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REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9106190435 DOC. DATE: 91/06/11 NOTARIZED: NO DOCKET #
 FACIL: STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
 AUTH. NAME AUTHOR AFFILIATION
 BRADISH, T.R. 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 91-006-00: on 910517, ESF actuation occurred due to radiation monitor failure. Caused by malfunctioning central processing unit & random access memory board on Train B. Boards replaced. W/910611 ltr.

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

NOTES: STANDARDIZED PLANT

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

JAMES M. LEVINE
VICE PRESIDENT
NUCLEAR PRODUCTION

192-00725-JML/TRB/WH
June 11, 1991

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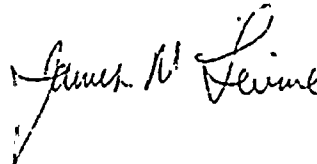
Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 91-006-00
File: 91-020-404

Attached please find Licensee Event Report (LER) No. 91-006-00 prepared and submitted pursuant to 10CFR50.73. In accordance with 10CFR50.73(d), we are forwarding a copy of the LER to the Regional Administrator of the Region V office.

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

Very truly yours,



JML/TRB/WH/nk

Attachment

cc: W. F. Conway (all with attachment)
J. B. Martin
D. H. Coe
A. C. Gehr
A. H. Gutterman
INPO Records Center

Cont'd No 541575907

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LICENSEE EVENT REPORT (LER)

| | | | | | | | | | | | | | | | | | | | | | |
|--|------------|--|----------------|--------------------|-----------------|-------------------------|-----------------|-----------|----------------|--|--|-------------------------------|------------------|---|---|--|--|--|--|---------------------------|--|
| FACILITY NAME (1) Palo Verde Unit-1 | | | | | | | | | | | | | | | DOCKET NUMBER (2) 0 5 0 0 0 5 2 8 1 | | | | | PAGE (3) OF 0 6 | |
| TITLE (4) ESF Actuation Due To Radiation Monitor Failure. | | | | | | | | | | | | | | | | | | | | | |
| 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) | | | | | | | | |
| | | | | | | | | | N/A | | | | 0 5 0 0 0 | | | | | | | | |
| 0 5 1 7 9 1 | 9 1 | 0 0 6 | 0 0 | 0 6 | 1 1 9 1 | N/A | | | | 0 5 0 0 0 | | | | | | | | | | | |
| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | | | | | | | | | | | | | | | | | |
| 1 | | 20.402(b) | | | | 20.406(e) | | | | <input checked="" type="checkbox"/> 60.73(a)(2)(iv) | | | | 73.71(b) | | | | | | | |
| POWER LEVEL (10) | | 1 0 0 | | | | 20.406(a)(1)(i) | | | | 60.36(c)(1) | | | | 73.71(c) | | | | | | | |
| | | 20.406(a)(1)(ii) | | | | 60.36(c)(2) | | | | 60.73(a)(2)(vii) | | | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | | | | | | | |
| | | 20.406(a)(1)(iii) | | | | 60.73(a)(2)(i) | | | | 60.73(a)(2)(viii)(A) | | | | | | | | | | | |
| | | 20.406(a)(1)(iv) | | | | 60.73(a)(2)(ii) | | | | 60.73(a)(2)(viii)(B) | | | | | | | | | | | |
| | | 20.406(a)(1)(v) | | | | 60.73(a)(2)(iii) | | | | 60.73(a)(2)(ix) | | | | | | | | | | | |
| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | | | | | | | | | | | | | |
| NAME | | | | | | | | | | TELEPHONE NUMBER | | | | | | | | | | | |
| Thomas R. Bradish, Compliance Manager | | | | | | | | | | AREA CODE | | 6 0 2 3 9 3 - 1 5 2 1 | | | | | | | | | |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDs | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPDs | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| X | I L | M O N | K O 2 0 | YES | | | | | | | | | | | | | | | | | |
| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | | | EXPECTED SUBMISSION DATE (15) | | MONTH DAY YEAR | | | | | | | |
| YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | | | | | | | | | <input checked="" type="checkbox"/> NO | | | | | | | |

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

On May 17, 1991, at approximately 0629 MST, Palo Verde Unit 1 was in Mode 1 (POWER OPERATION) at approximately 100 percent power, when a spurious Train "B" Containment Purge Isolation Actuation Signal (CPIAS) was initiated on the Balance of Plant Engineered Safety Features Actuation System. The Train "B" CPIAS resulted in the designed cross-trips of Train "A" CPIAS and Train "A" and "B" Control Room Essential Filtration Actuation Signals (CREFAS). The actuations occurred when the Train "B" Power Access Purge Area Radiation Monitor (RU-38) spiked, went off line, and was unreachable from the Radiation Monitoring System (RMS) Data Control Unit (DCU). At the time of the event no containment purge was in progress and all Containment Purge System isolation valves were closed. Following the spurious Train "B" CPIAS all components operated as designed. Control Room and Radiation Protection personnel verified that no abnormal radiation levels existed in the vicinity of RU-38.

The cause of the event was a malfunctioning Central Processing Unit and Random Access Memory board on the Train "B" Power Access Purge Area Radiation Monitor (RU-38). As corrective action, the boards have been replaced.

A previous similar event was reported in LER 530/90-001.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

On May 17, 1991, at 0629 MST, Palo Verde Unit 1 was in MODE 1 (POWER OPERATION) at approximately 100 percent power.

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

Event Classification: An event or condition that resulted in an Engineered Safety Feature (ESF) (JE) actuation.

At approximately 0629 MST on May 17, 1991, a spurious Train "B" Containment Purge Isolation Actuation Signal (CPIAS) (VA) (JE) was initiated on the Balance of Plant Engineered Safety Features Actuation System (BOP ESFAS) (JE). The Train "B" CPIAS resulted in the designed cross trips of Train "A" CPIAS and Train "A" and "B" Control Room Essential Filtration Actuation Signals (CREFAS) (VI). The actuations occurred when the Train "B" Power Access Purge Area Radiation Monitor (RU-38) (VA) (IL) (RI) spiked above its high alarm/trip setpoint and the monitor went off line due to a malfunction of its Central Processing Unit (CPU) and Random Access Memory (RAM) boards for the monitor. At the time of this event, no Containment purge was in progress and all Containment Purge System isolation valves (VA) (ISV) were closed. All components in the Control Room Essential Filtration System (VI) responded properly to the CREFAS. Control Room personnel (utility, licensed) verified that radiation monitors adjacent to RU-38 were indicating normal radiation levels. Radiation Protection personnel (utility, non-licensed) verified that normal radiation levels existed in the area of RU-38. They also verified that normal radiation levels existed in the Plant Vent (VL) exhaust.

The BOP ESFAS actuation resulted in close signals being sent to all Train "A" and "B" Containment Purge System isolation valves and actuations of the Control Room Essential Ventilation System (VI) Trains "A" and "B", the Essential Chilled Water System (KM) Trains "A" and "B", Essential Cooling Water System (BK) Trains "A" and "B", and the Essential Spray Pond System (BS) Trains "A" and "B". All components operated 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 BOP ESFAS actuations were identified by Control Room personnel (utility, licensed) as a result of main control board (MCBD) annunciators (ANN). There were no operator actions which contributed to the cause of the event. No other ESF actuations occurred and none were necessary. Unit 1 personnel (utility, licensed and non-licensed) verified that the ESF actuations did not occur as a result of high radiation levels in the Containment Purge System.

At approximately 0637 MST on May 17, 1991, Train "B" CPIAS was placed in bypass for troubleshooting and the remaining actuated equipment was secured, reset and returned to normal service.

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

Not applicable - no structures, systems, or components were inoperable at the start of the event which contributed to this event.

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

The BOP ESFAS actuations described in Section I.B. were caused by RU-38 spiking above the high alarm/trip point.

Troubleshooting performed in accordance with an approved work authorization document and an engineering root cause of failure investigation determined that the cause of the RU-38 spiking problem was malfunctioning of the original equipment Central Processing Unit (CPU) and Random Access Memory (RAM) boards in RU-38's microprocessor (CPU). Further determination of the cause of the board malfunctions will not be performed since the original equipment boards have been replaced by newer models. The newer models were developed to improve the high temperature performance of circuit boards in similar monitors located in higher temperature environments. The new models have improved high temperature performance and are expected to improve overall performance. Circuit board malfunction may still occur, but the new boards have upgraded components with higher demonstrated reliability. Due to the anticipated improvement in performance, the new model replacement boards are being installed in other similar radiation monitors consistent with parts availability and need to perform work which requires board replacement.

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

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

The malfunctioning CPU and RAM boards in RU-38's microprocessor resulted in the output of RU-38 spiking high. The spike was above the high alarm/trip setpoint for actuating a Train "B" CPIAS and subsequent ESF actuation signals as described in Section I.B.

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

Not applicable - RU-38 does not have multiple functions.

- G. For a failure 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 - The malfunction of radiation monitor RU-38 did not render a train of a safety system inoperable.

RU-38 was declared inoperable at approximately 0637 MST on May 17, 1991. Following troubleshooting and replacement of the malfunctioning CPU and RAM boards, RU-38 remained out of service to perform scheduled 18-month surveillance testing. Testing was satisfactorily completed and RU-38 was returned to service at approximately 1614 MST on May 24, 1991. RU-38 was inoperable approximately six (6) days and ten (10) hours.

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

The malfunctioning CPU and RAM boards in RU-38 were discovered during troubleshooting performed in accordance with an approved work authorization document and engineering root cause of failure investigation. There were no procedural errors discovered.

- I. Cause of Event:

The cause of the event was malfunctioning CPU and RAM boards in RU-38 as described in Section I.D (SALP Cause Code E: Component Failure).

No unusual characteristics of the work location (e.g. noise, heat, poor lighting) contributed to this event. The event was not a result of personnel errors or procedural errors.

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

J. Safety System Response:

The following automatic safety system responses occurred:

- Control Room Essential Ventilation Trains "A" and "B"
- Essential Chilled Water System Trains "A" and "B"
- Essential Cooling Water System Trains "A" and "B"
- Essential Spray Pond System Trains "A" and "B"

K. Failed Component Information:

Power Access Purge Area Radiation Monitor RU-38 was manufactured by Kaman Scientific Corporation. The malfunctioning CPU board is part number 451497 Rev. A and the malfunctioning RAM board is part number 451498 Rev. A.

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

There were no safety consequences or implications resulting from this event. All components worked as designed. The Train "A" and "B" Power Access Purge Area Radiation Monitors (RU-37 and RU-38) are located outside the Containment (NH) near the power access purge exhaust and refueling purge exhaust ducts (VA) (DUCT). Technical Specification (TS) Limiting Condition for Operation (LCO) 3.3.3.1, Table 3.3-6, Item 1.D. only requires one of these monitors to be OPERABLE. RU-37 was operable prior to and during this event. Both RU-37 and RU-38 monitor the ducts for purged airborne radioactivity concentrations that could potentially result in off-site doses exceeding 10CFR100 limits. RU-37 and RU-38 perform the safety function of monitoring purge exhaust and initiating a high dose rate alarm initiation signal to BOP ESFAS. BOP ESFAS performs the safety function of shutting the Containment Purge System isolation valves, activating Control Room Essential Ventilation, and starting necessary support systems (see Section I.J.). As discussed in Section I.B, Unit 1 personnel verified that no actual high radiation levels existed. Additionally, the Containment Purge System isolation valves were shut at the time of the event.

III. CORRECTIVE ACTION:

A. Immediate:

1. As immediate corrective action, Unit 1 personnel verified that no abnormal radiation levels existed as described in Section I.B.

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2. The malfunctioning CPU and RAM boards were replaced with new style CPU and RAM boards. These new boards have upgraded components with higher demonstrated reliability.

B. Action to Prevent Recurrence:

The old style CPU and RAM boards are being replaced with new upgraded boards. This replacement has been completed in Unit 2; in Unit 1, 4 monitors need new boards and in Unit 3, 6 monitors need new boards. The work in Units 1 and 3 will be completed during the next scheduled quarterly maintenance (July 1991 thru September, 1991).

IV. PREVIOUS SIMILAR EVENTS:

A previous similar event was reported in Unit 3 LER 530/90-001. The LER described an event where a CPU and RAM board failure caused a BOP ESFAS event. The corrective action for the 1990 event was completed in Unit 2 but had not been fully completed in Units 1 and 3 at the time of this event. As noted in the Corrective Actions (III.B.) the old style boards will be replaced during the next scheduled quarterly maintenance for each monitor.

