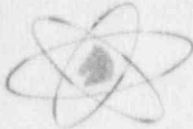


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Portland General Electric Company
Trojan Nuclear Plant
71760 Columbia River Hwy.
Rainier, Oregon 97048
(503) 556-3713

February 8, 1991
WRR-046-91

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington DC 20555

Gentlemen:

Licensee Event Report No. 91-01 is attached. This report discusses an event in which the Control Building Ventilation System inadvertently isolated due to the actuation of a Sulfur Dioxide detector while checking the status of the power indicating lamp.

Sincerely,

W. R. Robinson
General Manager
Trojan Nuclear Plant

c: Mr. John B. Martin
Regional Administrator, Region V
U.S. Nuclear Regulatory Commission

Mr. David Stewart-Smith
State of Oregon
Department of Energy

Mr. R. C. Barr
USNRC Resident Inspector
Trojan Nuclear Plant

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Trojan Nuclear Plant										DOCKET NUMBER (2) 0 5 0 0 0 3 4 4				PAGE (3) 1 OF 0 6							
TITLE (4) Inadvertant Control Building Ventilation Isolation Due to Actuation of Sulfur Dioxide Detector Power Switch While Checking the Status of Its Power Indicating Lamp																					
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 N/A		DOCKET NUMBER(S)										
0	1	0	9	9	1	9	1	0	0	1	0	2	0	8	9	1	0	5	0	0	0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																					
OPERATING MODE (9)		20.402(b)		20.405(c)		X		50.73(a)(2)(iv)		73.71(b)											
POWER LEVEL (10)		20.405(a)(1)(iii)		50.36(a)(1)				50.73(a)(2)(v)		73.71(c)											
		20.405(a)(1)(iii)		50.36(a)(2)				50.73(a)(2)(vi)		OTHER (Specify in Abstract below and in Text NRC Form 366A)											
		20.405(a)(1)(iii)		50.73(a)(2)(ii)				50.73(a)(2)(viii)(A)													
		20.405(a)(1)(iv)		50.73(a)(2)(iii)				50.73(a)(2)(viii)(B)													
		20.405(a)(1)(v)		50.73(a)(2)(iii)				50.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																					
NAME E. W. Ford, Compliance Engineer								TELEPHONE NUMBER 5 1 0 3 5 5 6 1 - 5 7 7													
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS												
NA																					
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)											
YES (If yes, complete EXPECTED SUBMISSION DATE)										NO											

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

On January 9, 1991, the Trojan Nuclear Plant was operating at 100 percent Rated Thermal Power. A Control Room Ventilation System isolation occurred when an operator was checking the status of a power indicating lamp on a Sulfur Dioxide detector. The causes of this event were as follows. Improper design - The power indicating lamp is an integral part of the power switch. This combined design makes it difficult to replace the lamp without actuating the switch. Inadequate labeling - The labels on the detectors did not provide warning against actuating the switch during light bulb replacement, or the protective actuation which will occur if the switch is actuated. Inadequate previous corrective action - A similar event occurred during Sulfur Dioxide detector maintenance in 1990. The corrective actions focused on causing an actuation during detector maintenance, and did not consider whether other plant personnel might cause the same type of event. Caution tags were placed on both detectors indicating that attempts to change the light bulbs may de-energize the detectors. New labels will be placed on the detectors which warn against changing the light bulbs and the possibility of causing an Engineered Safety Features actuation if the switch is operated. A modification to separate the indicating lamp from the power switch will be made.

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-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20585, 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 356A's) (17)

EVENT DESCRIPTION

On January 9, 1991, the Trojan Nuclear Plant was in Mode 1 (Power Operation) at 100 percent Rated Thermal Power under steady state operating conditions. The Generator Load was approximately 1160 MW. During routine rounds in the Control Building, the Auxiliary Operator noticed that the power supply indicating lamp on the "B" Control Room Ventilation System Sulfur Dioxide detector was not illuminated. Other indications on the detector unit were checked and were functioning properly. The power supply indicating lamp is an integral part of the power supply switch on the Sulfur Dioxide detectors used at Trojan. The operator removed the lens cover from the indicating lamp to check the status of the light bulb. The light bulb came on while it was being checked, and the operator replaced the lens cover. During replacement of the lens cover, the power switch was actuated and interrupted power to the detector. This occurred at 2333.

There are two Sulfur Dioxide detectors installed in the intake ductwork of the Control Room Normal Ventilation System. Their function is to isolate the outside air intake, and shutdown portions of the Control Room Normal Ventilation System upon the detection of Sulfur Dioxide. The system design is such that either detector will cause the automatic initiation functions to occur upon detection of Sulfur Dioxide or upon a power failure.

When the power to the detector was interrupted, the automatic actuation occurred and was annunciated in the Control Room. The Control Room Operators were initially unaware of the reason for the actuation and began to perform the actions of Off-Normal Instruction 54, High Toxic Gas Concentration. Performance of this procedure was stopped when the Auxiliary Operator informed Control Room personnel of the cause of the actuation. At 2348, after verifying the absence of toxic gas in the Control Room and proper functioning of the toxic gas detection system, the Control Room Ventilation System was returned to normal operation.

The Toxic Gas Detection System is considered to be part of the Engineered Safety Features at the Trojan Nuclear Plant. Therefore, this event constituted an Engineered Safety Features actuation which is reportable under the requirements of 10 CFR 50.73 (a)(2)(iv). This report is submitted to fulfill those requirements. This event was also reported via the Emergency Notification System, at 0002 on January 10, 1991, in accordance with the requirements of 10 CFR 50.72.

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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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CAUSE

Design

The application of a design which combines the power switch with the power indicating lamp is inappropriate for these detectors. Routine replacement of burned out indicating lights is a normal function performed by plant operators during their rounds. The combined design of the switch and light makes it difficult to replace the lamp without actuating the switch and causing an Engineered Safety Features actuation. There are bypass switches which block the actuation signals associated with these detectors, but requiring their use for performance of routine tasks such as indicating lamp replacement is considered inappropriate.

Labeling

Labels were placed on the detectors following a similar event in 1990 (Ref. LER 90-08). The labels identified the switch/lamp combination as the "on-off" switch and identified the need to bypass the actuation signal during detector maintenance (replacement of an indicating lamp light bulb is not normally considered maintenance). The labels did not provide warning regarding the protective actuation which will occur if the switch is depressed.

Inadequate Previous Corrective Actions

Inadequate corrective actions were taken to prevent recurrence when a similar event occurred during Sulfur Dioxide detector maintenance in 1990 (Ref. LER 90-08). The corrective actions taken were the labeling discussed in the paragraph above, and training of the maintenance staff regarding the circumstances involved in the event. These corrective actions were too narrowly focused in that they concentrated on the possibility of causing an actuation during detector maintenance, and did not consider whether other plant personnel (i.e. operators) might cause the same type of event.

Contributing Cause

In addition to the causes discussed above, inadequate maintenance trending contributed to the occurrence of this event. In a previous evaluation of problems with this detector, the Nuclear Plant Engineering Department determined that the expected life of the bulb should be on the order of three years. During the investigation of the event, it was identified that there have been three Maintenance Requests written against the indicating lamp in this detector since September, 1989. The most recent of these

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

Maintenance Requests was worked January 7, 1991, two days prior to the occurrence of this event. The problem which caused the light bulb to go out was not corrected. An evaluation to determine the cause of the frequent bulb failures and prescribe the proper corrective maintenance had not been performed.

CORRECTIVE ACTIONS

Immediate Corrective Actions

The Sulfur Dioxide detector was immediately re-energized, and the Control Room Ventilation System was returned to normal operation. Caution tags were placed on both detectors indicating that attempts to change the light bulbs may de-energize the detectors, and recommending submittal of a Maintenance Request for bulb replacement. An Operations Night Order was written to inform the other operating shifts of the event and provide caution against trying to replace the indicating lamp light bulb.

Long Term Corrective Actions

The Nuclear Plant Engineering Department has been assigned action to design and have installed a modification which will separate the indicating lamp from the power switch on these detectors. The design and installation will be completed by July 30, 1991.

The Nuclear Plant Engineering Human Factors Guideline will be revised to caution against use of switch/lamp combinations in the future. This action will be completed July 30, 1991.

New caution labels were placed on the Sulfur Dioxide detectors which warn personnel against changing the light bulbs and the possibility of causing an Engineered Safety Features actuation if the switch is operated. This action was completed January 31, 1991.

A review will be performed to determine whether there are other situations in which switch/lamp combinations are used where inadvertent switch operation could cause an undesirable plant response. A policy regarding the replacement of light bulb in these applications will be developed. This action will be completed March 19, 1991.

Since the time the previous similar event occurred in 1990, (Ref. LER 90-08) Portland General Electric Company has adopted use of an Event Review Team to analyze the causes and recommend corrective actions for reportable or other significant events which occur at

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Trojan. The Event Review Teams use formal root cause analysis techniques and bring a broad spectrum of experience to the review of these events. The use of the Event Review Teams is expected to reduce the number of repeat events.

Portland General Electric Company implemented use of a computerized Maintenance Evaluation and Trending System in December 1990. This system is used to identify repetitive problems, evaluate identified conditions and provide for corrective action. The system is expected to improve the corrective maintenance process and reduce the number of repeat problems. The system identified the power indicating lamps on the Sulfur Dioxide detectors as a problem independently of this event. However, since the system just recently became operational, the problem was not identified in time to prevent the occurrence of this event.

SAFETY SIGNIFICANCE

This event had no effect upon the safe operation of the plant or upon the health and safety of the public. The Control Room air intakes were isolated and normal ventilation systems shut down when the Sulfur Dioxide detector was deenergized. This is in accordance with the design of the system. The Sulfur Dioxide detector was immediately re-energized when the Auxiliary Operator realized that the switch had actuated. The ventilation system was restored to normal operation when the cause for the actuation was determined.

Additionally, the Trojan Nuclear Plant Architect Engineer performed an analysis which shows that the Sulfur Dioxide detectors are not a necessary part of the control room habitability system. The analysis showed that it would take greater than two minutes from the time Sulfur Dioxide odor was detectable in the Control Room until toxic concentrations were reached. Regulatory Guide 1.78, Assumptions for Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release, considers two minutes a sufficient time for trained operators to put a self-contained breathing apparatus (SCBA) into operation, if it is to be used. The Trojan operators are trained in SCBA use and these units are available in the Control Room. Portland General Electric Company submitted License Change Application 142 to the NRC to have (among other items) the requirement for Sulfur Dioxide detectors removed from the plant Technical Specifications.

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PREVIOUS SIMILAR EVENTS

One previous similar event was identified (Licensee Event Report 90-08). That event also involved a Control Room Ventilation System isolation which occurred during replacement of the indicating light bulb in a Sulfur Dioxide detector power switch.

Two additional events were identified in Licensee Event Report 89-01. These events involved the use of an incorrect bulb or an incorrect tool to replace a bulb. These events were not considered similar and the corrective actions taken could not have prevented inadvertently deenergizing the Sulfur Dioxide detectors.