contamination control techniques were adequate to prevent cross contamination of samples. One isolated incident was observed where an air sample cartridge was incorrectly handled with a potentially contaminated glove. Gloves were frequently changed and sampling tools were monitored and cleaned as necessary to prevent cross contamination.

Generally, sample labeling was adequate to ensure that samples could be uniquely identified by location, date, time and type. However, contrary to Procedure EG-11 Step F.1.e, the team name was not placed on all samples and no chronological sample number was utilized.

One team affixed a sample tag to flags left to mark sample locations. This greatly enhanced the ability to later identify exact sample location for correlation of data as necessary. The other team observed did not use tags to identify specific sample sites, but did leave stakes to mark such locations.

A few minor equipment and supply problems developed in the course of sampling activities. There were no metal planchets available for use in counting air samples using the SH-4A sample holder. The stop watch supplied to time air samples did not function properly. A low range dose rate meter broke during use. In each instance other available equipment or means were available to correctly obtain necessary results regardless of these minor problems.

The EOF directed one team to don protective clothing at 1034 after increasing offsite dose rates were detected. One pair of gloves in prepared packets of protective clothing was dry rotted and not usable; other additional supplies were adequate. Approximately 90 minutes later, the EOF contacted both teams to confirm that they were in full protective dress including respiratory protection equipment. One team had not previously been directed to don protective clothing, and neither team had been instructed to don respiratory protection equipment.

Radio communications were properly conducted and generally were of adequate quality to ensure good exchange of information and clarification of data. At one point when transmissions from one team were not clear, the EOF used the other team as a relay station to transmit necessary information. One team neglected to announce messages as drill related, but the EOF communicator, and the other team consistently included this important statement. The station call sign was infrequently announced and probably should have been done more often.

Dosimetry was issued to each team member and appropriate records forms initiated. Dose extension to one rem were authorized for each team member; however, current quarterly dose information for team members was never provided to the teams. Only one finger ring badge was observed being worn; Procedure EG-4 Step F.1.b requires two for each team member.

On two occasions members of the local population approached to inquire as to what the field monitoring teams were doing. Team members politely informed them of the nature of the exercise and their activities.

At the termination of the exercise, the teams took care to clean up the GSEP vans and return equipment to proper storage locations. Disposition of samples was discussed adequately.

With the exception of the above open item, this portion of the licensee's program was acceptable.

6. Exercise Scenario Review (IP 82302)

The licensee submitted the exercise scope and objectives and draft scenario package within the timeframes specified by NRC Region III. Following review, comments on the scenario package were given to the licensee. The licensee reviewed the NRC comments and made revisions to the scenario package where applicable.

The licensee's scenario was challenging including multiple equipment failures and assembly/accountability for 900 individuals. Release of radioactivity was projected in a plume to extend into the 50 mile ingestion pathway to permit the State and local government agencies to meet their exercise objectives as evaluated by FEMA. No instances of controller prompting were observed; and, overall, exercise control was considered good.

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

7. Exit Interview (IP 30703)

The inspectors held an exit interview the day after the exercise on December 9, 1989, with the representatives denoted in Section 2. The NRC Team Leader discussed the scope and findings of the inspection.

The licensee was informed that overall performance to a challenging exercise scenario was very good. All the participants in the key emergency response facilities demonstrated a good exercise mentality with cooperation and coordination shown as top priority items. The use of several mock-up equipment items in the OSC area for in-plant teams to utilize added another degree of realism to the exercise. The offsite teams need somewhat more discipline in conducting environmental sampling as indicated by the Open Item identified.

The licensee was asked if any of the information discussed during the exit interview was proprietary. The licensee responded that none of the information was proprietary.

Attachments:
1. Byron 1989 Exercise Scope and Objectives
2. Byron 1989 Exercise Scenario Outline

# BYRON NUCLEAR POWER STATION
## 1989 GSEP EXERCISE
## SCOPE OF PARTICIPATION

**DATE:** DECEMBER 6 AND 7, 1989

**TYPE:** Daytime
Day 1 - 10 Mile EPZ, Plume
Day 2 - 50 Mile EPZ, Ingestion Pathway

**OFFSITE AGENCY PARTICIPATION:**

State of Illinois
Ogle County
Winnebago County
State of Wisconsin (PARTIAL)

**PURPOSE:**

Test the capability of the basic elements within the Commonwealth Edison Company GSEP. The Exercise will include mobilization of CECo personnel and resources adequate to verify their capbility to respond to a simulated emergency.

**CECo FACILITIES ACTIVATED:** (DAY 1)

- Control Room
- TSC
- OSC
- EOF
- JPIC

**CECo FACILITIES ACTIVATED:** (DAY 2)

- EOF (Response Cell)
- JPIC

**CECo FACILITIES NOT ACTIVATED:**

- CEOF

The "Exercise" Nuclear Duty Person will be notified of simulated events as appropriate on a real-time basis. The "Exercise" Nuclear Duty Person and the balance of the Recovery Group will be prepositioned close to the Dixon EOF to permit use of personnel from distant locations.

Commonwealth Edison will demonstrate the capability to make contact with contractors whose assistance would be required by the simulated accident situation, but will not actually incur the expense of using contractor services to simulate emergency respone except as prearraged specifically for the Exercise.

Commonwealth Edison will arrange to provide actual transportation and communication support in accordance with existing agreements to the extent specifically prearranged for the Exercise. Commonwealth Edison will provide unforeseen actual assistance only to the extent that the resources are available and do not hinder normal operation of the Company.

0151b/wjm

BYRON NUCLEAR POWER STATION
1989 GSEP EXERCISE

December 6, 1989

## 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 Byron Nuclear Power Station. The 1989 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.
   - (CR, TSC, EOF)

   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.
   - (CR, TSC, EOF)

2) Notification and Communications

   a. Demonstrate the ability to correctly fill out a NARS form in accordance with EPIPs or EOF procedures.
   - (CR, TSC, EOF)

   b. Demonstrate the ability to make applicable notifications to offsite State and local organizations within fifteen (15) minutes of making an Emergency classification.
   - (CR, TSC, EOF)

   c. Demonstrate the ability to correctly fill out an ENS Notification Worksheet in accordance with EPIPs or EOF procedures.
   - (CR, TSC, EOF)

   d. Demonstrate the ability to notify the NRC immediately after the State notifications and within one (1) hour of the Emergency classification.
   - (CR)

NOTE: "*" INDICATES A PREVIOUSLY NOTED PROBLEM OR WEAKNESS

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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.
- (CR, TSC*, EOF)

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, EOF)

g. Demonstrate the ability to maintain an open-line of communication with the NRC (ENS and HPN) upon request.
- (TSC, EOF)

h. Demonstrate the ability to provide information updates to the NRC at least hourly and within thirty (30) minutes of changes in monitored conditions.
- (CR, TSC, EOF)

3) Radiological Assessment and Protective Actions

a. Demonstrate the ability to trend plant radiological survey information for conditions presented in the scenario.
- (TSC, OSC, EOF)

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 adequately prepare personnel for entry into a High Radiation Area in accordance with Station procedures and policies.
- (TSC*, OSC*)

e. Demonstrate the ability to brief personnel for entry into a High Radiation Area in accordance with Station procedures and policies.
- (TSC*, OSC*)

f. Demonstrate the ability to issue and adminstratively control dosimetry to the teams dispatched from the OSC in accordance with established policies and Station procedures.
- (OSC)

**NOTE:** **"*" INDICATES A PREVIOUSLY NOTED PROBLEM OR WEAKNESS**

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

g. Demonstrate the ability to establish radiological controls in accordance with established Health Physics policies and plant procedures.
- (OSC)

h. 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*)

i. Demonstrate the ability to establish radiological monitoring and controls of Assembly areas in accordance with established policies and plant procedures.
- (OSC*)

j. Using information provided by the Exercise scenario, demonstrate the ability to calculate Offsite Dose Projections in accordance with appropriate procedures, programs and guidances.
- (TSC, EOF)

k. 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.
- (CR, TSC, EOF)

l. Demonstrate the ability to perform decontamination of radioactively contaminated individuals in accordance with established policies and procedures.
- (OSC)

m. Demonstrate the ability to collect RCS and Containment Atmosphere samples using the Post Accident Sample System (PASS) equipment in accordance with PASS procedures and proper Health Physics controls.
- (OSC)

n. Demonstrate the ability to analyze RCS and Containment Atmosphere samples using appropriate analysis equipment in accordance with PASS procedures and proper Health Physics controls.
- (OSC)

o. Given information obtained from the PASS results, demonstrate the ability to perform a Core Damage Assessment in accordance with EPIPs.
- (TSC)

p. Demonstrate the ability to collect field samples in accordance with Environmental Sampling procedures.
- (Field Teams)

NOTE: "*" INDICATES A PREVIOUSLY NOTED PROBLEM OR WEAKNESS

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

q. Demonstrate the ability to perform field sample analysis in accordance with Environmental Sampling procedures.
- (Field Teams)

r. Demonstrate the ability to document field sample results in accordance with Environmental Sampling procedures.
- (TSC, EOF)

s. Demonstrate the ability to assess field sample results in accordance with ED procedures.
- (TSC, EOF)

t. Demonstrate the ability to trend field sample results in accordance with ED procedures.
- (TSC, EOF)

4) Emergency Facilities

a. Demonstrate the ability to staff and activate the on-site Emergency Response Facilities within thirty (30) minutes of the Alert Classification in accordance with EPIPs.
- (TSC, OSC)

b. Demonstrate the ability to augment the Control Room staff within thirty (30) minutes of an appropriate Emergency Classification in accordance with the EPIPs.
- (CR)

c. Demonstrate the ability to staff and activate the Emergency Operations Facility within approximately one (1) hour of the Site Emergency Classification in accordance with EOF procedures.
- (EOF)

d. 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, EOF)

e. Demonstrate the ability to document all Operations and Maintenance Team activities in logs and on appropriate Status Boards.
- (CR, TSC, OSC*)

f. Demonstrate the ability to track all in-plant job statuses in logs and on Status Boards.
- (CR, TSC, OSC*)

g. Demonstrate the ability to provide Station activity updates to the EOF at least every thirty (30) minutes.
- (TSC)

**NOTE:** **"*" INDICATES A PREVIOUSLY NOTED PROBLEM OR WEAKNESS**

5) 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.
- (CR, TSC, OSC, EOF, JPIC)

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.
- (CR, TSC, OSC, EOF, JPIC)

c. Demonstrate the ability to coordinate Operations and Maintenance activities during abnormal and emergency situations.
- (CR, TSC, OSC)

d. Demonstrate the ability to prioritize Operations and Maintenance activities during abnormal and emergency situations.
- (CR, TSC, OSC)

e. Demonstrate the ability to requisition emergency equipment and supplies necessary to mitigate or control unsafe or abnormal plant conditions.
- (CR, TSC, EOF)

f. Demonstrate the ability to acquire emergency equipment and supplies necessary to mitigate or control unsafe or abnormal plant conditions.
- (TSC, OSC, EOF)

g. Demonstrate the ability to transport emergency equipment and supplies necessary to mitigate or control unsafe or abnormal plant conditions.
- (TSC, OSC, EOF)

h. Demonstrate the ability to dispatch the Environs Teams within forty-five (45) minutes of determination of the need for field samples.
- (TSC, OSC*)

i. Demonstrate the ability to control/coordinate Environs Team's activities in accordance with ED and EG procedures.
- (TSC, EOF)

j. Demonstrate the ability to transfer control/coordination of Environs Team's activities in accordance with Station EPIPs and EOF procedures.
- (TSC, EOF)

k. Demonstrate the ability to assemble and account for all on-site personnel within thirty (30) minutes of sounding the Assembly Alarm.
- (TSC)

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5) Emergency Direction and Control (cont'd)

1. 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.
   - (CR, TSC, OSC*, EOF)

m. Demonstrate the ability to provide access for a Mock NRC Site Team in accordance with Access Control procedures.
   - (TSC, EOF)

n. Demonstrate the ability to interface with a Mock NRC Site Team.
   - (TSC, EOF)

6) Offsite Agency Coordination

a. Demonstrate the ability to coordinate emergency response with Illinois (SEOC and REAC) and Wisconsin (SEOC and SRC) in accordance with established Emergency Plans and procedures.
   - (TSC, EOF)

b. Demonstrate the ability to exchange pertinent information with the Illinois (SEOC and REAC) and Wisconsin (SEOC and SRC) in accordance with established Emergency Plans and procedures.
   - (TSC, EOF)

7) Public Information

a. Demonstrate the ability to maintain a CECo representative in the JPIC at all times in accordance with CECo policies and procedures.
   - (JPIC)

b. Demonstrate the ability to respond to Media requests in accordance with CECo policies and procedures.
   - (JPIC)

c. Demonstrate the ability to exchange event information with non-CECo JPIC representatives for Media Briefings in accordance with CECo policies and procedures.
   - (JPIC)

d. Demonstrate the ability to coordinate information with non-CECo JPIC representatives for Media Briefings in accordance with CECo policies and procedures.
   - (JPIC)

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7) Public Information

e. Demonstrate the ability to prepare accurate Press Releases within ninety (90) minutes of significant events while in a Site or General Emergency classification.
- (JPIC)

f. Demonstrate the ability to present Media Briefings within ninety (90) minutes of significant events while in a Site or General Emergency classification.
- (JPIC)

g. Demonstrate the ability to use visual aids to support Media Briefing information in accordance with CECo policies and procedures.
- (JPIC)

8) Recovery

a. Demonstrate the ability to generate a Recovery Plan which will return the plant to normal operations in accordance with CECo policies and procedures.
- (TSC, EOF)

b. Demonstrate the ability to identify the criteria to enter a Recovery classification in accordance with procedures.
- (TSC, EOF)

c. Demonstrate the ability to coordinate a Recovery Plan with the States in accordance with procedures.
- (TSC, EOF)

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# BYRON NUCLEAR POWER STATION
## 1989 GSEP EXERCISE
## December 6, 1989

## NARRATIVE SUMMARY

### INITIAL CONDITIONS
(0630 - 0645)

UNIT 1 - Mode 1 for the last 212 days. Load swing operations ramped the Unit from 80% at midnight to currently maintaining 100% power since 0430. CS019A is Out Of Service for valve repack due to excess leakage. Tech Spec 7 day clocks for LCOARs 6.2-1-1a and 6.2.2-1a were entered at 1030 December 5th. Activity in the RCS has been steadily increasing over the past five (5) days. Chemistry Department has been sampling every four (4) hours to determine the trend.

UNIT 2 - Mode 5 making preparations for entry into Mode 4 from a refueling outage. Containment integrity is not set. The large Purge and Exhaust fans are running to remove paint fumes from Containment wall painting performed during the outage.

UNIT 0 - Aux. Building Plenum B Charcoal Inlet isolation damper OVA085YA/B is stuck in the closed position. This was discovered while shifting filter trains in preparation for Tech Staff BVS. LCOAR 3.7.7-1a was entered this morning at 0600. An A1 Work Request has been generated and OOS cards are ready to be placed.

### EXPECTED ACTIONS

MMs will finish the repacking of CS019A. EMs will perform a valve signature on the motor. Applicable paperwork will be performed to return CS019A to operable status. OOS cards will be placed for the ventilation damper and MMs will investigate the scope of the job.

### UNUSUAL EVENT
(0645 - 0800)

At 0630, Loose parts monitoring indicates noise in the RCS. D RCP vibrations indicated higher than normal but within specifications (due to a failing impeller). At 0645, routine chemistry results indicate RCS activity 1.2 uCi/g dose equivalent I-131. At 0730, the Condensate Storage Tank level transmitter fails low.

### EXPECTED ACTIONS

IM investigation of the Loose Parts Monitor Alarm will confirm loose parts in the RCS. Tech Staff will be called to investigate pump vibrations. UNUSUAL EVENT called on EAL #2a (I-131 in excess of Tech Specs limits). Operations and IMs will be sent to investigate the CST level transmitter.

### ALERT
(0800 - 0900)

At 0800, the RM-11 alarms at the 4.0 uCi/ml setpoint. At 0840, a small RCS (50 gpm) leak starts which results in an increase in the Containment Rad Monitors. At 0850, the RM-11 alarms (High) on Containment Low Range Rad Monitors 1RE-AR001 and AR0002.

0153b/1/wjm
bNPS '89 GSEP

## EXPECTED ACTIONS

**ALERT called on EAL #2f (RM-11-PS206 indicates 1% fuel failure). RCS samples confirm the RM-11 alarm with results 4.7 uCi/g dose equivalent I-131. A flow balance will be performed to quantify the RCS leak rate.**

## SITE EMERGENCY
(0900 - 1000)

At 0900, Containment Rad levels indicated on 1RE-AR020 and AR021 exceed 400 R/hr with associated alarms due to the increased activity in the RCS. At 0905, a shutdown is ordered by the Operating Engineer to start at 0910 with a ramp rate of 5 MW/min. The slow ramp is recommended by Westinghouse and ordered to minimize damage to the fuel assemblies.

## EXPECTED ACTIONS

SITE EMERGENCY declared on EAL #2q (Containment Rad level > 400 R/hr.) Shutdown on the 5 MW/min. ramp is started.

## GENERAL EMERGENCY
(1000 - 1330)

At 1000, D RCP trips, 2 rods stick out and prevent a total Reactor trip, a 12,000 gpm LOCA occurs. On the SI initiation, Bus 142 is faulted by one of the breakers and prevents reenergization. The AR-3 relay for an Aux. Building Ventilation charcoal booster fan welds closed and does not allow tripping of the fan. At 1020, Containment pressure reaches 15 psig and three spare containment penetrations blow out into the Aux. Building. CS007A (containment isolation valve) fails to open when/if CS is manually initiated. The release continues for approximately three hours and is terminated when the containment is depressurized. At 1100, the A Aux. Feedwater Pump Low Suction Pressure alarm annunciates in the Control Room.

## EXPECTED ACTIONS

GENERAL EMERGENCY declared on EAL #2s (Loss of or challenge to <u>three</u> Fission Product Barriers). Operations and EM will be dispatched to investigate Bus 142. Containment Spray will be manually initiated. Operations and Maintenance will be dispatched to investigate CS0007A after planning for an entry into a High Rad Area. CS007A can not be manually opened. Operations may be dispatched to determine the actual AFW pump suction pressure and IMs will be dispatched to investigate the cause of the alarm.

## RECOVERY
## 24-HOUR TIME-JUMP
## (1330 - 1530)

The TSC, EOF, States and Counties will be given data for a 24 hour time-jump and will demonstrate Recovery.

THE TIME IS NOW 1330 ON 7 DECEMBER. CONDITIONS ARE AS FOLLOWS:

The RCS is on Cold Leg Recirculation through the Containment Recirc. Sump. BUS 142 inspection revealed damaged Bus Bars. The Bus Bars were replaced at 2230, the 1B RHR Breaker has been replaced and the SAT feed breakers were determined operational. The Bus has been reenergized from the SAT. The 1B RHR pump motor will be replaced when a replacement is available. Bus 132X was deenergized for 30 minutes to remove the AB Fan motor breaker after Bus 133X was reenergized.

CS007A is inaccessible due to radiation levels and contamination. A preliminary inspection by MM and EM personnel determined that the limitorque operator gears are the most likely problem. No external problems were noted. Removal and disassembly will be needed to make an exact determination of the problem.

Another Release occurred between 2100 and 2130 last night due to a fire in the charcoal filter train. Station and State Field Teams tracked the plume and found significant amounts of Iodine and Cesium deposition about 3 miles due north of the plant.

Control Rods in assemblies H8 and F10 drifted into the core. Rod bottoms lights lit at 2335 and 2356 respectively last night.

Three 16" spare penetrations in Area 5 were determined to be the release path from Containment. One was completely blown out and the other two were cracked, broken and deformed. All have been temporarily plugged. An investigation inside the Containment (when accessible) will help determine the cause of the failure of the penetrations.

Field Sample Results for the previous 24 hours were sent to Teledyne for analysis. These results are provided in the EOF.