

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-397/92-34
License No. NPF-21
Licensee: Washington Public Power Supply System
P.O. Box 968
3000 George Washington Way
Richland, Washington 99352
Facility Name: Washington Nuclear Project, Unit 2 (WNP-2)
Inspection at: WNP-2 Site, Benton County, Washington
Inspection Conducted: December 7 - 11, 1992

Inspectors: Arthur D. McQueen 12/21/92
A. D. McQueen, Emergency Preparedness Analyst Date Signed
Philip M. Qualls 12/21/92
P. M. Qualls, Reactor Inspector Date Signed
W. A. Russell 12/21/92
J. Russell, Reactor Licensing Examiner Date Signed
M. Cillis 12/25/92
M. Cillis, Radiation Specialist Inspector Date Signed
S. A. Boynton, Emergency Preparedness Specialist, NRR/PEPB
Approved by: Robert J. Pate 12/30/92
Robert J. Pate, Chief, Safeguards, Emergency Date Signed
Preparedness, and Non-Power Reactor Branch

Summary:

Areas Inspected: Announced inspection to examine the following portions of the licensee's emergency preparedness program: follow-up on Open Items identified during previous emergency preparedness inspections and observe the 1992 annual emergency preparedness exercise and associated critiques; and Inspector Identified Items. During this inspection, Inspection Procedures 82301, 92700 and 92701 were used.

Results: In the areas inspected, the licensee's emergency preparedness program was found to be in compliance with NRC requirements within the areas examined. One item was identified as an exercise weakness and several areas were indicated to the licensee for improvement. The exercise weakness is described in section 7.

INSPECTION DETAILS

1. Key Persons Contacted

- *P. Bagan, Emergency Preparedness (EP) Technical Advisor
- J. Baker, Plant Manager
- J. Bekhazi, HVAC System Engineer
- O. Brooks, Principal Training Specialist
- *D. Larsen, Manager, Emergency Preparedness
- S. May, Washington Department of Health
- T. Meade, Plant Technical Supervisor
- R. Mooney, Washington Department of Health
- *M. Monopoli, Manager, Support Services
- *J. Parrish, Assistant Managing Director of Operations
- *D. Pisarcik, Manager, Radiation Protection
- *G. Ray, Principal Emergency Planner
- M. Reis, Compliance Lead
- *G. Sorensen, Manager, Regulatory Programs
- *R. Utter, Supervisor, Emergency Preparedness Training

The above individuals denoted with an asterisk were present during the exit meeting. The inspectors also contacted other members of the licensee's emergency preparedness, administrative, and technical staff and management during the course of the inspection.

NRC Personnel at Exit Interview

- S. A. Boynton, Emergency Preparedness Specialist, NRR/PEPB
- M. Cillis, Radiation Specialist Inspector, RV
- A. D. McQueen, Emergency Preparedness Analyst, RV
- J. J. Russell, Reactor Licensing Examiner

2. Follow up on Previous Inspection Findings (92701)

Two inspection followup items from the 1991 annual emergency exercise were reviewed during this inspection.

a. (Closed) Followup Item - Exercise Weakness (91-33-01)

During the 1991 annual emergency exercise, it was noted at the TSC that the online Emergency Notification System (ENS) communicator with the NRC was unable to view status boards from his location. In discussions with the NRC base team after the exercise, it was indicated that the line was left unmanned at times up to fifteen minutes while gathering requested data. This appeared contrary to 10 CFR 50.72(c)(3), which indicates that "Each licensee shall, during the course of the event: Maintain an open, continuous communication channel with the NRC Operations Center upon request by the NRC." This request had been made by the NRC. Had this been an actual event, this situation could have resulted in violation of regulatory requirements. Action was necessary to insure manning and assignment of duties to provide for fulltime coverage of the ENS. Since the last exercise, the licensee had

installed a portable telephone with which the NRC Communicator could walk around and still maintain fulltime telephone coverage. This item is closed.

b. (Exercise Observation) Dose Projections for Future Offsite Releases

It was observed during the 1991 Annual Emergency Exercise that approximately 45 minutes prior to the termination of the exercise, following discussions with the NRC Site Team and Operations Center Staff, the Meteorology and Unified Dose Assessment Center (MUDAC) staff performed a dose consequence assessment of a complete core damage scenario. To perform this assessment, the MUDAC staff utilized the core inventory of radionuclides tabulated in Chapter 15 of the FSAR and attempted to estimate the response of the elevated release point monitor. Rather than use the iterative process that was actually used, the MUDAC staff should have had a more efficient method for estimating the offsite consequence of a release of 100% of the core inventory. Such a method would have facilitated smoother interaction with the NRC site team and operations center staff. In a review of this item during a previous inspection, the licensee indicated that they were looking at several options to accomplish this type task. One method reviewed was the NRC RASCAL program, along with other programs suggested by FEMA Region X as possible solutions. These and other options will be evaluated by the licensee and the most promising one will continue to be considered for implementation as deemed appropriate. For the present time the licensee has installed "RASCAL" for dose assessment and personnel have been trained in the use of the program. This item was reviewed during this exercise and it was concluded that improvements had been made since the 1991 exercise and better dose projections were evident.

The remaining open items will be reviewed during the next routine emergency preparedness inspection at the site.

3. Exercise Planning (responsibility, scenario/objectives development, control of scenario)

The Manager, Emergency Planning (EP) has the overall responsibility for developing, conducting and evaluating the annual emergency preparedness exercise. The EP staff developed the scenario with the assistance of licensee staff from other organizations possessing appropriate expertise (e.g. reactor operations, health physics, maintenance, etc.). In an effort to maintain strict security over the scenario, individuals who had been involved in the exercise scenario development were not to participate in the exercise. NRC Region V and Federal Emergency Management Agency (FEMA) Region X were provided an opportunity to comment on the proposed scenario and objectives. The complete exercise document included objectives and guidelines, exercise scenario and necessary messages and data (plant parameters and radiological information). The exercise document was tightly controlled before the

exercise. Advance copies of the exercise document were provided to the NRC and FEMA evaluators and other persons having a specific need. This exercise was conducted to meet the requirements of IV.F 3 of Appendix E to 10 CFR Part 50.

4. Exercise Scenario

The exercise objectives and scenario were evaluated by the NRC and considered appropriate as a method to demonstrate the Washington Public Power Supply System (WPPSS) capabilities to respond to an emergency in accordance with their Emergency Plan and implementing procedures. The exercise scenario started at about 8:00 a.m. with a trip of the Main Generator, closure of the 230 kilovolt (KV) offsite Startup Power breakers, which then tripped open due to a fault on the Startup Power Transformer (TR-S). Conditions for declaring an Unusual Event (UE) were then met due to a Loss Of Offsite Power (LOOP). Emergency Diesel Generators (DG-1, DG-2 and DG-3) received an autostart signal from the LOOP but DG-1 failed to start. This left DG-2 and DG-3 as the only Alternating Current (AC) power sources. Additionally, failure of DG-1 precluded operation of the Low Pressure Core Spray (LPCS) pump and RHR pump "A". Twenty minutes later, a Loss of Coolant Accident (LOCA) occurred due to a break of a Reactor Recirc Pump discharge line. The resulting loss of hot coolant uncovered the core and pressurized the Containment. The High Pressure Core Spray (HPCS) pump auto started and then tripped on overcurrent. The only remaining operable Emergency Core Cooling System (ECCS) pump was RHR pump "B", but the "B" pump injection valve failed to open. The loss of all ECCS pumps caused the core to remain uncovered and fuel damage soon occurred. At about 8:25 a.m., conditions for a Site Area Emergency were met due to Reactor water level less than -161 inches. About five minutes later, conditions were met for declaring a General Emergency (GE) due to fuel damage caused by inadequate core cooling and a radioactive release to the atmosphere. At about 8:50 a.m., a Burlington Northern freight train with 33 empty box cars derailed at the intersection of Highway 395 and Eltopia Road West. This necessitated emergency response from State and County agencies. The remainder of the exercise was devoted to stabilizing plant conditions to preclude any further radiological release.

5. Federal Observers

Five NRC inspectors evaluated the licensee's response to the scenario. Inspectors were stationed in the Control Room/Simulator (CR), Technical Support Center (TSC), Operational Support Center (OSC), and in the Emergency Operations Facility (EOF). An inspector in the OSC also accompanied a repair/monitoring team. FEMA evaluators were located at selected offsite emergency facilities and locations. FEMA Region X is preparing a separate report pertaining to offsite emergency exercise activities.

6. Exercise Observations (82301)

The following observations, as appropriate, are intended to be suggestions for improving the emergency preparedness program. An exercise weakness is a finding identified as needing corrective action in accordance with 10 CFR 50, Appendix E, Paragraph IV.F.5. All exercise times and other times indicated in this report are Pacific Standard Time (PST).

7. Control Room/Simulator (CR)

The following aspects of CR operations were observed during the exercise: detection and classification of emergency events, notification, frequent use of emergency procedures, and innovative attempts to mitigate the accident. The inspector assessed the performance of the staff as they operated the plant referenced simulator. The staff was one operating crew. The inspector also observed the critiques conducted after the exercise by drill participants and licensee staff.

The event began with "C" Residual Heat Removal (RHR) pump out of service. The unit was at 100% power when the Main Generator spuriously tripped. The Startup Transformers failed resulting in a loss of offsite power. The crew declared an Unusual Event. Diesel Generator "1" started and tripped. At 8:20 a.m. a loss of coolant accident (LOCA) occurred and the High Pressure Core Spray pump tripped on overcurrent. The crew used seven Automatic Depressurization System valves to depressurize the Reactor Pressure Vessel (RPV). A Site Area Emergency was declared. The Reactor Coolant Isolation Cooling turbine isolated on low steam inlet pressure. The "B" RHR pump injection valve stuck shut resulting in a loss of low pressure injection and causing RPV water level to peg low on Fuel Zone indication (less than -285 inches) for approximately 10 minutes. Due to valve failures, Standby Gas Treatment System (SGTS) train "A" provided an unfiltered release path for radioactive material. The "B" RHR pump injection valve was opened and "C" RHR pump was returned to service. The crew raised and maintained RPV level using "C" RHR pump while "B" RHR pump was used to cool the Suppression Pool. The exercise was terminated at 12:05 p.m.

The inspector observed two areas of concern. These observations are listed below.

- a. One area of concern was that the crew demonstrated a gap in knowledge concerning the RHR system. The "C" RHR pump was used to maintain RPV level after the LOCA. The pump was turned on, and then off, in order to raise level to the high end of the 13 inch to 54 inch band set in the Emergency Operating Procedures (EOPs). This resulted in starting the pump approximately every three minutes from 9:10 a.m. to 10:30 a.m. This was approximately 28 starts in an hour and 20 minute time period. At 10:30 a.m., the crew began to control RPV level by cycling the pump discharge isolation

valve and maintaining the pump running. These excessive pump starts were contrary to procedure PPM 2.4.2, "Residual Heat Removal System," which stated in step 4.12 that RHR pumps should be limited to two starts from ambient temperature and one start from rated temperature. Any more starts required a 30 minute running time or a 60 minute idle time. This caution was based on high motor winding temperatures caused by excessive starting currents. The inspector observed the "C" RHR amperage meter peg high each time the pump was started. In this instance the crew demonstrated a lack of knowledge of this system caution that could have resulted in a failure of one of the two low pressure Emergency Core Cooling System (ECCS) pumps available to maintain RPV level ("B" RHR pump was dedicated to Suppression Pool cooling but still available for RPV level control). The inspector concluded that in this instance the procedural caution was not contradictory to the intent of the EOPs and, although not explicitly reprinted in the EOPs, should have been observed.

- b. Another area of concern was that the crew failed to properly classify the event. At approximately 8:25 a.m., RPV level dropped to below -285 inches, which was below the Bottom of the Active Fuel. This level remained below the Fuel Zone indicating range (-285 inches) for approximately 10 minutes. During the same time period the Reactor Coolant Pressure boundary was lost due to the LOCA and Primary Containment was lost due to valve failures in the SGTS. A release of radioactive material was in progress and indicated by radiation levels in the plant vent stack and SGTS flow rates. PPM 13.1.1, "Emergency Classification," attachment 4.3 stated "Classification shall be made using conservative principles." PPM 13.1.1 also stated a General Emergency should have been declared if there was a loss of two fission product barriers and "a high potential for loss of the third." The operator was directed to attachment 4.4 of the same procedure, which referred the operator to PPM 9.3.22, "Core Damage Evaluation," for clarification of potential damage to the fuel. The fuel was the fission product barrier with a high potential for loss. PPM 9.3.22, section 5.1, directed the operator to evaluate the possibility of core damage based on reactor water level history. The inspector concluded, using these procedures, that core damage was possible during this scenario. Core uncover for a 10 minute period 30 minutes after shutdown would have probably caused the fuel clad to exceed 1500 degrees (F) resulting in some degree of clad failure. 1500 degrees (F) was the threshold for fuel rod perforation. The inspector concluded that the use of PPM 9.3.22 should have caused the crew to decide there was a high potential for loss of the fission clad barrier and, per PPM 13.1.1, declare a General Emergency. Emergency classification was the responsibility

of the Emergency Director, which was the Shift Manager, until he was relieved of this duty at about 9:10 a.m. This provided the crew with 45 minutes to declare the General Emergency from the time of the core uncover.

The inspector concluded the control room personnel's failure to adequately classify the event was of major concern (92-34-01, EXERCISE WEAKNESS). The facility controllers did not comment on this during the critique immediately following the exercise conducted in the simulator. The facility did subsequently acknowledge this concern. The crew that operated the simulator was off shift, undergoing facility requalification examinations, during the week of the exercise. The facility provided remediation and examination of this crew, in the areas listed above, prior to allowing them to return to shift.

8. Technical Support Center (TSC)

The following aspects of TSC operations were observed: activation, accident assessment/classification, notification, and interactions between the various emergency response facilities. The following represent the NRC inspector's observations in the TSC.

- a. At 8:58 a.m., players had been told by controllers that they would not be able to stop the release prior to 9:15 a.m. This was communicated between emergency centers, thus prompting players as to when this item would re-enter exercise play.
- b. TSC habitability was not properly monitored or maintained, for example:
 - The door to the TSC, required to be shut for TSC atmosphere isolation, remained open throughout the exercise.
 - The TSC Iodine and Noble Gas monitors remained inoperable throughout the exercise. This was determined to be a procedural problem and the procedure was revised soon after the exercise.
 - No portable atmosphere samples were taken in the TSC during the exercise.
 - No Step Off pad was established to monitor persons entering the TSC to prevent the spread of contamination.

This item is identified for followup in future routine and/or emergency exercise inspections (92-34-02).

- c. The TSC staff appeared pro-active in anticipating the need to call in additional personnel to obtain a PASS sample.

- d. After lunch arrived at about 11:15 a.m., it appeared to the inspector that player attention to the exercise activities decreased significantly. This was also observed by inspectors in the EOF.

9. Operational Support Center (OSC)

The following aspects of the OSC operations were observed: activation of the OSC, functional capabilities, communications, and various in-plant repair/monitoring teams.

The OSC was activated and staffed in an orderly and timely manner. Accountability and habitability activities were immediately initiated. Habitability was verified at least every 15-20 minutes and the accountability status verifications were completed in a timely manner. Field teams were properly briefed, tracked, and debriefed. Health physics coverage was good and communications with the field teams were maintained. The OSC Director and his staff provided status reports to the members in the Work Control Center (i.e., OSC) and to the field teams located in the cafeteria at approximate 15 minute intervals. Participation by all of the OSC and field team members was enthusiastic and realistic. Evacuation of non-essential personnel went efficiently and appeared effective. Observations for improvement and an area of strength included:

- a. The accident scenario contained conflicting health physics data; for instance, airborne concentrations were extremely low for the levels of contamination reported. Field teams did not encounter any airborne problems during the entire scenario even though a release was reported during the initial stages and remained in effect until CEP valves 1A and 2A were secured.
- b. The need for administering KI tablets appeared to be premature. The scenario never did develop to the point in which KI tablets would have been needed.
- c. A significant improvement was noted in this exercise by using both the cafeteria and Work Control Center office spaces for the OSC and for managing OSC activities. The OSC Director was able to maintain good command of the situation throughout the entire exercise. This was accomplished by establishing a priority list. The priority list was used very effectively in managing the field teams. There was less confusion than was observed during previous exercises. The OSC Director and the OSC support groups displayed an excellent knowledge of applicable EIPs and OSC functions.

The OSC and field team members were self critical of their performance at the post exercise debriefing. Many good findings were identified as areas needing improvement.

10. Emergency Operations Facility (EOF)

The following EOF operations were observed: activation; functional capabilities; interface with offsite officials; dose assessment; and the formulation of protective action recommendations. The following are NRC observations of EOF activities.

a. Emergency Classification and Protective Action Recommendations

A General Emergency, based upon loss of containment and RCS barriers and potential loss of fuel clad barrier, should have been declared at approximately 8:25 a.m. (see section 7 above). Notwithstanding this, a PAR was approved by the Plant Emergency Director (PED) at 9:15 a.m. for evacuation of affected zones out to 2 miles and sheltering of those zones out to 10 miles. The PAR was transmitted to State and local authorities at 9:34 a.m., about 74 minutes after the release had started and about 19 minutes after the PAR was approved. Had the appropriate classification been made around 8:25 a.m., a PAR would have likely been issued much sooner.

The SAE declaration led to several contradictions by the Emergency Response Organization:

- (1) A SAE was declared when a release was known to be in progress with plant conditions deteriorating. This sends mixed signals to offsite authorities as to what actions they should be taking. The issuance of the PAR during a SAE contradicted the definition of an SAE which assumes that PAGs will not be exceeded offsite. Also, when questions on the PAR were raised to the EOF, neither the Recovery Manager (RM) nor the Radiological Emergency Manager (REM) understood what the basis was for the PAR. It was subsequently determined the PAR recommendation was made by the MUDAC based on conservatism.
- (2) When issuing the airspace closure request per PPM 13.11.11, the General Emergency attachment was used and the SAE attachment had references to releases deleted.
- (3) When the licensee believed that radiological conditions warranted protective action recommendations for the general public this should have been a cue that declaration of a general emergency was also warranted. This was questioned in both the TSC and the EOF, but the classification was not upgraded in either center. The SAE declaration was not questioned in the EOF decision center until after 10:00 a.m.

In accordance with PPM 13.14.2, protective action recommendations are developed using plant conditions and using dose projections. The more conservative PAR is to be used. At 9:15 a.m., the PED was responsible for the issuance of PARs. Plant conditions at the

time did not warrant a PAR. This means that any PAR would be based upon radiological conditions and would involve dose assessment. No dose assessment was performed in the TSC and dose calculations in the control room did not indicate that a protective action was warranted. Contrary to this, TSC issued a PAR for evacuation at 9:15 a.m. No basis was given for the PAR except "radiological conditions" as indicated on the classification notification form. The PAR was inappropriate for known plant and radiological conditions and was not commensurate with the SAE classification. This appeared to be a failure to follow procedure 13.14.2.

b. Other Observations

- (1) The Communicator in EOFCC was not familiar with technical terminology and acronyms. This could potentially hinder notifications to State and local EOCs.
- (2) A MUDAC Coordinator log entry at 11:58 a.m. indicated that the JIC requested information on I-131, however, the coordinator said he could not provide specifics. Contrary to this, two air sample results were available to the MUDAC Coordinator at the time and would have provided useful information to the JIC.
- (3) A status board in the EOF Decision Center indicated that an Emergency Planning Advisor should be available; however, no name was posted and it was not apparent that an EP Advisor was available. The presence of an individual who is intimately familiar with emergency planning may have alleviated the emergency classification problem and would directly benefit the Recovery Manager.

11. Licensee Critiques and FEMA Public Meeting

A series of exercise critiques was conducted by the licensee upon completion of the exercise.

- a. Facility critiques were conducted at each emergency response facility with players and controllers immediately following the exercise. The licensee had noted several of the items also identified by the NRC observers, as well as other exercise strengths and problems for improvement. Two of the critiques immediately following the exercise were considered particularly effective for future exercise improvement, the OSC and the TSC (sections 8 and 9 above).
- b. The licensee provided a corporate level critique for the NRC inspection team on December 10, 1992.

A meeting open to the public was conducted by the FEMA Region X, at the Federal Building in Richland, Washington, on December 11, 1992. A brief NRC statement of exercise findings was made and FEMA conducted a discussion of exercise offsite activities. The meeting was then opened to questions from attendees.

12. Exit Interview.

On December 10, 1992, at the conclusion of the site visit, the inspectors met with the licensee representatives identified in the attachment hereto to summarize the scope and the preliminary results of this inspection. The inspectors noted which previously open items would be closed and what new items were identified. The inspectors reviewed the weakness discussed in section 7 above. The licensee indicated actions under consideration to correct the weakness and confirmed that the exercise crew involved had been remediated and examined prior to returning to shift.

ATTACHMENT

Exit Meeting Attendees.

ATTACHMENT

NRC EXIT INTERVIEW ATTENDEES

R. M. Abdella, WPPSS
H. L. Aeschliman, WPPSS
P. T. Bagan, WPPSS
S. A. Boynton, NRC
P. H. Brenberger, WPPSS
T. E. Chapman, WPPSS
T. E. Chrisler, WPPSS
M. Cillis, NRC
A. J. Connor, WPPSS
J. R. Fisher, WPPSS
N. L. Garza, WPPSS
G. L. Gelhaus, WPPSS
R. J. Given, WPPSS
J. A. Gloyn, WPPSS
G. H. Godfrey, WPPSS
J. D. Harmon, WPPSS
R. E. Jorgenson, WPPSS
D. E. Larson, WPPSS
M. J. Mann, WPPSS

D. W. Martin, WPPSS
A. D. McQueen, NRC
K. P. Meehan, WPPSS
M. M. Monopoli, WPPSS
L. S. Morris, WPPSS
A. L. Oxsen, WPPSS
J. V. Parrish, WPPSS
J. F. Perry, WPPSS
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