

APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-458/89-24

Operating License: NPF-47

Docket: 50-458

Licensee: Gulf States Utilities Company (GSU)
P.O. Box 220
St. Francisville, Louisiana 70775

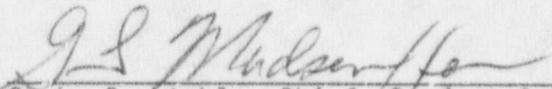
Facility Name: River Bend Station (RBS)

Inspection At: St. Francisville, Louisiana

Inspection Conducted: May 1-31, 1989

Inspectors: E. J. Ford, Senior Resident Inspector
W. B. Jones, Resident Inspector

Approved:


G. L. Constable, Chief, Project Section C
Division of Reactor Projects

6/26/89
Date

Inspection Summary

Inspection Conducted May 1-31, 1989 (Report 50-458/89-24)

Areas Inspected: Routine, unannounced inspection of plant events, operational safety verification, maintenance and surveillance test observation, and refueling activities.

Results: On April 19, 1989, a freeze seal failed on a 6-inch service water line. This event and its consequences resulted in an NRC augmented inspection team (AIT) inspection. Their findings have been reviewed and, as a result, two potential violations (failure to provide adequate procedures for control of a special process and failure to provide adequate training to control a special process, paragraph 3.b) were identified. Specifically, for the first potential violation, the procedure in use did not require the use of a temperature monitoring device in the freeze seal sleeve, nor did it prohibit more than one freeze seal being fed from one nitrogen bottle. The seal subsequently failed. The second potential violation was due to failure to provide adequate training to the individuals who were tasked with establishing and monitoring the freeze seal.

On May 26, 1989, the licensee successfully removed, repaired, and replaced a service water system check valve. A freeze seal was successfully set and maintained on a very large (30-inch) section of pipe to accomplish this task. Considerable management involvement was evident throughout the planning and execution phases of the work effort.

During the outage, detailed and thorough briefings were conducted by cognizant engineers prior to complex tests such as the 18-month ECCS surveillance and the ILRT. Control room noise and operator distractions during the outage were minimized by additional control operating foremen staffed to handle clearances, surveillances, and work authorizations.

DETAILS

1. Persons Contacted

- J. E. Booker, Manager, Oversight
- E. M. Cargill, Supervisor, Radiation Programs
- *J. W. Cook, Lead Environmental Analyst
- *T. C. Crouse, Manager, Quality Assurance
- *W. L. Curran, Cajun Site Representative
- *J. C. Deddens, Senior Vice President, River Bend Nuclear Group
- *D. R. Derbonne, Assistant Plant Manager, Maintenance
- *L. A. England, Director, Nuclear Licensing
- A. O. Fredieu, Supervisor, Operations
- P. E. Freehill, Outage Manager
- *P. D. Graham, Executive Assistant
- J. R. Hamilton, Director, Design Engineering
- *G. K. Henry, Director, Quality Assurance Operations
- D. E. Jernigan, Instrumentation and Control Supervisor
- V. J. Normand, Supervisor, Administrative Services
- *W. H. Odell, Manager, Administration
- *T. F. Plunkett, Plant Manager
- *M. F. Sankovich, Manager, Engineering
- J. P. Schippert, Assistant Plant Manager, Operations
- *K. E. Surke, Project Manager
- *R. G. West, Assistant Plant Manager, Technical Services

The NRC also interviewed additional licensee personnel during the inspection period.

*Denotes those persons that attended the exit interview conducted on June 14, 1989.

2. Plant Status

The unit has been in its second refueling outage since March 15, 1989. The reactor was placed in cold shutdown (Mode 4) on March 16, 1989, and the vessel head was detensioned for Mode 5 entry on March 18, 1989. Core alterations were conducted from March 27 through April 7, 1989.

The scope of the outage included: emergency diesel generator inspections, emergency core cooling system (ECCS) maintenance activities, integrated ECCS testing, integrated and local leak rate testing, modification to the control room chiller system, turbine generator inspections, and various other modifications and repairs.

The unit reentered Mode 4 on May 22, 1989, and performed the containment integrated leak rate test on May 27, 1989.

3. Followup of Events (93702)

a. Instrument Air System

The NRC inspectors reviewed the status of items identified by the licensee during the safety system functional inspection (SSFI) of the instrument air system (IAS). The licensee conducted the SSFI during November 1988 through January 1989. The findings of the SSFI are being resolved through quality assurance finding reports (QAFR), and items which required determination of operability or directly affected plant equipment are identified in the condition report (CR) program. The NRC inspectors reviewed the QAFRs and CRs to verify that conditions which affected operability were properly evaluated and resolved and the findings which should have been reported through 10 CFR 50.72 and/or 10 CFR 50.73 were properly reported within the time limits specified. During the review, the NRC inspectors reviewed the licensee's SSFI findings which could have prevented the fuel building and control building ventilation systems from performing as required during a design basis accident. An evaluation of these findings is provided in NRC Inspection Report 50-458/89-18.

b. Loss of Freeze Seal Event

On April 19, 1989, at about 11:45 p.m., a freeze seal failed on a 6-inch service water line. An NRC AIT was dispatched to the site on April 21, 1989, to perform the following tasks:

- ° perform a thorough review of the sequence of events leading to, and recovery from, the event;
- ° review the operator response to the event;
- ° review the licensee's use and control of freeze seals, including contingency measures;
- ° review electrical system vulnerability and response to this event;
- ° review the licensee's plans for recovery, including restoration from switchgear water damage; and
- ° review licensee's management control of outage activities with regard to this event, including any potential tie with previous outage-related problems.

The AIT members completed the above tasks on April 24, 1989. The results of this inspection are documented in NRC Inspection Report 50-458/89-20. As a result of the augmented inspection, two potential violations were identified.

The first potential violation (458/8924-01) involved the use of an inadequate procedure for control of the special process. Specifically, Corrective Maintenance Procedure (CMP)-9186, "Freeze Seal," Revision 4, did not require the use of a temperature monitoring device in the freeze seal sleeve and did not prohibit more than one freeze seal being sustained from one nitrogen bottle. As a result, the degraded condition of the freeze seal was not detected until after the seal began to fail.

The second potential violation (458/8924-02) involved a failure to provide adequate training to control the freeze seal activity. The individuals that were tasked with establishing and monitoring the freeze seal had not received formal training on the activity. Their previous experience consisted of observing the placement of other freeze seals. As a result, the individuals did not recognize any indications that the freeze seal was failing, nor were they cognizant of the importance of utilizing a temperature detecting device to monitor the condition of the freeze seal sleeve and freeze plug during the process. The potential for developing split phase flow through the two pressure regulators off the one nitrogen bottle was also not known. Split phase flow can develop when the pressure output from the two pressure regulators differ, allowing liquid nitrogen to pass through one while the second pressure regulator is passing nitrogen vapor.

No other violations or deviations were identified.

4. Operational Safety Verification (71707)

The NRC inspectors continued to monitor control room activities and conduct during the refueling outage. This refueling outage began on March 15, 1989. Control room activities and conduct were generally observed to be well controlled. Proper control room staffing was maintained, and access to the control room operational areas was controlled. In addition to the normal control operating foreman (COF), the licensee has staffed two additional COF positions during the outage. One COF is staffed for processing clearances and the other manages the work flow of surveillances and work authorizations. These activities are conducted away from the main area of the control room and considerably diminish the traffic and noise that would otherwise occur in that area. Selected shift turnover meetings were observed, and it was found that information concerning plant status was being covered in each of these meetings. The NRC inspector also observed the conduct of briefings for operating personnel and technical/craft crews by cognizant engineers for involved and complex testing, such as the 18-month ECCS testing and the Integrated Leak Rate Test (ILRT). These briefings were thorough and detailed.

Plant tours were conducted and general plant cleanliness was indicative of the outage activities. Extensive cleanup efforts have been underway to restore the plant to its normal good housekeeping state. The NRC

inspectors also noted that material dropped into the suppression pool was removed in a timely manner. In the previous report period, a lack of control over materials in the suppression pool was discussed with licensee management. Since then, the licensee has used remote cameras and scanned the lower pool areas around suction lines for ECCS pumps to determine if materials were present. Licensee personnel also inspected the pool surface area every 6 hours and retrieved any floating material. A log of materials retrieved from the suppression pool is being maintained by the licensee.

The NRC inspectors observed security activities in the plant. It was noted that alarms were being responded to as required. Plant parameter walkdowns were conducted and no significant problems were noted. The licensee is upgrading their security detection aids. Personnel entry and exit from the protected area were observed, and no problems were noted.

No violations or deviations were identified.

5. Maintenance Observations (62703)

Service Water 30-Inch Freeze Seal Plug

On May 26, 1989, the NRC inspector observed maintenance activities to remove a normal service water supply check valve (SWP*V327). This valve did not close as required when previously tested during the performance of Surveillance Test Procedure (STP) 256-3302, "Division II Standby Service Water Valve Operability Test." The valve is at the interface of the normal and standby service water systems and is physically located in the "D" tunnel of the auxiliary building. In order to remove the valve, it was necessary to set a freeze seal on the associated line.

The NRC inspector had earlier discussed contingency plans with licensee engineering personnel when the freeze seal was being considered. The discussions covered boundary valve locations, anti-siphoning precautions, and flooding effects if the seal plug were to fail. It was estimated that if the seal failed, approximately 27,000 gallons would be discharged from the bounded volume. An additional amount was allowed for leakage through the boundary valves. The total effect on plant and equipment would be minimal, however, due to the piping location which is in the lowest elevation (70-foot) of the auxiliary building. The resulting water level on the floor would be only 10 inches (the floor would have to flood to several feet to reach cabling or valves). Additionally, the licensee indicated that both ends of the pipe would have blank flanges installed after removing the check valve to minimize the window of vulnerability to a failure of the plug. The licensee also stated that the actual setting of the freeze seal would be performed by an experienced contractor, Freeze Technology, Incorporated.

The NRC inspector noted the progress of the freeze seal on several occasions during the setup of the plug and discussed the status of the

plug with Freeze Technology personnel. It was noted that log readings were taken from a remote temperature indicator which was attached to an RTD installed in the freeze sleeve surrounding the pipe. In addition to the contractor personnel, a licensee employee was also assigned to record seal temperature and tank pressure and to verify that liquid was present in the tank.

After drainage of the volume between the freeze plug and the boundary valve on the other side of the check valve (and verifying that RTD readings were steady), licensee maintenance personnel proceeded to unbolt the valve body for removal from the pipe run. Some difficulty was experienced when the split disc was found to be partially open, thus jamming the body in the pipe. This problem was solved by inserting a flat piece of sheet metal between the valve and the pipe causing the disc to close. The valve was extracted using a chain hoist and blank flanges were then installed on both ends of open pipe. Prior to installation of the flanges, the NRC inspector, licensee QC personnel, mechanical maintenance foremen, and supervisory mechanical engineers were able to inspect the piping interior for its erosion/corrosion condition and the upstream butterfly valve. The NRC inspector was also able to observe the freeze plug and frost line from the inside of the open pipe. The general pipe condition was observed to be fair with corrosion in evidence but not as severe as portions of service water components and piping observed earlier in the outage at the other locations in the system.

The check valve (a spring-loaded split disc which rotated about its center) was observed to have a broken spring arm which allowed the right-hand side to remain open, thus causing the valve to fail during testing. The valve was subsequently cleaned and disassembled, parts replaced and repairs and inspections performed prior to replacement.

Subsequent to the completion of the work effort, the NRC inspector requested the applicable work documents and reviewed the following items:

- ° QC Planning Review Checklist (dated 5-2-89)
- ° QC inspection report (for CMP-9173 and MSP-21)
- ° QC inspection report (for QCIP-0012)
- ° QC inspection report (for QCIP-0012 and R3)
- ° QC inspection report (for GMP-0017, CMP-9173, and MSP-0021)
- ° QC inspection report (for MSP-0014, ADM-0018, QCIP-0011, MSP-0021, CMP-9173, GMP-0018, and SWP*057B)
- ° CR 89-0749

- CR 89-0752
- Maintenance Work Order (MWO) R127710

The NRC inspector verified by direct observation and document review that applicable work requirements were complied with, that QC inspectors were involved, appropriate hold points were observed, and the work plan was followed. The NRC inspector also verified that prior to the commencement of valve removal, a contingency plan for freeze seal failure was present in the control room, and the operators were familiar with its contents.

No violations or deviations were noted. Furthermore, it was noted that the work effort was conducted in a controlled, cautious, and deliberate manner. Management attention, concern, and involvement were evident and prudent measures had been considered and taken prior to commencement of work.

No violations or deviations were identified.

6. Surveillance Test Observation (61726)

During this inspection period, the NRC inspectors observed the performance of Surveillance Test Procedure STP-309-0602, "Division II 18-month ECCS Test," Revision 5.

This surveillance test was performed on May 12-13, 1989, to verify that the Division II diesel generator (DG) and Low Pressure Coolant Injection (LPCI) "B" and "C" systems met the following 18-month surveillance requirements:

- the emergency busses deenergize and load shed on a loss of offsite power (LOP) in conjunction with an ECCS signal;
- the diesel generator auto starts and energizes the busses with permanently connected loads within 10 seconds;
- each automatic isolation valve actuates to its isolation position;
- the automatic load timers sequence the loads onto the bus within plus or minus 10 percent of the design interval;
- the LPCI "B" and LPCI "C" pumps actuate and each automatic valve in the flow path actuates to its correct position;
- Division II trip systems activate when required;
- the ECCS response time is within the limits established in the Technical Specification (TS) Table 3.3.3-3;
- the containment unit coolers actuate as required;

- ° a simulated ECCS signal with the DG operating in the test mode and connected to the bus overrides the test mode and returns the DG to standby operation;
- ° the ECCS signal automatically energizes the emergency loads with offsite power;
- ° the DG does not trip on a full load reject;
- ° the DG starts on a loss of coolant accident signal but does not tie onto the bus;
- ° during the ECCS signal, all DG trips are bypassed except engine overspeed and generator differential current; and
- ° the DG can operate for greater than 24 hours at loads between 3030-3130 kw without tripping.

The surveillance activities were well coordinated between the engineering, operations, and instrumentation and control (I&C) staff. The staff briefing held prior to initiating the test was thorough and adequate to ensure all personnel were knowledgeable of their assigned duties. Upon initiation of the test, all systems responded as expected. The licensee has generated several test exceptions as a result of this surveillance test. These exceptions are presently being reviewed by the licensee. The NRC inspectors will review the surveillance test data during subsequent inspections.

Additionally, during this inspection period, the NRC inspectors observed the performance of STP 051-4549, "ECCS Reactor Vessel Pressure Low/SRV Actuation Instrumentation Monthly Chfunct. (B21-N668E, B21-N669E, B21-N670E, B21-N616E, B21-N618E, B21-N697E, B21-N698E)"; STP-508-4215, "RPS/EOC-RPT Turbine Stop Valve - Closure 18-Month Chcal, 18-Month LSFT (C71-N006A, C71-N006B)"; STP 208-4207, "Containment System/MSIV Positive Leakage Control-Reactor-Steam Line-Differential Pressure Monthly Chfunct., 18-Monthly Chcal. (E33-N002, E33-N005, E33-K603, E33-N602, E33-N603, E33-N605, E33-N609, E33-N610, E33-R603)"; and STP 255-4209, "PVLCS-Main Supply Header A, Monthly Chfunct., 18-Month Chcal, (ILSV*PT10A, ILSV*PV10A, ILSV*PC10A)."

- ° STP 051-4549 - This monthly surveillance procedure was performed on May 12, 1989, with the reactor in Operational Condition 5. It satisfies the TS Section 4.3.3.1, requirement to perform a channel functional test of the ECCS Reactor Vessel Pressure Low/SRV Actuation Instrumentation.
- ° STP 508-4215 - The purpose of this procedure is to perform a channel calibration of the RPS/EOC-RPT Turbine Stop Valve-Closure instrumentation as required by TS 4.3.1.1 and 4.3.4.2.1. The former TS pertains to demonstrating the operability of reactor protection system instrumentation while the latter pertains to the end-of-cycle

recirculation pump trip (EOC-RPT) instrumentation. The NRC inspector observed portions of the conduct of this test on May 17, 1989.

- STP 208-4207 - The purpose of this procedure is to perform a channel functional test of the main steam positive leakage control system instrumentation as required by TS 4.6.1.5.e.1. The test was observed by the NRC inspector on May 17, 1989.
- STP 255-4209 - This surveillance test was performed on May 23, 1989, and portions of its conduct observed by the NRC inspector. Its purpose is to perform a channel functional test of the penetration valve leakage control system (PVLCS) main supply header as required.

The NRC inspector discussed the procedures with the technicians who were able to explain the technical intent of the procedure and had a working knowledge of the involved plant system. The test equipment being utilized was verified to be within its calibration date. The NRC inspector noted that the COF had granted permission to perform the test, and the technicians conducted the test utilizing the latest revision of an approved procedure. Independent verification and lifted lead control were performed as required by General Maintenance Procedure, (GMP)-0042, "Circuit Testing and Lifted Leads and Jumpers." The test results were within the limits established by the RBS TS, and they were reviewed and approved by the COF.

No violations or deviations were identified.

7. Refueling Activities (60710)

The licensee completed actual refueling of the reactor core on April 7, 1989, as reported in NRC Inspection Report 50-458/89-11. The NRC inspectors, on several occasions during this reporting period, conducted tours of the containment and drywell areas for the purpose of observing radiological practices, general housekeeping, and accessing the normally inaccessible drywell to observe the position of selected ECCS system valves. The NRC inspector noted that drywell housekeeping was occasionally poor. However, management attention was focused on this as a problem area as evidenced by licensee discussions at outage management meetings observed by the NRC inspector. Housekeeping in this area improved as the outage progressed.

The NRC inspector noted that the selected ECCS system valves were properly positioned and locked. Proper contact with position limit switches was verified by observing control room indication. This information will be verified on the final drywell closeout by the NRC inspector and factored into future inspection efforts during plant operation when the drywell is inaccessible.

No violations or deviations were identified.

8. Exit Interview

An exit interview was conducted with licensee representatives identified in paragraph 1 on June 14, 1989. During this interview, the NRC inspector reviewed the scope and findings of the report.