

U.S. NUCLEAR REGULATORY COMMISSION
Region I

Report: 50-309/90-24

License: DPR-36

Licensee: Maine Yankee Atomic Power Company

Inspection At: Maine Yankee Atomic Power Plant
Wiscasset, Maine

Conducted: November 1, 1990 to November 27, 1990

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Approved: E. C. McCabe, Jr. 12/10/90
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INSPECTION OVERVIEW

Operations: Walk-down identified a weakness in the local position indication of reach-rodged valves in the Containment Spray Building.

Radiological Controls: Radiological Controls received appropriate management attention.

Maintenance/Surveillance: Licensee management plans to address weaknesses in the technical content of the Emergency Diesel Generator surveillance procedure.

Security: No inadequacies were identified.

Engineering/Technical Support: Inspector review of the Palo Verde overpower event determined that a similar event is an analyzed condition at Maine Yankee.

Safety Assessment/Quality Verification: Although structure and formality were found lacking in licensee self-assessments, a competent safety perspective was evident in meetings and critical self-assessment was observed.

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DETAILS

1. PLANT OPERATIONS

During routine daily tours the following were checked: manning, access control, adherence to procedures and Limiting Conditions for Operation, instrumentation, recorder traces, protective systems, control room annunciators, radiation monitors, emergency power source operability, operability of the Safety Parameter Display System (SPDS), control room logs, shift supervisor logs, and operating orders. Weekly, selected Engineered Safety Features (ESF) trains were verified to be operable. The condition of plant equipment, radiological controls, security, and safety were assessed. Bi-weekly, the inspector reviewed a safety-related tagout, chemistry sample results, shift turnovers, portions of the containment isolation valve lineup, the posting of notices to workers, and selected Engineered Safety Features (ESF) train operability. Plant housekeeping and cleanliness were evaluated. The following items were considered noteworthy.

1.1. Low Pressure Safety Injection System Alignment

The inspector performed a system alignment inspection on the LPSI (Low Pressure Safety Injection) system. This system was chosen based on the current operating configuration of the plant. Maine Yankee has an installed spare pump (P-61S) that can be utilized as a LPSI or as a Containment Spray pump. Due to overhaul, Train "B" LPSI Pump P-12A was out of service with the spare pump aligned in its place.

The inspector reviewed relevant operating procedures, walked down accessible portions of the piping system, and reviewed the FSAR (Final Safety Analysis Report) and pump performance data. Valve positions were found to be in accordance with the procedure and controlled drawings. No discrepancies between the controlled prints and the "as installed" configuration were identified. Review of FSAR and pump performance data indicated that the spare pump is capable of performing the LPSI function.

A review of surveillance testing information indicated that the spare pump (P-61S) was routinely tested in the LPSI mode each refueling outage, in excess of Technical Specification requirements, and that monthly surveillances were performed prior to placing the spare pump in service as the LPSI pump and monthly thereafter.

Control Room indication and breaker alignment were also checked by the inspector. No conditions that would prevent the system from performing its function were identified.

A weakness in position indication of valves with reach rod operators located in the Containment Spray Building was noted. Several of these valves have local position indication in the form of a "peg in a slot" arrangement in the operator pedestal. Because the peg does not travel the full length of the slot on some of these valves, various markings have been used to indicate valve position. The markings appear to have been added in an uncontrolled fashion. Two motor-operated butterfly valves (CS-M-91, -92) in the same building do not have the "peg in a slot" arrangement but have several conflicting marks for position indication. No violation of NRC requirements was found; the position indication weakness was identified to the licensee for consideration.

The inspector concluded that the use of the spare Containment Spray pump (P-61S) as a LPSI pump was within the design basis of the facility and that the operations procedures adequately controlled operation in that configuration.

1.2. (Closed) Unresolved Item 50-309/90-07-01: Diesel Fuel Tanks Valved Together, Creating a Common Mode Failure Condition

NRC inspector walk-down had found that the cross-over piping valve was open to the two fuel storage tanks. The inspector also determined that the normal valve alignment in Procedure 1-25-1, "Fuel Oil System," allowed the equalizing valves to be opened. With these valves open, the two fuel storage tanks effectively become one tank, creating a potential for a common mode failure. The licensee evaluated the acceptability of these practices.

Inspector review of the licensee's analysis and the FSAR (Final Safety Analysis Report) identified that the original licensing basis of the plant was for a single storage volume capable of supplying the full load operation of one emergency diesel generator for seven days. The diesel generator fuel systems were designed to be independent from the fuel oil day tank to the diesel engine only. Two Fuel Storage Tanks appear to have been supplied for installation convenience. Redundant fuel transfer pumps were installed for reliability in transferring fuel from the storage tanks to the day tanks. The licensee closed the equalizing valves between the tanks and revised Procedure 1-25-1 accordingly. The valve which cross-connects the discharge of the fuel oil transfer pumps remains open to allow either pump to transfer fuel to either day tank. The inspector considered these licensee actions to be adequate. The potential for common mode failure is now related to the quality of the fuel oil delivered. Unresolved Item 50-309/90-07-03 (Detail 5.3 of this report) addresses that concern. This item is closed.

1.3 (Update) Unresolved Item 50-309/90-07-02: Adequacy of Quantity of Stored Emergency Diesel Generator (EDG) Fuel Oil

Technical Specification 3.12 specifies the minimum amount of fuel required in the EDG fuel oil storage tanks to provide the maximum expected engineered safeguard loads for seven days. The NRC inspector noted that the associated fuel use rate for the make and model of the engines appeared to be low. The licensee is addressing this concern. In the interim, the licensee is conservatively maintaining the minimum fuel level in the storage tanks at 30,000 gallons instead of at 19,600 gallons, and has revised Procedure 1-25-1 accordingly. An evaluation of the volume needed was underway by Yankee Atomic Electric Company. This item remains open pending resolution of the minimum fuel oil requirement.

2. RADIOLOGICAL CONTROLS

Radiological controls were observed on a routine basis. Areas reviewed included Organization and Management, external radiation exposure control, and contamination control. Radiological work practices and conformance to radiological control procedures and 10CFR20 were observed.

The licensee continued to reduce the contaminated floor space and "loose curies" in the RCA (Radiological Control Area). The rate of Personnel Contaminations also trended down as areas were decontaminated and specialized training was provided. Training has been provided on contamination control techniques to personnel with above average contamination instances as well as those performing work in highly contaminated areas. Also, to aid in routine decontamination, an improved floor coating was used in limited areas of the RCA to allow assessment of its performance. Licensee management routinely reviewed these issues at the Morning Managers' meetings. The above-mentioned activities showed appropriate management attention to Radiological Controls.

3. MAINTENANCE/SURVEILLANCE

The inspector observed and reviewed maintenance and problem investigation activities to assess compliance with regulations, administrative and maintenance procedures, codes and standards, proper QA/QC involvement, safety tag use, equipment alignment, jumper use, personnel qualifications, radiological controls for worker protection, retest requirements, and reportability per Technical Specifications.

Also, the inspector observed parts of surveillances to assess performance in accordance with approved procedures and Limiting Conditions for Operation, test results, removal and restoration of equipment, and deficiency review and resolution. The following were considered to be noteworthy:

3.1 Diesel-Generator Surveillance

On October 30, while performing Procedure 5-78-1, "Diesel Generator Redundant Systems Check and Diesel Overspeed Trip Test," in conjunction with Procedure 3.1.4, "Emergency Diesel Generator Testing," on DG-1A (Diesel-Generator 1A), the diesel tripped on overspeed during test of the redundant start circuitry. DG-1A was declared inoperable and remained out of service for about one day during troubleshooting. Licensee investigation identified that a breaker had been left open, preventing generator field flashing and electronic governor control. Licensee evaluation of the improper position of the breaker identified several factors including imprecise communications and procedures that did not "reflect the optimum sequence necessary to conduct the surveillance."

On November 20, during a local start of DG-1B in accordance with Procedure 3.1.4, "Emergency Diesel Generator Testing," the diesel-generator's speed was less than expected following field flashing. Licensee evaluation identified that the operator had manipulated the governor control switch on the electrical panel vice the governor control switch on the diesel panel, and that the diesel-generator's performance was as expected considering the mismanipulation. The procedure was changed to more clearly specify the proper switches to be manipulated.

Neither of these examples resulted in a significant degradation in safety. A previous weakness with Procedure 3.1.4, "Emergency Diesel Generator Testing," is documented in NRC Inspection Report 50-309/90-13, Detail 1.b, regarding system alignment and restoration. The inspector questioned the adequacy of the procedures involved and/or the adequacy of the training for these evolutions. Corrective actions planned by the licensee include appropriate items to address the weaknesses identified. The inspectors will observe performance of the surveillance procedures mentioned above in future inspections in accordance with the NRC inspection program.

3.2 Diesel Fire Pump Generator Failure

On November 11, the diesel fire pump was run in accordance with Procedure 3.1.9, "Fire Pump Testing." During the test it was observed that a "Diesel Fire Pump Running" Panalarm did not alarm as expected in the main control room. A DR (Discrepancy Report) was written, and the diesel fire pump was considered operable based on successful completion of the test. The test performed was not intended to test the automatic start feature of the diesel fire pump. That feature is tested on a refueling outage frequency. On November 19, I&C (Instrument and Controls) technicians began troubleshooting and identified that the diesel engines's generator had failed. It was established that low voltage from the generator resulted in the failure of the Panalarm as well as affecting other relays in the diesel fire pump circuitry. The diesel fire pump was then declared inoperable. Further investigation of the circuitry by the PED (Plant Engineering Department) and the Maintenance Department identified a starter protection relay which shuts down the diesel fire pump engine when the generator does not develop normal voltage after an automatic start. This conclusion was verified by an auto-start test on November 20. The repair of the generator was expedited and the diesel fire pump was returned to operable status on November 21. Since the diesel fire pump was inoperable in auto-start for over seven days, the licensee plans to submit a special report in accordance with Technical Specification 3.23. The licensee also plans to evaluate the diesel fire pump's electrical system for modification of the protective relays to improve pump reliability.

The licensee's actions were assessed as timely, comprehensive and aggressive.

3.3 Boric Acid System Flow Control Valve

The inspector observed portions of the work to replace the body-to-bonnet gasket on Valve BA-A-32, the boric acid flow control valve to the "blend tee." That work was performed in accordance with DR-5438-90. The inspector reviewed and verified the associated tagging order. The work was performed in a radiologically controlled area. Appropriate contamination controls were implemented and quality control involvement in the reassembly of the valve was noted.

3.4 Tagging Order Verification

Two safety-related pumps were out-of-service (OOS) for major disassembly and inspection. The OOS Train "A" LPSI (Low Pressure Safety Injection) pump was replaced with the spare Containment Spray pump as described in Detail 1.1 of this report. Also, the spare

charging/HPSI (High Pressure Safety Injection) pump was OOS. The inspector reviewed the tagging orders associated with both of these pumps, observed portions of the work, and reviewed the work package that provided for the installation of the shielding associated with the charging/HPSI pump work. No discrepancies were identified.

3.5 (Closed) Unresolved Item 88-16-01, "1988 Refueling Wiring Discrepancies"

There were several licensee-identified wiring discrepancies during the 1988 refueling outage. Each discrepancy was resolved and appropriate corrective actions taken by the licensee. Also, "Plant Root Cause Evaluation #166 - 1988 Refueling Outage Wiring Discrepancies," was performed. No systematic or programmatic weaknesses that contributed to the existence of the wiring discrepancies was identified. However, several recommendations were made to correct deficiencies and prevent recurrence. These appeared to have been appropriately implemented. This item was updated in NRC Inspection Report 50-309/88-21 to include additional wiring discrepancies described in the licensee's CAR (Corrective Action Request) 88-143-0. The inspector reviewed that CAR and the corrective actions taken. Inadequate corrective actions to address the CAR were identified by the licensee's Corrective Action QA (Quality Assurance) Surveillance 90S-103. Although adequate corrective action was not initially accomplished, the licensee's program identified this discrepancy, and appropriate actions were in place at the time of NRC inspection. This item is closed.

4. PHYSICAL SECURITY

Checks were made to determine whether security conditions met regulatory requirements, the physical security plan, and approved procedures. These checks included security staffing, protected and vital area barriers, vehicle searches and personnel identification, access control, badging, and compensatory measures when required. No discrepancies were identified.

A meeting was held at Region I on November 8, 1990, to discuss the status of the licensee's security program. The licensee has been routinely meeting with the NRC Safeguards Specialist Inspectors to discuss their efforts to upgrade the Maine Yankee Nuclear Security Program.

5. ENGINEERING/TECHNICAL SUPPORT

5.1 Main Steam Bypass and Dump Valve Operation

On Friday, October 20, 1990, Palo Verde 3, a CE (Combustion Engineering) System 80 plant, had a reactor overpower trip from 100% power due to the CPC (Core Protection Calculator). The CPC trip setpoint was at 110%. The trip was apparently caused by a malfunction (later identified as a ground failure of a single diode) in the SBCS (Steam Bypass Control System). The plant operators took manual control and closed the steam dump valves in about eight seconds.

The CE System 80 plants were designed to withstand a turbine-generator trip without a reactor trip by automatically reducing power by 25% with control rods, along with the about 75% capacity MSDS (Main Steam Dump System). The MSDS consists of six turbine bypass valves (one was out of service) and two atmospheric relief valves, all of the same design, with about 10% capacity each.

This CPC trip was caused by all eight main steam dump valves opening in response to both pressure transmitters sending a sudden high (ramped) signal to the SBCS. The ramped signal was generated during the following sequence: 1) a single power supply diode failed, causing a hard ground; 2) the ground caused the operating power supply to trip; 3) the second power supply restored instrument power; 4) the pressure transmitters produced rapidly increasing pressure indications; and 5) the indicated increasing pressure signals caused both a large controller demand signal and the permissive signal that allowed all MSDS valves to open.

The original CE System 80 SBCS design basis concluded that a single failure could not result in all steam dump valves opening; only opening of one atmospheric valve was deemed credible. This event identified a new failure mode beyond that presented in Palo Verde's updated FSAR (Final Safety Analysis Report).

Although Maine Yankee is not a System 80 plant, it is a Combustion Engineering plant. Because of the potential for a similar design of the main steam dump system and accident analysis, the inspector researched the possibility of a similar transient at Maine Yankee.

Based on a review of the FSAR, Maine Yankee's main steam dump system differs from the System 80 design in several ways. Most important, Maine Yankee's main steam dump system was not designed to withstand a turbine-generator trip without a reactor trip, and an interlock requires the turbine to be tripped before the dump valves can be opened. Further, the FSAR Excess Load Incident identifies the most limiting excess load transient with respect to the SAFDLs (Specified Acceptable Fuel Design Limits) as a result of a full opening of all the main steam dump and bypass valves near full power conditions. The analysis shows that the fuel is prevented from exceeding SAFDLs by the Reactor Protection System. Therefore, a single failure in the MSDS controls that results in the full opening of all the MSDS valves is an analyzed transient at Maine Yankee.

This event and its applicability to Maine Yankee was discussed in Region I Technical Issue Summary 90-17. The issues identified by this Technical Issue Summary do not apply to Maine Yankee.

5.2 (Closed) Unresolved Item 50-309/89-25-02: Spray Building Ventilation Alignment

This item addressed a configuration control issue related to the operation of the Containment Spray Building Ventilation System. An informal test of the spray building air flow was conducted in December of 1988. Deficiencies in the configuration of the air flow dampers resulted in degradation in the air flow through the pump cubicles. Ineffective communication

between the Engineering Department and plant personnel delayed ventilation realignment until December 1989. When this item was opened, several issues remained. They included an operability determination of the equipment in the spray building with the degraded air flow and an evaluation of the effectiveness of the process used to communicate the results of the air flow test to appropriate personnel.

The inspector reviewed the results of the above mentioned evaluations as documented in Yankee Atomic Memorandum dated March 5, 1990 (MYP-90-0255) and Quality Assurance Evaluation Report 90-E-003. The engineering evaluation determined that the pumps and other equipment in the Containment Spray Pump Area would have performed their safety functions following a design basis accident. The Quality Assurance Evaluation concluded that the test results were not effectively communicated to appropriate personnel. Actions to improve communications between the Plant Engineering Department and plant personnel were addressed in the licensee's response to NRC Inspection Report 50-309/89-25 (MN 90-33). The inspector considered these actions to be acceptable. This item is closed.

5.3 (Open) Unresolved Item 50-309/90-07-03: Lack of a Process to Assure the Quality of EDG Fuel Oil

The reporting NRC inspector noted deficiencies in the licensee's fuel sampling/analysis program. These deficiencies were also noted by the licensee's Chemistry and Quality Assurance (QA) personnel and are being addressed. For example, Procedure 7-702, Attachment A of QA-QC Manual for Large Lot Chemicals, formalized the timely reporting of fuel oil analysis and results of each fuel oil truck delivery. NRC follow-up review of these reports found that the reports were satisfactorily processed in a timely manner. Three analyses (water, sediment, and viscosity) were, however, conducted after the fuel was delivered. The licensee is taking action to address the timeliness of pre-receipt chemical analyses. The frequency and timing of the extensive analysis by an independent laboratory also needs to be evaluated by the licensee. This item is open pending completion of these actions.

6. SAFETY ASSESSMENT/QUALITY VERIFICATION

6.1 Maine Yankee Self-Assessment Capability

During the current SALP period, and particularly during this inspection period, the inspectors evaluated Maine Yankee self-assessment programs. The purpose of the evaluation was to determine whether the self-assessment programs contribute to the prevention of problems by monitoring and evaluating plant performance, providing assessments and findings, and communicating and following up on corrective action recommendations.

6.1.1 Quality Program Improvements

On November 2, Maine Yankee Quality Program managers met with the inspectors to provide an update of planned and completed improvements to QA (Quality Assurance) and QC (Quality Control) activities. Among the activities discussed were:

- the responsibilities of QA and QC groups;
- the QA/QC surveillance and in-plant audit programs;
- trending activities;
- the corrective action process;
- semiannual quality assessment;
- the hold point inspection program and work package review;
- receipt inspection; and
- the vendor surveillance and vendor audit programs.

The inspectors noted increasing licensee emphasis on performance-based audits and inspections, and determined that the improvement effort was a positive initiative designed to enhance Maine Yankee's ability to identify its strengths and weaknesses.

6.1.2 PORC (Plant Operation Review Committee)

The inspectors reviewed PORC meeting minutes for the current SALP period and found that the requirements of Technical Specification 5.5.A, Plant Operation Review Committee, specifying committee function, composition, meeting frequency and quorum requirements, had been met. The inspectors also reviewed the Technical Specification provision for PORC subcommittees, since PORC uses a subcommittee for procedure review. {The PRS (Procedure Review Subcommittee) is discussed in Detail 6.1.4, below.} Trend reports were attached to several of the PORC meeting minutes, indicating that PORC monitors trends in root cause determinations, performance improvement opportunities, closeout plans, coordination improvement opportunities, unusual occurrences, and actions to address unusual occurrences.

The inspectors concluded that PORC met its responsibilities and exercised its authority as required by Technical Specification 5.5.A. The minutes of the PORC meetings did not, however, indicate that assessments were drawn from monitoring trends. Although recommendations of the PRS were generally adopted, PORC frequently acted on procedures contrary to the recommendations of the PRS. The basis for adopting or acting contrary to PRS's recommendations was not evident in the PORC meeting minutes.

The inspectors attended PORC meetings, and daily meetings routinely attended by many of the PORC members. During the meetings, frequent discussions resulted from the questioning attitude and safety perspective of many of the PORC members. Discussion was only rarely dominated by any one individual. An informal structure at these meetings permitted freedom of expression; however, the informality and lack of structure apparently resulted in a plan of action that was not well documented and, therefore, in a potential loss of accountability.

6.1.3 NSARC (Nuclear Safety Audit Review Committee)

The inspectors reviewed the NSARC meeting minutes for 1990 and confirmed compliance with Technical Specification 5.5.B for composition, member qualifications, and quorum requirements. The minutes did not contain evidence that members (personally) conduct audits; however, audits were routinely performed by other entities under NSARC charter. NSARC meeting minutes contained evidence that the committee reviewed minutes from previous meetings and tracked action items from previous meetings.

As noted for PORC meetings, the NSARC meeting minutes contained little assessment. Review of the minutes of the five special and one regular meetings in 1990 found two recommendations, however, only one of these contained assessment.

During a regular NSARC meeting on November 27, the inspector assessed the ability of NSARC to assess Maine Yankee performance. The inspector concluded that, although assessment was not clearly included in the meeting minutes, the committee membership maintained a questioning attitude and attempted to identify trends in Maine Yankee's performance.

6.1.4 PRS (Procedure Review Subcommittee)

Inspector review of a sample of PRS meeting minutes for 1990 revealed similarities to the above observations for PORC and NSARC. Compliance with Technical Specification 5.5.A was clearly evident, but very little evidence of assessment of Maine Yankee performance was evident in the meeting minutes.

As with PORC and NSARC, during a PRS meeting the inspector observed significant self-assessment. Members of PRS displayed careful attention to detail in reviewing procedure changes and associated 10CFR50.59 reviews. A questioning attitude was clearly evident in subcommittee review of procedures. Although the PRS demonstrated dedication, competence, and safety perspective, the lack of clear guidance for the technical content of procedures was assessed as allowing the procedure review process to be inconsistent over time, because PRS performance can change with membership rotation. Also, PRS decisions have been periodically challenged by plant managers, and on some occasions procedure changes were taken directly to PORC for review, apparently to circumvent subcommittee review. The PRS is aware of these considerations and is pursuing resolution with the Plant Manager and PORC.

6.1.5 Summary

PORC, NSARC and PRS consist of competent, dedicated professionals. Technical Specifications require the committees to perform specific assessment activities which are limited in scope. Despite the lack of any clear requirement, each of the committees demonstrated the capability for programmatic assessment of Maine Yankee activities. NSARC, PORC, and PRS appeared to be performing assessment as a result of the guidance of the chairmen of each of the committees; however, the lack of clearly established goals permits the quality of assessment to

change, perhaps from one meeting to the next. The Plant Manager considers self-assessment an important PORC and PRS function, and is working to establish documented guidelines for the committees which will provide the necessary structure to assure continued identification of Maine Yankee strengths and weaknesses while providing individuals the freedom to be innovative.

Committee performance will be assessed further incident to routine inspections and periodic Systematic Assessment of Licensee Performance.

7. ADMINISTRATIVE

7.1 Person Contacted

Interviews and discussions were conducted with various licensee personnel, including plant operators, maintenance technicians and the licensee's management staff.

7.2 Summary of Facility Activities

At the beginning of the report period, the plant was operating at full power. On November 11, a power reduction was initiated for turbine valve testing and condenser backwashing. With the plant at seventy-five percent power on November 25, erratic turbine valve control resulted in a power reduction to take the turbine generator offline. Repairs were accomplished and the plant was returned to full power on November 26.

On November 15, an enforcement conference was held in the Region I Office to address the apparent violations identified in NRC Inspection Report 50-309/90-19.

7.3 Interface with the State of Maine

Periodically, the resident inspectors and the onsite representative of the State of Maine discussed findings and activities of their corresponding organizations. No unacceptable plant conditions were identified.

7.4 Exit Meeting

Meetings were periodically held with senior facility management to discuss this inspection. A summary of findings for the report period was also discussed at the conclusion of the inspection.

7.5 Inspection Hours

The inspection involved 159 inspection hours, including 18 backshift and 2 deep backshift hours.