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January 29, 1985

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Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Re: Catawba Nuclear Station, Unit 1
Docket No. 50-413

Dear Mr. O'Reilly:

Pursuant to Technical Specification 3.4.9.3, Action Statement c, please find attached a Special Report concerning the automatic opening of a pressurizer power-operated relief valve.

Very truly yours,

H.B. Tucker

Hal B. Tucker

RWO:slb

Attachment

cc: Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC Resident Inspector
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INTRODUCTION

On December 26, 1984, at 2201:11 hours, Pressurizer Power Operated Relief Valve (PORV) 1NC32B automatically opened. It remained open for 3 seconds to relieve a pressure increase in the Reactor Coolant (NC) System caused by starting NC Pump 1A. Catawba Unit 1 was in Mode 5, Cold Shutdown, at the time of the incident. This incident is reportable pursuant to Technical Specifications 3.4.9.3 and 6.9.2.

Once the NC System was filled and vented and NC temperature was increased above Charging and Seal Injection water temperature, a steam bubble should have been formed in the Pressurizer prior to starting a NC Pump. A Limits and Precautions Statement existed in the NC Pump Operating Procedure addressing the situation. However, it was not clear in that its application was misinterpreted by the Nuclear Control Operator (NCO). Therefore, this event is classified as a Personnel Error and an Administrative/Procedural Deficiency. The NC System Fill and Vent Procedure was changed to verify the applicability of the Limits and Precautions Statement.

EVALUATION

The Pressurizer is equipped with Power Operated Relief Valves (PORV's) which open when necessary to relieve Reactor Coolant (NC) System pressure. The PORV's can be placed in the MANUAL or AUTOMATIC Mode. In MANUAL, the PORV can be opened by a Nuclear Control Operator (NCO). In AUTOMATIC, the PORV will open at either the Upper High Pressure Setpoint (2335 psig) or the Lower High Pressure Setpoint (400 psig) selected depending upon NC System conditions.

DESCRIPTION OF INCIDENT

On December 26, 1984, at 2200 hours, plant conditions were as follows:

- Unit 1 was in Mode 5, Cold Shutdown.
- Reactor Coolant (NC) System pressure 275 psig.
- NC System temperature 155°F.
- Steam Generator (S/G) temp 160°F.

Operating Procedure OP/1/A/6150/01, Filling and Venting the Reactor Coolant System, was in progress with the NC System in a water solid condition. Hydrazine had been added to the NC System. Reactor Coolant was being circulated by Residual Heat Removal (ND) System, Train A.

At 2200:26 hours, NC Pump 1A was started to recirculate the Pressurizer. Coincident with the pump start, NC System Pressure started increasing. At 2201:11 hours, PORV 1NC32B started to open, reaching the fully open position in two seconds. At 2201:14 hours, PORV 1NC32B closed. During this incident, PORV 1NC32B was in the Lower High Pressure Mode (400 psig).

CONCLUSIONS

On December 26, 1984, at approximately 1200 hours, NC Pump 1A was started to Heat-up the NC System. At approximately 1420 hours, NC Pump 1A was secured. However, after NC Pump 1A was secured, Charging and Seal Injection water was still being supplied to the NC System. Because the NC System temperature had previously been increased, a significant temperature difference existed between the NC System and the Charging and Seal Injection water.

When NC Pump 1A was started at 2200:26 hours, the Lower Temperature water which had accumulated in portions of the NC Loops was circulated and picked up heat from the NC System and the Steam Generators. A Pressure Transient occurred due to thermal expansion of the Charging and Seal Injection water causing NC System Pressure to increase. Since the NC System was in a water solid condition, a Pressurizer bubble was not available to dampen the effects of a pressure transient. Because of this, PORV 1NC32B opened following the start of NC Pump 1A.

There are two Pressurizer PORV's which will open in the Lower High Pressure Mode (400 psig); 1NC32B and 1NC34A. Of these, only 1NC32B opened. This valve was able to mitigate the NC System Pressure Transient.

The Reactor Coolant Pump Operation Procedure (OP/1/A/6150/02A), which is referenced in Filling and Venting the Reactor Coolant System (OP/1/A/6150/01), states that "if all Reactor Coolant Pumps have been stopped for more than 5 minutes and the Reactor Coolant System temperature is greater than Charging and Seal Injection Water temperature, the pumps cannot be started until a steam bubble has been formed in the Pressurizer". This is to ensure that a pressure transient, if it occurs, can be controlled by the Pressurizer. The procedure also states that the condition mentioned above does not apply to fill and vent operations. The intent of this statement was that it does not apply to the actual NC System fill and vent process which is only a portion of the fill and vent procedure. However, it does not exclude the entire fill and vent procedure.

During and following Hydrazine addition, which is included in the NC System Fill and Vent Procedure, the NC System is completely filled and vented. Therefore, since NC System temperature was increased above Charging and Seal Injection water temperature, and a significant amount of time elapsed between NC Pump runs, a steam bubble should have been formed in the Pressurizer prior to starting NC Pump 1A as required by the Limits and Precautions Statement. However, because the Limits and Precautions Statement stated that it did not apply to fill and vent operations, the application of the Limits and Precautions Statement was misinterpreted by the Nuclear Control Operator (NCO) and was not applied to the entire Fill and Vent Procedure. Therefore this event is classified as a Personnel Error, and an Administrative/Procedural Deficiency. The NC System Fill and Vent Procedure was changed to verify the applicability of the Limits and Precautions Statement.

The PORV responded as designed to relieve the NC System pressure transient. There was no release of radioactive materials, radiation exposures, or personnel injuries as a result of this incident.

CORRECTIVE ACTION

A change was made to Operating Procedure OP/1/A/6150/01, Filling and Venting the Reactor Coolant System, inserting the following CAUTION Statement:

If the temperature of the NC System or S/G's has been increased prior to stopping NCP's, a bubble shall be formed in the Pressurizer prior to any further NC Pump start. This is to prevent a possible NC Pressure Transient due to cold water expansion.

This statement was inserted after the Procedure step completing the fill and vent process and prior to Hydrazine addition.

Operators will be instructed on this incident, and the importance of the procedure changes will be stressed.

NC Pump starts as related to system water temperature differences and pressure transients will be analyzed.

SAFETY ANALYSIS

The PORV responded as designed and all water relieved through the PORV went directly to and was contained in the Pressurizer Relief Tank. The health and safety of the public was not affected by this incident.