

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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SUBJECT: LER 90-023-00:on 901004,engineered safety feature  
 actuation of CIA caused by sys overpressure during ST.

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

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	NRR/DST/SELB 8D	1 1	NRR/DST/SICB 7E	1 1
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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Docket No. 50-397

November 5, 1990

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

Subject: NUCLEAR PLANT NO. 2  
LICENSEE EVENT REPORT NO. 90-023

Dear Sir:

Transmitted herewith is Licensee Event Report No. 90-023 for the WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

Very truly yours,

J. W. Baker (M/D 927M)  
WNP-2 Plant Manager

JWB:lr

Enclosure:  
Licensee Event Report No. 90-023

cc: Mr. John B. Martin, NRC - Region V  
Mr. C. Sorensen, NRC Resident Inspector (M/D 901A)  
INPO Records Center - Atlanta, GA  
Ms. Dottie Sherman, ANI  
Mr. D. L. Williams, BPA (M/D 399)  
NRC Resident Inspector - walk over copy

P085602301



## 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.

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Washington Nuclear Plant - Unit 2

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TITLE (4)  
Engineered Safety Feature Actuation of Containment Instrument Air (CIA)  
Caused by System Overpressure During Surveillance Testing

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	0	0	9	0	0	0	2	3	0	0
1	0	0	9	0	0	1	1	0	5	9

OPERATING MODE (9) 1

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

## LICENSEE CONTACT FOR THIS LER (12)

NAME  
C. L. Fies, Compliance Engineer

TELEPHONE NUMBER  
AREA CODE 5 0 9 3 7 7 1 - 2 5 0 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

## 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 1700 hours on October 4, 1990, during the performance of activities associated with a Technical Specification Surveillance Channel Functional Test, a pressure loss occurred in the Containment Instrument Air (CIA) System. The pressure loss occurred when relief valve (CIA-RV-2) opened prematurely when pressure was increased in the system. The pressure decrease caused the safety-related part of the CIA system to be isolated and automatically placed the backup bottled nitrogen source into service. This action is considered an Engineered Safety Feature Actuation.

The root cause of this event was an equipment misapplication associated with Pressure Switch CIA-PS-21B. This situation was aggravated by a process associated with the Material Management System (MMS) which allowed a different model switch to be installed. A contributing cause was less than adequate procedures.

Corrective actions to prevent recurrence include a review of the installed equipment against design requirements, and a review of operations and maintenance procedures associated with this event. An evaluation of the Material Management System processes will also be performed.

The event posed no threat to the health and safety of either the public or plant personnel.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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

Plant Conditions

Power Level - 96%

Plant Mode - 1

Event Description

On October 4, 1990, the safety-related portion of the Containment Instrument Air (CIA) System was actuated. Just prior to the actuation Plant Instrumentation and Control Technicians were performing Technical Specification Surveillance 7.4.5.1.21, ADS-Accumulator Backup Low Pressure Alarm Division II-Channel Functional Test. This test is a monthly test to verify the proper operation of three Containment Instrument Air (CIA) pressure switches. The I&C Technicians found Pressure Switch 21B (CIA-PS-21B) in the tripped condition and immediately notified the Shift Manager as required by the procedure.

Plant Operators then initiated action to reset CIA-PS-21B. They knew a CIA pressure of approximately 160 psig would be required to reset CIA-PS-21B and since the pressure control valve for CIA (CN-PCV-10) was set to control at 150 psig specific action would be needed to accomplish this task. One operator was sent to the Nitrogen Storage Tank (CN-TK-1) located outside the power block where he established radio communication with the control room. One of the I&C Technicians was located at CIA-PS-21B at the 548 foot Level of the Reactor Building who was also in communication with the control room. The Control Room Supervisor then instructed the Plant Operator at CN-TK-1 to open the bypass valve (CN-V-34) around CN-PCV-10 two turns to pressurize the CIA system in an effort to reset CIA-PS-21B.

When the pressure was increased in the CIA system it peaked at approximately 165 psig according to the computer trace measured by Pressure Transmitter CIA-PT-20. This was enough pressure to open relief valve (CIA-RV-2) located on the Air Receiver (CIA-AR-1). The setpoint listed on the data sheet for CIA-RV-2 is 180 psig so it appears to have opened at a somewhat lower pressure. With the relief valve open the pressure in the CIA header dropped to the point where the safety-related part of CIA isolated and the Division II backup nitrogen supply was initiated. This action is considered an Engineered Safety Feature Actuation.

The safety-related part of the CIA provides the nitrogen supply to operate the Main Steam Safety Relief Valves (MSRVs) in the Automatic Depressurization System (ADS) mode of operation. The ADS is a portion of the backup Emergency Core Cooling System (ECCS) designed to quickly reduce reactor pressure in the unlikely event of failure of the High Pressure Core Spray (HPCS) system. The ADS is composed of seven specially designated MSRVs that provide rapid depressurization of the primary system. The safety-related part of the CIA system normally receives nitrogen from the non-safety-related part of the system via CIA-V-39A(B). The "A" devices are used to designate safety-related Division I and the "B" devices make up Division II. When a loss of pressure is detected by Pressure Switches CIA-PS-39A(B) valves CIA-V-39A(B) are automatically closed. This isolation occurred at 1700 hours when the pressure dropped to 140 psig.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

Following isolation the CIA system is designed to maintain the Division I and II safety-related headers at a nominal pressure of 150 psig using backup nitrogen bottles. A total of three signals are used to initiate backup nitrogen for the ADS. The signals are (1) CIA-PS-22A(B) 137 PSIG, (2) CIA-PS-21A(B) 140 PSIG, and (3) CIA-V-39A(B) closed as described above. These signals feed a two-out-of-three logic circuit which initiates the stepping programmers for the nitrogen bottles. Programmer "A", CIA-PROG-1A, is initiated by the "A" logic and provides backup nitrogen to three ADS valves. Programmer "B", CIA-PROG-1B, is initiated by the "B" logic and provides backup nitrogen to four additional ADS valves. At 1700 hours CIA-PROG-1B (Division II) was automatically initiated by the logic described above. The pressure in the Division II header recovered to 150 psig by 1705 hours. It should be noted that the accumulators for the ADS valves each have a check valve between the accumulator and the header where the relief valve is located. Thus, nitrogen pressure would have been available to operate the Division II ADS valves. The pressure in the Division I part of the CIA system was maintained above 150 psig throughout this time period.

Once CIA-RV-2 reset the CIA header pressure returned to the normal value of 150 psig and both CIA-V-39A and B were reopened. At this time CIA-PS-21B was still in a tripped condition. CN-V-34 was then opened again (one half turn) to reset CIA-PS-21B allowing I&C to complete their surveillance.

Immediate Corrective Action

The relief valve was closed allowing the CIA header pressure to reestablish at 150 psig at 1705 hours. CIA valves CIA-V-39A and CIA-V-39B were then reopened to establish the normal configuration.

Further Evaluation and Corrective Action

## A. Further Evaluation

1. The actuation of the Division II portion of CIA is being reported per the requirements of 10CFR50.73(a)(2)(iv) as an "event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF).....".

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 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)

2. Further evaluation of the history of CIA-PS-21B revealed the following information. In 1986 the pressure switch was changed from a Barton instrument to a Static-O-Ring device (Design Change Package 85-0147-0A-29) to provide a narrower deadband. Since the operating pressure in the CIA header is normally 150 psig and the trip setpoint (decreasing) is 140 psig the deadband was specified (Engineering Specification No. 16961-0009-1) at 8 psig. The final test certificate provided with the shipment of switches indicated that the 8 psig deadband was achievable. A review of the test data associated with the work order that installed the switch (Maintenance Work Request AU6651) indicates CIA-PS-21B never met the design requirements. A Material Request and subsequent purchase order to the manufacturer was submitted for an alternate switch to meet the deadband requirements in late 1986. In early 1987 the vendor issued a Part 21 that included the model switch installed as CIA-PS-21B. An engineering evaluation of the Part 21 notification indicated that the installed switches were adequate for the CIA application. To remedy the Part 21 concern the vendor offered a replacement model switch with a greater deadband. In March 1990, in response to the open purchase requisition, the vendor formally guaranteed a maximum 12 psig deadband, 4 psig above the desired level. After an engineering review of the deadband information, the evaluation revision record for the replacement model was updated to allow the use of the replacement model for CIA-PS-21A(B) due to the system operating margin. The Material Management System (MMS) was updated to allow that application. Three days later, on March 23, 1990, the evaluation revision record was updated to remove CIA-PS-21A(B) from the list of available plant applications but the MMS database was not revised at that time.
3. In May 1990 I&C Technicians withdrew a replacement switch from plant stores to change out CIA-PS-21B due to a discrepancy discovered during a monthly surveillance. As part of the withdrawal process for this application, a Material Verification Record (MVR) check in the MMS is required to validate the use of the equipment for the specific application. That check was executed on this withdrawal but since the MMS database had not been updated to reflect the record revision there was no flag to preclude withdrawal for the CIA-PS-21B application. The MMS database was updated in June 1990 to remove CIA-PS-21A(B) as a suitable application for this model.
4. CIA-PS-21B surveillance data from June 1989 to June 1990 indicates an average deadband of 12.76 psig. Surveillance data from July 1990 to October 1990 for the replacement model switch indicates an average deadband of 15.29 psig.



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

5. A review of the Plant Technical/Engineering correspondence including Field Change Request (FCR) 02- 85-0147-0-01 dated October 24, 1986 shows a request was made to have Pressure Switches CIA-PS-21A(B) connected to the Bypass and Inoperable Status Indicators (BISI) similar to Pressure Switches CIA-PS-22A(B). This would provide an alarm in the control room if either of these switches is in the tripped condition. However, the request was outside the scope of the associated modification and a revision to the Plant Modification Request (PMR) was never submitted.
6. Plant Operators were using the general guidance of Plant Procedures PPM 1.3.1, Conduct of Operations to perform the operation associated with the reset of CIA-PS-21B. They were also familiar with the problem because the same thing had happened before and the same process had been successfully used to reset the switch.
7. Discussions were held with the Plant I&C Technicians on alternate methods of resetting CIA-PS-21B. A portable nitrogen source is available to locally pump up the switch since the current procedure calls for a pressure source including a nitrogen bottle and regulator. They pointed out this was not included in the present version of the procedure and they would be reluctant to do this without a procedure deviation or approved work request.
8. The preliminary root cause of this event was an equipment misapplication involving the reset value of Pressure Switch CIA-PS-21B. The situation was aggravated by the processes associated with the Materials Management System (MMS) that allowed a different model switch with a larger deadband to be installed. Another contributing cause was less than adequate procedures to provide an alert to the switch condition and the process to be followed if the switch is found in the tripped condition. The root cause evaluation has not been completed. If any significant changes are made to the summary given above the LER will be revised.

B. Further Corrective Action

1. The system requirements along with the installed configuration of CIA-PS-21A(B) will be reviewed to determine if improvements can be made in system operation. This review will include a review of the need for annunciation in the control room if CIA-PS- 21A(B) are in the tripped condition.

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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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2. Plant operating procedures will be reviewed to determine if changes need to be made to reset CIA-PS- 21A(B) if a pressure decrease takes place in the CIA system.
3. Surveillance Procedure 7.4.5.1.21 will be reviewed to provide additional guidance on steps to be taken in the event a switch is found in a tripped condition.
4. CIA-RV-2 will be tested to verify the proper relief pressure.
5. An evaluation will be performed of the transmittal and MMS update process where procurement requirements or use controls are revised.

Safety Significance

This is no safety significance associated with this event. The accumulators for the ADS valves each have a check valve between the accumulator and the header where the relief valve is located. Thus, nitrogen pressure would have been available for initial automatic operation of the ADS valves. In addition, all conditions associated with CIA-PS-21B have put the plant in a safer condition. There was no threat to the health and safety of Plant personnel or to the public.

Similar Events

The most recent LER associated with CIA was LER 90-022. This LER described an ESF actuation of CIA caused by depleting the Nitrogen Cryogenic Tank (CN-TK-1) during containment inerting. There is a high probability that CIA-PS-21B was placed in a tripped condition three days earlier during that event which ended on October 1, 1990.

There were two other recent LERs associated with loss of normal CIA pressure and ESF actuation of the safety-related portion of CIA. LER 90-005 describes the event that occurred when the normal CIA supply was lost due to a faulty non-safety-related circuit breaker. LER 90-018 describes the event that occurred on September 4, 1990 when a light fixture was inadvertently moved against the manual handle on relief valve CIA-RV-5B causing depressurization of the Division II portion of the system.

These events all occurred on the CIA system but do not appear to be related in any significant way except as noted above.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS  
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

IIIS InformationText ReferenceIIIS ReferenceSystem Component

Containment Instrument Air (CIA)

LD

--

CIA Relief Valve 2 (CIA-RV-2)

LD

RV

CIA Pressure Switch 21B

LD

PS

(CIA-PS-21B)

Containment Nitrogen Pressure Control

LK

PCV

Valve 10 (CN-PCV-10)

Nitrogen Cryogenic Tank (CN-TK-1)

LK

TK

Containment Nitrogen Bypass Valve

LK

V

(CN-V-34)

CIA Pressure Transmitter 20 (CIA-PT-20)

LD

PT

CIA Receiver Tank (CIA-AR-1)

LD

TK

Safety Relief Valves (SRVs)

SB

V

Automatic Depressurization System (ADS)

BG

--

High Pressure Core Spray System (HPCS)

BG

--

CIA Valves 39A and B (CIA-V-39A(B))

LD

V

CIA Pressure Switches 39A and 39B

LD

PS

(CIA-PS-39A(B))

CIA Pressure Switches 22A and 22B

LD

PS

(CIA-PS-22A(B))

CIA Pressure Switch 21A (CIA-PS-22A)

LD

PS

CIA Programmers 1A and 1B

LD

PMC

(CIA-PROG-1A(1B))

CIA Relief Valve 5B (CIA-RV-5B)

LD

RV

