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October 25, 1993

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

Subject: Catawba Nuclear Station
Docket No. 5 14
LER 414/93-003

Gentlemen:

Attached is Licensee Event Report 414/93-003, concerning REACTOR TRIP DUE TO INADVERTENT CLOSURE OF MAIN STEAM ISOLATION VALVE.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

D. L. Rehn

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Catawba Nuclear Station, Unit 2	05000414	1 OF 14

TITLE (4)
Reactor Trip Due To Inadvertent Closure Of Main Steam Isolation Valve

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	05000
09	25	93	93	-- 003 ~~414~~ --	000 ~~003~~	10	25	93	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)	50.73(a)(2)(vii)	OTHER
	20.405(a)(1)(iii)		50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
R. C. Futrell, Compliance Manager	(803) 831-3665

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

	YES (If yes, complete EXPECTED SUBMISSION DATE)		NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
		X					

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 25, 1993 at 0937 hours, Unit 2 was operating in Mode 1, Power Operation, at 100% power. Instrument and Electrical (IAE) personnel were preparing to perform a functional test on Liquid Waste (WL) Sump Pump control circuits, when they improperly opened link A-5 in cabinet 2ATC16. The proper link was A-5 in cabinet 2ATC14. When determining the actions to be taken, IAE did not notice that the diagram legend for link A-5 showed it to be in cabinet 2ATC14. Opening this link caused Main Steam Isolation Valve (MSIV) 2SM7 to close. The closing of the MSIV resulted in a Main Turbine/Reactor trip. This event is attributed to less than adequate self checking and independent verification. Corrective actions include communication of the event to all IAE personnel and revision of the troubleshooting procedure. Following the Turbine/Reactor trip at 1705 hours, Unit 2 was in Mode 3, Hot Standby, when Lo-Lo T-ave (P-12) actuated. P-12 actuated again at 2251 hours. In both events the Main Steam system was in an unusual alignment due to a valve problem. An additional steam load of warming the Main Feedwater Pump Turbines (CFPTs) for start with the unusual steam alignment caused T-ave to drop below 553 degrees F. The root cause of the P-12 events is the failure to adequately evaluate the impact of the unusual steam alignment on future evolutions. The corrective actions include communication of the events to all Operations personnel through an Operator Update and further communication of the details through operator proficiency training.

BACKGROUND

IAE procedure IP/0/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance, establishes controls for troubleshooting and corrective maintenance on safety related and non-safety related equipment. The procedure provides directions on: communication with the operational control group, independent verification for isolations, verification that correct parts are used, and verification that equipment is returned to service. If a specific maintenance procedure is approved that details the corrective action to be taken, then this procedure is not used to perform corrective action.

Main Steam Isolation Valves [EIIS:V] (MSIV) provide steam isolation for the Steam Generators [EIIS:HX] (S/Gs) during shutdown and accident conditions.

The Power Operated Relief Valves (PORVs) provide a flow path for Reactor Coolant System [EIIS:AB] (NC) heat removal when the MSIVs are closed. The PORVs also minimize the operation of the S/G safety valves. There is one PORV per S/G providing 10% Main Steam [EIIS:SB] (SM) flow capacity.

The Main Steam Vent to Atmosphere System [EIIS:VL] (SV) S/G safety valves provide over pressure protection for SM. There are five valves per steam line and provide 100% steam relief capacity.

The Auxiliary Steam System [EIIS:SA] (AS) provides steam to various plant equipment during all modes of operation. During startup it is preferred that AS be supplied from the opposite unit SM header. AS can be supplied from the same unit SM or the auxiliary boiler during startup. AS supplies the Main Turbine [EIIS:TRB] Seal System [EIIS:TC] (TL) and Main Feedwater [EIIS:SJ] (CF) Pump [EIIS:P] Turbine Steam Seal System [EIIS:SJ] (TF) while at less than 15% power.

Operations procedure OP/2/A/6250/01, Enclosure 4.3, Feedwater Pump Startup, provides directions for starting CFPTs. This procedure aligns various Main Steam Supply to Feedwater Pump Turbine System [EIIS:SA] (SP) valves and Feedwater Pump Turbine Exhaust System [EIIS:SJ] (TE) valves prior to start per Enclosure 4.17, Feed Pump Turbine Steam Valve Checklist. For five minutes prior to start, the remaining five SP and two TE valves needed to warm the turbine for start are opened and then placed in Auto.

The condenser and atmospheric steam dump valves are controlled by one of three controllers [EIIS:KC] (steam pressure, load rejection, plant trip). The selected controller actuates to control NC loop T-ave at or near a set reference signal.

P-12, Lo-Lo T-ave Interlock, is part of the Engineered Safety Features (ESF) Actuation System. The purpose of the interlock is to block steam dump valve actuation to prevent excessive cooldown below the minimum temperature for criticality. The setpoint for P-12 is 553 degrees F on any two of four NC loops.

EVENT DESCRIPTION

Turbine/Reactor Trip

On September 25, 1993, Unit 2 was operating in Mode 1, Power Operation, at 100% reactor power.

IAE technicians were troubleshooting the Liquid Waste System [EIIS:WD] (WL) Sump Pump 2A1 and 2A2 level control circuits using procedure IP/0/A/3890/01 and the two appropriate electrical elementary diagrams (one for each pump). Using these diagrams the technicians determined that links A-5 and A-32 in cabinet 2ATC16 were to be opened. IAE technician A reviewed the diagrams to determine if their actions might affect other plant equipment. IAE technician B verified that these actions were correct and would not affect other plant equipment. The IAE technicians did not notice that the diagram legend for link A-5 showed it to be in cabinet 2ATC14. IAE technician A listed the agreed upon steps in Enclosure 11.2 of the procedure. The technicians then used the steps in Enclosure 11.2 to identify, independently verify, and open link A-5 in cabinet 2ATC16.

At 0937:35 hours, IAE technician A opened link A-5 in cabinet 2ATC16. Opening this link closed S/G 2A MSIV 2SM7.

Level in S/G A began to decrease while level in S/Gs B, C and D began to increase. Steam flow increased from these S/Gs to meet total steam flow demand without S/G A.

At 0937:41, Main Feedwater regulator valve 2CF-28 opened to increase level in S/G A. At the same time, S/G A safety reliefs 2SV-20 and 2SV-21 opened due to high S/G pressure (>1175 psig and increasing).

At 0937:43, S/G A Power Operated Relief Valve (PORV) 2SV-19 opened due to pressure > 1125 psig and increasing.

At 0937:48, S/G A safety relief 2SV-22 opened due to pressure >1200 psig.

At 0937:59, Pressurizer [EIIS:VSL] (PRZ) heaters [EIIS:EHTR] groups A,B and D energized due to decreasing PRZ pressure of 2210 psig.

At 0938:00, condenser dump valves began opening due to increasing NC temperature.

At 0938:01, the Main Turbine tripped due to Hi-Hi S/G D level, P-14 interlock. The P-14 interlock initiates a Main Turbine trip, initiates CF isolation and CF pump turbine trip when S/G level reaches 77% in 1/4 S/Gs.

At 0938:02, the Reactor tripped due to Main Turbine trip, P-9 interlock. The P-9 interlock initiates a Reactor trip on a Main Turbine trip when Reactor power is greater than 69%.

The Control Room Operators (CROs) immediately entered procedure AP/2/A/5500/02, Turbine Generator Trip and EP/2/A/5000/01, Reactor Trip or Safety Injection, to verify the plant responded properly and to assess plant conditions. The CROs then entered procedure EP/2/A/5000/01A, Reactor Trip Response, per EP/2/A/5000/01.

At 0938:05, The Main Feedwater System isolated due to the S/G D Hi-Hi level, P-14 interlock. Auxiliary Feedwater [EIIS:BA] (CA) motor driven pumps auto started due to trip of the main feedwater pumps.

At 0938:23, The CA turbine driven pump started on 2 of 4 S/G Lo-Lo level. S/G A PORV 2SV-19 closed due to S/G pressure < 1092 psig and decreasing.

At 0938:29, condenser dump valves closed due to P-12 actuation.

At 0942:54, PRZ heaters A,B, and D deenergized due to pressurizer level < 17% and decreasing.

At 0943:04, Chemical and Volume Control System [EIIS:CB] (NV) letdown isolated due to pressurizer level < 17%. The CROs immediately entered procedure AP/2/A/5500/12, Loss of Charging or Letdown.

At 0944:33, the CROs throttled CA flow to control cooldown and closed valves 2SA2 (S/G 2B SM to CAPT) and 2SA5 (S/G 2C SM to CAPT) stopping the CA turbine driven pump. The lowest NC loop temperature reached was 540.8 degrees F.

At 0946:29, PZR heaters A,B and D energized due to PZR level > 17%.

At 0957:02, NV letdown was reestablished.

At approximately 1010 hours, the plant was stabilized in Mode 3, Hot Standby.

At 1130 hours, the required notifications for the Reactor trip and ESF actuations were made per RP/0/B/5000/13, NRC Notification Requirements.

P-12 Actuation 1705 Hours

On September 25, 1993 at approximately 1500 hours Unit 2 was in Mode 3, Hot Standby. The CROs were in the process of returning Unit 2 to operation using the Unit Fast Recovery (OP/2/A/6100/05) procedure.

Prior to this event there were two unusual steam loads aligned to Unit 2 SM.

1) Valve 2TL-8 (AUX STM TO STEAM SEAL REG) was not passing steam flow and therefore the CROs had SM maintaining turbine steam seal header pressure through 2TL-2 (MAIN STEAM TO STEAM SEAL REG).

2) Unit 2 was aligned to the AS header through 2AS-1 (SM TO AS INLET) to troubleshoot the cause of the Unit 1 AS header relief lifting.

At 1529 hours, steam dumps automatically closed and remained closed throughout this event. Prior to this time the steam dumps were modulating slightly open to closed.

At approximately 1629, the Operator At The Controls (OATC) began aligning TE valves (steam drains of the CFPT stop valves) per procedure OP/2/A/6250/01, Condensate and Feedwater System, Enclosure 4.17, Feed Pump Turbine Steam Valve Checklist, in preparation to start the CFPTs. This checklist, in part, has the operator open 6 TE valves and ensure 4 TE valves are closed.

At 1632, the OATC opened 6 TE valves that were required to be opened and opened 4 TE valves that were required to be closed. The OATC did not recognize that those 4 valves should have remained in the closed position. However, the OATC was aware that he had opened these valves and expected a decrease in steam pressure.

At 1633, steam pressure and NC loop T-ave began to trend downward. NC temperature was approximately 558 degrees F. The OATC was monitoring steam pressure and expected the downward trend after opening the TE valves. The OATC was aware of the additional steam loads (SM to steam seal header and Unit 2 supplying AS header) and felt the temperature decrease was not abnormal and could continue for a limited time while warming CFPTs.

Between 1633 and 1705, in addition to monitoring steam pressure, the OATC was maintaining S/G level using the CA pumps, supporting IAE during their test of CF regulator valves, and filling out the reactor trip report.

Prior to 1705, the CROs noticed a decrease in Volume Control Tank (VCT) level and noted that temperature had decreased further than expected.

At 1705:34, the CROs began closing TE valves. The CROs also closed valves 2AS-1 (SM TO AS INLET), 2AS-2 (MAIN STM TO AUX STM), and 2AS-12 (AS TO CFPT ISOL) to turn temperature around.

At 1707:55, P-12 actuated sending a close signal to the steam dumps. However the steam dumps were closed prior to this actuation.

At approximately 1712, T-ave reached a low of 552.3 degrees F.

At approximately 1718, T-ave had increased to 553 degrees F.

At 1850, the required notifications of the ESF actuation were made per RP/0/B/5000/13, NRC Notification Requirements.

P-12 Actuation 2251 Hours

On September 25, 1993 at 1900 hours Unit 2 was in Mode 3, Hot Standby. Operations day shift turned control over to Operations night shift. The night shift CROs continued to return Unit 2 to operation using the Unit Fast Recovery (OP/2/A/6100/05) procedure.

At shift turnover the night shift CROs and SRO understood that:

1) SM was maintaining steam seal header pressure through 2TL-2 due to problems with the TL system.

2) P-12 had actuated while the TE valves were being aligned to start CFPTs. The operators thought the probable cause was that Unit 2 SM had been aligned to the AS header at that time.

3) The TE valves that were opened from the control room had been closed and that Unit 1 was now supplying the AS header.

At 2207, steam dumps automatically closed and remained closed throughout this event. Prior to this time the dumps were modulating slightly open to closed.

At 2230, the operator opened the TE valves (steam drains of the CFPT stop valves) per procedure OP/2/A/6250/01, Condensate and Feedwater System, Enclosure 4.17, Feed Pump Turbine Steam Valve Checklist, in preparation to start the CFPTs. The operator knew about the P-12 actuation that had occurred on the previous shift and was monitoring temperature. The operator saw no decreasing trend in temperature.

At 2232, the operator opened valves 2SP-40, 29, 99 (CFPT A HP DRNS) and 2SP-37, 19 (CFPT A LP DRNS) per procedure OP/2/A/6250/01, Condensate and Feedwater System, Enclosure 4.3, Feedwater Pump Startup. These valves are required to be opened for five minutes prior to turbine start and then placed in AUTO.

At 2234, the operator opened valves 2TE-3 (CFPT A LP S/V ABOVE SEAT DRN) and 2TE-7 (CFPT A HP S/V ABOVE SEAT DRN), per the procedure.

Prior to 2237, the operator noticed an unacceptable downward trend in NC temperature from approximately 558 degrees F.

At 2237, the operator closed the SP valves per the procedure and saw temperature begin an upward trend from a low of approximately 554 degrees F.

At 2243, the operators determined NC temperature (approximately 555 degrees F and increasing) to be acceptable and continued with feedwater pump startup procedure by resetting both CFPTs.

Resetting the CFPTs opens the high and low pressure CFPT stop valves. NC temperature began to trend downward.

At 2250, the operator began closing the TE valves on both CFPTs in response to the downward trend in temperature.

At 2251, P-12 actuated sending a close signal to the steam dumps, however the steam dumps were closed prior to this actuation. T-ave reached a low of 553 degrees F.

On September 26, 1993 at 0032 hours, the required notifications of the ESF actuation were made per RP/0/B/5000/13, NRC Notification Requirements.

CONCLUSION

Turbine/Reactor Trip

The Turbine/Reactor trip was the result of MSIV 2SM-7 closing while Unit 2 was at 100% power. IAE technicians inadvertently closed 2SM-7 while troubleshooting the WL Sump Pumps 2A1 and 2A2 level control circuits. The technicians were using IP/0/A/3890/01 and the two appropriate electrical elementary diagrams (one for each pump). Using these diagrams the technicians determined that links A-5 and A-32 in cabinet 2ATC16 were to be opened. IAE technician A reviewed the diagrams to determine if their actions might affect other plant equipment. IAE technician B verified that these actions were correct and would not affect other plant equipment. The IAE technicians did not notice that the diagram legend for link A-5 showed it to be in cabinet 2ATC14. IAE technician A listed the agreed upon steps in Enclosure 11.2 of the procedure. The technicians then used the steps in Enclosure 11.2 to identify, independently verify, and open link A-5 in cabinet 2ATC16. Opening link A-5 in 2ATC16 closed 2SM-7.

The contributing factors which may have led the technicians to misidentify link A-5 to be in cabinet 2ATC16 are:

1) The technicians had begun troubleshooting the WL sump pump circuits in cabinet 2ATC16 the previous day.

2) The majority of the components and circuits for these pumps were located in 2ATC16.

These two factors tended to put the technicians in the mind set that all of their work would be in this cabinet.

3) Beneath both links on the diagrams, *2 was listed as the legend reference for the links' location. On the diagram for pump 2A2, *2 referred to 2ATC16 in the legend. On the diagram for pump 2A1, *2 referred to 2ATC14 in the legend. This difference was not noticed by the technicians.

4) When viewing the diagrams, the technicians laid one diagram on top of the other diagram. This caused the technicians to view both diagrams as one. This may have contributed to the technicians not noticing the difference in the two legends.

The root cause of this incident is inadequate self checking and independent verification of the intended actions. To help prevent similar mistakes, IAE communicated the details of this event to IAE personnel through electronic mail and through discussions with their supervisors. In addition, the troubleshooting procedure will be revised to have an additional sign-off for self checking and independent verification of the written action steps. Also the procedure steps will be enhanced to more clearly identify the actions to be taken. Because of the amount and simlarity of identifiers on electrical diagrams, there is the potential for problems to occur when using these diagrams. IAE distributed a bulletin to IAE personnel that listed some good practices for when electrical diagrams are used.

IAE will evaluate similar type procedures to determine if changes are warranted.

During the Reactor trip systems responded as expected. One significant anomaly was the loss of the C-9 permissive signal. The C-9 signal allows steam to be dumped to the condensers. The initial investigation indicates that C-9 was lost because a steam supply was not aligned to the steam seal header while at power. A steam supply has been aligned to the steam seal header with the unit at power until this issue is resolved. Operations has initiated the Problem Investigation Process (PIP) by writing PIP 2-C93-0836. Operations also informed all operators about this problem through an Operator Update.

A review of operating experience data for the 24 months prior to this event identified five events involving a reactor trip. None of these five events are similar to this event, in that they do not involve the same equipment, administrative controls or personnel actions. Therefore this is not a recurring event.

P-12 Actuations

The P-12 actuations were an actuation of the interlock circuit and did not cause the steam dumps to close. The steam dumps were closed prior to the actuation. The P-12 actuations were reported because they were an unexpected actuation of an engineered safety feature.

In both P-12 actuations the operators had not realized how great of an effect the startup of the CFPTs would have on NC temperature with the additional demands on the steam system and without automatic temperature control (steam dumps closed). In both events the CROs knew of the additional steam load demands and were aware that the steam dumps had been modulating, but did not realize the potential of additional steam loads to significantly reduce NC temperature. In neither event did the CROs discuss how the position of the steam dumps relative to T-ave and the unusual alignment of SM to the AS header might affect future evolutions. The CROs are expected to evaluate these types of operating conditions. The root cause of this event is the failure to adequately evaluate the impact of unusual operating conditions on future evolutions. A subsequent corrective action was to communicate this event to the Operations shifts through an Operator Update. The planned corrective action is to communicate the details of this event to licensed operators through operator proficiency training. This training will emphasize the need to discuss and evaluate the impact of unusual alignments on future evolutions.

The reason SM was unusually aligned to the steam seals was because valve 2TL-8 was not working properly. This additional steam load on SM caused the steam dumps to be closed further than normal. Problems with 2TL-8 had been identified in 1992 and a deficiency tag had been hung on the valve. However, the work request written to repair the valve could not be found. Operations has written PIP 2-C93-0839 to investigate why 2TL-8 was not repaired. Work Request 93033950 has been written to repair this valve.

Contributing to the P-12 actuation at 1705 was the fact that the OATC had opened 4 TE valves on the checklist that were required to be closed. The OATC was aware that he had opened these valves and expected and saw a decrease in steam pressure. At this time the operator felt that the decrease in steam pressure was normal and could be continued for a limited time while warming the CFPTs. Opening these 4 valves was not the root cause of the P-12 actuation, but caused the P-12 to occur earlier in the startup of the CFPTs. The procedure checklist was reviewed and it states that these valves should be in the closed position. The OATC did not adequately self check his actions. As a subsequent corrective action, Operations management discussed the need to perform adequate self checking with the individual. The Human

Performance Enhancement Systems (HPES) Team is investigating this event and will make recommendations based on their findings.

Operations monitors the highest T-ave when at power and during no load conditions. When at power the highest T-ave is the most limiting. However, when at no load Operations should be cognizant of both highest and lowest T-ave. The best estimate of the difference between highest and lowest T-ave during these events is 1 - 1.5 degrees F. It is not certain if this fact contributed to these events. Operations will discuss methods of monitoring T-ave during no load conditions as part of the planned operator proficiency training.

A review of operating experience data for the 24 months prior to this event identified two LERs reporting engineered safety feature actuations involving the Lo-Lo T-ave interlock (P-12). In both cases the P-12 actuations were caused by the inadvertent opening of the steam dumps. The root cause was linked to the process control cards for the steam dumps. Since the root cause for this event is different than these past events, this event is not considered recurring.

CORRECTIVE ACTIONS

Turbine/Reactor Trip

IMMEDIATE

1) CROs entered procedure AP/2/A/5500/02, Turbine Generator Trip and EP/2/A/5000/01, Reactor Trip or Safety Injection, to verify the plant responded properly and to assess plant conditions.

2) CROs entered procedure EP/2/A/5000/01A, Reactor Trip Response, per EP/2/A/5000/01.

3) CROs entered procedure AP/2/A/5500/12, Loss of Charging or letdown, upon NV letdown isolation.

4) CROs throttled CA flow to control cooldown and stopped the CA turbine driven pump.

SUBSEQUENT

1) IAE notified the control room that they had inadvertantly closed valve 2SM7.

2) Operations investigated the loss of the C-9 permissive signal and initiated PIP 2-C93-0836 to further investigate this problem.

3) Operations personnel were informed of this event through an Operator Update.

4) Details of this event were communicated to IAE personnel through electronic mail and through discussions with their supervisors.

5) IAE distributed bulletin to IAE personnel that listed some good practices for when electrical diagrams are used.

PLANNED

1) IAE will revise IP/0/A/3890/01, Controlling Procedure for Troubleshooting and Corrective Maintenance, to include a separate sign-off for self checking and independent verification to verify the written action steps agree with the drawings. Also the procedure steps will be enhanced to more clearly identify the actions to be taken.

2) IAE will evaluate similar type procedures to determine if changes are warranted.

P-12 Actuations

IMMEDIATE

1) CROs responded to the cooldown by isolating steam loads on SM.

SUBSEQUENT

1) Information concerning the P-12 actuations was communicated to Operations personnel through an Operator Update.

2) Operations management discussed the need to perform self checking with the operator who failed to self check when completing the Feed Pump Turbine Steam Valve Checklist.

3) Operations investigated problems with valve 2TL-8 and initiated PIP 2-C93-0839 to further investigate this problem.

4) Work Request 93033950 was written to repair valve 2TL-8.

PLANNED

1) Operations will communicate the details of these events to licensed operators through operator proficiency training. This training will emphasize the need to discuss and evaluate the impact of unusual alignments on future evolutions. Also, methods of monitoring T-ave during no load conditions will be discussed.

2) HPES will complete their investigation of the P-12 event.

SAFETY ANALYSIS

Turbine/Reactor Trip

This event was initiated on the inadvertent closure of a main steam isolation valve 2SM7 which resulted in a main turbine/reactor trip. These events are bounded by the Safety Analyses documented in the FSAR Sections 15.2.4, Inadvertent Closure of Main Steam Isolation Valves, and 15.2.3, Turbine Trip.

Upon closure of 2SM7 the S/G A safety relief valves and power operated relief valves opened to control pressure. The level in S/G A began to decrease and the level in S/Gs B, C, and D began to increase. Subsequently the level in S/G D reached the Hi-Hi level setpoint of 77% and the P-14 interlock actuated to trip the main turbine, isolate main feedwater and trip the main feedwater pump turbine. The condenser dump valves opened to control NC temperature. Upon the main turbine trip with reactor power greater than 69% the P-9 interlock actuated and tripped the reactor. All rods inserted as expected to control reactivity. The Auxiliary Feedwater motor driven pumps and turbine driven pump auto started to remove residual heat from the core. Subsequently, NC loop T-ave reached 553 degrees F and the P-12 interlock actuated closing the steam dumps to prevent excessive cooldown. The operators properly responded by throttling auxiliary feedwater flow to control cooldown. The cooldown of the NC system experienced during this event is bounded by the Safety Analysis documented in the FSAR Section 15.1.5, Steam System Piping Failure.

After a review of this event all systems responded as designed to shutdown the reactor and maintain it in a safe shutdown condition. There were no unusual releases of radioactive material.

The health and safety of the public were not affected by this event.

P-12 Actuations

The P-12 actuations were an actuation of the interlock circuit and did not cause the steam dumps to close. The steam dumps were closed prior to the actuation. The operators had noticed the decreasing trend in NC temperature and had taken action to prevent any further cooldown before the actuations occurred. The P-12 interlock did function properly in each case when NC loop T-ave reached 553 degrees F. This cooldown of the NC system is bounded by the Safety Analysis documented in the FSAR Section 15.1.5, Steam System Piping Failure.

The health and safety of the public were not affected by this event.