

Indian Point 3
Nuclear Power Plant
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Buchanan, New York 10511
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March 12, 1993
IP3-NRC-93-015

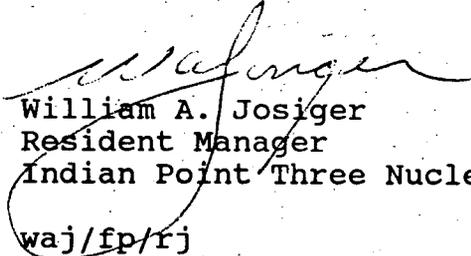
Docket No. 50-286
License No. DPR-64

Document Control Desk
Mail Station PI-137
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

The attached Licensee Event Report LER 93-005-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in the requirements per 10CFR50.73(a)(2)(ii).

Very truly yours,


William A. Josiger
Resident Manager
Indian Point Three Nuclear Power Plant

waj/fp/rj
Attachment

cc: Mr. Thomas T. Martin
Regional Administrator
Region 1
U.S. Nuclear Regulatory Commission
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (11)						DOCKET NUMBER (12)						PAGE (13)		
Indian Point Unit 3						0 5 0 0 0 2 8 6						1 OF 0 6		
TITLE (4)														
Fault in AMSAC Logic Caused by Improper Performance and Documentation of Work Activities Degraded the Operability of the AMSAC System														
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 NAMES		DOCKET NUMBER(S)			
1	2	3	1	9	3	9	3	0	0	5	0	0		
				0	0			0						
				5	0			3						
								1						
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OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § <i>Check one or more of the following: (11)</i>												
POWER LEVEL (10) 1 0 0		<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.408(a)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 73.71(b)									
		<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(a)(1)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 73.71(a)									
		<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.36(a)(2)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> OTHER (Specify in Abstract below and in Test NRC Form 308A)									
		<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)										
		<input type="checkbox"/> 20.406(a)(1)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iv)(B)										
		<input type="checkbox"/> 20.406(a)(1)(vi)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(v)										
LICENSEE CONTACT FOR THIS LER (12)														
NAME						TELEPHONE NUMBER								
Federico Perdomo, Licensing Engineer						9 1 4 7 3 6 8 0 2 9								
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)														
CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFAC TURE	REPORTABLE TO NRC					
SUPPLEMENTAL REPORT EXPECTED (14)										MONTH	DAY	YEAR		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)														
<input checked="" type="checkbox"/> NO														
ABSTRACT (Limit to 1400 spaces. Do not include title, single space between words) (15)														
<p>On December 31, 1992, with the reactor at 100 percent power, a time delay in the Anticipated Transient Without Scram (ATWS) Mitigation System Actuation Circuitry (AMSAC) logic failed to operate during the performance of a surveillance test. The subject fault in the logic placed the AMSAC system in a state of degraded operability from August 3, 1992 through January 12, 1993, thereby, placing Indian Point 3 outside its design basis. The cause of the event is human error; corrective maintenance work activities were improperly performed and documented thereby preventing the discovery of a misplaced time delay in the AMSAC logic. Corrective actions to prevent recurrence include: revising an Instrumentation and Control (I&C) administrative directive to include guidance on oversight of vendor activities; and revising the appropriate surveillance test. The AMSAC system logic fault was corrected on January 12, 1993. During the investigation of this event, additional deficiencies were identified in periodic testing and design of the AMSAC system. Based these findings the unit was shut down. Additional information on these deficiencies will be reported in a revision to this LER.</p>														

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 8 6						LER NUMBER (8)			PAGE (3)		
							YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
							9 3	- 0 0 5	- 0 0	0 2	OF	6

TEXT (if more space is required, use additional NRC Form 308A's) (17)

DESCRIPTION OF THE EVENT

On December 31, 1992, with the reactor at 100 percent power, a 40 second time delay in the Anticipated Transient Without Scram (ATWS) Mitigation System Actuation Circuitry (AMSAC) (JG) logic failed to operate during a semi-annual surveillance test being performed by an I&C technician. This time delay fault could have prevented the automatic start of the motor driven AFW pumps during an ATWS event. On January 12, 1993 I&C Engineering and Foxboro (vendor for AMSAC) field personnel determined that this failure was caused by AMSAC system software manipulations which took place during corrective maintenance on July 8, 1992 (corrective maintenance consisted of performing troubleshooting activities using surveillance test 3PT-SA31). A Foxboro field engineer inadvertently misplaced the subject 40 second time delay in the software logic during the July 8, 1992 corrective maintenance. The misplaced time delay went undetected until the December 31, 1992 surveillance test was performed. On January 12, 1993, the 40 second time delay was placed in the appropriate software location, the system was tested satisfactorily, and declared operable.

INVESTIGATION OF THE EVENT

On May 12, 1992, semi-annual surveillance test 3PT-SA31 failed due to an AMSAC system hard drive failure and the hard drive was subsequently returned to Foxboro for repair. Along with the defective hard drive, a Foxboro field technician sent an uncontrolled configuration diskette ("save all disk") that was loaded onto the hard drive once it was repaired. The uncontrolled "save all disk" contained software logic which caused the system to reboot (load logic from hard drive to active memory) improperly during the performance of the July 8, 1992 corrective maintenance.

The July 8, 1992 corrective maintenance results were satisfactory until the performance of a step which verifies that AMSAC will reboot properly and not send a trip signal when power is turned off and restored. When this step was performed, AMSAC did not reboot properly and sent a trip signal when power was restored to it. In order to remedy this situation, the Foxboro field engineer manipulated the AMSAC system software so that the system would reboot properly. This manipulation was successful and the test was continued with no further complications. During this software manipulation the 40 second time delay was inadvertently misplaced in the software logic.

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 05000286	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		93	005	00	03	OF

TEXT (If more space is required, use additional NRC Form 306A's) (17)

The event date is December 31, 1992 when a time delay in the AMSAC logic failed to operate during the performance of a surveillance test. On January 12, 1993 I&C Engineering and Foxboro field personnel determined the cause of failure. However, it was on January 26, 1993 that licensing personnel determined that the failure was reportable. Licensing determined that because the AMSAC system was in a state of degraded operability from August 3, 1992 through January 12, 1993 it did not meet the reliability requirements of the ATWS rule (10 CFR 50.62) during this time period. This was reported to the Commission pursuant to 10 CFR 50.72(b)(1)(ii)(B).

The AMSAC system is non-safety related but portions are classified as Category M because a commitment has been made to the Commission that AMSAC equipment will be treated under a Quality Assurance (QA) program that is consistent with and satisfies the guidance contained in Generic Letter 85-06. Investigation of this event revealed that the Final Safety Analysis Report (FSAR) and the Plant Equipment Data Base (PEDB) do not reflect that portions of AMSAC are classified as Category M. This condition was not a direct contributor to the occurrence of this event. However, these documents will be updated as indicated in the corrective actions.

In response to the NRC Resident's questions, the Authority concluded that two AMSAC system surveillance tests have not been performed in accordance with the required frequency. A verification that the final output devices have received an AMSAC output signal in response to a simulated AMSAC initiation signal, and calibration of narrow range feed flow and select turbine first stage pressure instrumentation, had not been performed every refueling outage as required. The Commission was notified of this occurrence at 2313 hours on 2/26/93 pursuant to 10 CFR 50.72(b)(1)(ii)(B). Subsequently, a design deficiency was identified which indicated that the AMSAC actuation timer did not function as expected. This deficiency was also reported to the Commission, pursuant to 10 CFR 50.72(b)(1)(ii)(B), at 1233 on March 5, 1993. Prior to the plant achieving criticality, the AMSAC system will be restored to full compliance with our commitments to 10 CFR 50.62.

A revision to this LER will be submitted by April 5, 1993 to address the surveillance test, calibration, and AMSAC actuation timer deficiencies. Presently, the details of these deficiencies are being investigated.

CAUSE OF THE EVENT

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 05000286	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		93	005	00	04	OF 16

TEXT (If more space is required, use additional NRC Form 308A's) (17)

The cause of the event was human error in that the July 8, 1992 corrective maintenance activities were improperly performed and documented. Improper documentation of the troubleshooting activities which took place led reviewers, of the corrective maintenance, to believe that the AMSAC system was operable. During the performance of the corrective maintenance (utilizing 3PT-SA31) a feature of the system failed to function as required. Software manipulations were made in order to correct the cause of failure and 3PT-SA31 was continued. The July 8, 1992 corrective maintenance activities should have been documented in detail sufficient for reviewers of the work to conclude that the system required a retest to demonstrate AMSAC operability. The results of a new retest would have served to test the AMSAC system logic and would have indicated a problem with the 40 second time delay.

A contributing factor was inadequate document control in that a controlled "save all disk" was not maintained for the AMSAC system. Because of this, an uncontrolled version of the disk containing faulty software logic was loaded.

CORRECTIVE ACTIONS

The following corrective actions serve to prevent recurrence of the event:

1. In addition to the existing administrative requirement that vendors/contractors perform all work in accordance with plant approved procedures, the I&C department will revise Administrative Directive IC-AD-8, "Work Processing" by March 22, 1993 to require that all vendor performed work is properly documented. The I&C department shall ensure that vendors document their actions on the notes page of work requests (WRs) prior to WR submittal for retest requirements.
2. A cautionary note will be included in the AMSAC surveillance test which will require the user to retest the system if any repair or modification to the AMSAC logic or hard drive is required. Surveillance test 3PT-SA31 will be revised before the next semi-annual surveillance test is required.

The following corrective actions do not prevent recurrence but are required:

1. The AMSAC system software is now currently being maintained as controlled "documents".

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 05000286	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		93	005	00	05	OF

TEXT (If more space is required, use additional NRC Form 306A's) (17)

2. The FSAR will be revised to reflect that portions of the AMSAC system are classified as Category M. The FSAR will be revised in the 1993 FSAR update which is due July 22, 1993. Also, the AMSAC system components will be included in the Plant Equipment Data Base (PEDB) by April 5, 1993.
3. An administrative operational specification that will provide reportability guidance and limiting conditions for operation, in the event AMSAC is found inoperable in the future, will be approved for use by April 15, 1993.
4. Surveillance Test 3PT-R145, "AMSAC System Functional Test" was written to ensure that: the AMSAC logic will generate a trip signal to all applicable final actuation devices; all instruments providing inputs to AMSAC have been calibrated; and signals from these instruments are provided to the AMSAC cabinet. This test was successfully performed on 2/28/93 indicating that all tested functions are operable.

ANALYSIS OF THE EVENT

The AMSAC system was in a state of degraded operability from August 3, 1992 through January 12, 1993. The AMSAC system did not fully meet the requirements of the ATWS rule during this specified time period. This event is reportable under 10 CFR 50.73 (a)(2)(ii)(B) because the degraded operability of the AMSAC system placed the plant outside its design basis. The additional deficiencies which were identified during the investigation of this event are also reportable pursuant to 10 CFR 50.73 (a)(2)(ii)(B).

SAFETY SIGNIFICANCE

This event had no impact on the health and safety of the public. The AMSAC system provides an alternate means of tripping the turbine and actuating auxiliary feedwater (AFW) flow apart from the reactor protection system (RPS). During the period of degraded operability the RPS was operable.

The misplaced time delay may have prevented the automatic initiation of the motor driven AFW pumps during an ATWS event. However, AMSAC would have provided the required alarms and

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 2 8 6	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 3	0 0 5	0 0	0 6	OF 16

TEXT (If more space is required, use additional NRC Form 388A's) (17)

performed all other automatic functions including tripping the main turbine generator, isolating the steam generator blowdown and sample valves, and providing a start signal to the turbine driven auxiliary feedwater pump (with manual throttling).

In the unlikely event that both trains of RPS had failed and AMSAC activation had been called upon, the combination of the AMSAC alarm and the guidance in Emergency Operating Procedure (EOP) FR-S.1, "Response to Nuclear Power Generation/ATWS" would ensure that the operators manually started the AFW pumps. One of the immediate action steps mandated by this EOP is to check that both motor driven auxiliary feedwater pumps are running. The immediate action step also requires the operator to manually start the turbine driven auxiliary feedwater pump if either motor driven pump will not start.

The safety significance of the additional deficiencies identified in periodic testing and design of the AMSAC system is presently being investigated. The revision to this LER will provide the safety significance of these deficiencies.

SECURING FROM THE EVENT

On January 12, 1993, the 40 second time delay was placed in the appropriate software location, the system was tested satisfactorily, and had been declared operable. However, during the investigation and design review of this event, other deficiencies were identified in activities affecting the AMSAC system. Due to this situation the AMSAC system has not yet been declared operable. The AMSAC system will be verified operable prior to the plant achieving criticality.