

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8912190062    DOC. DATE: 89/12/11    NOTARIZED: NO    DOCKET #  
 FACIL: STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi    05000528  
 AUTH. NAME                      AUTHOR AFFILIATION  
 SHRIVER, T.D.                    Arizona Public Service Co. (formerly Arizona Nuclear Power  
 LEVINE, J.M.                     Arizona Public Service Co. (formerly Arizona Nuclear Power  
 RECIP. NAME                      RECIPIENT AFFILIATION

SUBJECT: LER 89-020-00: on 890907, voluntary rept of load sequencer actuation.

W/8            ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

05000528

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	ACRS WYLIE	1 1		AEOD/DOA	1 1
	AEOD/DSP/TPAB	1 1		AEOD/ROAB/DSP	2 2
	DEDRO	1 1		NRR/DET/ECMB 9H	1 1
	NRR/DET/EMEB9H3	1 1		NRR/DET/ESGB 8D	1 1
	NRR/DLPQ/LHFB11	1 1		NRR/DLPQ/LPEB10	1 1
	NRR/DOEA/OEAB11	1 1		NRR/DREP/PRPB11	2 2
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	NUDOCS-ABSTRACT	1 1		<u>REG FILE</u> 02	1 1
	RES/DSIR/EIB	1 1		RGNS FILE 01	1 1
EXTERNAL:	EG&G WILLIAMS, S	4 4		L ST LOBBY WARD	1 1
	LPDR	1 1		NRC PDR	1 1
	NSIC MAYS, G	1 1		NSIC. MURPHY, G.A	1 1
	NUDOCS FULL TXT	1 1			

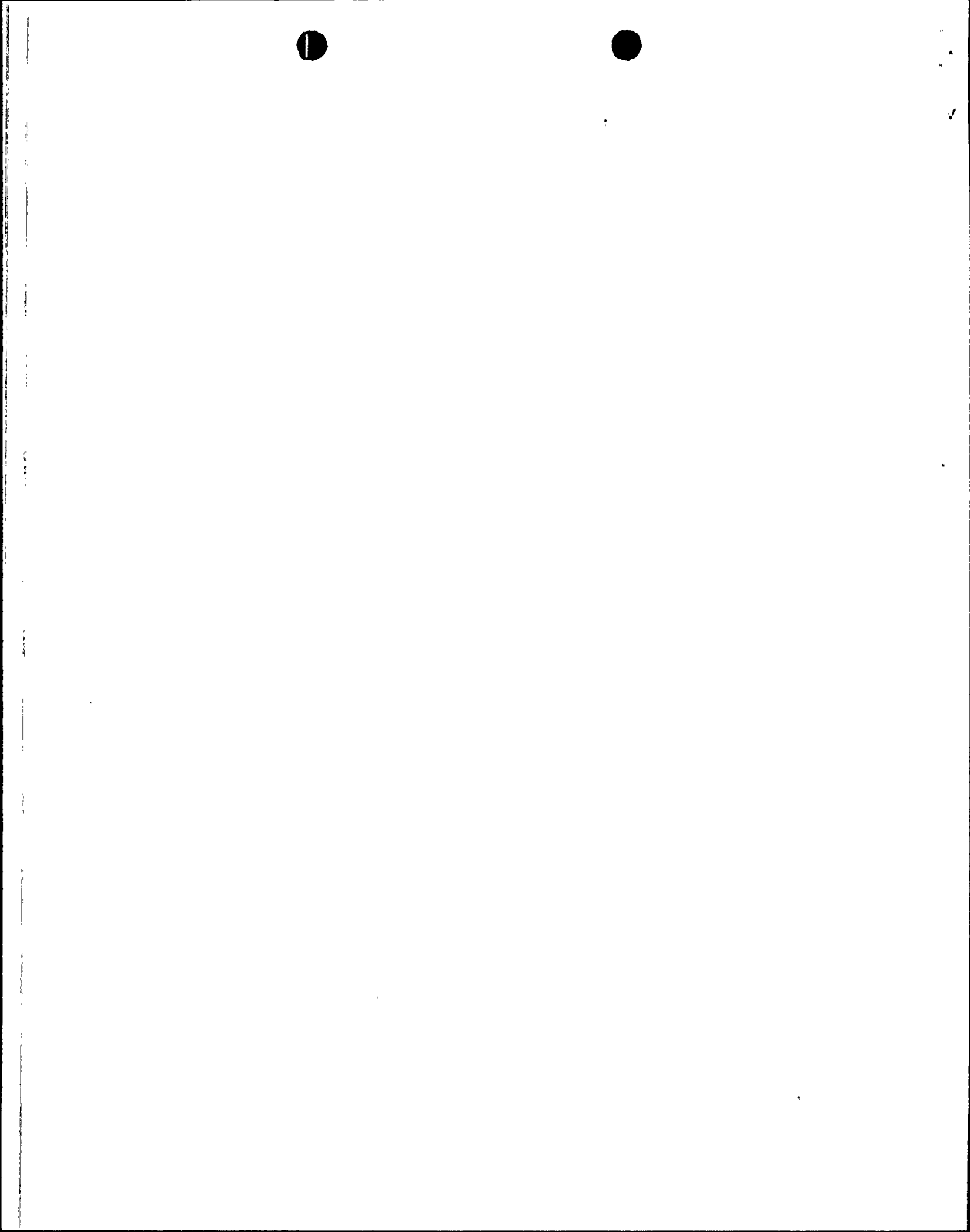
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Arizona Public Service Company

PALO VERDE NUCLEAR GENERATING STATION  
P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

192-00601-JML/TDS/SBJ  
December 11, 1989

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


Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Unit 1  
Docket No. STN 50-528 (License No. NPF-41)  
Licensee Event Report 89-020-00  
File: 89-020-404

Attached please find voluntary Licensee Event Report (LER) No. 89-020-00. This voluntary report was prepared pursuant to guidance contained within 10CFR 50.73. In accordance with 10CFR 50.73(d), we are herewith forwarding a copy of the LER to the Regional Administrator of the Region V office.

If you have any questions, please contact T. D. Shriver, Compliance Manager at (602) 393-2521.

Very truly yours,

  
J. M. Levine  
Vice President  
Nuclear Production

JML/TDS/SBJ/kj

Attachment

cc: W. F. Conway (all w/a)  
E. E. Van Brunt, Jr.  
J. B. Martin  
T. J. Polich  
M. J. Davis  
A. C. Gehr  
INPO Records Center

TE22  
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Palo Verde Unit 1										DOCKET NUMBER (2) 0   5   0   0   0   5   2   8			PAGE (3) 1 OF 06	
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TITLE (4)  
Voluntary Report of Load Sequencer Actuation

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)		
0	9	07	8	9	02	0	0	12	11	8	9	N/A	0   5   0   0   0
0	9	07	8	9	02	0	0	12	11	8	9	N/A	0   5   0   0   0

OPERATING MODE (9) N

POWER LEVEL (10) 0 | 0 | 0

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

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.406(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)
20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Voluntary
20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: Timothy D. Shriver, Compliance Manager

TELEPHONE NUMBER: AREA CODE 6 | 0 | 2, 3 | 9 | 3 | - | 2 | 5 | 2 | 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15): MONTH 0 | 1, DAY 3 | 1, YEAR 9 | 0

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On September 7, 1989, at approximately 2027 MST, while maintenance technicians were removing jumpers from an engineered safety features actuation system (ESFAS) cabinet, the "B" Emergency Diesel Generator (EDG), the "B" essential spray pond pump, and the "B" essential cooling water pump started. The components started as the result of an inadvertent deenergization of a ESFAS actuation relay.

The EDG was stopped at approximately 2105 MST after the cause of the actuation had been confirmed. The essential cooling water pump and spray pond pump were stopped at approximately 2130 MST and 2210 MST, respectively.

The cause of the event was a cognitive personnel error in that a maintenance technician did not properly install a jumper.

In order to prevent recurrence, the conduct of maintenance procedure will be revised to incorporate guidance on temporary jumper installation. The initial and continuing I&C training will be revised to include work practices for jumper installation/removal.

This is being reported as a voluntary report.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		8   9	-   0   2   0	-   0   0	0   2	OF	0   6

TEXT (If more space is required, use additional NRC Form 366A's) (17)

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On September 7, 1989 at approximately 2027 MST, Palo Verde Unit 1 was in a refueling outage with the core (AC) off-loaded. The reactor coolant system was at atmospheric pressure with a temperature of approximately 74 degrees Fahrenheit.

B. Reportable Event Description (Including Dates and Approximate Times of Major Occurrences):

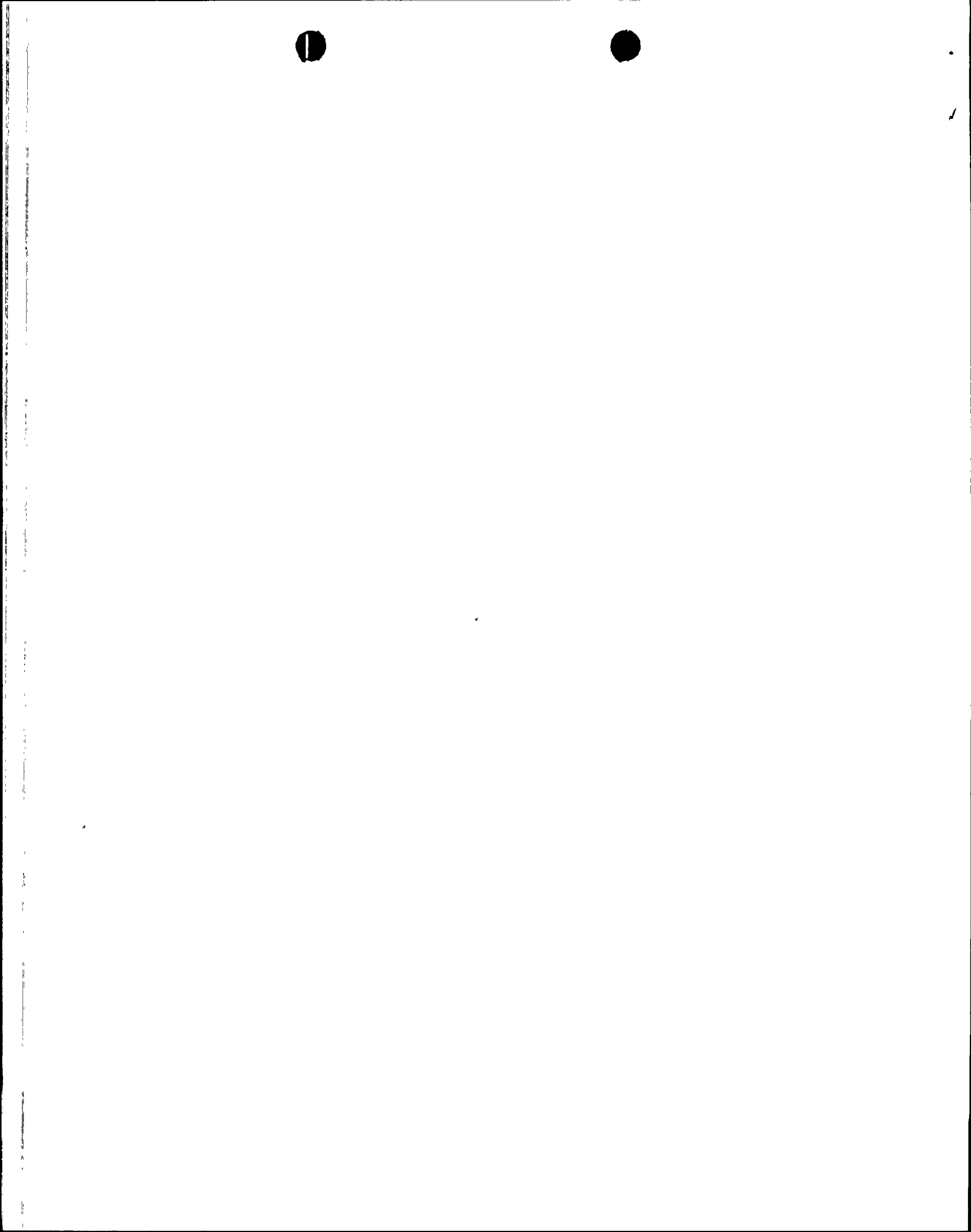
Event Classification: Voluntary

On September 7, 1989 at approximately 2027 MST, APS maintenance technicians (utility, non-licensed) were removing jumpers from an engineered safety features actuation system (ESFAS)(JE) cabinet when the "B" Emergency Diesel Generator (EDG)(EK), the "B" essential spray pond (BS) pump (P), and the "B" essential cooling water (BI) pump started. The event was caused when an actuation relay was inadvertently deenergized during jumper removal simulating an auxiliary feedwater actuation system (AFAS) signal.

On July 7, 1989 a modification to the Unit 1 ESFAS train "B" was commenced in accordance with approved work documents. This modification replaced defective actuation relays as part of the corrective action specified in LER 528/88-018, "Potter & Brumfield Relay Malfunctions". In accordance with the work order, maintenance technicians installed jumpers and lifted leads to prevent inadvertent equipment actuations prior to replacing the relays. On August 26, 1989, the relay replacement work was completed with a few exceptions.

On August 26, 1989, the ESFAS cabinet was energized in preparation for testing of the replacement jumpers and a ground fault indication was received on ESFAS Train "B" power supplies. The ground fault indication was still present after the replacement jumpers were removed and all associated lifted leads were reterminated. The replacement jumpers were then reinstalled and wires determined to prevent inadvertent actuations during troubleshooting of the ground fault. On August 27, 1989 the cause of the ground was isolated to a relay coil wire. All lifted leads with the exception of the wires to the defective relay were reterminated at approximately 0200 MST on August 28, 1989.

Upon completion of "A" Train Integrated Safeguards (ISG) on September 1, 1989, Unit 1 commenced "B" Train ISG prerequisites. In parallel with these activities, Unit 1 Work Control and





LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Operations evaluated clearance restraints, subsequently releasing, modifying, or temporarily lifting approximately 69 clearances.

On September 7, 1989 at approximately 1630 MST, the integrated safeguards test on the "B" Train was initiated. Thirty-five components failed to respond to the test signal. An inspection of the ESFAS cabinet revealed that the jumpers to prevent inadvertent actuations during the ground fault troubleshooting were still installed.

At approximately 1900 MST on September 7, 1989 maintenance personnel started the removal of temporary jumpers installed for the ground fault troubleshooting. At approximately 2027 MST the Unit 1 Control Room Operator noted the diesel generator "B", essential cooling water pump "B", and spray pond pump "B" had started. The operator evaluated the event utilizing procedures 1A0-1ZZ28 (Inadvertent SIAS/CIAS) and 73ST-1DG02 (Integrated Safeguards Train "B"). The operator noted that the essential chilled water pump "B" (CC) had not started. At approximately 2105 MST, after the cause of the actuation had been confirmed, the "B" DG was shutdown. The "B" essential cooling water pump was stopped at approximately 2130 MST. The "B" spray pond pump was stopped at approximately 2210 MST.

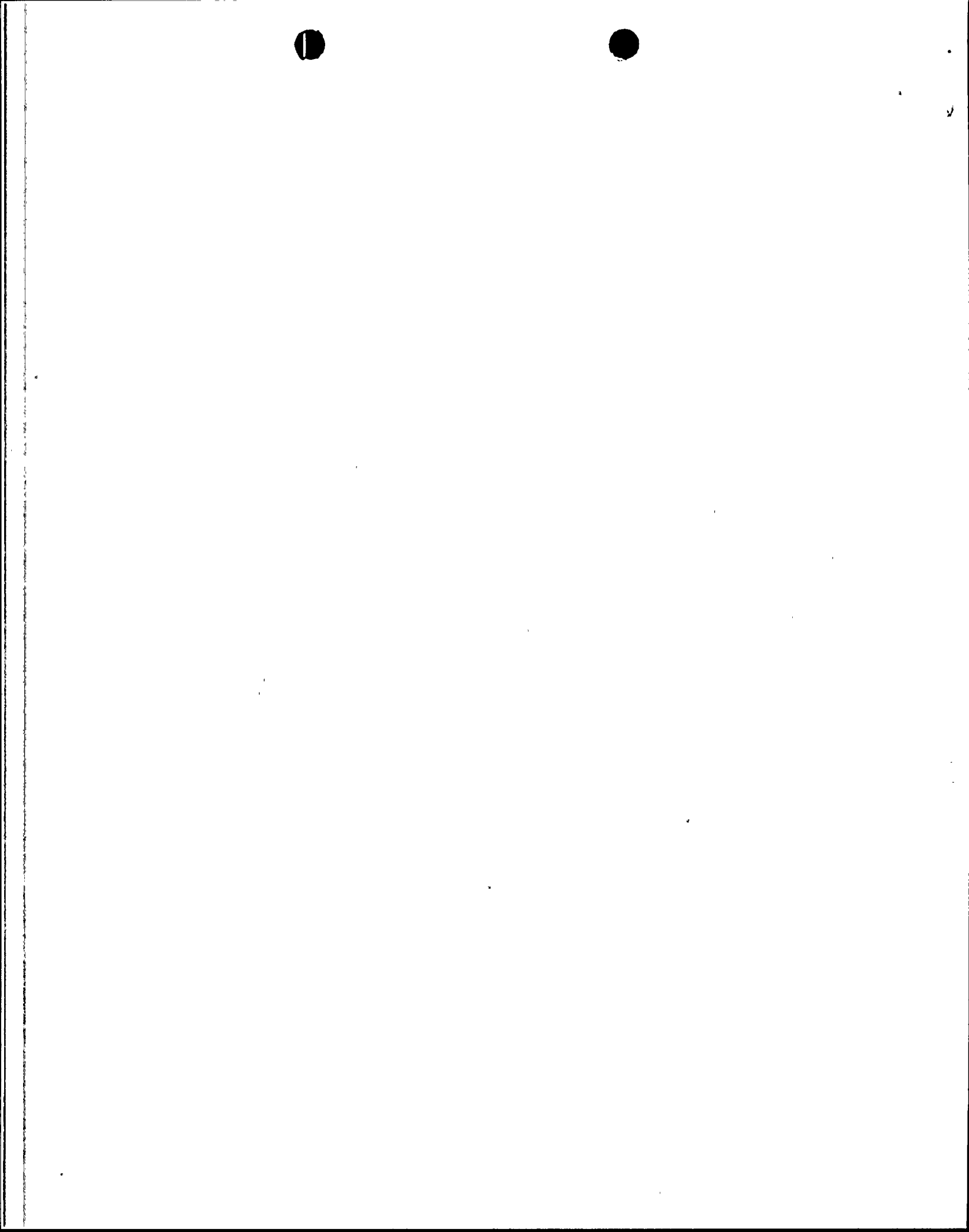
The Shift Supervisor stopped the removal of the jumpers and instructed the I&C personnel to return the work order to work control for an amendment that will specify utilization of secondary jumpers to prevent loss of continuity during removal of the remaining jumpers. The need to use secondary jumpers was emphasized to maintenance technicians prior to returning to work on September 8, 1989. Jumper removal was completed on September 8, 1989 at approximately 0900 MST.

In response to the event and the events leading up to the event, the Unit 1 plant manager assigned the outage manager to coordinate an investigation into the events and outline a recovery plan.

The outage manager had the 5 work orders associated with the replacement of "B" train ESFAS Potter-Brumfield relays reviewed for outstanding items which could impact the resumption of the ISG testing. The removal of the jumpers was verified by reviewing documentation and field verification.

On September 8, 1989, the actions taken were reviewed by the plant manager and approval was given to proceed with the ISG testing.

The ISG test was recommenced on September 8, 1989 at approximately 1651 MST. An evaluation of the test results identified that six



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

components did not respond as designed. A review of the work orders associated with the ESFAS relay replacement identified that lifted leads from work performed during August 27, 1989 troubleshooting had prevented the equipment actuations. The plant manager placed the ISG testing on hold until a thorough review of the events was completed.

On September 8, 1989 at approximately 2200 MST action assignments to ensure the ESFAS cabinet was ready for testing were made. All wires under the relay replacement work orders were terminated. A 100 percent restoration verification for all ESFAS relay replacement jumpers and lifted leads was performed. All work was completed by approximately 0700 MST on September 9, 1989.

Following the review meeting for the corrective actions, another 100 percent independent restoration verification was performed. At approximately 1200 MST on September 9, 1989, the plant manager gave permission to resume the ISG testing. The ISG testing was completed without further incident on September 9, 1989 at approximately 1530 MST.

- C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:

The ESFAS cabinets were inoperable at the time of this event. The ISG test was part of the return to service operability verification.

- D. Cause of each component or system failure, if known:

Not applicable - there were no component or system failures.

- E. Failure mode, mechanism, and effect of each failed component, if known:

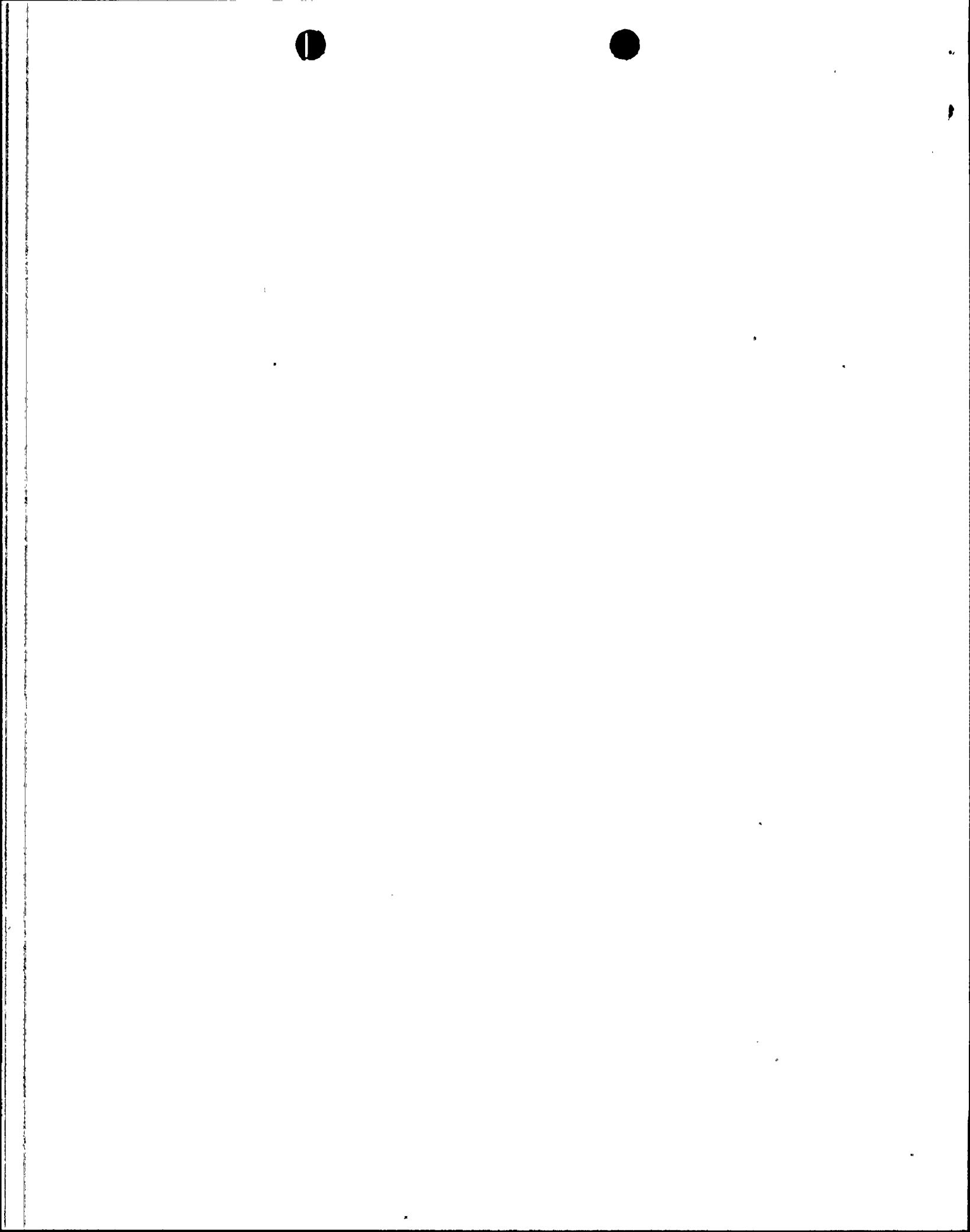
Not applicable - there were no component failures.

- F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:

Not applicable - there were no component failures.

- G. For failures that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the train was returned to service:

Not applicable - there were no equipment failures. The ESFAS cabinets were inoperable prior to the event. The ISG testing was being performed to establish operability of the system.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

H. Method of discovery of each component or system failure or procedural error:

The initiation of the plant components and the subsequent control room annunciations led to discovery of the jumper removal error.

I. Cause of Event:

This event was caused by cognitive personnel error in that the technician failed to install a secondary jumper to ensure circuit continuity prior to removal of the installed jumper.

The secondary jumper provides an alternative path for power to the relay such that a loss of power will not occur if the normal power supply lead is inadvertently disconnected when the primary jumper is removed. Although the use of the secondary jumper was not specifically required in the work order, the use of secondary jumpers is an expected work practice.

The cause for the failure to remove the replacement jumpers prior to the ISG test is under investigation. A supplement to this report will be submitted when the investigation is completed.

J. Safety System Response:

The safety system response is detailed in Section I.B.

K. Failed Component Information:

Not applicable - there were no failed components.

II. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THIS EVENT:

This event was initiated by the inadvertent deenergization of a NSSS ESFAS actuation relay during the removal of a jumper. This caused an Auxiliary Feedwater Actuation System (AFAS)(BA) -2 signal to be sensed downstream of the actuation relay. The minimum actuation logic upstream of the actuation relay to initiate an AFAS signal was not completed. The plant equipment, DG, and load sequencer responded as designed to the sensed signal. The deenergization of the actuation relay caused the diesel generator to start and initiated the load sequencer. The load sequencer started the "B" essential spray pond pump and "B" essential cooling water pump. The load sequencer stopped prior to the starting of the essential chilled water pump because the AFAS signal was removed. The technician had completed the jumper removal which subsequently reenergized the actuation signal and removed the AFAS signal. All equipment responded as designed.



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The event was caused by an inadvertent actuation of a relay by a maintenance technician, not the result of a valid actuation signal.

All equipment functioned as designed during the event. These actuations would not adversely affect the safe operation of shutdown of the reactor. Therefore, the event did not affect the health or safety of the public.

This event was not initiated by the minimum actuation logic for an AFAS. This is being submitted as a voluntary report.

III. CORRECTIVE ACTIONS:

A. Immediate:

The unit operator verified that the equipment actuations did not result from an actual condition, and verified that all components operated as designed. The shift supervisor terminated further work in the NSSS ESFAS cabinet until steps were taken to prevent recurrence of the event.

The replacement jumpers were removed and documentation verified complete prior to reperforming the test.

B. Action to Prevent Recurrence:

The maintenance technician was counseled. In order to ensure similar mistakes are not made by other maintenance technicians, the following actions will be completed.

The conduct of maintenance procedure will be revised to incorporate guidance on temporary jumper installation. This will be completed by December 31, 1989.

The initial and continuing I&C training will be revised to include work practices for jumper installation/removal. The continuing training will be revised by December 31, 1989. The initial training will be revised and implemented by March 31, 1990.

Recurrence control for the failure to remove the replacement jumpers prior to the ISG test will be provided in the supplemental report.

