NON-PUBLIC?: N
ACCESSION #: 9208190114
LICENSEE EVENT REPORT (LER)

FACILITY NAME: BIG ROCK POINT PLANT PAGE: 1 OF 05

DOCKET NUMBER: 05000155

TITLE: REACTOR SCRAM DURING PLANT STARTUP FOR CYCLE 26 - REVISION 1
EVENT DATE: 05/13/92 LER #: 92-009-01 REPORT DATE: 08/12/92

OTHER FACILITIES INVOLVED: N/A DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 0% TO 2%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Michael D Bourassa, Senior Technologist TELEPHONE: (616) 547-6537

COMPONENT FAILURE DESCRIPTION:
CAUSE: A SYSTEM: SB COMPONENT: FCV MANUFACTURER: G080
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On May 13, 1992, the plant was starting up after a refueling outage. At 1224 the operators were testing the Turbine Stop Valve, and experienced difficulty in getting the valve to open fully. The turbine bypass valve was placed in manual and opened at 1353, reducing the delta P across the turbine stop valve. At 1401 the turbine stop valve opened. The turbine bypass valve was then given a partial close signal as the turbine stop valve opened, and at 1401 the reactor scrammed on short reactor period detected by two out of three wide range neutron monitors.

The cause of the event has been attributed to opening the turbine bypass valve to reduce reactor pressure at low power levels. This action lowered reactor power from roughly 1.5% to a level just below 1% power which enabled short period scram protection. The root causes that led to operating the valve in this range can be attributed to not recognizing

the sensitivity of the nuclear instrumentation below 1% power, lack of written precautions or warnings operating the bypass valve in this power range and undersized steam flow pilot holes internal to the turbine stop valve.

The pilot holes' size was increased, the turbine stop valve was reassembled, and successfully tested at 2329 on May 16 during a subsequent plant startup.

Operator training and appropriate procedure revisions will be completed.

OC0892-0002A-BL01

END OF ABSTRACT

DISCUSSION OF EVENT

On May 13, 1992, the plant was starting up after a refueling outage. The reactor (RCT) had been taken critical at 0426, and the startup had proceeded to where turbine (TRB) warmup was in progress. At 1224 in accordance with System Operating Procedure 13, Turbine Generator (TA;TB) System, the operators were testing the Turbine Stop Valve CV-4200 (FCV), and had opened the valve to the intermediate position as indicated by the valve position lights (IL) on the control room (NA) console (CSL). The delta P across the valve was logged as 370 psig. Reactor pressure and power at this time was approximately 1063 psig and 1.5% respectively, with the turbine rotating at 300 revolutions per minute. After several attempts to continue opening the turbine stop valve per the test failed, the operator was instructed to open the Turbine Bypass Valve CV-4014 (FCV) in order to lower reactor pressure, which would allow an equalization of pressure across the turbine stop valve. At 1353 the turbine bypass valve was placed in manual and opened, reducing the delta P across the turbine stop valve. At a bypassed steam flow of approximately 200,000 lb/hr, a reactor pressure of 830 psig, and turbine chest pressure of 540 psig, the turbine stop valve opened at 1401. The turbine bypass valve was then given a partial close signal to stabilize the reactor pressure decrease as the turbine stop valve opened, and at 1401 the reactor scrammed on short reactor period detected by two out of three Wide Range Neutron Monitors (MON).

CAUSE OF THE EVENT

The cause of the event has been attributed to opening the turbine bypass valve to reduce reactor pressure. This action lowered reactor power from

roughly 1.5% to a level just below 1% power which enabled the short period scram protection. (Below 1% power, channels 1, 2 and 3 provide period scram protection. Above 1% power, rate scram protection is provided.) This is a very sensitive range for the nuclear instrumentation, and operation of the bypass valve in this range may cause a short period scram independent of any stop valve problems. Root causes that led to operating the bypass valve in this sensitive range include:

1. The failure to recognize the sensitivity of the Hi-Hi trip caused by the short period scram signal, to bypass valve operation below 1% power.

2. The lack of procedural precautions or warnings regarding bypass valve operation at low power conditions.

3. As a result of troubleshooting by maintenance and with vendor (General Electric (GO80)) assistance, undersized steam flow pilot holes internal to the turbine stop valve were discovered. The Big Rock Point Staff concluded that in order for the turbine stop valve to operate correctly and equalize the delta P across the seat, the steam inlet flow must exceed the inherent leakage downstream of the turbine stop valve.

NOTE: For reference, troubleshooting included the following actions:

A. Maintenance inspected the turbine bypass valve (static - with no steam flow), and verified steam flow instrument calibration.

B. The Wide Range Monitor Channel 3 recorder (JR) pen had stuck, and was fixed. (The RPS sensor was not affected.)

C. The after seat drain valves (V) on the turbine stop valve were checked leak tight.

D. Oil pressure for the turbine stop valve was verified to be within specification.

E. Dump valve (V) on the steam seal regulator (SEAL;RG) was checked satisfactory.

F. After the turbine stop valve was disassembled, the pilot had

acceptable travel, however the pilot ports/flow holes were measured and determined to be too small for system leakages.

CORRECTIVE ACTION TAKEN

The operators entered Off Normal Procedure 2.31, Reactor Scrams and General Operating Pr
cedure 4, Reactor Trip Recovery. All immediate
actions were completed. No other Reactor Protection System (JC) Sensors were challenged. There were no Engineered Safeguards Features failures experienced. The operators quickly established Steam Drum (SD) level control and cooldown rate, and proceeded to shutdown.

NOTE: When the operators were verifying full rod insertion, four drives (D3, D6, F2 and F4) suffered a temporary loss of position indication because of overtravel. Resetting the safety system enabled the position indication and the rods were verified fully inserted.

In accordance with General Electric's recommendation, the pilot holes' size was increased from 1/4 inch nominal to 3/8 inch nominal per a facility maintenance order (92-MSS-0018). The turbine stop was reassembled, and successfully tested at 2329 on May 16 (Plant restart) in accordance with Maintenance Procedure MMSS-4, Inspection/Repair of Main Turbine Stop Valve CV-4200.

ACTION TAKEN TO PREVENT RECURRENCE

For the May 16 plant startup, the operators were instructed by management to commence a plant shutdown to all rods all in if the turbine stop valve did not open when desired. However, because of the successful post-maintenance testing, the startup continued.

To prevent recurrence in future startups, the following corrective actions will be completed:

A. Revise General Operating Procedures by September 1, 1992 to enhance precautions and limitations related to low power operations. Special consideration should be given to those evolutions which have the potential for affecting primary system pressure, temperature and/or power.

B. Revise 0-TGS-1, Master Checklist, and related System Operating

Procedures by September 1, 1992 to incorporate lessons learned from the May 13, 1992 reactor trip. Specifically, add caution statement at appropriate points to control use of the turbine bypass valve at low power. Also provide additional direction as to when and how the bypass valve is tested during plant startup.

C. Conduct operator training on the reactor trip event by October 1, 1992. Training to include:

1. specifics of event

2. review of previous startups where bypass valve was opened to swing reactor pressure and enable opening of stop valve

3. review of low power operations with specific attention to evolutions and procedures that have potential impact on reactor power.

SAFETY SIGNIFICANCE

Three wide range monitors makeup the power range channels. They provide information of the neutron flux over the range of 1E-7 to 150% power. The wide range monitors receive their input signal from compensated ion chambers (DET). From this input the wide range monitor determines reactor power level and calculates both reactor period and power rate.

Channels 1, 2 and 3 provide logarithmic neutron flux level information and period scram protection (10 sec below 1% power) from approximately 1E -7% to 1% rated power and linear neutron flux level information from approximately 1% to 150% rated power. Above 1% power, rate scram protection is provided. (50 MWt/min between 1% and 50% power, 20 MWt/min between 50% and 83.3% power.) As the operator lowered reactor pressure, the reactor power followed from an initial value of approximately 2% to a value less than 1%. The scram protection function of the wide range monitors also changed from rate protection to period protection. Lowering reactor pressure resulted in more void formation, therefore reducing reactor power. When the turbine bypass valve was closed after the turbine stop valve opened, the voids collapsed causing a reactor power increase.

When the reactor scrammed, the wide range monitor recorders indicate that

reactor power had returned to where it was (about 2%) before the pressure was lowered to assist in the opening of the turbine bypass valve. The reactor protection system operated properly, limiting the consequences of this low power event.

OC0892-0002A-BL01

ATTACHMENT 1 TO 9208190114 PAGE 1 OF 1

Consumers
Power William L Beckman
Plant Manager

POWERING
MICHIGAN'S PROGRESS

Big Rock Point Nuclear Plant, 10269 US-31 North,
Charlevoix, MI 49720

August 12, 1992

Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - LICENSEE EVENT REPORT 92-009: REACTOR SCRAM DURING PLANT STARTUP FOR
CYCLE 26 (REVISION 1)

Licensee Event Report 92-009, Reactor Scram During Plant Startup For Cycle 26 Revision 1, is attached. Revision 1 is being submitted to clarify and expand the Cause and Root Cause discussion to include the following considerations:

1. The failure to recognize the sensitivity of the Hi-Hi trip caused by the short period scram signal to Bypass Valve operation below 1% power, and

2. The lack of procedural precautions or warnings regarding Bypass Valve operation at low power conditions, as well as difficulty in Stop Valve operation due to undersized holes in the pilot valve.

William L Beckman

William L Beckman

Plant Manager

CC: Administrator, Region III, USNRC
NRC Resident Inspector - Big Rock Point

Attachment

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*** END OF DOCUMENT ***