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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 90-022-01: on 900930, ESF actuation occurred re pressure being decreased in containment Instrument Air sys. Caused by less than adequate procedure. Obtain more liquid nitrogen & containment nitrogen procedures revised. W/910422 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 12
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

Docket No. 50-397

April 22, 1991

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 90-022-1

Dear Sir:

Transmitted herewith is Licensee Event Report No. 90-022 Revision 1 for the WNP-2 Plant. This report provides more complete information on this event as discussed during meetings associated with Inspection 90-28 and the SALP review.

Very truly yours,

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

JWB:lr

Enclosure:
Licensee Event Report No. 90-022-1

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

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LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1) Washington Nuclear Plant - Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 1				PAGE (3) 1 OF 1									
TITLE (4) Engineered Safety Feature Actuation of Containment Instrument Air (CIA) Caused by Depleting the Nitrogen Cryogenic Tank																							
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	3	0	9	0	0	2	2	0	1	0	4	2	2	9	1	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(c)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)									
POWER LEVEL (10)		20.406(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)									
7.0		20.406(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vii)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)									
		20.406(a)(1)(iii)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(A)													
		20.406(a)(1)(iv)				50.73(a)(2)(iii)				50.73(a)(2)(viii)(B)													
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)													
LICENSEE CONTACT FOR THIS LER (12)																							
NAME C. L. Fies, Compliance Engineer												TELEPHONE NUMBER AREA CODE 510 937 71-12 510 11											
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)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
<input type="checkbox"/> 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)

At 1600 hours on September 30, 1990, while plant operators were inerting the primary containment during a reactor startup, a pressure decrease occurred in the Containment Instrument Air (CIA) System. The pressure loss occurred when the Nitrogen Cryogenic Tank (CN-TK-1) (the normal supply used for containment inerting and for CIA) was inadvertently depleted. This 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. Further evaluation showed that the pressure maintained by the bottled nitrogen source in Division II did not meet design requirements because of a misadjusted pressure regulator.

The root cause of the depleted nitrogen supply in CN-TK-1 was less than adequate procedures that did not contain precautions for containment inerting with low tank levels. A second root cause was less than adequate supervisory oversight and a contributing root cause was an equipment design deficiency associated with the alarm setpoint on CN-TK-1. The root cause of the low nitrogen pressure in Division II was an equipment design deficiency associated with the Pressure Control Valve CIA-PCV-2B. The root cause of the event where plant operators did not respond to the abnormal condition alarm was a knowledge based error.

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-630), 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)

Abstract (continued)

Immediate corrective action was taken to obtain an additional supply of nitrogen. Procedures and the level setpoint were also changed to make sure plant operators are aware of the CN-TK-1 level and the possibility of loss of pressure. The Pressure Control Valves (CIA-PCV-2A and CIA-PCV-2B) have been evaluated and will be secured in their proper regulating position. Plant operating personnel were counseled on the need to strictly follow the guidance in Plant Procedures.

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

Plant Conditions

Power Level -70 %

Plant Mode - 1

Event Description

At 1600 hours on September 30, 1990 Plant Operators were in the process of inerting Primary Containment following reactor startup on September 28. During the inerting process, shortly after shift change, the inventory of Containment Nitrogen Tank One (CN-TK-1) was lowered to a level which led to an ESF actuation due to low system pressure in the Containment Instrument Air (CIA) System.

The Shift Support Supervisor noted that the CN-TK-1 was somewhat lower than normal at 150" (325" being full) following shift turnover at approximately 1400 hours. He had previously assigned two Equipment Operators to follow Primary Containment inerting. One was assigned to follow the job at the Nitrogen Cryogenic Tank (CN-TK-1) skid, using Plant Procedure PPM 2.3.7, "Nitrogen Inerting System". The other Operator used Plant Procedure PPM 2.3.1 "Primary Containment Venting, Purging, and Inerting", which had work to do in several locations. The CN-TK-1 Low Level alarm was set to actuate at a level of 220". Thus the alarm is normally on during the inerting process.

At the start of swing shift the Shift Support Supervisor believed that there was enough inventory in the tank to complete any further inerting. The Drywell oxygen was approximately 7.5% of total Drywell volume at 1430 hours, with the system designed to control the oxygen at approximately 2 percent. The Technical Specification limit is 3.5 % oxygen.

At 1615 hours the Equipment Operator at the CN-TK-1 skid questioned the Shift Support Supervisor as to how much inerting there was left to do, because the Tank level was getting rather low, reading approximately 40" at that time. The PPM provided no guidance as to minimum values for the tank. He was told by the Supervisor that inerting would be completed shortly, so the process could continue.

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 80.0 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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TEXT (If more space is required, use additional NRC Form 366A's) (17)

It was shortly following this exchange, via telephone, at approximately 1615 hours, that Control Room personnel received "Cryogenic Tank N2 Press Low" alarm, which activates at 155 psig (+ or - 6 psig). Subsequently, the A and B ADS Headers isolated at 1618 hours and at 1620 hours, respectively. At that time the Division II CIA ADS Timer cycled the Nitrogen Backup bottles ON to maintain ADS Nitrogen pressure. This event is considered an ESF actuation at WNP-2. Eventually, the Div. II CIA ADS Header stabilized at 121 psig. The Division I CIA Header, which is much tighter, stabilized at approximately 150 psig.

When the Containment Nitrogen (CN) system loses pressure, Plant Operators must take manual action to provide a backup supply of air from the Control Air System (CAS) to prevent the Main Steam Isolation Valves (MSIVs) from closing. At 1625 hours, Plant Operators cross connected the CAS system to the CIA system per Plant Procedures, PPM 2.8.2, Containment Instrument Air. This lineup connects non-safety related loads to the CAS through the CIA system air dryers. This procedure states that "Normal CIA pressure while being supplied by CAS is 80 psig. Normal CAS header pressure is 100 psig. MSIV closure will occur at approximately 50 psig." Plant operators observed the CIA pressure decrease and were concerned about the pressure drop across check valves (CIA-V-742 and CIA-V-743) downstream of the CIA Dryer tower and filter units.

Because of their concern about pressure drop Plant Operators installed an air path jumper between the Service Air (SA) System and the CIA receiver tank (CIA-AR-1) through CIA-V-19. This jumper bypasses the dryer units and provides air through an Air Receiver (CIA-AR-1) to the non-safety related part of CIA. At 1910 hours CIA non-safety related header pressure was stabilized at approximately 105 psig using Service Air. Operations management then stationed Equipment Operators at the SA hose connections for continuous monitoring.

The CN System is a non-safety related system that provides a one million standard cubic foot supply of nitrogen for the plant. It provides a high volume source of nitrogen to inert the containment and also provides a regulated supply of nitrogen to specific loads inside Containment. The non-safety related part of the Containment Instrument Air (CIA) header supplies pneumatic pressure to the Inboard Main Steam Isolation Valves (MSIVs) and the Main Steam Safety/Relief Valves (SRVs). The "safety related" part of the CIA system is composed of two separate headers which, combined, supply the nitrogen to operate seven 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), an Engineered Safety Feature, 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 (7) 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 designate Division II. When a loss of pressure is detected by pressure switches CIA-PS-39A(B), valves CIA-V-39A(B) are automatically closed. The isolation of these valves, by system design, occurred at approximately 1618 hours when the pressure dropped to 137 psig.

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-830), 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)

At 1620 hours, when the Logic for Division II Initiation was satisfied (The logic being 2/3 of: (1)CIA-PS-22B less than 137 psig; (2)CIA-PS-21B less than 140 psig; or CIA-V-39B closed) the CIA-PROG-1B was automatically initiated and the Div. II system went on backup bottles. The pressure in the Div. II header dropped to a low of 117 psig at 1900 hours and then, eventually, stabilized at 120 psig. The system should maintain header pressure at 150 psig. The Div. II System stayed at 120 psig for approximately 24 hrs., as shown by the pressures recorded by Transient Data Acquisition System (TDAS). Control Room Alarm 4.820.B1, Window 10-4 "CIA Div 2 Out of Service" was on for approximately 24 hrs. due to "N2 Div. 2 Supply Press Low" which alarms at a pressure less than or equal to 137 psig, or when the Programmer selects the last bottle. With this alarm on it means that the backup bottles were not providing sufficient pressure to the Div. II header. The response to 4.820.B1, 10-4, step number 4 calls for checking the pressure regulating valve CIA-PCV-2B, and to consider bypassing if necessary. For the 24 hour period that the alarm was lit, this was never done, nor was the alarm responded to.

A truckload of liquid nitrogen, which had been previously ordered, was scheduled for delivery on October 1, 1990. It arrived on schedule and at 1125 hrs operators began filling CN-TK-1. The CIA system was placed back into service at approximately 1600 hours on October 1.

Immediate Corrective Action

1. Immediate action was taken to obtain additional liquid nitrogen.
2. The Containment Nitrogen Inerting Procedures (PPM 2.3.1 and 2.3.7) were revised to clearly provide a lower limit for CN-TK-1 level. Specifically, a caution statement was added to the procedures which reads: "When inerting the containment, closely monitor the Liquid Nitrogen Storage Tank Level. Do not drain liquid level to less than or equal to 50 inches at CN-LIS-1. If the tank level is lowered beyond the point where normal pressure is maintained, as indicated by CN-PI-1, containment CIA header pressure will be lost."

Further Evaluation and Corrective Action

A. Further Evaluation

The actuation of the Safety Related 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).....". In addition, this event is being reported under 10CFR50.73(a)(2)(i)(B) as "Any operation or condition prohibited by the plant's Technical Specifications..."

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

1. The first part of this further evaluation is concerned with the part of the event associated with low level in CN-TK-1.
 - a. The Liquid Nitrogen Tank (CN-TK-1) was inadvertently reduced to less than desired levels because of less than adequate plant procedures. The procedures being used, PPM 2.3.1 and PPM 2.3.7, did not provide the Equipment Operator(s) adequate information for them to realize, on their own, what the minimum acceptable tank level was, before the process of inerting had to be terminated. The Equipment Operators knew that the tank inventory was approaching a marginally, low condition, but the procedures did not provide guidance nor instruction on what was the minimum level before stopping the process.
 - b. The Shift Support Supervisor could have stayed at the CN-TK-1 skid and followed the Inerting process through to it's conclusion. Instead, he elected to have the two operators, who were qualified on the system, follow the procedures for Primary Containment inerting, contacting them by telephone when needed. The Supervisor had physically been to the skid at the start of the shift, at 1415 hours. After he assigned the operator to the job, he did not return until the occurrence of the event. At the start of the job he noticed that there was less than a desired amount of inventory of liquid nitrogen, but that there was probably enough to complete inerting. He did not return to the skid again, until the event occurred, being busy in performing his other duties throughout the plant. He did stay in contact with both Equipment Operators prior to event initiation.
 - c. The root cause for the inadvertent draining of the Liquid Nitrogen Tank was determined to be procedural. The purpose of Plant Procedures PPM 2.3.1 and 2.3.7 is to provide operations personnel with instructions that will guarantee successful completion of the task being described. These plant procedures lacked a caution or instruction step for providing instruction for the Equipment Operators to NOT go below a certain minimum tank level.
 - d. An additional cause for the depletion of the Nitrogen Tank was less than adequate supervisor oversight on the part of the Shift Support Supervisor. Because he devoted his attention to completing duties of a lesser priority, he choose to spend less time following the inerting process. The Shift Support Supervisor should have given the inerting of the Primary Containment a much higher priority of importance and followed the job much closer than he did.

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-630), 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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- e. A contributing cause to the depletion of the liquid nitrogen tank level event was the nitrogen tank Low Level Alarm, 4.813.H1 Window 3-3, "Cryogenic Tank N2 Level Low" which was set to actuate at 220". This alarm level is too high since the level of the tank reaches 220", from a max level of 325", rather quickly in the initial stages of inerting Primary Containment. Normally, the highest tank level readings recorded on the Outside Tour Log Sheet are 300" which is only 80" above the 220" alarm setting. At 220" Operations would be in the initial stages of Inerting and the low level alarm would actuate. Operations would continue on with Inerting with the alarm on for the remainder of the process. Thus, its purpose is lost to the Control Room Operators. The alarm at 220" did not make Operations do anything other than to, verify the level in the tank and notify the appropriate personnel to order additional liquid nitrogen.
2. The second part of this further evaluation is concerned with the low pressure in the Division II CIA header.
- a. When the initial event occurred on October 1, 1990 the Plant Operations manager requested a review of the situation by the System Engineer. A Plant Technical/Engineering evaluation of the CIA data on October 12, 1990 showed that pressure maintained in the Division II CIA header was below the design basis value. Engineering Calculation 5.46.05, stated a pressure of 127 psig was required to satisfy the system safety function. This value is based on a Safety Relief Valve (SRV) actuating pressure of 88 psid and a peak containment pressure of 39 psig. Plant operators were not aware of the minimum design basis pressure of 127 psig for the system when the event occurred on September 30, 1990.
- b. Further evaluation on October 12 indicated that the pressure regulator for Division II (CIA-PCV- 2B) was not adjusted properly causing the low pressure in the header. At 1000 hours on October 12, 1990 ADS Division II was declared inoperative due to low header pressure and Technical Specification Action Statement 3.5.1.e.2 was entered which required HOT SHUTDOWN within the next twelve hours. An emergency work request was generated to investigate the pressure setpoint of CIA-PCV-2B. It was immediately apparent that it was not set at the proper pressure and an adjustment was completed to establish a pressure of 150 psig in the Division II header. ADS Division II was declared operable at 1242 hours on October 12, 1990.

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

- c. A root cause associated with this low pressure setting was an equipment design deficiency. The location of this valve placed it in a position where "inadvertent adjustment" could occur by bumping or hitting the Tee handles on the valve. The valve should have been designed to prevent this type of "adjustment."
- d. During this time plant operating personnel were under the guidance of Abnormal Condition Procedure 4.820.B1, Window 10-4 "Containment Instrument Air Division II Out of Service". Step #5b states that if pressure is less than 140 psig, action should be taken to use backup systems to restore low MSIV/SRV header pressure. This was done, as explained above through the use of CAS and SA. Step #5c states that if inerting is in progress restore nitrogen tank pressure. Actions were taken to make sure additional nitrogen was ordered. Step #3 says to "Check for proper control of CIA-PCV-2B, consider bypassing if necessary". This refers to bypassing the regulating valve CIA-PCV-2B by opening the 1/2" bypass valve CIA-V-733B and, thereby, increasing Div. 2 pressure. The reason that this was not done was their concern for repressurization of the header, which might cause the Div. 2 header isolation valve (CIA-V-39B) to reopen. The reopening of CIA-V-39B could create a condition where the entire backup supply would eventually be depleted. The error in this diagnosis, which was discovered at a later date, was that the pressure sensing instrument, for CIA-V-39B which could cause the valve to open, is on the side of the valve that would not have seen the pressure increase. Up until this, Operations had taken all the correct actions and exercised every precaution for maintaining CIA system pressure and Plant safety.
- e. Further evaluation showed, however, that for approximately 24 hours the "CIA Div. 2 Out of Service" alarm was on. Step #1 of the procedure for "N2 Div 2 Supply Press Low" relates that the alarm annunciates pressure less than or equal to 137 psig and Step #4 states, "Check for proper control of CIA-PCV-2B. Consider bypassing if necessary". They failed to realize that the alarm for N2 Div. II was independent of the loss of N2 Tank level problem. Therefore, they failed to use Abnormal Condition Procedure 4.820.B1, which would have corrected the cause of the alarm, and returned the system pressure to normal. CIA Division II header pressure was at 120 psig and the bypass around CIA-PCV-2B could have been opened/throttled to raise the pressure and restore normal pressure per the procedure instructions. Additionally, Step #6 could have alerted Operations personnel to the fact that with alarm window 10-4 ON (actuated), pressure may not be within the requirements of Technical Specification 3.5.1., therefore, some form of action was required.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

- f. TDAS documentation confirms that DIV. II Header pressure did in fact drop to approximately 120 psig and remain that way until approximately 1600 on October 1, 1990. Supporting this is the fact that on October 12, 1990, 12 days after the event, CIA-PCV-2B was found to be set to regulate Div. II ADS pressure at only 120 psig (127 psig was minimum required at the time). A Maintenance Work Request (MWR) AR1148 was initiated and adjustments completed on October 12, 1990. At that time the system was returned to a 150 psig regulating pressure.
- g. The cause for annunciators not being corrected for 24 hours was personnel related attributed to a Knowledge Based Error. Knowledge Based Errors occur when a worker is put in a new or novel situation where limited information is available, limited response time available, and he must rely on his system knowledge to work. The response to the loss of N₂ and CIA header pressure taxed the Operation personnel's knowledge and teamwork abilities.
- h. An Engineering evaluation (Supply System Memo SS2- PE-90-0998) after the event on October 17, 1990 showed the required minimum pressure in the ADS pneumatic supply header is 134 psig. This higher pressure takes into account the line losses between the accumulators and the point where the header pressure is measured.
3. A further evaluation was performed of the portion of the event associated with the use of Service Air (SA) to provide a backup to CIA. CAS was lined up to supply pressure to the CIA main header to ensure the Main Steam Isolation Valves (MSIVs) had adequate air pressure to stay open. However, the pressure continued to drop and the Shift Manager made a decision to have a jumper installed from the Service Air (SA) system to the CIA system. Operations reasoning for doing this was that no CAS air flow was initially observed and conceivably the check valves downstream of the dryer unit could have remained closed or the pressure drop across the dryer units could be excessive. They evaluated the moisture content of the air before connecting the SA system to CIA.
4. The containment was inerted to an oxygen content below the Technical Specification limit of 3.5% prior to nitrogen depletion and stayed below that value for the duration of the event.
5. There were no structures, components or systems that were inoperable prior to the start of the first part of this event associated with the loss of the contents of CN-TK-1. The loss of nitrogen clearly contributed to the second part of the event associated with low pressure in the Division II CIA header.

LICENSEE EVENT REPORT (LER)
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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Washington Nuclear Plant - Unit 2	05000397	90	022	01	09	OF 11

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

B. Further Corrective Action

1. Pressure Regulating Valve (CIA-PCV-2B) was adjusted to its proper setpoint of 150 psig.
2. An Instrument Setpoint Change Request was prepared and implemented to move the low level alarm on CN-TK-1 from 220 inches to 80 inches.
3. Plant Procedure, PPM 2.3.7, Nitrogen Inerting System was modified with a Caution note which states: "Performance of the remainder of this procedure section requires the Shift Support Supervisor remain informed regarding inerting equipment operability, tank filling operations, operator assignment and responsibility."
4. Procedures for using CAS as a backup to CIA were evaluated to see if changes needed to be made to better define when and how the backup is to be accomplished. No changes were required.
5. Plant operating personnel were counseled on the need to strictly follow the guidance provided in Abnormal Condition Procedures.
6. Plant Procedure PPM 1.3.1, Conduct of Operations was revised to add a new section to track "Out of Service Instruments and Alarms".
7. Plant Procedure (PPM 4.820.B1-10-4), Containment Instrument Air Division 2 Out of Service, was reviewed to assure actions required in response to low nitrogen supply are clear. No changes were required to the procedure.
8. A review of surveillance procedures was conducted to provide additional assurance that regulating valves on the safety related part of CIA (CIA-PCV-2A and 2B) are set correctly to maintain pressure. Plant Procedure PPM 8.3.49 checks the operation of these valves. A change will be made to the valves to secure them in a fixed position.

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. The operation of this equipment is verified by Surveillance Test 7.4.0.5.53, CIA-V-40 Operability Test. This test was completed successfully in July 1990. Thus, nitrogen pressure would have been available for initial automatic operation of the ADS valves.

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)

The use of Service Air (SA) as a backup to CIA raised the concern of moisture entrainment in the CIA system since the CIA Dryer Skid was bypassed. This is not a concern since the safety related part of CIA remained at a higher pressure (greater than 117 psig) than the CAS pressure (approximately 105 psig). When the normal Containment Nitrogen (CN) supply was returned to service it connects into the system between the Air Receiver tank (CIA-AR-1) and the Safety related part of CIA. Any moisture in CIA-AR-1 would tend to condense out in that volume. Consequently, there was no safety significance associated with the use of Service Air for this limited time period.

The safety related nitrogen supply for the ADS valves is designed to maintain the ADS function for 100 days following a postulated LOCA. The Programmers along with 34 nitrogen cylinders provide a 30 day supply of nitrogen. In addition, each division has a single remote nitrogen cylinder CIA-TK-20A(8) that provides nitrogen for the time period from 30 to 100 days. All these nitrogen sources feed through the pressure regulators (CIA-PCV- 2A(B) that control pressure to 150 psig. The pressure regulators are located in the corridor between the Diesel Generator and the Reactor building. This is one of the areas of the plant that is designed to be accessible during LOCA conditions. Thus Plant Operators would have had access to CIA-V-2B and could have adjusted the pressure in the unlikely event it was needed during long term post LOCA conditions. In addition, the CIA-V-2B has a bypass valve and a local pressure indicator (CIA-PI-31B) that could be used to control pressure.

At the time of the event the Primary Containment was below its Technical Specification required oxygen limits and it remained below this value throughout the event. There was no threat to the health and safety of Plant Personnel or to the public.

Similar Events

There were two 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.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATIONESTIMATED 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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

EIIS InformationText ReferenceEIIS Reference
SystemComponent

Containment Instrument Air (CIA)	LD	--
Nitrogen Cryogenic Tank (CN-TK-1)	LK	TK
Containment Nitrogen Inerting System (CN)	LK	--
CIA Pressure Control Valve 2B (CIA-PCV-2B) and (CIA-PCV-2A)	LD	V
Main Steam Isolation Valves (MSIVs)	SB	V
CIA Check Valves (CIA-V-742, 743)	LD	V
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 (CIA-PS-39A(B))	LD	PS
Control Air System (CAS)	LD	--
Service Air System (SA)	LF	--
CIA Receiver Tank (CIA-AR-1)	LD	TK
CIA Valve 19 (CIA-V-19)	LD	V
CIA Pressure Switches 22A and 22B (CIA-PS-22A(B))	LD	PS
CIA Pressure Switches 21A and 21B (CIA-PS-21A(B))	LD	PS
CIA Programmers 1A and 1B (CIA-PROG-1A(1B))	LD	PMC
CIA Pressure Indicator 21B (CIA-P-21B))	LD	PI
CIA Pressure Indicator 31B (CIA-P-31B))	LD	PI
CIA Remote Nitrogen Cylinder 20A and 20B (CIA-TK-20A(B))	LD	TK

