



June 13, 2007

L-2007-100
10 CFR 50.4
10 CFR 50.36


U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Date of Event: May 14, 2007
Technical Specification Special Report
Pressurizer Power Operate Relief Valve (PORV)

The attached special report is submitted pursuant to the requirements of St. Lucie Unit 1 Technical Specification 3.4.13 Action e and Technical Specification 6.9.2. This report provides notification that the St. Lucie Unit 1 power-operated relief valves (PORV) were used to mitigate a reactor coolant system (RCS) pressure transient.

The attached special report outlines the apparent cause of the event and actions taken to prevent recurrence.

Very truly yours,


Gordon L. Johnston
Site Vice President
St. Lucie Plant

GLJ/DLC

Attachment

JE22

SPECIAL REPORT

I. TITLE

St. Lucie Unit 1 Activation of Power-Operated Relief Valves

II. EVENT DESCRIPTION

On May 14, 2007, while in Mode 5 for the SL-1 refueling outage, St. Lucie Unit 1 was performing a reactor cooling system (RCS) fill and vent evolution when two power-operated relief valves (PORVs) opened on high pressure approximately one minute after the reactor coolant pumps (RCPs) were started. The St. Lucie Unit 1 Technical Specification (T/S) 3.4.13 Action e was entered, which states:

“In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.”

The low temperature overpressure protection system (LTOP) is designed to prevent RCS over-pressurization above operating limit curves and at RCS temperatures at or below 304°F during heatup, and 281°F during cooldown. The system is based on the using the PORVs and implementation of certain administrative and operational controls. The PORVs are aligned to the RCS with low pressure setpoints of 350 and 530 psia. Restrictions on RCP starts, along with limitations on heatup and cooldown rates, and with the disabling of non-essential components, provide assurances that Appendix G P/T limits are not to be exceeded during normal operation or design basis overpressurization events resulting from mass or energy additions to the RCS.

Plant Operations and Engineering reviewed the chain of events leading up to the PORV actuation to determine the apparent cause of the event and to identify the necessary corrective actions.

III. CAUSE OF THE EVENT

A review of the actions leading to the PORV actuation was completed and an apparent cause conducted. The apparent cause of the lifting of the PORVs was due to an unexpected pressure rise in the RCS resulting from a reduction in the letdown pressure. Additionally, there were some opportunities for procedural improvements identified that could have helped prevent this lift.

The pressure rise in the RCS was due to the effect that operation of the RCP, specifically the 1B1 RCP, had on letdown pressure and the letdown pressure control valves (PCV-2201P and PCV-2201Q). When the 1B1 RCP was started under solid pressure control, the pump developed an approximate 100 pounds per square inch differential (psid) of head across the RCS, an increase of 40 psid across the reactor vessel head and approximately 60 psid across the steam generator (SG). The reactor vessel (RV) increase was a result of the RCP being discharged to the RCS hot leg. The RCS hot leg is tied directly to the pressurizer which shortly after the RCPs started, indicated approximately 304 psia. The other 60 psid was dropped over the Steam Generator

(SG), which indicated the suction pressure of the RCPs was approximately 240 psia. On the outlet of the SG, the "intermediate leg", specifically the 1B1 intermediate leg, ties directly to the letdown system.

The letdown pressure control valves sense pressure directly upstream of the respective valves using the pressure indicator, PI-2201. When the 1B1 RCP was started, pressure immediately dropped on the letdown system. This caused the letdown pressure control valves PCV-2201P and PCV-2201Q to close, as designed, based on a lowering letdown pressure. When the letdown pressure control valves closed to maintain letdown pressure, letdown flow decreased. In the interim, charging flow continued to maintain approximately a 56 gpm flow. The mismatch between charging and letdown flows ultimately resulted in the pressurizer pressure rising above the PORV's set point.

IV. ACTION TAKEN

The proposed corrective actions listed below were entered into the site corrective action program. Any changes to the proposed actions will be managed under the commitment management change program.

1. Information will be developed and incorporated into Operating procedures to incorporate lessons learned.
2. Licensing Operator Continuing Training (LOCT) Training Review Committee (TRC) will review this event for incorporation into licensed operator continuing training.