Nebraska Public Power District
Nebraska's Energy Leader

NLS980169
November 4, 1998

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

Subject: Licensee Event Report No. 1998-009
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

The subject Licensee Event Report is forwarded as an enclosure to this letter.

Sincerely,

M. F. Peckham
Plant Manager

/lrd
Enclosure

cc: Regional Administrator
USNRC - Region IV

Senior Project Manager
USNRC - NRR Project Directorate IV-1

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

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Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)

Operator Error Results In Unexpected Full Scram on High Scram Discharge Volume (SDV) Level While in Mode 5

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
10	05	1998	1998	-- 009 --	00	11	04	1998		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	5
POWER LEVEL (10)	000

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

	20.2201(b)		20.2203(a)(2)(v)		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)	X	50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	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)
Linda Dewhirst, Licensing Engineer	402-825-5009

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)

On October 5, 1998, while in Mode 5 for a refueling outage with the reactor pressure vessel (RPV) head detensioned, Cooper Nuclear Station (CNS) experienced an invalid reactor scram during the conduct of planned maintenance on the "B" side Intermediate Range Monitors (IRM). All control rods were fully inserted at the time of the scram. A faulty test lead used during troubleshooting IRMs on the "B" side caused a spike on an "A" trip system IRM, which resulted in a spurious, invalid full scram, since a half scram was already present in the "B" trip system due to the maintenance activities. Shortly after the scram was reset, a second full scram occurred due to high Scram Discharge Volume (SDV) level. This constituted a valid, unplanned RPS actuation and was reported as a four hour non-emergency report pursuant to 10 CFR 50.72(b)(2)(ii). The second scram was properly reset and the licensed operators involved were briefed on the event.

The cause of the second scram was the failure to bypass the SDV high level trip in accordance with station operating procedures when resetting the first scram. This was due in part to a failure to adequately preplan for a potential scram event during the pre-shift brief, where it was discussed that, due to maintenance activities, a scram could occur and would need to be reset in a timely manner to maintain RPV level within the required band to support RPV disassembly activities.

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PLANT STATUS

At the time of the event, the plant was in Mode 5 for a refueling outage with all control rods inserted. Reactor pressure vessel (RPV) [EIIS Component Code: RPV] disassembly was in progress with the RPV head detensioned. The water level was being maintained just below the RPV flange in order to minimize dose to the RPV disassembly crew, and to assist in the cool-down of the RPV flange area.

EVENT DESCRIPTION

On October 5, 1998, at approximately 1443, an invalid full scram occurred while planned maintenance on Intermediate Range Monitors (IRMs) [EIIS System Code: HC] was in progress. The safety function of the actuated systems had already been established prior to the event, as the Unit was in Mode 5 for a refueling outage with all control rods [EIIS System Code: AA] inserted. Prior to the event, troubleshooting was in progress on IRMs in the "B" trip system, and the "B" side IRMs were inoperative and in the tripped condition due to the 24 VDC battery bus [EIIS Component Codes: BTRY, BU] being out of service for planned maintenance. During the troubleshooting on the "B" side IRMs, a faulty test lead induced a signal in "E" IRM, which caused a scram signal in the "A" trip system. This resulted in a full reactor scram due to a half scram signal already present in the "B" trip system for planned maintenance.

48 seconds after the full scram occurred, and once the cause was verified to be an invalid spike on one of the IRMs, the licensed operator reset the "A" trip system scram. However, during the resetting of the scram, the operator failed to bypass the scram discharge volume (SDV) [EIIS System Code: AA] high level trip, a required action in the scram recovery procedure. Approximately 20 seconds later a second full scram occurred due to high water level in the SDV. This valid Reactor Protection System (RPS) [EIIS System Code: JC] actuation was reported as a 4-hour non-emergency event pursuant to the requirements of 10 CFR 50.72(b)(2)(ii). Subsequent to the second RPS actuation, the licensed reactor operator placed the SDV high level bypass switch [EIIS Component Code: HS] in the bypass position in accordance with station procedures and successfully reset the "A" trip system scram. Below is a time line summarizing the events which took place on October 5, 1998 (times below are Central Daylight time):

Time	Event
14:43:30	IRM RPS Channel [EIIS Component Code: CHA] "A" Upscale Trip or INOP (IRM "E" spike)
14:43:30	IRM RPS Channel "A" Upscale Trip or INOP Reset (IRM "E" returned to normal)
14:43:30	Reactor SCRAM (RPS A1 Trip)
14:44:03	North SDV not drained alarm [EIIS Component Code: ALM]
14:44:07	South SDV not drained alarm
14:44:18	Reactor SCRAM reset
14:44:37	North SDV Channel A1 Trip (Reactor SCRAM)
14:44:49	SDV Trip Bypass
14:45:01	Reactor SCRAM reset

During the operations crew brief at the beginning of the shift, the Control Room Supervisor (CRS) discussed the RPV disassembly planned for the day, and the need to maintain RPV level within a relatively small band near the RPV flange, to keep the steam dryer [EIIS Component Code: DRY] submerged and minimize dose to the disassembly crews. Since troubleshooting activities on "B" side IRMs were also planned which would result in a half scram condition, the shift brief included a discussion on the possibility that a full scram could occur. During the brief, the staff was instructed that in the event a scram occurred, it would need to be properly diagnosed and reset in a timely manner to control reactor level

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within the required band. This was to limit the rise in RPV level that results from the Control Rod Drive (CRD) system [EIIS System Code: AA] when the scram valves [EIIS Component Code: V] are open.

When the initial full scram occurred due to the spike on an IRM, the operators responded to the scram. The Control Room personnel were aware that RPV level was near the flange and that the scram needed to be diagnosed and reset in a timely manner. The operator determined the reason for the scram to be a spike on "E" IRM, and the CRS directed the operator to reset the scram. The operator checked annunciators [EIIS Component Code: ANN] to determine if there was anything preventing a reset of the scram. A management expectation is that peer checking will be performed for all switch manipulations at the control room front panels to identify that the proper component is being manipulated. A second licensed reactor operator performed the peer check function and noticed that the SDV high level trip was not bypassed. However, instead of questioning why the SDV high level trip had not been bypassed, the second operator rationalized that it was inconsequential in that the SDV would drain once the scram was reset. While resetting the scram, alarms indicating the SDV had not been drained annunciated, and within 20 seconds of resetting the scram, an SDV high level scram occurred. The operator took the necessary steps to reset the second scram, including properly bypassing the SDV high level trip.

The operator indicated in post-event interviews that he attempted to determine the procedure to use in recovering from the scram, but was unable to readily determine the specific procedure applicable to the existing plant conditions. CNS has multiple procedures which include actions for resetting a scram. These procedures are event-dependent and detail actions necessary to control and recover from the initiating event; resetting of the scram is a simple sequence that is a part of these procedures. A review of these procedures revealed that they outline the same basic sequence with minor variations. Based on the pre-shift brief, the operator believed it was necessary to reset the scram promptly in order to maintain RPV level within the required band. The operator had performed this task numerous times in training and therefore reasoned that resetting the scram was within his skill level. He then performed the scram reset actions from memory. The procedure which was applicable for this event is CNS Instrumentation Operating Procedure 4.5, "Reactor Protection/Alternate Rod Insertion Systems." It wasn't until after the event that the crew located this procedure. Procedure 4.5 is currently categorized as "Reference Use Only," and as such, conducting the actions without the procedure in hand is acceptable providing that the procedure is close at hand, and referred to periodically to ensure that the correct steps are being performed in sequence.

During the investigation of this event it was discovered that not all systems functioned as expected, and a follow up report was made to the NRC on October 11, 1998. This involved the failure of RPS Trip Channel [EIIS Component Code: CHA] A2 north and south SDV high level trip to occur. This did not prevent the RPS from performing its intended safety function (i.e., a full scram signal was achieved). Shortly before the plant was shutdown for refueling, a fuse [EIIS Component Code: FU] had blown on CRD-ES-2A, which is the 30 VDC power supply [EIIS Component Code: JX] for two level transmitters [EIIS Component Code: LT]: CRD-LT-231C (South SDV high level trip transmitter) and CRD-LT-234C (North SDV high level trip transmitter). CRD-ES-2A also supplies power to the corresponding alarm modules, current-to-voltage converter, and trip modules. The power supply was replaced, and all indications suggested it was functioning properly. However, a separate investigation determined that when the power supply had been replaced, a female connector [EIIS Component Code: CON] was bent during installation which prevented the transmitters from receiving power. Power to the redundant transmitters, CRD-LT-231D and CRD-LT-234D, which send trip signals on high SDV level to RPS Channel A1, was not affected. The power supply was reinstalled and a functional test performed which verified that the transmitters were properly connected to the power supply. The root cause and corrective actions for this failure are being investigated separately under CNS Condition Report 98-0678.

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CAUSE

The root cause for this event was the failure to bypass the SDV high level trip in accordance with station operating procedures when resetting the first scram. This was due in part to a failure to adequately preplan for a potential scram event during the pre-shift brief. During the operations crew brief at the beginning of shift, contingencies for a potential scram were discussed, but this did not include a discussion of the procedures to be used and how much time the crew actually would have to reset the scram before challenging the required RPV level band. Adequate guidance exists for the conduct of briefings, however this guidance does not specify that a formal briefing is required for time-critical evolutions.

A contributing factor was the perception that a scram recovery during this shift was more of a time-critical evolution than what is typically encountered, in order to control the RPV level band. Additional contributing factors include the lack of familiarity with the appropriate procedure and failure of peer checking as a barrier.

SAFETY SIGNIFICANCE

The safety significance of this event was minimal. At the time of the event, the reactor was in Mode 5 (Refueling) and all control rods were fully inserted. There was no control rod motion. The failure of the RPS Channel A2 SDV high level trips did not prevent RPS from performing its intended safety function of scramming the reactor.

CORRECTIVE ACTIONS

Corrective actions taken include the immediate identification of the cause of the second scram and the proper resetting of that scram. There were no similar issues noted in the review of the previous 12 months of training records for the crew members that were directly involved.

Additional corrective actions to prevent recurrence are:

1. Revise Operations Instructions to require a briefing for tasks that are perceived as time-critical evolutions.

2. Review scram procedures and consolidate the guidance on resetting a scram.

3. Communicate lessons learned from this event with the operations staff.

4. Revise the peer checking Operations Instruction to ensure the peer checker vocalizes questions and verifies manipulations will provide the correct outcomes.

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PREVIOUS SIMILAR EVENTS

There have been no previous events where, during the shutdown condition, an unplanned RPS actuation occurred due to human error in resetting an inadvertent half scram. However, there are two previous events with similar conditions in that an unexpected RPS or Engineered Safety Features (ESF) actuation occurred. Both events were due to equipment malfunctions:

1996-008-00, "Scram Discharge Volume High Level RPS Trip Channel Anomaly." This was a voluntary report detailing an unexpected half scram while conducting calibration and functional testing of CRD-LT-231C, due to a stuck shut instrument lower shutoff valve (CRD-V-93) which had been previously over-torqued. A corrective action was to ensure that the minimum number of operable SDV high water level RPS trip channels is 4 of 4 per trip system per SDV.

1997-009-00, and 1997-009-01, "Inadvertent Reactor Protection System Half Trip." This event was reported as an unplanned ESF actuation. The cause was determined to be due to a defective card in the Electrical Protection Assembly (EPA).

ATTACHMENT 3 LIST OF NRC COMMITMENTS

Correspondence No: NLS980169--LER 1998-009

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
Revise Operations Instructions to require a brief for tasks that are perceived as time-critical.	02/26/99
Review scram procedures and consolidate the guidance on resetting a scram.	06/26/99
Communicate lessons learned from this event with the operations staff.	02/26/99
Revise the peer checking Operations Instruction to ensure the peer checker vocalizes questions and verifies manipulations will provide the correct outcomes.	02/26/99