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Beaver Valley Power Station, Unit No. 1
Docket No. 50-334 License No. DPR-66
LER 99-012-01

United States Nuclear Regulatory Commission
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In accordance with Appendix A, Beaver Valley Technical Specifications, the following Licensee Event Report supplement is submitted:

> LER 99-012-01, 10 CFR 50.73(a)(2)(i), "Inoperability of Loop 1 Over Temperature Delta Temperature Function and Resulting Non-Compliance with Technical Specification 3.3.1.1, Table 3.3-1, ACTION 7, Item a."

This supplement provides more detail on this event.

Lew W. Myers

Attachment

IE22

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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TITLE (4)

Inoperability of Loop 1 Over Temperature Delta Temperature Function and Resulting Non-Compliance with Technical Specification 3.3.1.1, Table 3.3-1, ACTION 7, Item a.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	
9	15	99	99	012	01	05	23	2000	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
POWER LEVEL (10)	100	20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)	
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)	
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71	
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER	
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)		
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
T. S. Cosgrove, Manager Licensing	(724) 682-5203

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

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

(Times provided are approximate)
At 1130 hours on 9/16/99, it was discovered that the Loop 1 Over Temperature Delta Temperature (OTDT) channel had been inoperable, since calibration and return to service of the N41 power range drawer, at 0245 hours on 9/15/99. As such, ACTION 7, Item a. of Technical Specification (TS) 3.3.1.1, Table 3.3-1, to trip the bistables of an inoperable channel within six hours, was not met. Event discovery occurred during repair of a calibration problem with the N41C bench board Delta-Flux meter. To permit this repair, the Loop 1 OTDT channel bistables were tripped, at 0941 hours on 9/16/99. Therefore, at event discovery the TS required action to trip the channel bistables was being met. This event is reportable per 10 CFR 50.73(a)(2)(i)(B).

The inoperable Loop 1 OTDT channel resulted from mis-calibration of the N41 power range drawer, due to personnel error by the involved Instrumentation and Control (I&C) technicians (utility non-licensed) during the calibration on 9/15/99. The personnel error is attributed to misreading the test equipment input digital voltmeter. This occurred when 0.2734 volts direct current (VDC) was misread as 0.2374 VDC.

The N41 power range drawer was calibrated and returned to service, the Loop 1 OTDT channel was declared operable and N41 was returned to service, at 1448 hours on 9/16/99. This event was discussed with the involved I&C technicians. Self-checking training was given to the involved I&C technicians, as a refresher to ensure their awareness of adequate self-checking techniques. This LER and lessons learned from this event have been discussed with I&C technicians and I&C Supervisors of both Units. These discussions included equipment adjustment interactions in general.

TEXT *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

PLANT AND SYSTEM IDENTIFICATION

Beaver Valley Power Station (BVPS) Unit 1
Westinghouse Pressurized Water Reactor
Reactor Trip System (RTS) {JC}
Excore Nuclear Instrumentation System (NIS) {IG}
Delta-flux Indicator NI-NI-41C {IG/XI}

Times provided are approximate.

INITIAL CONDITIONS

Unit 1: Mode 1, 100% Reactor Power

EVENT DESCRIPTION

At 1134 hours on September 14, 1999, ACTION 7 of Technical Specification (TS) Table 3.3-1 was entered due to removing Reactor Power Range Neutron Flux drawer N41 (channel 1) from service for updating the current flux map data. N41 was removed from service, in accordance with Maintenance Surveillance Procedure 1MSP- 2.03-I, "Power Range Neutron Flux Channel N41 Refueling Calibration." This defeated the N41 input to the quadrant power tilt ratio (QPTR). The following redundant inputs to QPTR remained operable: N42, N43, and N44. Due to removal of N41 from service, TS Surveillance Requirement (TSSR) 4.2.4. was entered, which requires verification that the QPTR is within the limit once within 12 hours and every 12 hours thereafter.

At 1809 hours (same day), the N41 input to the QPTR was restored in accordance with 1MSP-2.03-I. This was done to allow manual calculation of QPTR to comply with TSSR 4.2.4. In addition, while investigating an indication problem with the N41 delta flux bench board meter, NI-NI-41C, it was (wrongly) suspected that isolation amplifier NM301 {AMP/XI}, Westinghouse Model Number 6065D75G01, in the N41 instrument drawer input to the meter was defective and required replacement.

The N41 input to the Loop 1 Over Temperature Delta Temperature (OTDT) channel remained inoperable pending repair involving isolation amplifier NM301 and the input to the N41C Delta-Flux meter and completion of 1MSP-2.03-I. NM301 was replaced; however, NI-NI-41C

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EVENT DESCRIPTION (continued)

would not calibrate and remained out of service. In accordance with TSSRs 4.2.1.1 and 4.2.1.2 for determining axial flux difference (AFD), delta flux logging continued with the remaining three operable delta-flux meters NI-NI-42C, 43C, and 44C. In addition, the required actions of TS 3.3.1.1, Table 3.3-1 were exited, with exception of ACTION 7 for OTDT, which remained in effect.

MSP-2.03-I for power range drawer N41 was completed, at 0245 hours on September 15, 1999, the N41 drawer was returned to service and ACTION 7 for OTDT of TS Table 3.3-1 was exited. However, NI-NI-41C would still not calibrate and the indicator remained out of service. Determination of the AFD, in accordance with TSSRs 4.2.1.1 and 4.2.1.2, continued using operable redundant Delta-Flux meters NI-NI-42C, 43C, and 44C.

At 0941 hours on September 16, 1999, the N41 drawer was removed from service and the Loop 1 OTDT bistables were tripped, in accordance with ACTION 7 of TS Table 3.3-1. This was done to permit repair of the NI-NI-41C meter calibration problem. During this repair activity it was discovered, at 1130 hours on September 16, 1999, that the Loop 1 OTDT Reactor Trip System trip function was inoperable when the N41 power range drawer was previously returned to service, at 0245 hours on September 15, 1999. As such, when N41 was returned to service on September 15, 1999, ACTION 7 of TS Table 3.3-1 was unknowingly not met. However, at the time of event discovery, the TS required action to trip the Loop 1 OTDT bistables was already in effect, since 0941 hours, as described above.

It was subsequently determined that the indication problem with NI-NI-41C resulted from mis-calibration of the N41 drawer and did not involve a defective isolation amplifier. The N41 power range drawer was then calibrated and returned to service, the OTDT channel was declared operable and N41 was returned to service, at 1448 hours on September 16, 1999.

REPORTABILITY

TS 3.3.1.1, Table 3.3-1, ACTION 7, Item a. specifies that with the number of OPERABLE OTDT channels one less than the total number of channels (3), POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 6 hours and the MINIMUM CHANNELS OPERABLE (2) requirement is met. Therefore, at 0245 hours on September 15, 1999, when the N41 drawer was returned to service and ACTION 7 of TS Table 3.3-1 was exited, the MINIMUM

REPORTABILITY (continued)

CHANNELS OPERABLE requirement of the TS table was met. However, the required action of tripping the bistables of the inoperable channel, per Item a. of TS Table 3.3-1 ACTION 7 was not met. This condition existed until the channel bistables were tripped, at 0941 hours on September 16, 1999. This non-compliance with TS requirements is applicable to the 30 day LER reporting criteria of 10 CFR 50.73(a)(2)(i)(B).

CAUSE OF EVENT

The inoperability of the Loop 1 OTDT Reactor Trip System trip function resulted from mis-calibration of the N41 power range drawer due to personnel error by the involved Instrumentation & Control (I&C) technicians (utility non-licensed) during the MSP on September 15, 1999. This occurred during the detector 120% ion current adjustment when the as-found value of 0.2734 volts direct current (VDC) for the as-found input test signal to N41 detector B current meter was misread as 0.2374 VDC. Based upon the use of this misread value, the N41 power range drawer was adjusted and unknowingly returned to service not functioning within calibration tolerance. The indication problem with the N41 delta flux bench board meter also resulted from the mis-calibration of the N41 power range drawer.

The problem with the N41 delta-flux meter, NI-NI-41C, was incorrectly diagnosed by the involved I&C Supervisor (utility non-licensed). This diagnosis was based on the belief (after troubleshooting was performed) that the meter was defective. The problem identified with the meter after the mis-calibration of the N41 power range drawer provided an opportunity to identify the mis-calibration of the drawer prior to restoring the channel to service.

SAFETY IMPLICATIONS

During the time period of approximately 31 hours that the N41 input to the Loop 1 OTDT channel setpoint was inoperable and the channel bistables were not tripped, the other two OTDT channels remained operable and would have functioned to provide the 2-out-of-3 channels needed to accomplish the OTDT function. Therefore, this event had minimal effect on the health and safety of the public.

If it is postulated that another OTDT channel would not have functioned properly during this period, the mis-calibrated OTDT channel would have functioned as follows: when the mis-calibrated N41 power range drawer was returned to service, a false signal between

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SAFETY IMPLICATIONS (continued)

+12% and +14% was injected into the Loop 1 OTDT setpoint. This false signal would have made the setpoint conservative, in response to a power transient which forced the delta flux in the positive direction, since the channel would trip earlier than designed. However, the channel response to a power transient, which forced the delta flux in the negative direction would be non-conservative since the channel would trip later than designed. In this case, the OTDT setpoint penalty would not have reduced the Loop 1 OTDT setpoint until actual delta flux had reached approximately -35%, which would be outside the allowable setpoint of between -23 and +11%.

The reactor trip system is designed to be diverse and redundant. As such, there are numerous backup and overlapping signals to the OTDT for accidents credited in the Updated Final Safety Analysis Report. Examples of the backup and overlapping signals to OTDT include over power delta temperature, pressurizer pressure and level, steam generator pressure and level, and neutron flux. In response to these accidents, OTDT is typically not the first protection signal encountered. Exceptions to this are a loss of external electrical load and an uncontrolled withdrawal at power with a small reactivity rate of a rod control cluster assembly. These accidents have backup protection from other trip signals.

CORRECTIVE ACTIONS

1. This event was discussed with the involved I&C technicians.

2. Self-checking training has been given to the involved I&C technicians, as a refresher to ensure their awareness of adequate self-checking techniques.

3. This LER and lessons learned from this event have been discussed with I&C technicians and I&C Supervisors of both Units. These discussions included equipment adjustment interactions in general.

4. Enhancements to the I&C technician training program regarding peer/self checking techniques will be evaluated and identified enhancements will be incorporated into the training program as part of the systematic approach to training process.

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CORRECTIVE ACTIONS (continued)

5. A review of recent BVPS events, including this event, will be performed and lessons learned from the events will be provided to selected personnel. This action is part of an effort to better utilize actual BVPS operating experience to improve the overall performance of the station.

The above actions will be tracked and completed as part of the corrective action program.

PREVIOUS SIMILAR EVENTS

A review of LERS for BVPS Unit 1 and Unit 2 within the past two years, for occurrences attributed to misreading test equipment, did not reveal a previous similar occurrence.