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SUBJECT: LER 88-004-00:on 880406,engineered safety feature actuation R
 resulting from loss of power. I

W/8 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6 D
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:Standardized plant. 05000530S

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INTERNAL:	ACRS MICHELSON	1				1	ACRS MOELLER	2				2		A
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	NRR/DRIS/SIB 9A	1				1	NRR/PMAS/ILRB12	1				1		A
	NUDOCS-ABSTRACT	1				1	REG FILE 02	1				1		D
	RES TELFORD, J	1				1	RES/DE/EIB	1				1		S
	RES/DRPS DIR	1				1	RGN5 FILE 01	1				1		/
EXTERNAL:	EG&G GROH, M	4				4	FORD BLDG HOY, A	1				1		R
	H ST LOBBY WARD	1				1	LPDR	1				1		I
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	NSIC MAYS, G	1				1								S
NOTES:		1				1								/

TOTAL NUMBER OF COPIES REQUIRED: LTR 48 ENCL 47



LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Palo Verde Unit 3	DOCKET NUMBER (2) 0 5 0 0 0 5 3 0	PAGE (3) 1 OF 0 5
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TITLE (4)
Engineered Safety Feature Actuation Resulting From Loss Of Power

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)																																																																																													
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)</td> </tr> <tr> <td colspan="3">OPERATING MODE (9) 1</td> <td colspan="3">20.402(b)</td> <td colspan="3">20.405(c)</td> <td colspan="3"><input checked="" type="checkbox"/> 50.73(a)(2)(iv)</td> <td colspan="3">73.71(b)</td> </tr> <tr> <td colspan="3">POWER LEVEL (10) 1, 0, 0</td> <td colspan="3">20.405(a)(1)(i)</td> <td colspan="3">50.38(c)(1)</td> <td colspan="3"><input type="checkbox"/> 50.73(a)(2)(v)</td> <td colspan="3">73.71(c)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.405(a)(1)(d)</td> <td colspan="3">50.38(c)(2)</td> <td colspan="3"><input type="checkbox"/> 50.73(a)(2)(vii)</td> <td colspan="3" rowspan="4">OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.405(a)(1)(d)(i)</td> <td colspan="3">50.73(a)(2)(i)</td> <td colspan="3"><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.405(a)(1)(iv)</td> <td colspan="3">50.73(a)(2)(ii)</td> <td colspan="3"><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.405(a)(1)(v)</td> <td colspan="3">50.73(a)(2)(iii)</td> <td colspan="3"><input type="checkbox"/> 50.73(a)(2)(ix)</td> </tr> </table>												THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)												OPERATING MODE (9) 1			20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			73.71(b)			POWER LEVEL (10) 1, 0, 0			20.405(a)(1)(i)			50.38(c)(1)			<input type="checkbox"/> 50.73(a)(2)(v)			73.71(c)						20.405(a)(1)(d)			50.38(c)(2)			<input type="checkbox"/> 50.73(a)(2)(vii)			OTHER (Specify in Abstract below and in Text, NRC Form 366A)						20.405(a)(1)(d)(i)			50.73(a)(2)(i)			<input type="checkbox"/> 50.73(a)(2)(viii)(A)						20.405(a)(1)(iv)			50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(viii)(B)						20.405(a)(1)(v)			50.73(a)(2)(iii)			<input type="checkbox"/> 50.73(a)(2)(ix)		
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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
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At approximately 1421 MST on April 6, 1988, Palo Verde Unit 3 was operating in Mode 1 (POWER OPERATIONS) at approximately 100 percent power when a loss of power event occurred which resulted in a "B" Train Engineered Safety Feature (ESF) Load Sequencer System Actuation (JE). This resulted in the automatic start of the "B" Train Emergency Diesel Generator (DG). There were no other safety system responses and none were necessary. Unit 3 continued to operate at 100 percent power throughout the event.

The event occurred when post maintenance testing on a current transformer (XCT) for Unit 2 non-vital bus (2E-NAN-S05) (BU) (EA) resulted in the X01 Startup Transformer (AE-NAN-X01) (EA)(XFMR) relaying out (i.e. tripping). The X01 Startup Transformer was supplying power to the Unit 3 "B" train vital bus (3E-NAN-S06) prior to the event. The event was caused by an error in the work document being utilized to replace the current transformer.

As immediate corrective action, the testing was stopped on the Unit 2 non-vital bus and the appropriate work document revisions incorporated. As corrective action to prevent recurrence, this event will be reviewed by personnel responsible for work order preparation. These personnel will be responsible for delineating instructions necessary to ensure that unexpected plant transients do not occur.

There have been no previous similar occurrences.

TE22
1/1



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

I. DESCRIPTION OF WHAT OCCURRED

A. Initial Conditions:

At the time of the event, April 6, 1988 at approximately 1421 MST, Palo Verde Unit 3 was in Mode 1 (POWER OPERATION) at approximately 100 percent power. Unit 3 "house" electrical loads (e.g. Reactor Coolant Pumps (AB) (P)) were being supplied by the Unit Auxiliary Transformer (EL) (XFMR). The Unit Auxiliary Transformer is powered from the main generator output power system (EL). The Unit 3 "B" train vital bus (EB) (BU) was being powered by the X01 Startup Transformer (AE-NAN-X01) (EA). This is the preferred electrical lineup for plant reliability considerations.

In Unit 2, work was being performed in accordance with approved work procedures on the 2E-NAN-S05 bus (BU) (EA) which is also powered from the X01 Startup Transformer. The work being performed involved replacing a current transformer (XCT) on the 2E-NAN-S05 bus. The current transformer had been replaced and testing on the current transformer was in progress at the time of the event.

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

Event Classification: Engineered Safety Feature Actuation.

On April 6, 1988 at approximately 1421 MST, a "B" Train Engineered Safety Feature (ESF) Load Sequencer System (JE) actuation occurred. Each redundant ESF Load Sequencer System performs logic functions to generate a loss of offsite power (LOP) signal/load shed signal, a diesel generator (EK) (DG) start signal (DGSS), and a load sequencer start and permissive signals.

The LOP signal/load shed signal logic continuously monitors the Class 1E 4.16-kV bus (EG) for an undervoltage condition. If an undervoltage trip occurs, annunciation and indication is provided to the control room operators (utility, licensed). On a 2-out-of-4 coincidence of undervoltage relay (27) trips or upon manual actuation, an LOP signal and load shed pulse are generated. The LOP signal is sent to the DGSS logic. The load shed pulse (1 second) sheds 4.16 kV and selected 480V loads from the Class 1E 4.16-kV bus and trips the 4.16-kV Class 1E bus preferred (offsite) power supply breakers by energizing actuation relays (RLY). The preferred, offsite



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

power supply is the X01 Startup Transformer. The load sequencer start and permissive signal logic monitors input signals, determines the appropriate mode of operation, and generates sequentially timed start and permissive signals to ESF and forced shutdown loads as required to prevent instability of Class 1E buses.

At approximately 1421 MST, the X01 Startup Transformer relayed out (i.e. tripped) causing a loss of power to the Unit 3 "B" train vital bus (EG). A LOP signal was initiated on the "B" train ESF Load Sequencer System. The Unit 3 "B" Emergency Diesel Generator (EDG) (EK) (DG) started within 10 seconds reenergizing the vital bus, and the load sequencer properly sequenced all loads back onto the bus. All equipment operated per design. Unit 3 remained at approximately 100 percent power throughout the event.

The event was discovered by control room personnel (utility, licensed) as a result of main control board (MCBD) annunciation (IB) (ANN). Control room personnel responded properly to the event and took the appropriate action. Operator actions during the course of the event were in accordance with approved procedural controls. The cause of the event was identified and normal power was returned to the "B" train vital bus. The "B" Train EDG was stopped and all equipment was returned to normal by approximately 1603 MST on April 6, 1988 terminating this event.

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

There were no structures, systems, or components inoperable at the start of the event that contributed to the event.

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

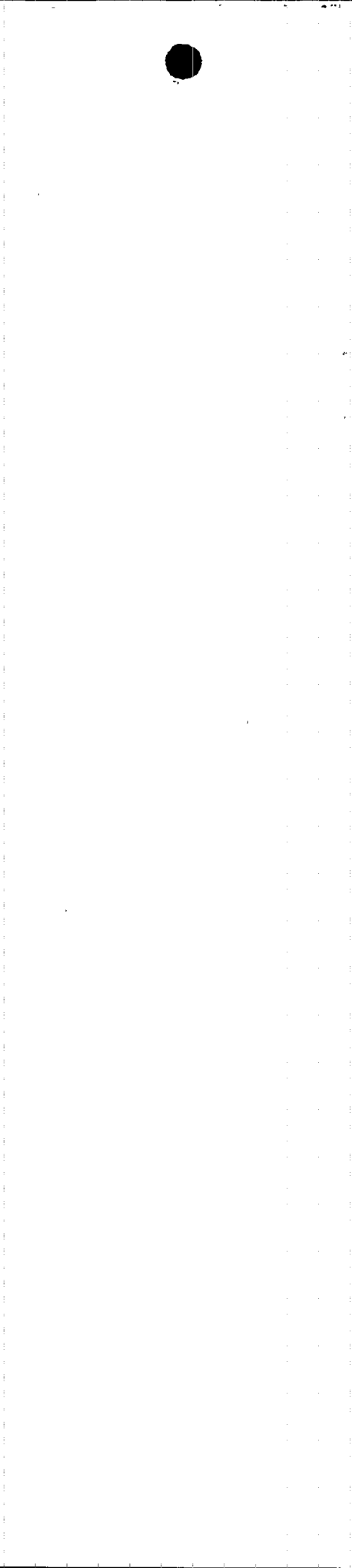
Not applicable - no failures were involved.

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

Not applicable - no failures were involved.

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

Not applicable - no failures were involved.



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

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

Not applicable - no failures were involved. However, the "B" train vital bus was without power for less than ten (10) seconds.

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

There were no component or system failures involved. The procedural error discussed below was discovered as a result of the investigation into the root cause of the event. The procedural deficiency was identified by Protective Relay and Control (PR&C) personnel (utility, non-licensed).

I. Cause of Event:

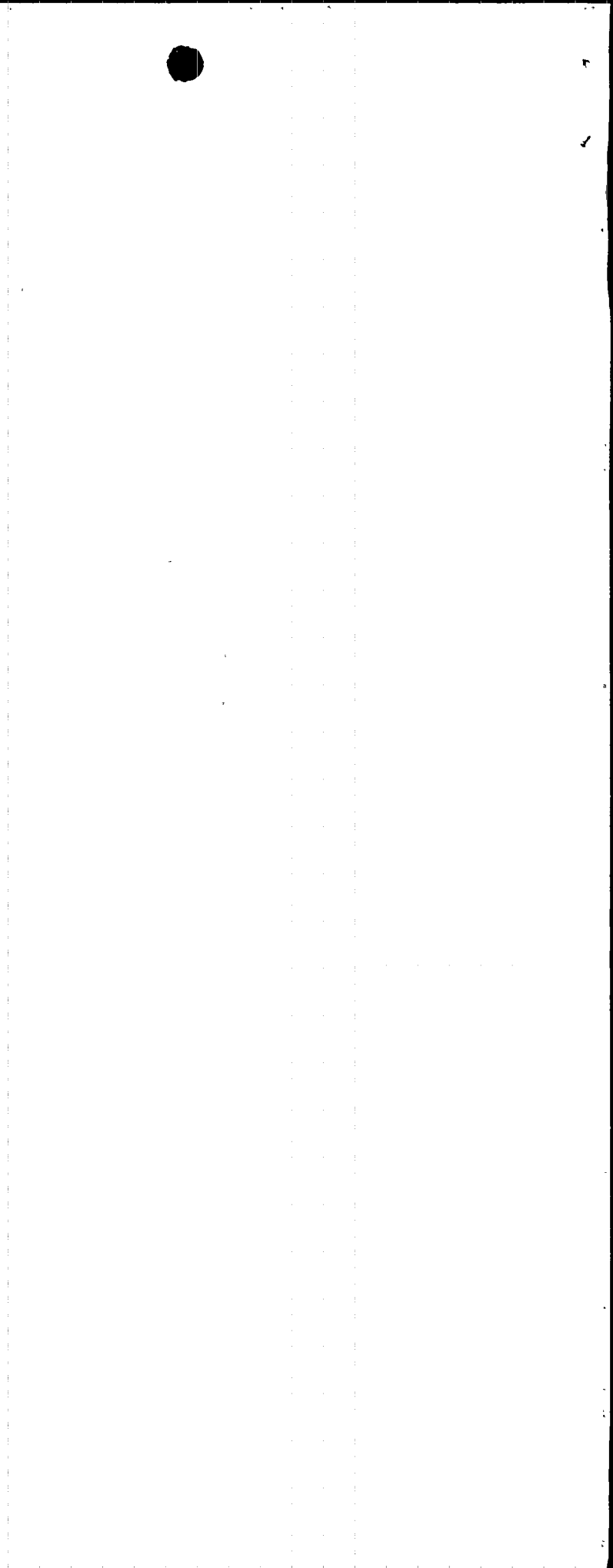
The cause of the event described herein was a personnel error as a result of an error in the procedural controls (i.e., work order) being utilized to control the replacement of the current transformer in Unit 2. The work order being utilized to replace the current transformer in Unit 2 contained post replacement testing requirements to ensure that the current transformer would perform satisfactorily. One of the tests required that current be injected into the current transformer to verify the integrity of the electrical connections. The performance of this step resulted in the X01 Startup Transformer tripping on a phase differential trip signal. This work order was prepared based upon previous work orders written for replacing current transformers and a detailed technical knowledge of the testing requirements necessary to ensure that the current transformer would perform satisfactorily in service. The work order did not include precautionary notes to ensure that the appropriate activities were initiated to mitigate the effects of the potential X01 Startup Transformer trip. It was assumed that the personnel performing the current transformer replacement or the operations personnel (utility, non-licensed) reviewing the work document would take the appropriate action to ensure that the X01 Startup Transformer did not trip (i.e. disable the differential trip scheme) or transfer loads such that a trip would have no affect on plant operations.

There were no unusual characteristics of the work location or other personnel errors which contributed to this event.

J. Safety System Response:

The following automatic safety system responses occurred:

- Engineered Safety Feature Load Sequencer System Train "B"



LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

Emergency Diesel Generator System Train "B"

There were no other safety system responses and none were necessary.

K. Failed Component Information:

Not applicable - no failures were involved.

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

There were no safety consequences or implications resulting from this event. Unit 3 continued to operate at power and all equipment functioned as designed.

III. CORRECTIVE ACTIONS:

A. Immediate:

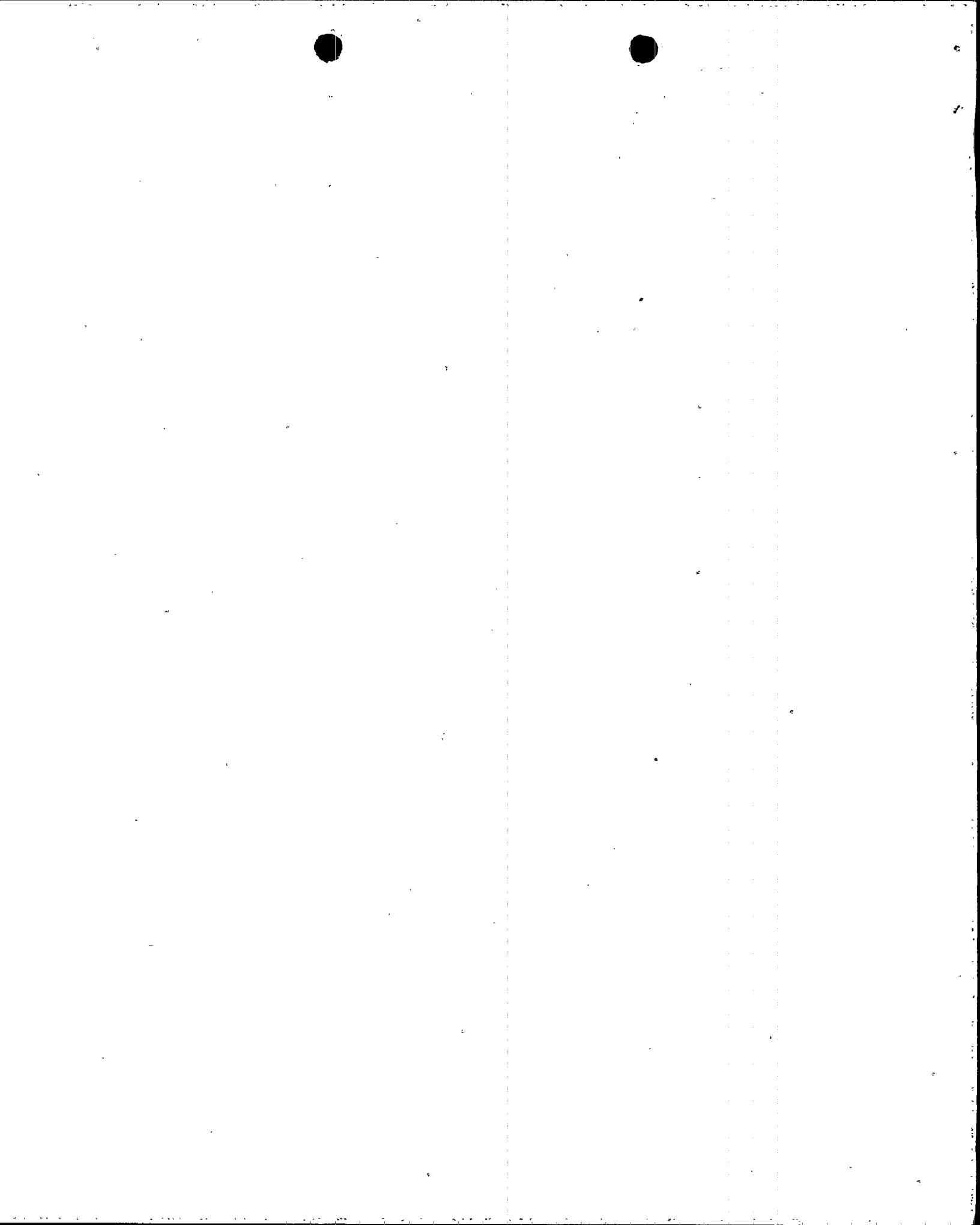
As immediate corrective action, all current transformer testing on the Unit 2 non-vital bus was terminated when the X01 Startup Transformer tripped. Additionally, a meeting was held to discuss the event described herein and the work order revised to ensure that the appropriate testing requirements were specified. Work on the current transformer was then completed.

B. Action to Prevent Recurrence:

This event will be reviewed by the personnel responsible for preparing work control documents in Nuclear Construction, Central Maintenance and Units 1, 2, and 3. Concurrently, these personnel will be directed to include in work documents the instructions necessary to ensure that retesting does not result in unexpected plant transients.

IV. PREVIOUS SIMILAR EVENTS:

There have been no previous similar events.





Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

192-00372-JGH/TDS/DAJ

May 5, 1988

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 3
Docket No. STN 50-530 (License No. NPF-74)
Licensee Event Report 88-004-00
File: 88-020-404

Attached please find Licensee Event Report (LER) No. 88-004-00 prepared and submitted pursuant to 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. G. Haynes
Vice President
Nuclear Production

JGH/TDS/DAJ/kj

Attachment

cc: O. M. DeMichele (all w/a)
E. E. Van Brunt, Jr.
J. B. Martin
T. J. Polich
E. A. Licitra
A. C. Gehr
INPO Records Center

IER2
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