U. S. NUCLEAR REGULATORY COMMISSION
REGION I

DOCKET/REPORT NO.: 50-334/96-01 and 50-412/96-01

LICENSEE: Duquesne Light Company
Shippingport, Pennsylvania

FACILITY: Beaver Valley Power Station

INSPECTION: February 26-29, 1996

LOCATION: Shippingport, Pennsylvania

INSPECTORS: _____ 4/3/96
J. Laughlin, Emergency Preparedness Specialist — Date
Emergency Preparedness and Safeguards Branch
Division of Reactor Safety

G. Good, Senior Emergency Preparedness Specialist, Region IV
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Approved: _____ 4-9-96
Richard R. Keimig, Chief — Date
Emergency Preparedness and Safeguards Branch
Division of Reactor Safety

Area Inspected: An inspection of the licensee's performance in its biennial, full-participation emergency preparedness exercise was conducted. Activities in all emergency response facilities, except the Joint Public Information Center, were observed.

Results: Implementation of the Emergency Plan during the exercise showed that adequate onsite protective measures can be taken in an emergency. An exercise strength was identified in the prioritization and coordination of repair team activities. An exercise weakness was identified in the technical assessment of accident conditions by the Technical Support Center staff. Two exercise weaknesses and one open item from previous inspections were closed.

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DETAILS

1.0 INDIVIDUALS CONTACTED

The following individuals attended the exit meeting on February 29, 1996:

1.1 Principal Licensee Personnel Contacted

R. Brosi, Manager, Nuclear Safety Department
A. Brunner, Manager, Procedure Upgrade
E. Chatfield, General Manager, Nuclear Support
J. Cross, Senior Vice President, Nuclear
A. Dulick, Operations Experience Manager
G. Farr, Supervisor, Emergency Preparedness (EP)
L. Freeland, Manager, Nuclear Engineering
R. Hansen, Engineering Manager
C. Hawley, General Manager, Maintenance Programs Unit
R. Hruby, Director, Nuclear Engineering
S. Jain, Vice President, Nuclear Services
M. Johnston, Manager, Nuclear Security
R. Kaiiler, Director, EP
J. Kasunick, Maintenance Manager
F. Lipchick, Senior Licensing Supervisor
W. Mahan, Senior Planner, EP
J. Matsko, Manager, Outage Management
J. Maurer, General Manager, Nuclear Human Resources
T. Noonan, Vice President, Nuclear Operations
K. Ostrowski, Manager, Quality Services
S. Paletta, Supervisor, EP
M. Siegel, Manager, Information Services Department
J. Starr, Supervisor, Nuclear Engineering
H. Szklinski, Supervisor, EP
G. Thomas, Vice President, Nuclear Planning and Development
B. Tuite, General Manager, Nuclear Operations
R. Vento, Manager, Health Physics
S. Vicinie, Director, Chemistry Operations

1.2 NRC Employees

G. Good, Senior Emergency Preparedness Specialist, Region IV
J. Laughlin, Emergency Preparedness Specialist
R. Lorson, Resident Inspector
J. Lusher, Emergency Preparedness Specialist
N. McNamara, Emergency Preparedness Specialist
J. O'Brien, Emergency Preparedness Specialist, NRR
L. Rossbach, Senior Resident Inspector
P. Sena, Resident Inspector
D. Silk, Senior Emergency Preparedness Specialist

The inspectors also interviewed other licensee personnel during the inspection.

2.0 PURPOSE OF INSPECTION

The purpose of this inspection was to evaluate the licensee's performance during the biennial, full-participation emergency preparedness exercise conducted on February 27, 1996, from 4:00 p.m. until 10:00 p.m.

The inspector also reviewed recent changes to the emergency plan and implementing procedures to verify that there was no reduction in their effectiveness. The documents reviewed are listed in Attachment 1 to this report. The inspector had questions on two changes which involved the omission of information previously found in the plan and procedures. After discussion with licensee representatives, the licensee stated that these two omissions would be restored, and the inspector concluded that there was no reduction in the effectiveness of the plan and procedures as a result of the changes.

3.0 OTHER EXERCISE PARTICIPANTS

Beaver County, PA and the Bureau of Radiation Protection, Commonwealth of Pennsylvania, participated in the exercise. The States of West Virginia and Ohio and their risk counties also participated. Pennsylvania and West Virginia entities were evaluated by the Federal Emergency Management Agency (FEMA), Region III office. Ohio entities were evaluated by FEMA, Region V. A report of FEMA's observations will be issued by that agency in the future.

The Region I NRC office participated in the exercise by sending a site team whose participants co-located with their licensee counterparts, and by maintaining a base team at the regional office.

4.0 SCENARIO REVIEW

The licensee submitted the exercise objectives on November 28, 1995, and the scenario, on December 28, 1995, for NRC review. After reviewing the scenario, the inspector discussed its content with licensee representatives and concluded that it adequately tested the major portions of the Emergency Plan (the Plan) and Emergency Plan Implementing Procedures (EPIPs), and also included demonstrations of areas previously identified by the NRC as weaknesses.

The NRC evaluation team attended a scenario briefing, conducted by the licensee, on February 27, 1996. The final scenario was discussed in depth and licensee staff answered NRC questions concerning the scenario. The licensee stated that certain emergency response activities would be simulated and that controllers would intercede in exercise activities to prevent deviations from the scenario, and to ensure that normal plant operations were not disrupted.

5.0 ACTIVITIES OBSERVED

The NRC inspection team observed the activation and augmentation of the Emergency Response Organization (ERO), activation of emergency response facilities (ERFs), and the actions of other emergency response personnel. The following specific activities were observed.

- Selection and use of control room procedures
- Detection, classification, and assessment of scenario events
- Direction and coordination of emergency response
- Notification of licensee personnel and offsite agencies
- Communications, information flow, and recordkeeping
- Assessment and projection of offsite radiological doses
- Issuance of protective action recommendations
- Provisions for communicating information to the public
- Accident analysis and mitigation
- Post-exercise critique by the licensee

6.0 EXERCISE OBSERVATIONS

Activation and utilization of the ERO and ERFs were generally consistent with the Plan and EPIPs. The Senior Vice President, Nuclear, was present at onsite and offsite ERFs during the exercise and the NRC exit meeting was well attended by senior licensee management. This was considered by the NRC team to be evidence of good management involvement in emergency preparedness (EP). The following sections provide observations made by the inspection team in the various ERFs during the exercise.

7.0 CONTROL ROOM (CR)

The exercise was conducted in the Unit 2 CR with the plant at full power. Exercise participants maintained a professional atmosphere in the CR and did not interfere with the safe operation of the plant. Exercise scenario information was provided to the CR exercise participants with operational data sheets that were updated every 3 minutes. This information and simulated exercise actions were very well coordinated throughout the scenario.

The Nuclear Shift Supervisor (NSS) promptly assumed the role of the Emergency Director (ED) after a simulated explosion in the "B" charcoal filter bank of the Supplemental Leak Collection System. The NSS/ED correctly classified this situation as an Unusual Event (UE). Upon notification of charcoal filter equipment damage, the NSS/ED accurately upgraded the event to an Alert condition.

The assistant nuclear shift supervisor's (ANSSs) implementation of the emergency operating procedures (EOPs) was excellent during the exercise. Additionally, the ANSS provided detailed plant status updates to the CR team at the key scenario transition points.

However, when the ANSS and one reactor operator (RO), who were fire brigade members, left the CR to respond to the ventilation charcoal filter fire/explosion, the NSS/ED and RO who remained in the CR appeared to be overly burdened. The NSS/ED had to perform the ED duties, including the UE classification and notification of local officials, in addition to directing emergency mitigation efforts, while the RO was distracted from plant monitoring and control activities with the licensee's procedural requirement to announce the emergency classification over the plant page three times at 3-minute intervals. Additionally, the RO sometimes had problems getting the attention of the NSS/ED to report equipment malfunctions.

During this time, repeat-backs of communications were weak. The loss of one-half of the CR staff could result in a reduction in the capability to respond to equipment problems, while at the same time maintain the plant in a safe, stable condition during an emergency event. Two licensed operators in the CR met the Technical Specification requirements for minimum staffing and, for this exercise, were able to maintain the simulated plant in a safe condition. However, the ability of the two licensed operators to implement the EOPs, if needed, would have been significantly restricted. (No EOPs were required to be implemented while the ANSS and second RO were absent from the CR--in this case about 35 minutes.)

Shift staffing must always be at a sufficient level to accomplish all needed functions during an emergency event. During this exercise, the inspector believed that CR exercise participants were overburdened during the fire brigade response, which involved two of the four licensed CR operators. Therefore, the issue of shift staffing during emergency events will be reviewed in a future inspection (IFI 50-334/412/96-01-01).

Additionally, although CR exercise participants routinely monitored the reactor vessel level indication system (RVLIS) data, there was no announcement made when the reactor vessel level dropped below the top of active fuel. The core remained uncovered (RVLIS full range indication below 62%) from 7:05 p.m. to 8:38 p.m. It was not apparent that anyone in the CR tracked the length of time the core was uncovered or that the Technical Support Center (TSC) personnel questioned the RVLIS readings. The CR exercise participants implemented the functional recovery procedure for inadequate core cooling, as required, when RVLIS indication reached a level of 40%, however, the time of the core uncovery and associated fuel damage was significant information that was not adequately pursued by CR and TSC exercise participants.

An area identified for improvement in the February 1994 emergency exercise concerning NSS oversight of plant control was noted again during this exercise. Specifically, the exercise NSS remained on the telephone for extended periods of time, which detracted from his CR oversight. At one point, the NSS was on the phone for 12 consecutive minutes during which time containment pressure degraded significantly and RVLIS readings dropped below the top of active fuel. Also, the ANSS requested feedback from the NSS about EOP implementation, but the NSS remained on the phone and did not provide a second check for the ANSS. Extensive phone conversations also pre-empted an in-depth evaluation by the NSS of the plant radiation monitoring data for the primary containment, primary auxiliary building, and safeguards building.

Overall, the inspector concluded that there were no exercise strengths or weaknesses in the CR. We recognize that the exercise artificiality of providing plant parameters for the exercise via paper handouts to the control room participants rather than by normal control room monitoring methods may have exacerbated the problems identified above, however, the issues of CR staffing during emergency events and reduced NSS oversight due to extensive telephone conversations warrant licensee review.

A previous area for improvement, related to the submission of a 4-hour notification to the NRC for an injured and contaminated person, was demonstrated satisfactorily during this exercise.

8.0 TECHNICAL SUPPORT CENTER (TSC)

The TSC was activated approximately 40 minutes after the Alert declaration. Subsequently, the TSC staff promptly and correctly classified the Site Area Emergency (SAE) and was pro-active in evaluating the status of fission product barriers for classifying the General Emergency (GE). However, due to controller intervention, the GE declaration was delayed until a dose assessment was performed. This interrupted the classification process, caused negative training to the emergency responders, and impacted the ability of the inspectors to observe the licensee's process for GE classification, notification of offsite agencies, and protective action recommendation decision-making (see also Section 13).

The coordination and prioritization of in-plant repair activities were well done, and together was assessed as a strength. The ED and Maintenance Coordinator interacted effectively to keep repair efforts focused on priority equipment. The Maintenance Coordinator also interacted well with the Operational Support Center (OSC) Coordinator to keep track of repair efforts.

The technical assessment of accident conditions by TSC staff was poorly carried out. The ED did not provide effective direction to the Technical Support Coordinator (TSCO), in that engineering priorities were not established and follow-up on assigned tasks was not conducted. The TSCO had no mechanism for tracking requests for engineering analysis, prioritizing those requests, or for maintaining the status of completed requests. This resulted in the ineffective utilization of engineering staff and a lack of focused effort toward priority technical issues. For example, engineering was not requested to evaluate possible release paths until about 1 hour after the release started. Also, the core damage assessment was not completed in a timely manner, was poorly documented, and the results were not effectively communicated to emergency managers. Inspectors noted that documentation of technical analyses was generally weak.

Additionally, the inspectors concluded that the engineering staff, and the assistant ED providing them data, lacked a clear understanding of the RVLIS and this prevented them from effectively assessing the degree of core damage. They did not understand the relationship between the two ranges of indication used in the RVLIS system (i.e., full range and upper range), did not know what RVLIS indication corresponded to the top of active fuel in the core, and were unable to determine this value. Also, they could not locate a document which correlated RVLIS level with water level in the core. Finally, the staff did not appear to understand how adverse containment conditions affected RVLIS indication. This lack of understanding of RVLIS generally resulted in confusion when addressing the core damage issue.

The inability of the TSC staff to prioritize and resolve technical issues in a timely manner delayed the completion of assessment activities for mitigation of the simulated event. Overall, the technical assessment of accident conditions by TSC staff was identified as an exercise weakness (IFI 50-334,412/96-01-02).

Additionally, ED briefings of the TSC staff could have been more effective. During the briefings, the ED or his assistant faced away from the TSC staff, many staff members did not pay close attention during the briefings, and the noise level was high. The briefings did not help to focus the TSC staff on the high priority issues.

However, except for the noted exceptions, the ED maintained good command and control, and kept his staff apprised of plant status and repair activities.

9.0 OPERATIONS SUPPORT CENTER (OSC)

The Alert was declared at 4:55 p.m. and the first responders arrived at the OSC at 5:05 p.m. At 5:17 p.m., the OSC Coordinator (OSCC) declared the OSC operational.

The OSCC immediately contacted the CR and TSC to establish repair team priorities. The OSCC backup and other staff members started forming repair teams and the first team was dispatched to the Radiological Operations Center (ROC) at 5:55 p.m. for a radiological briefing. The team left the ROC at 6:05 p.m. The OSCC and the OSCC backup provided good team briefings. The TSC communicated changing maintenance priorities to the OSCC, who kept his staff informed of plant status and priorities. The repair teams kept the OSC informed of job progress by telephone and plant page communications. Overall, the OSC performance was very good.

10.0 RADIOLOGICAL OPERATIONS CENTER (ROC)

The ROC Coordinator (ROCC) maintained good command and control of damage control teams (DCTs), onsite monitoring teams and in-plant health physics teams. The teams were generally briefed and dispatched in a timely manner. The ROCC provided good direction to the ROC staff and established priorities based on direction from the Radiological Control Coordinator located in the TSC. The ROCC and his assistant maintained excellent control of the ROC during the changing radiological conditions of the plant.

The teams were prioritized and tracked on a status board. However, the board was too small to track the numerous DCTs. Also, the individual maintaining the status board often provided assistance in other areas which sometimes resulted in losing track of team composition and dispatch times.

The ROC staff generally followed radiological contamination control procedures. However, on one occasion, a health physics technician surveyed two potentially "contaminated" charcoal cartridges in the ROC, which is outside the radiological controlled area. These cartridges should have been counted in an appropriate radiological laboratory facility. Overall, ROC performance was good.

11.0 EMERGENCY OPERATIONS FACILITY (EOF)

The EOF was promptly staffed following the Alert declaration and activated 19 minutes after the Site Area Emergency declaration. Activation was conducted in a systematic manner; procedures, logbooks, and supplies were quickly distributed.

Throughout the exercise, the Emergency Recovery Manager (ERM) effectively maintained command and control. The ERM and technical support staff did an excellent job evaluating the emergency action levels (EALs) and anticipating the need for protective action recommendations (PARs). The four assistant ERMs provided excellent support to the ERM. Two minor issues were identified. First, the plant public address announcements were barely audible in the EOF. Second, although briefings were conducted regularly in the EOF, only the last briefing included input from the Environmental Assessment and Dose Projection staff regarding offsite radiological conditions. The EOF staff were not kept well informed of offsite radiological conditions.

Following the General Emergency declaration, the ERM developed a PAR in accordance with Implementing Procedure 4.1, "Offsite Protective Actions." The PAR was appropriate and promptly communicated to the offsite agencies.

Interactions with state/local and NRC response personnel were effective. Separate briefings were conducted for offsite agency representatives.

Although news releases were issued frequently, properly approved by the ERM, and generally contained accurate information, announcement number six incorrectly indicated that the emergency began at 4:51 p.m. (the time of the Alert declaration), instead of 4:28 p.m. (the time of the Unusual Event declaration).

The pre-termination (recovery) discussions were thorough, systematic, and complete. Preparations for termination included completion of a list of EALs in effect and a list of equipment problems that would have to be addressed during the recovery phase.

11.1 Environmental Assessment and Dose Projection (EA/DP)

The inspector observed EA/DP activities and procedure usage pertaining to the exercise. The EA/DP staff arrived at the EOF at 5:02 p.m., 28 minutes after the first UE plant page announcement. The EA/DP area was set up and activated in accordance with the licensee procedure within 15 minutes.

The EA/DP personnel continually tracked plant radiation monitoring system values on the Meteorological Information and Dose Assessment System computer. Throughout the exercise, EA/DP personnel aggressively pursued verification of plant and equipment status. They also correctly performed dose projection calculations before and during the release. These results, and the associated PAR, were immediately communicated to the ERM.

The EA/DP coordinator effectively coordinated his staff's activities which included dose projection, PAR development, charting the radioactive plume, status board maintenance, meteorological data display, and field monitoring team (FMT) coordination. The EA/DP staff effectively coordinated two FMTs in taking plume dose rate measurements, air samples, plume-tracking, and

verification of the radiological release and its termination. However, due to a delay in procuring drivers, it took approximately 40 minutes from the time FMTs were requested to be dispatched until the teams were dispatched.

The EA/DP staff could have been more effective in communicating their assumptions and findings to the other technical staff in the TSC and EOF. Specifically, EA/DP staff members made assumptions pertaining to the radioactive release for performing dose projection calculations. They then compared the projections with FMT data, and concluded that they had made accurate assumptions. However, after confirming their assumptions, they did not inform other groups who were also working to identify the release path.

Overall, the EA/DP coordinator demonstrated good command and control of staff activities throughout the exercise and generally demonstrated good proactive thinking. The EA/DP staff members demonstrated familiarity with, and were effective in performing their duties.

12.0 EXERCISE CONDUCT AND CONTROL

The inspectors noted several exercise conduct and control problems. During the simulated fire in the charcoal filter housing, inaccurate information was communicated to the CR, which resulted in a UE declaration instead of the scenario intended declaration of an Alert. Also, CR controllers had excessive interaction with the exercise participants. In a graded exercise, this interaction should be limited to only that which is necessary to adhere to the scenario and its timeline.

Two controllers were assigned to the ROC and three to escort DCTs. Due to the limited number of team controllers, the lead controller in the ROC was unable to assign a controller to each team. For example, a controller was not assigned to one of the two onsite monitoring teams so it had to call the ROC continuously for dose rate information in the areas through which the team passed. This resulted in the lead controller being distracted from his main task of evaluating the exercise. Additionally, one controller provided erroneously high dose rates in the ROC area, causing the ROCC and his assistant to spend approximately 35 minutes initiating evacuation procedures which were not necessary for the intended scenario conditions.

In the EOF, the controller prevented declaration of the GE based on plant conditions, until the offsite dose calculations resulted in a 2-mile radius, 10-mile downwind evacuation. This action detracted from the overall realism of the exercise and resulted in negative training.

The licensee's post-exercise critique did not include a participant critique in the TSC and the EOF. Additionally, participants were not reminded to complete provided critique summaries. Therefore, little or no critique input was received from exercise participants in those two facilities. This significantly affected the overall effectiveness of the licensee's critique.

13.0 LICENSEE ACTION ON PREVIOUSLY IDENTIFIED ITEMS

CLOSED (IFI 50-334,412/95-01-01) Emergency Preparedness Plan (EPP), Table 5-1 does not meet the minimum staffing requirements of NUREG-0654, Table B-1.

The licensee had revised the EPP, Table 5-1 to conform with NUREG-0654, Table B-1. This item is closed.

CLOSED (IFI 50-412/95-13-02) Untimely notification to the Pennsylvania Emergency Management Agency.

During this exercise, timely notifications to state and county emergency organizations was effectively demonstrated, therefore, this item is closed.

CLOSED (IFI 50-412/95-13-03) Declaration of SAE prior to exceeding emergency action level criteria.

During this exercise, the ED correctly classified the SAE when the reactor failed to manually scram. In addition, the ED correctly classified the GE based upon the loss of two fission product barriers with the potential loss of the third barrier. Therefore, this item is closed.

14.0 LICENSEE CRITIQUE

On February 29, 1996, the NRC team attended the licensee's exercise critique. The lead controllers summarized the controllers' observations in each functional area. The critique was acceptable, but it did not identify all NRC findings, and could have been more self-critical.

15.0 EXIT MEETING

Following the critique, the inspectors met with the licensee personnel listed in Detail 1.0 to discuss the inspection findings. The team leader summarized the following NRC observations.

- Overall, the onsite response to this exercise was good, demonstrating effective implementation of the emergency plan and procedures.
- There was one exercise strength and one exercise weakness. Of particular concern was the lack of understanding by technical staff of the reactor vessel level indication system (RVLIS) and poor technical support from the TSC.
- Three previously identified items were closed.
- There were a number of problems in exercise conduct and control.

Licensee management acknowledged the NRC findings.

ATTACHMENT 1

List of the Emergency Plan and Implementing Procedures Reviewed

Procedure Number	Procedure title	Revision(s) Reviewed
EPP	Emergency Preparedness Plan	6A, 7
EPP/I-2	Unusual Event	7, 8, 9
EPP/I-3	Alert	7, 8, 9
EPP/I-4	Site Area Emergency	7, 8, 9
EPP/I-5	General Emergency	7, 8, 9
EPP/IP 1.1	Notification	10, 11, 12
EPP/IP 1.2	Communications and Dissemination of Information	7
EPP/IP 1.3	Turnover Status Checklist ED/ERM	6, 7
EPP/IP 1.4	Technical Support Center (TSC) Activation, Operation and Deactivation	7, 8
EPP/IP 1.5	Emergency Support Center (OSC/ROC) Activation, Operation and Deactivation	7, 8
EPP/IP 1.6	Emergency Operations Facility (EOF) Activation, Operation and Deactivation	7
EPP/IP 1.7	Emergency Response Organization Activation and Augmentation	0, 1
EPP/IP 2.6	Environmental Assessment and Dose Projection Controlling Procedure	7
EPP/IP 2.6.1	Dose Projection-General Methods	6, 7
EPP/IP 2.6.2	Dose Projection-ARERAS/MIDAS With FSAR Defaults	7, 8
EPP/IP 2.6.3	Dose Projection-ARERAS/MIDAS With Real-Time Inputs	8, 9
EPP/IP 2.6.4	Dose Projection-ARERAS/MIDAS With Manual Inputs	8, 9
EPP/IP 2.6.11	Dose Projection-Miscellaneous Data	7
EPP/IP 2.6.12	Dose Projection-ARERAS/MIDAS With Severe Accident Assessment	6
EPP/IP 3.1	Evacuation	7
EPP/IP 3.2	Site Assembly and Personnel Accountability	7
EPP/IP 3.3	Emergency Contamination Control	7
EPP/IP 3.4	Emergency Respiratory Protection	7
EPP/IP 3.5	Traffic and Access Control	7
EPP/IP 5.1	Search and Rescue	6
EPP/IP 5.3	Emergency Radiation Exposure Criteria and Control	7

Procedure Number	Procedure title	Revision(s) Reviewed
EPP/IP 5.4	Emergency Personnel Monitoring	6
EPP/IP 6.1	Re-entry to Affected Areas-Criteria and Guidance	7
EPP/IP 6.2	Termination of the Emergency and Recovery	6
EPP/IP 7.1	Emergency Equipment Checklist and Maintenance Procedure	7
EPP/IP 7.2	Administration of Emergency Preparedness Plan Drills and Exercises	6
EPP/IP 8.1	Fires in Radiologically Controlled Areas	7
EPP/IP 9.1	Nuclear Communications	7
EPP/IP 9.3	Activation, Operation and Deactivation of Nuclear Communications EOF	0
EPP/IP 9.4	Activation, Operation and Deactivation of the Joint Public Information Center (JPIC)	0
EPP/IP 9.5	Activation, Operation and Deactivation Nuclear Communications Corporate Offices	0
EPP/IP 10.1	Emergency Response Organization Corporate Support	0
EPP/IP Annex A	Emergency Response Plan, Water Reactor Division Westinghouse Electric Corp.	7
EPP/IP Annex B	Radioactive Contamination Control for Injury Cases-Aliquippa Hospital	7
EPP/IP Annex C	Major Injury Involving Radioactive Contamination-The Medical Center, Beaver	7
EPP/IP Annex D	Procedure for Transferring Radiation Casualties to the Department of Radiation Health-Presbyterian Hospital	7