From: Glen W. Meyer (GQM), EO
To: JEB2, LJW2, KDL JBeall, OE LWatson, RII KLandis, RII
Date: Monday, October 30, 1995 11:13 am
Subject: Status of St. Lucie Enforcement

I revised the briefing package somewhat, so I've attached what I gave Milhoan. He appreciated your efforts, and plans to speak with Libermann this afternoon to firm up the regulatory basis for the action. Thanks.

Glenn

CC: BXU

Files: P:\ENFDIS2.STL

EEE/13B

4PP.

BRIEFING O.. JSE OF DISCRETION TO PROPOSE CI..L PENALTY FOR INOPERABLE PORVs AT ST. LUCIE

Both PORVs were inoperable from the time they were installed in the RCS on November 5, 1994, during the 1994 refueling outage until they were removed and reworked in August 1995.

MISSED OPPORTUNITIES

1. Maintenance on the PORVs did not include precautions to ensure operability and protect against a common mode failure.

   The PORVs were last reworked in November 1994 in the Unit 1 refueling outage. The rework was conducted by Furmanite. Post-event disassembly and inspection revealed that the main disc guide had been installed upside down, with the holes (required to vent the space below the main disc) located at the upper extreme of the main disc cavity such that proper venting below the main valve disc could not take place.

   Maintenance was performed by the same two workers. The maintenance procedure did not include a QC hold point to verify proper installation. No independent verification method was used to ensure the valve was properly assembled. The main disc guide was the only component which could be installed improperly and result in undetected inoperability. FP&L could have used several standard methods to ensure that a common mode error did not cause both PORVs to be inoperable, i.e., use of different work crews on each valve, independent verification of the maintenance work steps, or a QC holdpoint.

2. Post Maintenance Testing was limited to a seat leakage test and the scope/responsibility for testing was not understood between Operations and Maintenance

   Post-maintenance testing was limited to a bubble test for seat leakage prior to reinstallation. Procedures specifically excluded lift test requirements with an explanation that the valve was lifted based upon solenoid valve input. The procedure did not require a verification that the valve would change state under pressure prior to installation.

   Operations accepted the PORVs from Maintenance with the assumption that they had been properly tested and, as such, considered them operable upon installation. Maintenance personnel thought in-situ surveillance testing was to be used as the post-maintenance test. Maintenance and Operations were under completely different impressions of the status of the PORVs following installation in the system. As a result of this misunderstanding, the PORVs were placed in the RCS and declared operable without reasonable assurance that the PORVs would perform satisfactorily in the LTOP conditions which would exist prior to performance of the surveillance test.

3. Inservice surveillance testing did not demonstrate that, after complete valve disassembly and reassembly, that the valve would change state under pressure.

   There are no specific technical specification surveillance requirements. Surveillance tests are performed to comply with the ASME Code. The testing involves valve stroke testing associated with its use in LTOP.

   Surveillance tests performed on November 25, 1994 and February 27, 1995, used acoustic data, as opposed to system pressure changes, to indicate valve position. FP&L failed to recognize that the PORV pilot valves

allowed sufficie... bypass flow to actuate the acoustic monitors. An indication of only one lit acoustic monitor LED was sufficient to pass the test. Only the acoustic monitor annunciator was used when other control room indications could have been used to confirm valve operation.

On August 4, 1995, FP&L performed a surveillance test and did not receive an acoustic signal in the control room, but an increase in tailpipe temperature was observed, and an increase in acoustic levels was recorded on a plant computer. RCS and Quench Tank parameters in the control room exhibited less than expected changes. The FP&L assumed the acoustic monitor was inoperable. FP&L then contacted the vendor to discuss possible reasons for the observed valve performance. While evaluations were being conducted, the unit was taken through LTOP conditions to Mode 4. At 7:03 p.m. on August 9, 1995, the valves were retested and found to be inoperable based, in part, on observations of RCS and Quench Tank parameters.

4. <u>The indications of valve operability after a unit trip were missed.</u>

On July 11, 1995, Unit 1 experienced a high pressure trip (see IR 95-14). According to FP&L, at the time of the trip, both PORVs lifted. The conclusion was supported at the time by the inherent design of the system, the fact that acoustic data indicated that the PORVs lifted, and noted increases in Quench Tank temperature. Upon a re-review of data (which suggested that pressure drifted above the PORV setpoint, as opposed to plateauing) and an analysis which showed that the post-trip loss of heat source acts, in conjunction with steam reliefs, to limit pressure increases, FP&L concluded that the PORVs probably did not lift following the trip.

CONCLUSION

Section VII.A of the Enforcement Policy allows the exercise of discretion to propose a civil penalty when the case involves poor performance. The performance in this case was particularly poor throughout the control of the maintenance and testing of these valves and led to a common mode failure of the PORVs. Expected provisions to ensure valve operability were not implemented. A critical point in the reassembly did not have a QC holdpoint; other independent verification methods were not employed. Engineering analysis and plant safety committee reviews of the acceptability of post maintenance testing and inservice testing contained basic flaws in ensuring methods were employed to assure operability. These flaws included accepting post-maintenance testing that only verified seat leakage prior to putting the valves back in service; miscommunication between Operations and Maintenance on scope of post-maintenance testing; and failure to provide an adequate inservice test to ensure PORV operability. Operator attention to diverse control board indications during testing was lacking and only when the one parameter that was required, i.e., the acoustic monitoring indication, failed, did operators question the other indications they were getting. The post trip data analysis during the July 1995 unit trip was not indepth. Therefore, we propose that a base civil penalty be imposed in this case to ensure the appropriate regulatory message that programs must provide defense in depth to preclude common mode failures.

The design and operation of the PORVs are discussed in Attachment 1.

Attachment 1

DESIGN AND OPERATION OF THE PORVs

St. Lucie Unit 1 employ two PORVs. Purposes: (1) Pressure relief coincident with a high pressure reactor trip - open at 2400 psia. Accident analyses do not credit the valves' actuation; (2) Pressure relief under LTOP conditions - open at two selectable LTOP setpoints based upon RCS temperature; (3) Once through cooling - credited in the EOPs for providing core cooling in the event of a loss of heat sink.

The Unit 1 PORVs are Dresser Industries Model 31533VX-30 pilot operated relief valves. The main valve (responsible for actual RCS pressure relief) opens by the force of water or steam acting on the main valve disc/seat interface. The main disc moves within a guide cylinder and its movement is governed both by the differential pressure established across the disc and spring force which attempts to move the disc into a closed position.

A differential pressure is established across the main disc when the valve's pilot valve opens, venting a space inside the main disc to a low pressure area (the tailpipe). The pilot valve is actuated by a solenoid acting on the pilot valve lever.

When actuation is required, a signal is sent to the actuating solenoid, which strokes the pilot valve lever to open the pilot valve. A vent path is thus established from the inside of the main disc, through the pilot valve, to a low pressure area. The resulting differential pressure across the valve main disc opens the PORV main valve.

Indications of valve operation include acoustic flow monitors at the discharge of each PORV, tailpipe temperature indication, and indication of solenoid energization. PORV operation can also be inferred from changes in quench tank parameters (temperature, pressure, and level) or changes in RCS pressure. Output of the acoustic monitors is indicated in the control room, behind the main control panels. The discretized output is indicated by ten LEDs per instrument channel. On the energization of a single LED, a control room annunciator is energized, alerting operators.