U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-344/90-27

Docket No. 50-344

License No. NPF-1

Licensee: Portland General Electric Company
71760 Columbia River Hwy.
Rainier, Oregon 97048

Facility Name: Trojan Nuclear Generating Station

Inspection at: Rainier, Oregon

Inspection Conducted: November 5-9, 1990

Inspector: Kent M. Prendergast 12/12/90
K. M. Prendergast Date Signed
Emergency Preparedness Analyst/
Team Leader

Arthur D. McQueen 12/12/90
A. McQueen, Emergency Preparedness Analyst Date Signed

Team Members:

R. C. Barr, Senior Resident Inspector, Trojan
J. M lfi, NRC Resident Inspector, Trojan
G. A. Stoetzel, Pacific Northwest Laboratories
N. MacGuire-Moffitt, Pacific Northwest Laboratories

Approved by:

G. P. Yuhas, Chief Date Signed
Radiological Protection Branch

SUMMARY:

Inspection on November 5-9, 1990 (Report No. 50-344/90-27)

Areas Inspected: Announced inspection to examine the licensee's capabilities for dose assessment, electronic data flow to the Technical Support Center (TSC) and Emergency Operations Facility (EOF), follow-up on previous inspection findings, and to observe the 1990 annual emergency preparedness exercise and associated critiques. Inspection Procedures 92701, 82207, 82301, and 30703 were used as guidance.

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Results: The licensee's approved exercise objectives and scenario provided an adequate challenge to the licensee's emergency response capabilities. Based on the response to the scenario, the licensee demonstrated their capabilities to protect the health and safety of the public. Three exercise weaknesses identified during the 1989 annual exercise were reevaluated during this exercise and all three areas showed improvement over the previous year's evaluation. Two open items regarding concerns in the area of dose assessment and actions to improve TSC performance are discussed in Sections 3 and 8 respectively. No deficiencies or violations of NRC requirements were identified in the areas inspected.

DETAILS

1. Persons Contacted:

J. Cross, Vice President
J. Thale. Supervisor, Emergency Preparedness
S. Harlos, Emergency Preparedness
C. Cox, Emergency Preparedness
F. Jones, Emergency Preparedness
A. Ankrum, Security Manager
E. Schieman, I&C Engineer

2. Action On Previous Inspection Findings

(Closed), Open Item 89-28-04, Exercise Weakness TSC, inadequate support of the Control Room (CR) and the Emergency Operations Facility (EOF) due to a lack of command and control. During the Trojan 1990 exercise, the TSC staff accomplished all drill objectives and provided adequate support to the CR and EOF. This item is considered closed.

(Closed), Open Item 89-28-05, The TSC radiological monitoring system was inoperable during the entire 1989 exercise. During the 1990 Trojan exercise, the licensee demonstrated the ability to correctly start, place in service, and verify proper operation of the radiological monitoring system. This item is considered closed.

(Closed), Open Item 89-28-03, A potential common mode failure of the 4160 busses A1 or A2 could render both containment hydrogen analyzers inoperable. In a letter from Portland General Electric (PGE) to NRC, letter dated December 17, 1982, PGE identified this condition as an exception to NUREG-0737. In a Safety Evaluation Report (SER) dated May 24, 1983, NRC addressed this exception and agreed that the deficiency does not have a significant impact on the accuracy, availability, or safety margin of the Containment Hydrogen Monitoring System (CHMS). In addition, the Regulatory Guide 1.97 SER dated September 29, 1986, accepted the CHMS design and did not require any further actions concerning the hydrogen analyzers. Based on the above information, this item is considered closed.

(Closed) Open Item 89-28-06, Exercise Weakness - the EOF did not declare a SAE in a timely manner. This item was evaluated and all emergency classifications originating from the EOF were well thought out and declared in a timely manner. This item is considered closed.

(Closed) Open Item 89-28-07, Exercise weakness - there was a breakdown of management and control in the dose assessment area. This area was evaluated and there was adequate management supervision and control of dose assessment activities in the EOF. Dose projections and efforts to locate the plume were adequately performed during the 1990 exercise. This item is considered closed.

(Open), Open Item (GG-TR-01), 30-minute Notification of State Agencies. The licensee indicated that the State of Washington now has a 24-hour manned Emergency Response Center and can be notified within the 15-minute time frame described in Section IV.D.3, 10 CFR 50, Appendix E. The State of Oregon Department of Energy (ODOE) representative at Trojan indicated that the state has requested in the current budget cycle necessary funding for 24-hour manning by the ODOE Emergency Management Division. The expected time frame for the State of Oregon to go to 24-hour manning is about June or July of 1991. For consistency, the licensee indicated that when the ODOE implements 24-hour manning, they will make necessary changes to their Emergency Plan and implementing procedures to include the two states in the 15-minute time frame for notification. This item will remain open until appropriate changes to the Emergency Plan and implementing procedures (EPIPS) have been made and approved.

(Open), Open Item 89-28-02, Follow-up on NCR and NCARs Related to ARM-22 Inoperability. Three elements relating to one Nonconformance Report (NCR) and two Nonconforming Activity Reports (NCAR) were addressed in this item. The licensee indicated that appropriate corrective action for ARM-22 "is to set the alarms for both ARMs to the same values", based on their review done for NCAR 89-385. As of this inspection, action was still pending on this element; therefore, it will remain open until action is completed.

(Open), Open Item 90-04-01, EP-001 Issues. Inspection Report 50-344/90-04 addressed several areas relating to Emergency Preparedness Procedure (EP-001). These areas concerned the "15-minute verification time on loss of offsite and onsite AC power," and definitions of the terms "high" and "high pressure injection." The licensee has drafted a Revision 6 to EP-001 to clarify the above stated issues. The finalized revision will be submitted to NRC in the near future. This item will remain open pending NRC review of Revision 6 to EP-001.

3. Dose Assessment (82207)

To determine whether there is an adequate capability for assessing the consequences of a radiological release, the Emergency Plan (EP) and implementing procedures were reviewed, interviews were held with individuals responsible for dose assessment, and dose projections were performed using different release pathways. The following were noted.

The licensee's primary dose assessment model (SUBIN) was developed in the early 1980's. SUBIN is the primary dose calculation method and is used in the EOF. The model uses a straight line Gaussian atmospheric dispersion model with terrain correction factors. Revisions have been made to the model over the years; however, none has changed the basic calculation method. The latest revision dated 9/22/89, (Rev. 10) modified some of the default values in the model (i.e., steam jet air ejector flow rate, PORV/safety valve flow rate, and iodine and xenon reactor coolant system concentrations), made several format changes, and corrected the vertical dispersion coefficient for stability class "A" at distances beyond 10 km. The documentation for each revision includes a program description, algorithms, sample runs, and verification calculations.

A simplified version of SUBIN called FRSTDOSE is used in the CR to perform initial dose calculations prior to EOF activation. There is no capability to perform dose assessment in the TSC. Because of the close proximity of the EOF to the plant, dose assessment is transferred directly to the EOF upon activation. Both facilities are activated at the "alert" emergency classification. FRSTDOSE was developed in 1985 and revised only once, (in 1987). This revision involved a correction to the calibration factor used when the source term is a contact radiation dose rate on the main steam line insulation. Similar to SUBIN, no changes have been made to the basic calculation method. The primary differences between FRSTDOSE and SUBIN are that FRSTDOSE does not: 1) calculate thyroid doses, 2) include terrain correction factors, 3) consider downwind decay, and 4) consider decay in containment.

In the CR, FRSTDOSE is loaded on the hard disk of the personnel computer (PC) located in the Shift Supervisor's office. This is the primary computer for performing FRSTDOSE. A floppy disk containing FRSTDOSE is available at the primary computer. Emergency procedures designate alternate computers for the CR staff to use in the event the primary computer is unavailable. Procedures EP-100 and EP-401 appear to contain conflicting information regarding the location of the backup computers. This potential problem caused uncertainties during the walkthroughs and was also identified by the licensee. Although both procedures are presently correct, the licensee stated they will be working on developing a single procedure for dose assessment.

In the EOF, SUBIN is run off a floppy disk at a PC in the dose assessment area. Another PC located in the EOF, has SUBIN loaded on its hard disk, this PC is the backup to the primary EOF computer in the dose assessment area.

The States of Washington and Oregon were involved in the development of the SUBIN model. Discussions with a member of licensee staff and individuals from Washington State, knowledgeable in this area, indicated that both Washington and Oregon would rely on the licensee's dose calculations during an emergency and would not perform parallel calculations.

The auxiliary operators (AOs) and the on-shift radiation protection technicians (RPTs) are trained in performing FRSTDOSE in the CR. During walkthroughs with several trained individuals, the individuals were able to complete a calculation within 10 minutes of beginning FRSTDOSE. The licensee just recently started training RPTs in FRSTDOSE in an effort to free up auxiliary operator's time during an emergency. RPT training should be complete within the next month.

Based on this inspection, the licensee had adequate capabilities for dose assessment. However, the following areas for program improvement were noted. These items will be followed as Open Item 90-27-01.

- Emergency procedures EP-200 and EP-201 provided guidance on primary and alternate methods for obtaining meteorological information (i.e., wind speed and wind direction) for input into the dose models. The primary source is the 33 ft reading from the met tower

with the 200 ft reading from the met tower as a backup. If the met tower is not operational, then dose assessors are directed to determine wind speed and wind direction by general observation. Consideration should be given to developing a more accurate backup method. During the walkthroughs, it was also observed that one RPT was unfamiliar with the backup procedure for obtaining meteorological data.

- Currently meteorological data (i.e., wind speed, wind direction, and delta T) for input into the dose models is taken from strip charts in the Control Room. There are strip charts for both the 33 ft and 200 ft levels of the met tower. Procedure EP-200 requires the Control Room auxiliary operator or RPT to estimate 15-min averages from the strip charts. The inspector observed that obtaining 15 minute averages from the strip charts was difficult and could result in error. This area should be evaluated for improvement with regards to methods of obtaining 15 minute averages.

- Procedure EP-103 (EOF), Section III.14 (EOF Field Team Coordinator) gives the FTC the responsibility for directing aerial monitoring teams. Section 14.3.2 of EP-103 provides some general guidance in this area, but an interview with a FTC indicated that this area was not discussed in training. This area should be evaluated to determine if additional training for the FTC in aerial monitoring is necessary.

- The licensee should perform a comparison of FRSTDOSE and SUBIN to quantify the conservatism of FRSTDOSE for a variety of atmospheric stability conditions and wind directions.

Licensee performance in this program area appears satisfactory. No violations were identified in this program area.

4. Trojan Emergency Response Facilities Appraisal (modified) (82412)

A. TSC Variable Availability

i. Documentation for Regulatory Guide (RG) 1.97 Variables

Portland General Electric through a series of letters from November 23, 1983, through May 31, 1990, provided NRC a detailed description of their conformance to RG 1.97 as applied to its Emergency Response Facilities (ERF). The NRC, in its Safety Evaluation Report for Trojan Nuclear Plant dated September 29, 1986, found that PGE's instrumentation meets the recommendations of RG 1.97 with the exception of the variables for quench tank temperature and neutron flux. NRC requested that PGE upgrade this instrumentation to be in accordance with RG 1.97 Rev. 2. NRC inspection report 88-36 documents the installation of an acceptable quench tank temperature instrument, and PGE letter dated May 31, 1990, documents the installation of a redundant post-accident neutron flux instrumentation channel with connections to the TSC and EOF. A PGE internal memo dated September 21, 1990, states that the

modifications required for the neutron flux instrumentation channel have been completed.

ii. RG 1.97 Variable Availability and Sufficiency

Variables are available to the TSC and EOF via the Plant Safety System Display (PSSD) computer system. The Safety Parameter Display System (SPDS) is the top level iconic display at any of the PSSD display terminals. The inspector compared RG 1.97 required variables to the variables available on the PSSD and concluded the PSSD variables meet the criteria.

iii. Computer Data

Parameter availability via the PSSD computer system is satisfactory in terms of data being input to the system. Variables are tagged as to quality to inform users of any questionable data. The system is powered from an uninterruptable power supply (UPS). The system has a backup computer as well as magnetic data storage capability. Trending can be provided on any variable selected for up to eight (8) days.

iv. Manual Data

The backup system for transmitting plant variables from the CR to the TSC is through a dedicated telephone system utilizing trained phone communicators. Data is recorded at 30 minute intervals on a plant status board in the TSC, and provides a historical trend for emergency personnel to determine plant conditions and emergency action levels.

v. Data Adequacy

Based on a review of available documentation and inspection of the RG 1.97 variables available in the PSSD system, data provided to the TSC is adequate to evaluate the status of the core and to support determination of proper protective action recommendations.

B. EOF Variable Availability

i. The EOF uses the same data and displays as the TSC; therefore, the discussion of data adequacy in Section A above is applicable to the EOF.

ii. Manual Data

Plant variables may be obtained in the EOF via the dedicated telephone network that connects the CR, TSC, and EOF. The plant data that is obtained in the TSC is also faxed to the EOF as a backup method for data communication. There are a sufficient number of redundant telephone lines and facsimile

machines to ensure transmission paths for facsimile transmission.

iii. Data Adequacy

Based upon the above findings, the data provided to the EOF is adequate to evaluate the existing and projected status of the containment and to support protective action recommendations. This portion of the licensee's program is adequate.

5. Emergency Preparedness Exercise Planning (Inspection Procedure 82301)

The licensee's Nuclear Safety and Regulation Department (NSRD) has the overall responsibility for developing, conducting, and evaluating the emergency preparedness exercise. The scenario package was developed by licensee staff with expertise in health physics, operations, maintenance, and engineering. A contractor was used to assist in this effort.

The exercise objectives were developed in cooperation with state and local agencies. The scenario package included general objectives and specific onsite and offsite objectives. NRC Region V and the Federal Emergency Management Agency (FEMA), Region X, were provided with an opportunity to comment on the exercise objectives. The players did not have access to the scenario package or information regarding the date of the exercise. The date was withheld in order to take credit for an unannounced exercise. The exercise was intended to meet the requirements of Section IV.F.2 of Appendix E to 10 CFR 50.

6. Exercise Scenario

The exercise scenario, started with an event classified as an "alert" and ultimately escalated to a "general emergency" classification. The "alert" declaration was based on a hydrogen explosion inside the protected area. A "site area emergency" was declared for reactor coolant leakage outside of containment. The "general emergency", the most severe emergency category, was based on a loss of two fission product barriers with an imminent failure of third.

7. Federal Evaluators

Six NRC inspectors evaluated the licensee's response to the scenario. Inspectors were stationed in the CR/Simulator, the TSC, the EOF, and the Operational Support Center (OSC). The Inspector in the OSC also accompanied repair/monitoring teams dispatched from the OSC.

FEMA, Region X, did not evaluate this exercise because this was a scheduled off-year.

8. Exercise Observations (82301)

a. Control Room

The following aspects of CR operations were evaluated during the exercise: detection and classification of emergency events,

emergency notifications, frequent use of emergency procedures, and actions to mitigate the accident described in the scenario. The following are NRC observations of CR activities. The observations, as appropriate, are intended to be suggestions for improving the program.

The CR staff demonstrated good technical knowledge and did a good job of supporting the Shift Supervisor (SS) and in complying with procedures. It was observed that when procedural questions developed, the questions were thoroughly discussed and proposed actions were approved by shift management prior to proceeding.

The CR staff rapidly identified the second scenario event as a loss of coolant accident in the residual heat removal system.

The classification of the first scenario event, a dropped hydrogen bottle explosion, took eleven minutes to classify, even though the information required to correctly classify the event was known by the SS one minute into the event. Based upon statements made by the SS, the SS appeared reluctant to classify the "alert". The SS stated that he was concerned that the event was not significant enough to warrant calling personnel to the site - an automatic requirement of the EPIPs at the "alert" level. Although the "alert" classification was appropriate, the licensee did not discuss the appropriateness or the reluctance to classify the "alert" in their critique.

The most significant negative finding in the CR was that only one formal briefing was held during the entire course of the exercise. The lack of formal briefings may have resulted in a fragmented problem solving effort and delayed actions to isolate the RCS leakage.

b. Technical Support Center

The following aspects of TSC operations were observed: facility activation, accident assessment and classification, recommendations for protective actions, and actions to support of the CR and EOF. The following represent the NRC observations in the TSC. The observations, as appropriate, are intended to be suggestions for improving the program.

The TSC was activated in a timely manner and in accordance with the EPIPs. TSC briefings were routinely conducted throughout the exercise, and the engineering staff suggested several innovative ways to supply cooling water to the core.

Although frequent briefings were conducted, the TSC staff did not effectively track and follow-up parallel path solutions that could result in timely mitigation of the accident. While priorities were established and announced during regular briefings, the Duty Plant General Manager (DPGM), and others, lost focus and did not follow up on the status of priority work assignments as priorities shifted. The following examples were noted:

- At 0514 the isolation of the reactor coolant leak was declared the highest priority. However, the DPGM was not timely in following up on the actions being taken to close valve 8700A. At 0715 the Operational Activities Manager asked if anyone had checked the electrical portion of the 8700A operator. This prompted the DPGM to refocus on getting valve 8700A closed. The leak was not stopped until 0905.

- At 0636 recovery of one of the six Emergency Core Cooling System (ECCS) pumps was established as the highest TSC priority. However, specific assignments were not established to determine detailed prioritized actions for the recovery of one or more of these pumps. Also, the TSC failed to followup on the status of the repairs of the "B" Coolant Charging Pump after it tripped on breaker fault at 0630. When the charging pump was restored at 0827, the DPGM and the Technical Activities Manager both asked, "What did they do to fix the pump?"

The efforts of the TSC to support the CR and EOF were improved over last years exercise. However, based upon the items above, there is a need for further effort to improve this area. This area will be reevaluated in a future exercise or drill as 90-27-02.

c. Operational Support Center

The following aspects of OSC operations were observed: activation, functional capabilities, and briefing and disposition of approximately 20 in-plant teams. The following are NRC observations of the OSC activities. The observations, as appropriate, are intended to be suggestions for improving the program.

The OSC was activated within 60 minutes of the "alert" declaration and habitability checks were routinely performed throughout the course of the exercise. Step-off pads and friskers were set up at all entrances to the OSC and proper use of anti-contamination clothing and self-contained breathing apparatus (SCBAs) were fully demonstrated.

The OSC interfaced well with security personnel when security doors needed to be opened.

Dose extensions were promptly obtained for in-plant teams when deemed necessary by the Radiation Protection Manager. Team briefings and debriefings were conducted in a thorough manner, utilizing the "OSC Work Form" as a basis for the briefings.

While individual team briefings were thorough, only four OSC facility briefings were observed during the course of the exercise, excluding the announcements.

One individual who transported an air sample and floor smears to the TSC for counting was not formally tracked as a team. As a result, he did not receive a formal briefing of radiological conditions or

fill out the "OSC Work Form" which is used to maintain accountability of OSC staff.

d. Emergency Operations Facility

The following EOF operations were observed: activation, dose assessment, emergency classification, protective action recommendations, and the interface with state and local agencies. The following are NRC observations of EOF activities. The observations, as appropriate, are intended to be suggestions for improving the program.

The changes to the physical layout and status boards in the EOF appeared to significantly facilitate the operation of the EOF.

The Emergency Response Manager in the EOF was effective in prioritizing EOF activities, following the status of EOF activities, and holding frequent briefings to ensure EOF staff were apprised of changing plant conditions and activities.

Emergency classifications and recommendations for protective actions were timely and appropriate.

Dose assessment status boards were not properly maintained, consequently, they were ineffective in providing the EOF staff with a clear picture of offsite radiological conditions. The last entry on the "Offsite Dose Trends" status board was at 0720, and the exercise was not terminated until 0905. The field team status boards were not always quickly updated to reflect the measured dose rate at the location specified on the dose projection status board, and the units for projected down wind thyroid dose based on measured field data of "Rem/hr" appears incorrect.

9. Critiques

Immediately following the exercise critiques were held in each of the emergency facilities. A formal critique involving site management was conducted on November 9, 1990. The following represent some of the comments discussed at this meeting.

- All facilities were activated within one hour.
- Notifications to state and local agencies were well done.
- Public address announcements were improved over last years exercise; however, more Public Address announcements would have been beneficial.
- Plant actions to isolate the leak took too long.
- Dose Assessment status boards are inadequate and do not present a clear picture of offsite radiological conditions. The status boards and the information on them needs to be reevaluated.

- One accident assessment form sent to the States of Washington and Oregon contained an incorrect protective action recommendation (PAR). This PAR was based upon dose projection. The appropriate PAR had already been made based upon plant conditions. The State of Washington caught the error and quickly provided feedback to the licensee.

10. Drill Conduct

During the course of the exercise, the NRC Team observed several examples of exercise conduct that could have had a negative effect on the outcome of the exercise. The following examples were noted. These observations are intended to be suggestions for improving the conduct of future drills and exercises:

- The initial CR briefing did not include all necessary members of the CR staff.

- It appeared that the CR staff was stagged waiting for the exercise to begin. The scenario did not provide routine evolutions that would have created a more normal CR environment prior to the initation of the exercise.

- The P-2500 computer failed three times during the drill which resulted in confusion regarding radiation levels and the core exit thermocouple temperatures. Problems with the P-2500 have been noted during previous exercises and drills. It appears that the problems have not been corrected.

- Several examples of prompting were observed in the TSC and OSC. One TSC controller provided inadvertent prompts to the TSC crew by asking pointed questions about missing status board information and by discussioning the scenario with PGE evaluators in the general vicinity of the TSC crew members.

- The simulated evacuation of the OSC to the TSC basement was outside the scope of the simulations agreed to by the NRC.

- The practice of using individuals as both a controller and an evaluator appeared to overwhelm some of the controllers and distract them from exercise evaluation. Also, the number of controllers/evaluators used to evaluate and control the drill appeared very limited. For example, only two evaluators were scheduled as evaluators/controller for the EOF. Perhaps utilizing individuals from other NRC licensed facilities, or members of the Quality Assurance group, would improve this area.

11. Exit Interview

An Exit Interview was held on November 9, 1990, to discuss the preliminary findings of the inspection. The Attachment to this report identifies the licensee personnel who were present at this meeting. The NRC was represented by the six members of the inspection team which included J. Melfi, Resident Inspector and R. Barr, Senior Resident

Inspector. The licensee was informed that there were no significant deficiencies or violations of NRC requirements identified during this inspection. The exercise results indicated some improvement over the previous year's performance. However, a number of areas were noted for improvement. One area specifically emphasized for improvement was the frequency and content of staff briefings in the CR and TSC. Other areas discussed during the Exit Interview are described in Sections 2 through 8.

ATTACHMENT

Exit Interview Attendees

M. Amick, Clerical
A. Ankrum, Nuclear Security Manager
A. Bielit, PSE Engineer
A. Bless, ODOE
C. Brown, E.P. Trainer
S. Carmichael, Plant System Engineer
T. Ciapanno, STE Engineer
J. Cleary, PSE Engineer
J. Connolly, HMM
J. Cross, Vice President Nuclear
D. Desmarais, Public Relations
N. Dyer, HP Supervisor
G. Ellis, Manager, Plant Support
D. Fanchen, Training Supervisor
R. Hafer, Plant Mechanic
S. Harlos, Emergency Planner
D. Hicks, Manager, Plant Services
M. Hoffman, Manager, NSRD
L. Hopkins, Clerical Staff
P. Jones, HMM EOF Controller
D. Kotila, Plant Electrician
M. Krenz, EOF, Clerical Staff
T. Kuyper, PSE Engineer
M. Lackey, Manager, Planning and Shielding
J. Lentsch, Personnel Protection Manager
R Magnusson, Supervisor Security Depot
S Nichols, Training Manager
T. Nicholson, Plant Electrician
D. Nordstrom, Q.A. Supervisor
E. Peterson, DMEA Engineer
G. Rich, Radiation Protection Supervisor
E. Schmeiman, PSE Engineer
M. Schwartz, Manager Technical Services
C. Seaman, Manager QA
M. Singh, Manager, Plant Modification
J. Sinibaldi, Security
J. Taylor, PMEA Supervisor
G. Tingley, Engineering Supervisor
J. Ulmer, System Engineer
J. Vingeruo, Maintenance Foreman
W. Williams, Licensing Engineer
D. Worlein, STA-Simulator Staff