

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-382/91-06

Operating License: NPF-38

Docket: 50-382

Licensee: Entergy Operations, Inc.
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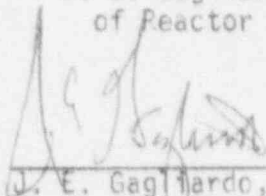
Facility Name: Waterford Steam Electric Station, Unit 3 (Waterford 3)

Inspection At: Waterford 3, Taft, Louisiana

Inspection Conducted: March 18 through April 15, 1991

Inspectors: L. E. Ellershaw, Reactor Inspector, Materials & Quality Programs
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Approved:



J. E. Gagliardo, Chief, Operational Programs
Section, Division of Reactor Safety

6/4/91

Date

Inspection Summary

Inspection Conducted March 18 through April 15, 1991 (Report 50-382/91-06)

Areas Inspected: Routine, announced inspection of the licensee's self-assessment capability, corrective action, followup of previously identified inspection findings, and followup of 10 CFR Part 21 reports.

Results: The licensee's self-assessment and corrective action systems were generally very effective and contained features that were considered superior by the inspection team. Weaknesses, however, were identified in the timeliness and scope of some corrective actions. The licensee's root cause investigations and determinations were often weak and failed to address generic implications of the adverse condition being evaluated.

Within the three areas inspected, no violations or deviations were identified.

DETAILS

1. PERSONS CONTACTED

LICENSEE PERSONNEL

- *R. Azzarello, Director, Engineering and Construction
- *D. Baker, Director, Operations Support and Assessment
- *R. Barkhurst, Vice President, Operations
- G. Boerschig, Event Analysis Reporting and Response (EAR&R)
- *G. Bratton, Quality Assurance (QA) Specialist
- R. Briar, Supervisor, Technical Support
- *R. Burski, Director, Nuclear Safety
- G. Davis, Manager EAR&R
- *W. Day, Shift Technical Advisor (STA) Supervisor
- W. Favaloro, EAR&R Engineer
- E. Fields, Design Engineer (Electrical)
- *T. Gates, Operations Licensing
- J. Gavigan, System Engineer
- S. Ghanavati, Supervisor, Reliability Engineering
- P. Gropp, Supervisor, System Engineering
- *J. Hoffpauir, Maintenance Supervisor
- *J. Howard, Manager, Procurement/Programs Engineering Manager
- J. Johnston, Senior Engineer, Operations Assessment
- *G. Koehler, QA Support Supervisor
- J. Laque, System Engineer
- L. Laughlin, Manager Licensing
- R. Legere, System Engineer
- *B. Loetzerich, Operations Licensing
- *A. Lockhart, QA Manager
- *J. McGaha, General Manager, Plant Operations
- T. Payne, Instrumentation and Control (I&C) Design Engineer
- J. Pollack, Supervisor of Audits
- *P. Prasankumar, Manager, Technical Services
- B. Proctor, Mechanical Design Engineer
- L. Pyle, I&C Design Engineer
- K. Robert, Buyer, Purchasing
- *G. Robin, Lead Inservice Inspection Engineer
- F. Sock, Design Engineer (Structural)
- *R. Starkey, Operations Superintendent
- P. Troy, Manager, Independent Safety Engineering Group
- *K. Walsh, Supervisor, Events Analysis and Reporting
- J. Wilkerson, Reliability Engineer
- G. Wilson, Administrative Assistant, Offsite Committee

NRC

- *W. Smith, Senior Resident Inspector

*Denotes those attending the exit meeting on April 4, 1991.

The inspectors also contacted other licensee personnel during the inspection.

2. ACTION ON PREVIOUSLY IDENTIFIED INSPECTION FINDINGS (92701)

(Closed) Unresolved Item (382/8911-02): Documentation of QA audit and surveillance findings, tracking and trending, and management notification appeared weak, and recurring discrepant conditions raised a concern regarding the adequacy of actions taken to preclude recurrence.

The inspectors found that the licensee had determined that Procedure QAP-302, "Conduct of Quality Assurance Audits," required strengthening in the areas noted above. The procedure was revised (Revision 8) on June 15, 1989, in response to the unresolved item. The following changes were established: audit checklists became formal records requiring review by the QA audit supervisor at the end of the audit; a more comprehensive definition of what constitutes the different types of findings was established; the method for documenting findings was established; and the requirement for exit meetings at the conclusion of all audits, even if there were no findings. The procedure had undergone two complete rewrites (Revisions 9 and 10) to provide further enhancement. In addition, Site Directive W2.501, "Corrective Action," Revision 0, dated September 28, 1990, was issued, which defined the interfaces and responsibilities of the Waterford 3 corrective action program. The directive clearly requires all corrective action procedures to establish mechanisms to track, ensure implementation, confirm the adequacy of corrective action completion. The above steps provided the necessary controls for recurring discrepant conditions. This issue is considered closed.

3. FOLLOWUP ON 10 CFR PART 21 REPORTS (92701)

By letter dated October 24, 1990, Target Rock Corporation (TRC) notified the NRC of the discovery of an improper material substitution of marker strips supplied as either spare parts or with TRC solenoid valves. TRC was able to trace the substituted material to a single lot and identified all recipients of the subject marker strips. TRC initiated Service Bulletin S.B. 9012, which was mailed to the identified customers, one of which was Louisiana Power & Light Company. The licensee investigated and determined that they had received one solenoid valve with this condition, and the valve was subsequently identified with a "Hold" tag. The inspector visited the warehouse and verified that the valve was tagged. The licensee had not made a final determination as to the valve's disposition at the time of this inspection. The inspector concluded that the licensee had acted in a responsible manner regarding this issue.

Limitorque Corporation, by letter dated December 11, 1990, simultaneously notified the NRC and their nuclear utility customers of a potential for failure of model SMB-00 torque switch roll pins, depending on licensee operating conditions. The licensee performed a review and determined that a total of 48 model SMB-00 actuators were installed in the plant, with 38 of them being safety-related. A motor-operated valve user-group meeting was held on January 23, 1991, with

Limitorque and other representatives of the nuclear industry to further assess the 10 CFR Part 21 report and to develop the necessary actions to correct the deficiency. This assessment, coupled with the licensee's engineering evaluation, resulted in the development and implementation of interim solutions. The engineering evaluation's permanent solution was to expedite the ordering of newly designed torque switches and to schedule replacements in accordance with a recommended priority. The inspectors concluded that the interim solutions would eliminate the potential for failure of the SMB 00 torque switches and that the licensee had taken the appropriate actions.

4. SELF-ASSESSMENT AND CORRECTIVE ACTION (40500 and 92720)

The objective of this performance-based inspection effort was to determine the effectiveness of the licensee's process for correcting identified problems and for critically assessing the activities that led to the problem. The inspection was performed by selecting a number of problems (or issues) that had been identified by the licensee, the NRC, and/or other external sources and by examining how the licensee had corrected the problem. The inspection also evaluated the actions that the licensee had taken to prevent recurrence.

Each of the problems (issues) selected was evaluated against the following criteria:

- ° Identification: The identification of the problem was at the appropriate level, but could have been identified by employees at a number of levels in the licensee's organization.
- ° Evaluations: The evaluations of the problem (issue) included determinations of plant safety, operability, generic implications, causal linkage, and reportability. The evaluation also included a root cause analysis, if appropriate.
- ° Actions Taken: The corrective actions taken were timely, had been verified, and had been tested. The problem and its correction was trended by cause, timeliness, and area of responsibility; and the problem (issue) was reported to management for their oversight.
- ° Oversight: The oversight function for each type of problem (issue) included the appropriate tracking to closure, periodic review by management, and periodic audit of the process.
- ° Expectations: The responsibilities of employees at all levels had been defined for the corrective action process, and appropriate training had been provided.

4.1 Review of Significant Occurrence Reports (SORs)

Administrative Procedure UNT-006-014, "Significant Occurrence Report," Revision 2, dated May 31, 1990, described the methodology for handling events that were not reportable to the NRC, but could have resulted in a significant degradation of personnel safety, equipment, protection, or plant operability. The procedure provided the criteria for initiating, investigating, reviewing, approving, tracking, and establishing corrective actions for these events.

Any employee, upon discovering an event or occurrence, was required to immediately make it known to their supervisor. The supervisor was required to determine the appropriate corrective action procedure to be applied, and to determine if the event should be reported to the NRC. If it was not reportable, an SOR was to be initiated. The two sections of the SOR entitled "Description Of Occurrence" and "Immediate Corrective Action," were to be filled out, and a copy was to be provided to the trending compliance and response department (TC&RD), which was responsible for assigning sequential SOR numbers and maintaining the SOR log. The TC&RD maintained and tracked the status of the SORs in the document review and approval database.

The inspectors reviewed 10 SORs and found that, in general, the identification and description of the events was comprehensive and that the immediate corrective actions taken were appropriate for the described event.

Each of the SORs reviewed had received an immediate evaluation to determine if safety and operability concerns were present. Evaluations of SORs 90-015 and 90-020 resulted in the determination that conditions prohibited by Technical Specifications (TSs) existed as a result of this event. This caused the licensee to enter a TS limiting condition for operation (LCO). For each of these cases the problem identified by the SOR was resolved within the specified time frame permitted by the TS LCO. The issues addressed by these SORs are discussed below.

SOR 90-020 dated August 29, 1990, described several events that occurred during the performance of maintenance and operation of chemical and Volume Control Charging Pump B from August 21-27, 1990. The pump was taken out-of-service for scheduled repacking. During subsequent retest, the discharge capacity dropped from the normal 44 GPM to 28 GPM. The pump was disassembled and inspected. Small pieces of packing were found in one cylinder and removed. The pump was reassembled, retested, and still had a capacity of only 28 GPM. On August 22, the pump was completely disassembled and inspected. Suction and discharge valves were removed and replaced. After reassembly, the pump was retested successfully and declared operable. On August 26, the pump was declared inoperable as a result of a low flow of approximately 8 GPM. The pump was disassembled and inspected. The suction and discharge valves in one cylinder were heavily scored. All valves were replaced with the exception of one discharge valve for which there was no available spare. After reassembly, the pump was retested and results showed a flow rate of 28 GPM. On August 27, the discharge valve that had not been replaced, was removed and lapped to a flat finish, replaced, and the pump was retested. On this occasion, the retest was successful, and the pump was declared operable. The opening statement in the description of occurrence section stated that these events need to be investigated. The SOR reflected that event investigation, establishment of root cause(s), and generic implications had not been determined.

Additional documentation could not be located to support the performance of these activities. A licensee representative indicated that, to the best of his knowledge, no further review had been performed because of the low priority assigned to this issue. In view of the concerns identified in paragraph 4.1 of this report, it would appear that licensee action is needed to identify and correct the cause of this event.

With respect to SOR 90-015, dated July 3, 1990, the licensee determined that the event was reportable, which caused the initiation of Licensee Event Report (LER) 90-008 dated August 1, 1990. The SOR provided a thorough description of the event (i.e., the dropping of Control Element Assembly (CEA) 51, a Shutdown Group A control rod, from the fully-withdrawn position to the fully-inserted position). Further discussion centered on problems with the essential service chillers, which started approximately 4 hours and 20 minutes prior to the CEA dropping. A series of events occurred in which the chillers were declared inoperable and TS LCOs were entered. These events were resolved, CEA 51 was withdrawn, and the LCOs were exited. During the restoration of CEA 51, it was also found that CEA 49 would not move. The event investigation, dated February 14, 1991, revealed that several components had failed in the power switch assembly that was common to both CEAs. The investigation revealed that the system engineer and the I&C technician that had repaired the switch assembly stated that the component failures may have been the result of the problems experienced with the chillers. They further stated that the component failures should not have resulted in CEA 51 dropping because of the design of the control element drive mechanism control system (CEDMCS). The root cause was determined to be a result of the equipment malfunction or unforeseen failure causing the CEA to drop. This appeared to conflict with the earlier statement regarding the CEDMCS design. The stated root cause appeared to be very shallow and not adequately researched. The stated corrective action was to implement Design Change DC-3103 to improve the cooling of the CEDMCS cabinets. This modification was expected to be completed by April 30, 1991. A root cause investigation was determined to be unnecessary as indicated on page 4 of Attachment 0.1 to the SOR. The subsequent LER provided all of the above information and expanded on the probable root cause by discussing the chillers and the subsequent temperature effects on the CEDMCS cabinets. The LER stated that "an investigation is being conducted to confirm the root cause of the CEA problems and appropriate corrective action will be carried out based on causal information." The inspectors requested information relative to the status of the investigation and were told that a memorandum had been transmitted to Combustion Engineering, Inc. (CE), the nuclear steam supply system manufacturer, on July 26, 1990. The memorandum asked questions regarding how the failed components would result in a CEA drop, and questioned the maximum allowable ambient temperature for the power switch assembly. Licensee representatives could provide no other information regarding the investigation other than the memorandum and support notes.

During review of the CEA drop, the inspectors became aware of a CE letter dated February 7, 1991, which transmitted CE Information Bulletin 91-02, dated February 6, 1991, to the licensee. The information bulletin addressed the CEDM

pressure housing cracking discovered at the Fort Calhoun Station, which resulted in a primary coolant leak. It stated that metallurgical evaluations of the cracked CEDM housings determined that the cracks resulted from transgranular stress corrosion cracking under the long periods of exposure to high stresses in the oxygenated high-temperature water environments. The information bulletin advised all CE nuclear steam supply system utilities to review their procedures and practices for venting CEDM housings, and to assess whether additional evaluations or examinations were warranted for any unvented CEDM housings. It was also noted that CE Technical Manual 457000397 for magnetic jack-type CEDMs stated that the mechanisms should be vented to preclude oxygen entrapment prior to their operation after each refilling or depressurization of the main-coolant system. The inspectors determined that the CEDM housings were not vented at Waterford 3. A licensee representative stated that to the best of his recollection, venting was last performed during Refueling Outage I, in 1986. The inspectors found no documentation of venting, or justification for not venting, the CEDMs at Waterford 3. Licensee representatives indicated that the practice was probably stopped as a result of concerns regarding high radiation exposure.

This issue was evaluated by the licensee's Operations Assessment Information Dissemination (OAID) group who recommended that operations should vent the CEDM pressure housings in accordance with the guidance given in the CE technical manual. The evaluation and recommendation were documented in an operations-experience evaluation form dated March 13, 1991, and submitted to operations for their review and comments. Operations and system engineering performed a technical review during which a number of questions were raised. Their review, which was completed on March 27, 1991, concluded that they disagreed with the OAID group's recommendation until further research and justification were obtained.

An OAID action item, dated April 1, 1991, considered operations response to be "Unsat." The inspectors were informed that this issue was to be presented to the Safety Review Committee on April 12, 1991, for resolution. The resolution of this issue has been identified as an open item (382/9106-01) and will be reviewed during a future inspection.

4.2 Potential Reportable Events (PREs)

The inspectors reviewed procedure UNT-006-010, "Event notification and Reporting," and 12 PRE packages. The licensee considered the procedure to be part of the corrective action system. Thus, the procedure had provisions for notification determination, reportability determination, root cause determination/investigation, and corrective action. The procedure also contained attachments which served as guidelines and included a checklist of questions to determine if there was a requirement for initial notification or reporting. A number of the PRE packages reviewed were open, awaiting the completion of corrective action. The PRE packages contained all of the documentation needed to ascertain that the reportability determination had been made, initial notification (reporting) had been accomplished, root causes had been determined, and corrective action had been initiated and/or completed.

The procedure appeared capable of performing the objectives of guiding licensee personnel in making the required determinations. The inspectors identified one instance where the reportability determination may have been hampered by the procedure. All of the checklist questions referenced a reporting or initial notification requirement from the Code of Federal Regulations, the TS, or some applicable document.

During the inspector's review, a weakness was noted in Procedure UNT-006-010. Specifically, question number four of the reporting guidelines for submission of a 30 day licensee report read as follows:

"Did an event or condition during operation result in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded? 10 CFR 50.73(a)(i)."

This question infers that an event is reportable only if it occurs during plant operation, but 10 CFR 50.73(a)(i) states in part:

". . . the licensee shall report an event regardless of the plant mode or power level, and regardless of the significance of the structure, system, or component that initiated the event."

Therefore, the caveat in the procedure checklist question that implies the plant must be operating before an event is reportable appeared to be in conflict with the regulations and could result in the licensee failing to report an event that required a report.

From the PRE packages reviewed, the inspectors determined that the licensee's documentation of the determination process, reporting process and followup corrective action process was effective. The inspectors also found the reportability determination process to be timely. However, several of the PRE documents remained open for extended periods after the reportability determination was made, awaiting the completion and verification of corrective action. The inspectors also determined that the root cause determination and investigation efforts were often superficial and weak. The entire issue of root cause investigation, analysis, and determination is addressed in paragraph 4.3.

The inspectors reviewed PRE packages that had been issued in 1989 and 1990, and noted that more than half of the packages were still open pending the completion of corrective actions. The inspectors were concerned regarding the lack of timely corrective action for the issues reviewed. None of the issues were at a level of significance to cause a regulatory concern, but collectively, they indicate a concern that warrants management attention. Examples of PREs that were not corrected in a timely manner include:

- ° PRE 86-054 was initiated July 28, 1986, after the discovery that the refueling water storage pool (RWSP) indication was inaccurate. Immediate corrective action called for changing the TS to increase the minimum allowable level maintained in the RWSP. This immediate corrective action was accomplished quickly. Followup corrective action was required to

make changes in the plant data book and to change the tank percentage to be accurately reflected by the level. The original scheduled completion for this action was January 8, 1988. The PRE was still open at the time of this inspection.

- ° PRE 88-043 was initiated on April 21, 1988, when a work package was inadvertently opened that allowed the simultaneous disassembly of two valves in a sample line on either side of the containment wall with the plant in "Mode Six." The event was subsequently declared not reportable, as the licensee determined that core alterations or fuel movement had not occurred during the period when the containment was inadvertently open to the atmosphere for an estimated 6 hours. The report form indicated that all specified corrective action was completed on October 17, 1989. However, the PRE remained open pending verification of the completion of the corrective action.

All of the PRE packages reviewed contained documentation that showed corrective action was being tracked by the EAR&R group. Groups were informed as to the specific corrective action they were responsible for and the required completion date. Notices or memorandums were initiated when the action was late. However, several organizations had been unresponsive in meeting the committed schedules for completing the corrective action.

4.3 Root Cause Investigations (RCIs)

The licensee's corrective action procedures required that for each condition adverse to quality and each significant industrial safety or plant reliability concern, a root cause shall be identified and documented. Procedure UNT-006-016, "Root Cause Investigation and Analysis," provided threshold criteria and guidelines for performing a RCI. If the condition or concern did not meet the threshold criteria, a "Root Cause Determination" was to be made.

The inspectors selected for review several RCIs that had been initiated by SORs or PREs. The RCIs were reviewed to verify the quality of the root cause determinations and the adequacy of the corrective action recommended to correct the root cause and, thereby, prevent recurrence of the event or condition. The RCIs reviewed and the inspector's findings are summarized below.

- ° RCI 90-08 investigated the reactor trip caused by a dropped CEA. The event was caused by a binding drawer slide which resulted in a damaged connector. The RCI identified the root cause of the event as a malfunction of the power drawer slide causing misalignment of and damage to the connector. The RCI stated that the contributing cause was the inattention to detail on the part of the technicians who failed to inspect the power switch on the drawer after its removal from the cabinet. The licensee removed all the CEDMCS power switch drawers and inspected their connectors. The RCI recommended corrective actions included: (1) the replacement of the binding drawer slides, (2) augmenting existing outage maintenance tasks for CEDMCS to inspect power-switch drawer connectors for damage after removal and to inspect the drawer slides for binding, (3) revise the station information management system component sheet for CEDMCS to assure that power switch connectors are inspected when drawers are

removed from their cabinets, (4) augment the CEDMCS training course to have instructors stress the drawer connector inspection, and (5) the supervisor working with the technicians on this task was to ensure that the lessons learned from this event were understood by the personnel working on this system. The inspectors noted that the causes and the corrective actions were directed toward the CEDMCS equipment and technicians. The actions did not consider that this problem might be generic to other instrumentation cabinets for which damage to drawer connectors was possible as a result of binding slides. The training and procedure revisions were applied to only the CEDMCS and should have also been applied to other safety-related instruments that could have been subjected to this type of failure.

- ° RCI 90-21 was initiated to address the root causes for failed fuses and fuse holders in the Westinghouse 7300 series process analog control (PAC) power supply panels. The RCI stated that the root cause of the failure was an inadequate design of the PAC fuse protection, and that a contributing cause was possibly a capacitor failure resulting in both fuses blowing in the power supply. The licensee replaced the 15 amp fuses in the PAC power supplies with 20 amp fuses. The recommended corrective action to correct the root cause and contributing causes was to (1) replace the 20 amp fuse holders in the PAC system with 30 amp fuse holders, (2) evaluate other fuses and fuseholders in the PAC system, (3) evaluate the need to replace the fuseholder wire quick-connections with soldered connections, (4) check the previously failed PAC card racks for capacitor failure, and (5) evaluate, with Westinghouse assistance, the proximity of fuseholders. The licensee established a "Fuse Configuration Control Task Force" to evaluate fuse configuration control at Waterford 3. The inspectors noted that the activities of this task force and the RCI addressed only the fuse problems with the PAC. There was no apparent effort to evaluate the possibility that the fuses and fuse holders of other safety-related instrumentation may have also been inadequately designed.
- ° RCI 90-28 investigated the event (LER 90-14) involving the removal of the fire seal from a fire damper. The RCI stated that the root cause and contributing causes of the event were (1) lack of sufficient documentation and details of the control room envelope boundary seals, (2) an inadequate design change in which the documentation was not thoroughly researched, (3) timely corrective action not taken by plant personnel, (4) the HVAC system engineer not being part of the review process for the design change, and (5) that there was no procedure for tracking work that may effect the integrity of the control room envelope. The licensee's immediate corrective actions included stopping all work that effected the control room envelope, repairing the seal, and leak testing the envelope. The long-term corrective actions included the revisions to equipment lists, procedures, and labels to correct the specific concerns that led to this problem. The corrective action also included instructions to the supervisors and employees involved in the event. The RCI did not, however, address such things as training of the system engineers and operators who failed to fully understand the need to assure that the control room envelope was maintained, or correcting the faulty procedure process that permitted the issuance of the weak procedures, which contributed to this event.

- ° RCI 90-009 was issued in response to PRE 90-027, which documented the finding that the setpoints for both of the shutdown cooling system relief valves (SI-406A & SI-406B) exceeded the maximum TS allowable setpoint pressure. The TS permits a maximum allowable set pressure of 430 psia, but the maintenance procedure permitted a set pressure as high as 438 psia. Both of the relief valves had been set with lift pressures greater than 430 psia on previous occasions. The RCI identified the root cause and the contributing cause as an inadequate maintenance procedure and an inadequate technical review of the work procedure. The licensee changed the lift setpoint of the one relief valve currently out of specification and revised the work procedure. The RCI also recommended that a meeting be conducted with the developers and reviewers of maintenance work procedures to discuss the problem. The RCI also recommended that a review be conducted of other work procedures involving relief valves and a sampling of TS surveillance procedures to ensure that TS acceptance requirements have been met. The licensee's actions in this case appeared to be appropriate.
- ° RCIs 89-03, 89-09, and 89-15 addressed the problems experienced with the "B" HPSI pump as documented in SORs 89-07, 89-09, and 89-12. These concerns are also discussed in more detail in paragraph 4.10 of this report. The RCIs listed root causes and contributing causes that include equipment failures, improper maintenance, and inadequate vendor manuals. Neither the identified root causes nor the recommended corrective action addressed the reason for the maintenance errors or the inadequate vendor manuals being used by the craftsmen. The recommended corrective action also failed to address the need to review other vendor manuals to determine if they also contain the weaknesses identified by these events.

The inspectors concluded that the licensee's root cause analysis process for those issues subjected to a root cause investigation was acceptable. The analysis procedures were good; however, the scope of the analyses could have been expanded to address causes that were more likely to get at the root of the identified problem. The engineers and technical specialists that performed the RCIs had been trained in root cause analysis techniques. The inspectors found, however, that a number of the individuals performing root cause determinations had not received this training. A licensee representative stated that they were in the process of revising the lesson plan for root cause analysis training. No target date for the completion of this effort was indicated.

4.4 Quality Notices (QNs)

The inspectors assessed the licensee's QN program by reviewing approximately 35 individual QNs and the last four corrective action audits performed in the past 2-year period. In the sample reviewed, it appeared that the program had been primarily used by quality control (QC)/QA personnel. However, the program was available to any employee for identifying conditions perceived to be adverse to quality. These conditions would normally be in the form of departures from policies, programs, procedures, or instructions.

The quality audits performed on the corrective action processes appeared to be thorough and included complex and important essential elements incorporated into the audit checklists and plans. These audits routinely used auditors from outside the quality organization to help in the assessment of program or technical adequacy. The four audits reviewed disclosed numerous observations and findings by the auditors, which were further assessed to determine the programmatic weaknesses in the corrective action system documented as QNs. The responses to these QNs were generally timely and adequate to correct the specific findings. The review process for corrective action audit findings and observations appeared to be appropriate. The responses to the findings included a review by at least one of the two site review committee (SRC) subcommittees or by the SRC itself.

In contrast, the QNs generated in response to other conditions (not from audits) often failed to correctly identify the root cause, failed to consider generic implications or programmatic issues, and failed to meet corrective action schedules. The following examples support the findings of the inspectors:

- ° QA-90-018 was submitted January 11, 1990, by operations QA because documentation could not be found to substantiate that conditions adverse to quality identified in six Notices of Violation (NOV) had been corrected. A licensee investigation of this issue revealed that all corrective action commitments made to the NRC had not been performed by the licensee. No root cause determination was made for the failure to perform corrective action. The QN was closed on January 7, 1991, by providing a status of the corrective action committed to for four of the six violations. There was no documentation of corrective action to meet the commitments for correcting NOV 8811-01 and 8808-07. The programmatic issue of the failure to document the completion of commitments made in response to the NOV was never addressed. This package contained two memorandums to the responding manager for overdue corrective action. The original corrective action due date was May 25, 1990. An extension was granted to require corrective action by August 22, 1990. Closure was not completed until January 7, 1991.
- ° QA-90-048 was written to correct the oversight of the failure to include the Emergency Operating Facility (EOF) emergency diesel generator (EDG) in the preventive maintenance (PM) program. The root cause was determined to be the failure to control the vendor technical manual during the construction turnover period. The program that controlled "non-plant equipment" technical information was not addressed. The corrective action specified that a review should be performed to determine if other EOF equipment was omitted from the PM program. "Non-plant equipment" outside the EOF was not considered. The condition was discovered on January 30, 1990. Corrective action was to be completed by April 30, 1990. The corrective action was not completed and verified until March 26, 1991.

- QA-90-068 was initiated on March 13, 1990, to identify an inadequate safety review of a modification that had been performed in 1987. The root cause was stated to be an inadequate review procedure in effect when the initial review was performed. The initial corrective action stated on the QN form was "none" since the review occurred under a procedure no longer applicable. Initial action recommended to prevent recurrence was to reconfigure the hardware affected by the modification. A conflict was still ongoing regarding the appropriate corrective action that should be taken for this QN. According to the documentation reviewed by the inspectors, the safety evaluation performed for the modification was still indeterminate 3 years after the modification and 12 months after discovery. The original response due date for corrective action determination was April 12, 1990. The proposed corrective action was rejected and the due date was extended to August 31, 1990, then to September 26, 1990. At the time of the inspection, the due date had been extended to March 31, 1991, and the QN was still open.
- QA-90-081 was issued to document procedure noncompliance by operators on March 5, 1990. The corrective action was to write a letter to operations personnel stressing the need for attention-to-detail and the requirement to strictly follow procedures and to revise the procedure. The letter was issued to operations personnel on March 16, 1990. The procedure, however, was not revised until June 22, 1990.
- QA-90-097, dated March 23, 1990, was written when plant engineering personnel gave a plant maintenance mechanic verbal authority to implement a work authorization without the shift supervisor's approval. The root cause was documented to be an inappropriate decision to allow the work to proceed in parallel with processing the paperwork. The corrective action taken to prevent recurrence was to discuss the event at an engineering department staff meeting. The root cause determination did not address the maintenance craftperson's failure to recognize the work control procedure violation. A second notice of overdue response was sent to the responding manager on October 9, 1990. The specified corrective action (staff meeting) was not completed and verified until November 28, 1990.
- QA-90-129 dated May 4, 1990, stated that the safety evaluation required by 10 CFR 50.59 had not been adequately performed for a temporary modification. A licensee representative stated that this problem was to be corrected by issuing a work authorization. The QN was closed on November 28, 1990, and contained no documented root cause determination or basis for closure (corrective action).
- QA-90-197 was initiated on August 8, 1990, based on the finding that the "AB" HPSI pump coupling assembly was missing two lockwashers. The root cause was designated as inattention to detail by the individuals involved in the previous coupling assembly in November 1989. For corrective action, one individual was counseled and the incident was discussed in a mechanical maintenance department meeting. The inspectors reviewed the work authorization for reassembling the pump coupling, when the washers were most likely left out. The work included QC witnessed steps for aligning the coupling (pump and motor), and for torquing the coupling fasteners. The

step for assembling the coupling was not a detailed step and did not require QC witness or independent verification. The specified corrective action to prevent recurrence (individual counseling and a department meeting) was completed on February 15, 1991, 6 months after discovery.

QA-91-014 was written because the procedure to determine reactor protection system/engineered safety feature actuation system response time was deleted in 1987 and had not been replaced. The stated corrective action was to issue a new plant staff policy (unwritten) which would provide guidance assuring that a new plant procedure would be issued to meet the requirements of any deleted procedures. The licensee could not demonstrate how this new policy was implemented, administered, or enforced.

The inspectors determined that the QN program for corrective actions was a comprehensive program but that implementation weaknesses existed. The program had good availability and high usage, and the identification of problems adverse to quality was good. The evaluation phase of the QN program, however, exhibited weaknesses in the generic consideration of adverse conditions and root cause analysis.

In the QN sample reviewed by the inspectors, the corrective action to close the QNs was generally late. The commitment schedules or deadlines did not appear to be unrealistic and the inspectors could not identify the cause for late corrective actions. The corrective action, especially that to prevent recurrence, often failed to address generic or programmatic issues. The licensee had a comprehensive trending program, but it did not trend late corrective actions. At the end of the inspection, licensee representatives informed the inspectors that late corrective actions would be trended and reported to management in the near future.

Periodic review of the elements of the program were performed by the QA corrective action audits and the corrective action subcommittee of the site review committee. These review efforts were designed to find and report problems in all of the licensee's corrective action programs. The review results and the findings of this inspection led the inspectors to believe that the QN program had not been subjected to an effective programmatic review covering the intended scope of this program.

4.5 Problem Evaluation/Information Requests (PEIRs)

The licensee had established a program that served as a vehicle for any employee, group, or organization to request information or an evaluation of a condition or concern. The program was implemented by Procedure NOAP-018, "Problem Evaluation/Information Request," and required the use of a form to formally request information or support from other sections within the nuclear operations organization. The inspectors reviewed the implementing procedure, the PEIR tracking system, the current PEIR status, and a sampling of PEIRs, both open and closed.

4.7 Generic Communications

The inspectors evaluated the licensee's handling of generic communications such as generic letters (GLs), information notices (INs), and NRC bulletins. The inspector selected a sampling of these documents and reviewed the licensee's handling of the generic information, and any requirements requested by the GLs or bulletins. All of the reviewed generic communications had been received in the licensing department. The issue was entered into the licensee's commitment management system and was then assigned to a licensing engineer for review and initiation of actions.

The licensee's commitment management system was considered to be superior by the inspection team. The system provided a comprehensive status of all issues for which the licensee has made commitments. It also included items that were not formal commitments, but were identified and tracked to correct weaknesses that had been identified to the licensee by various mechanisms. The inspectors found this system to be very effective in determining the status of the issues evaluated in this inspection effort.

4.8 Precursor Trending Program

The licensee had established a precursor trending program (PTP), which provided a mechanism for all employees to identify problems, circumstances, and deficient conditions that could delay the performance of their duties to management. This system was designed to document, collect, and track items which individually were minor, but collectively could be more serious. The PTP cards were located throughout the plant and the individual could submit the completed card anonymously, and it did not have to be reviewed or approved by his/her supervisor.

The PTP cards were reviewed by the reliability engineering group and evaluated by them and reported as part of the plant-wide trend report. Licensee management had been very supportive of this program, and the inspectors found it to be a very effective mechanism for employees to communicate their concerns. The inspectors reviewed a sampling of the PTP cards that had been submitted in recent months and found them to be a good source of information for the licensee's corrective action process. This system was considered superior by the inspectors.

4.9 Vendor Technical Information/EDG Failure

The inspectors assessed the quality and availability of up-to-date vendor technical information for the safety-related EDG. One of the two EDGs had recently experienced a failure while operating during the performance of outage surveillance testing. This failure was originally characterized as an apparent crankcase explosion which damaged one of the 16 cylinder units. The licensee subsequently determined that vendor information in the form of several service bulletins had never been received and incorporated into the technical manual.

The inspectors reviewed Procedure NOECI-155, Revision 0, "Key Component Supplier List (KCSL)," and Site Directive W5.603, Revisions 0 and 1, "Control of Vendor Information." The KCSL was designed as a tool for contact and interface with

Although not established by the procedure, the inspectors determined through interviews of licensee personnel that PEIR system input was initially handled and processed by plant engineering. An initial screening was performed to ensure that the request did not require entry into one of the corrective action systems. A subsequent determination was made regarding the proper respondent to be assigned to the issue. After these initial actions, the individual request was entered into the tracking system to ensure timely response to the originator.

The inspectors determined that there were 126 PEIRs open at the time of the inspection. Since January 1, 1991, a total of 57 PEIRs had been entered into the system, and 88 had been closed out, resulting in a significant decrease in the backlog of the open PEIRs for the short-term. Graphs in the trend report for the fourth quarter of 1990 charted the open PEIRs for which the engineering department was responsible for closure, and showed a slow but steady decrease in the backlog from the high point it reached in the second quarter of 1989.

The inspectors reviewed a number of PEIRs and determined that the uses of the PEIR system were many and varied. At times, it was used to merely document the respondent's efforts and the time utilized to complete a project. The inspectors did not identify any cases where the PEIR system had circumvented any of the licensee's corrective action systems. The program appeared to be functioning as it was intended.

4.6 Plant Operations Review Committee (PORC)

The inspectors determined that the committee was meeting all of the responsibilities delineated in TS (TS) 6.5.1. All responsibilities except that developed in TS 6.5.1.6.g ("Review of unit operation to detect hazards to nuclear safety") for review of unit operation appeared to be met in the normal course of the review of documentation associated with safety-related activities. The inspectors questioned the PORC chairmen as to how the responsibility was met. The PORC chairman responded that each PORC meeting included a discussion period where committee members were free to ask any questions of or surface any issues to, the entire committee. The meeting minutes that were reviewed verified that these free discussion periods did occur during the course of PORC meetings.

During the review of Procedure UNI-001-003, "Procedure Initiation, Review, and Approval," the inspectors determined that the procedure contained requirements for PORC subcommittee and/or full committee review of temporary and permanent changes or revisions to procedures associated with safety-related activities. Guidance was provided in Procedure UNT-001-002, "Procedure Classification," for making the determination that a procedure was safety-related.

The inspectors found that Administrative Procedure, UNT-001-004, "Plant Operations Review Committee", was intended to ensure that formal onsite reviews of applicable activities were performed by the PORC or one of the subcommittees reviewing the area. The procedure prescribed PORC membership, meeting requirements, review requirements, review process, and the interface with the plant manager. Although the procedure described the generic makeup of a subcommittee, it did not list or prescribe the number and function of the subcommittees to be used.

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the vendors supplying components which are critical to safety or power generation. Directive W5.603 was intended to establish responsibility and requirements under the vendor equipment technical information program (VETIP) relating to the control of Waterford 3 information. The two procedures together required that procurement personnel periodically initiate contact with vendors to obtain up-to-date technical information.

The inspectors contacted the purchasing department to assess the action that had been taken to obtain up-to-date service information for the EDGs. The file for this equipment contained copies of three letters to the EDG vendor requesting updated service information. The letters were dated: December 12, 1988, March 31, 1989, and January 9, 1990. There were no vendor responses to any of these letters in the licensee's files.

Site Directive WF.603, 5.5.3.1 stated that for those vendors who do not respond to the correspondence initiated by the KCSL program, engineering shall determine the necessary additional actions to be taken and the results of this determination shall be documented in writing. The inspectors could not identify any engineering determination that had been made as a result of the EDG vendor's failure to respond to the three licensee requests for technical information.

The inspectors contacted the acting system engineer for the EDG. The system engineer had obtained a copy of all service bulletins issued since 1980, which included 35 bulletins. The system engineer had obtained these bulletins through the auspices of the equipment owners group of which the licensee was a member, and the bulletins arrived onsite March 18, 1991.

The inspectors held discussions with a licensee representative relating to possible causes of the failure and how to eliminate some of the possible causes from consideration. At the conclusion of the inspection, the licensee was in the process of obtaining assistance from the EDG vendor and a report from a metallurgical consultant to investigate the root cause of the failure. Additional NRC followup of licensee actions relative to obtaining EDG vendor information is discussed in NRC Inspection Report 50-382/91-15.

4.10 Trending

Procedure UNT-07-025 established the requirements for a trend analysis program and the issuance of quarterly trend reports. The inspectors reviewed the last two quarterly trend reports. These reports were found to be comprehensive in that a wide range of inputs were found to be used, including many of the plant performance indicators. The reports trended the human performance characteristics of licensee event reports (LERs) and other corrective action documents such as NCRs, PREs, QNs, SORs, and their precursors. The reports also covered programmatic breakdowns indicated in NCRs, PEIRs, the procedure upgrade program, temporary alteration requests, annunciators out-of-service, and 10 CFR Part 21 deficiencies. The hardware performance of pumps, valves, EDGs, main turbine, main generator, heat exchangers, piping erosion and corrosion, tanks and coolers, and calibration failures were also addressed as were nuclear plant reliability data system component failures.

The reports were distributed to top and middle levels of management. The reports identified negative trends and followup items. The close-out of negative trends and followup items were also tracked in the quarterly reports. The timeliness of close out appeared to be reasonable in that almost all items were closed in the following report. The most recent report identified that negative trends for example, had been found in plant operations review committee records' and turbine generator bearing vibrations.

Previous inspector comments on trend reports had been acted upon by the licensee, and the most recent reports included an executive summary. The tracking and cross referencing of trends and followup items was found to be much improved in the most recent report, but improvements were warranted in the status reports provided in the followup section of the report.

4.11 Safety Rev Committee (SRC)

The SRC was established by the TS requirement to provide an offsite committee to provide oversight of licensee activities at the Waterford 3 site. The SRC had established a four person corrective action subcommittee to review and evaluate the activities of the Waterford corrective action program. The review activities of the SRC corrective action subcommittee were required to be addressed at each of the regularly scheduled meetings of the SRC.

The inspectors reviewed the minutes from the two most recent meetings of the SRC corrective action subcommittee and discussed the subcommittee's activities with the subcommittee chairman. The inspectors noted that the subcommittee's activities have primarily involved the quantitative evaluation and trending of correction action documents and their resolution. The subcommittee had performed very few performance-based evaluations of the quality of the licensee's corrective actions. The inspectors allowed that the subcommittee had only recently been established, and was only beginning to develop its approach to providing oversight of corrective action activities.

5. EXIT INTERVIEW

The inspectors met with the licensee representatives denoted in paragraph 1 on April 4, 1991, and summarized the scope and findings of this inspection. Mr. J. E. Gagliardo also met with Ms. R. Loetzerich on April 15, 1991, upon completion of his return visit to the site. The licensee did not identify, as proprietary, any of the material provided to, or reviewed by, the inspectors during this inspection.