

RIVER BEND STATION

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U.S. Nuclear Regulatory Commission Document Control Desk Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1 Docket No. 50-458

Please find enclosed Licensee Event Report No. 89-043 for River Bend Station - Unit 1. This report is being submitted pursuant to 10CFR50.73.

Sincerely,

J. E. Booker

Manager-River Bend Oversight River Bend Nuclear Group

cc: U.S. Nuclear Regulatory Commission 611 Ryan Plaza Drive, Suite 1000 Arlington, TX 76011

> NRC Resident Inspector P.O. Box 1051 St. Francisville, LA 70775

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| NRC Form 306 (9-63) | | ICENSEE EVENT RE | PORT (LER) | | CLEAR REGULATORY COMMISSION APPROVED OMB NO. 3156-0104 EXPIRES. 8/31/86 |
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ABSTRACT (Limit to 1400 spaces Le approximately fifteen single space typewritten lines) (16)

SUPPLEMENTAL REPORT EXPECTED (14)

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At 2135 on 12/01/89, with the unit in Mode 4 (cold shutdown), main steam isolation valves (MSIVs) 1B21*AOVF028A and 1B21*AOVF028D were found to be inoperable due to failure of the corresponding fast closure solenoid operated valve (SOV). All remaining MSIVs were closed and each remained in the full closed position indicating proper operation of the fast closure solenoid operated valve (SOV) and the capability of the MSIVs to close on a valid isolation signal. event is similar to that previously reported in LER 88-023.

In order to preclude recurrence of the failure of the SOVs, all eight (8) MSIV fast closure SOVs were replaced with new SOVs. Prior to installation, the Dow-Corning 550 lubricant was removed from all components within the SOVs. The cause of this event was incomplete removal of the silicone lubricant subsequent to the previously reported event. Gelling of the lubricant has been determined to be the cause of the failure for the fast closure SOVs.

Only two of the eight MSIVs failed to close with the remaining six functioning properly. The closure of a minimum of one MSIV in each of the four main steam lines demonstrated that had a valid isolation been required, each main steam line would have been isolated thereby ensuring adequate protection of the health and safety of the public.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 EXPIRES 8/31/68

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REPORTED CONDITION

At 2135 on 12/01/89, with the unit in Mode 4 (cold shutdown), outboard main steam isolation valves (MSIVs) (*ISV*) 1B21*AOVF028A and 1B21*AOVF028D were found to be inoperable due to failure of the corresponding fast closure solenoid operated valve (SOV). Because reactor power was at 0 percent, and the inboard isolation valves had previously been closed, no immediate actions relative to plant operating conditions were taken.

The River Bend Station Technical Specifications require the MSIVs to be operable in Modes 1, 2, and 3. The River Bend Technical Specifications allow continued operation with one or more MSIVs inoperable provided that the affected steam line is isolated by use of a deactivated MSIV within 8 hours. The SOVs that failed were both on outboard MSIVs, and therefore would not have prevented isolation of the affected main steam lines. This event is being reported pursuant to 10CFR50.73(a)(2)(v) because even though six of the eight MSIVs functioned properly, discovery of some evidence of hardened lubricant inside an unfailed inboard SOV raised the question of the potential for a common mode failure.

INVESTIGATION

After shutdown of the reactor, the MSIVs are closed using System Operating Procedure (SOP) -0011, "Main Steam System". Specifically, the MSIVs are closed by transferring the MSIV control switch (*HS*) from the "auto" position to the "open-test" position and then the test pushbutton is depressed. The test pushbutton activates the slow-closure SOV allowing the MSIV to close. When the indicating lamps (*IL*) show that the MSIV has reached the full closed position, the control switch is transferred to the "close" position, de-energizing both coils on the fast closure SOV. If the MSIV remains in the closed position, the fast closure SOV vented properly. If the MSIV returns to the open position, the ammeters (*II*) and isolation indication lamps on a control room back panel are checked to verify that power has been removed from both coils of the fast closure SOV. If all indications are that both coils of the fast closure SOV are de-energized and the MSIV is still open, failure of the fast closure SOV to vent is indicated because all other components functioned properly to allow slow closure of the MSIV. Closure of the MSIVs is performed in this manner to minimize the potential for inducing a plant transient while at power, and to preclude unnecessary wear to the MSIV seating surfaces during shutdowns.

Prior to removal of the failed SOVs from the MSIV, Engineering personnel inspected the MSIVs in-situ to determine if any physical evidence of degradation existed. The MSIVs were inspected for discoloration, rust, and other types of deposits that would indicate the occurrence of steam impingement or high humidity. In addition,

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the exhaust ports were checked for particulate matter which may have blocked the exhaust pilot area of the SOVs. No evidence of steam impingement or other adverse environmental factors were apparent on the external surfaces of the MSIV actuator or SOV, and no particulate matter was found in or around the exhaust ports. The failed SOVs were then removed from service for disassembly and internal inspection.

Valve 1B21*AOVF028YD (SOV) was disassembled and subjected to internal inspection using an approved plan that had been developed for the previous event (LER 88-023). O-rings and gaskets (EPDM) had taken varying degrees of compression set, and one O-ring had flowed slightly, but all gaskets and O-rings were intact and no evidence that the elastomers had contributed to the observed failures was found. The EPDM disc holder subassembly seat (exhaust seat) was inspected for degradation (reference NRC Information Notice 89-66) and while a compression set was noted, no evidence of bonding to the exhaust pilot orifice (brass mating surface) was found. Examination of the "B" core assembly revealed an amber colored ring on the surface that mates with the plugnut assembly when energized. The amber colored ring was hardened and had some darkened areas observable. Inspection of the plugnut assembly revealed similar material deposits. observations, it was determined that the failures had occurred as a result of gelling of the silicone lubricant contained within the SOVs similar to that reported in LER 88-023.

As a result of the previous event at RBS, the silicone lubricant (Dow-Corning 550) had been removed from the metallic portions of the SOVs prior to their return to service. Removal of the lubricant was performed using a modified version of the vendor's manual with Engineering review and approval. The modification to the vendor's manual only removed the lubricant from the metallic portions of the SOVs and failed to delete a step which called for application of the lubricant to all internal O-rings. It is surmised that reintroduction of the lubricant contaminated the "B" core assembly and the plugnut resulting in the observed failure. To validate the failure mechanism, SOV 1821 *AOVF022YA (inboard) was removed from service and subjected to disassembly and internal inspection. Similar compression set was found on all internal O-rings and gaskets, and a more severe compression set was found on the disc holder subassembly (exhaust seat) than that observed for the failed SOV. An amber colored ring was found on the mating surfaces of the "B" core assembly and the plugnut although much smaller in quantity than that observed on the failed SOV. The findings indicated that residual lubricant had existed in other SOVs as well.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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CORRECTIVE ACTION

In order to preclude recurrence of the failure of the SOVs, all eight (8) SOVs were replaced. Prior to their installation, the Dow-Corning 550 lubricant was removed from the SOVs by placing all metallic components in an ultrasonic bath using Acetone, and wiping all non-metallic components (except coil assemblies) with Acetone. (Note: ASCO has provided GSJ with a statement that silicone lubricant is no longer used in the manufacture of the NP8323 SOV). Interim corrective action includes monthly cycling of the fast closure SOVs antil the long term corrective actions (replacement of the dual coil SOVs with a single coil design) are implemented.

SAFETY ASSESSMENT

The MSIVs are not required to be operable in Mode 4 (cold shutdown). Only two of the eight MSIVs failed to close with the remaining six functioning properly. The closure of one MSIV in each affected steam line demonstrated that had a valid isolation signal occurred, each main steam line would have been isolated thereby ensuring that the health and safety of the public was adequately protected at all times.

NOTE: Energy Industry Identification System Codes are identified in the text as (*XX*).