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 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-012-00: on 940623, discovered water in bottom of control room emergency filter unit WMA-FU-54B. Caused by leaky manual isolation valve. Revised deluge system valve station lineups. W/940722 ltr.

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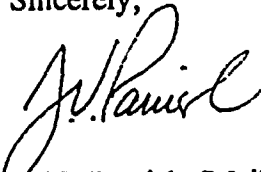
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Subject: NUCLEAR PLANT WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 94-012

Transmitted herewith is Licensee Event Report No. 94-012 for the WNP-2 Plant. This report is submitted in response to the reporting requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

Should you have any questions or desire additional information, please call me or D.A. Swank at (509) 377-4563.

Sincerely,



J. V. Parrish (Mail Drop 1023)
Assistant Managing Director, Operations

JVP/KBL/js
Enclosure

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JEH

LICENSEE EVENT REPORT (LER)

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| FACILITY NAME (1) | | | | | | | | | | | | | | DOCKET NUMBER (2) | | | | | | | | | | PAGE (3) | | | | | | | | | | | | | |
| Washington Nuclear Plant - Unit 2 | | | | | | | | | | | | | | 0 5 0 0 0 3 9 7 | | | | | | | | | | 1 OF 7 | | | | | | | | | | | | | |
| TITLE (4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 NUMBERS(S) | | | | | | | | | | | | | | | | |
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| OPERATING MODE (9) | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| POWER LEVEL (10) | | | 20.402(b) | | | | | | 20.405(C) | | | | | | 50.73(a)(2)(iv) | | | | | | 77.71(b) | | | | | | | | | | | | | | | | |
| 0 | | | 20.405(a)(1)(i) | | | | | | 50.36(c)(1) | | | | | | 50.73(a)(2)(v) | | | | | | 73.73(c) | | | | | | | | | | | | | | | | |
| | | | 20.405(a)(1)(ii) | | | | | | 50.36(c)(2) | | | | | | 50.73(a)(2)(vii) | | | | | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | | | | | | | | | | | | | | | | |
| | | | 20.405(a)(1)(iii) | | | | | | X 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 | | | | | | | | | | | | | | TELEPHONE NUMBER | | | | | | | | | | | | | | | | | | | | | | | |
| Kurt B. Lewis, Technical Specialist | | | | | | | | | | | | | | AREA CODE | | | | | | | | | | | | | | | | | | | | | | | |
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| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | | COMPONENT | | | MANUFACTURER | | | REPORTABLE TO NPRDS | | CAUSE | SYSTEM | | COMPONENT | | | MANUFACTURER | | | REPORTABLE TO NPRDS | | | | | | | | | | | | | | | | | |
| A | V | I | F | L | T | | F | A | R | R | NO | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | | | | | EXPECTED SUBMISSION DATE (15) | | | | | MONTH | DAY | YEAR | | | | | | | | | | | | | | | | |
| YES (If yes, complete EXPECTED SUBMISSION DATE) X NO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

At approximately 2310 hours on June 23, 1994, during maintenance with the reactor in cold shutdown, water was discovered in the bottom of control room emergency filter unit WMA-FU-54B. The water originated from leakage past a deluge system isolation valve and rendered the unit's charcoal filter inoperable. The root cause of this event was a leaky manual isolation valve installed in the unit's deluge supply line. Contributing causes were missed opportunities for earlier detection of water within the unit and inadequate communications. Immediate corrective actions included replacing the leaky valve and restoring filter unit operability. Further corrective actions included revising the appropriate deluge system valve station lineups to preclude recurrence and training on the lessons learned from this event. Because the charcoal filter was inoperable, this event had potential safety significance.

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| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | |
| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | LER NUMBER (8) | | | PAGE (3) | | |
| | | Year | Number | Rev. No. | | | |
| | | 94 | 012 | 00 | 2 | OF | 7 |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | |

Event Description

At approximately 2310 hours on June 23, 1994, during maintenance with the reactor in cold shutdown, water was discovered in the bottom of control room emergency filter unit WMA-FU-54B. Water had leaked past normally closed charcoal filter deluge isolation valve FP-V-WMA/21 (see Figure 1) and collected at the bottom of the filter unit. Spring-loaded check valves installed in the unit's bottom drain lines trapped about five inches of water in the filter unit and rendered the unit's charcoal filter inoperable.

Immediate Corrective Action

1. Engineering inspected the filter unit and determined that the unit was not significantly corroded by the trapped water. Workers cleaned the unit and replaced the leaky valve.
2. The affected charcoal filter bed was replaced and tested satisfactorily. While other filters associated with the filter unit were not damaged, its HEPA filter was also replaced.

Further Evaluation, Root Cause, and Corrective Action

Further Evaluation

1. There were no other structures, systems, or components inoperable at the time that contributed to this event.
2. Control room emergency filter unit WMA-FU-54B includes a manually-operated deluge spray system (see Figure 1) designed to extinguish a charcoal bed fire. To initiate deluge spray, an operator would open normally-closed deluge spray isolation valve FP-V-WMA/21. During normal operation, the deluge station includes a quarter-inch overflow drain line (installed with a strainer and restricting orifice) just downstream of FP-V-WMA/21. This drain line is designed to pass water that might leak by FP-V-WMA/21 to a drain. Each of the filter unit's four bottom drain lines includes a spring-loaded check valve. These check valves, in conjunction with a deep water seal trap installed downstream of the unit's bottom drain collection manifold, ensure an airtight seal during normal operation and pass water from the unit to its plant drain connection during deluge system actuation.
3. In March 1994, personnel discovered that water was leaking past FP-V-WMA/21 and draining through its quarter-inch overflow drain line. There was no noted leakage from the associated filter unit bottom drain. Personnel initiated a work order to repair FP-V-WMA/21. The associated work completion date, scheduled for July 1994, was prioritized to be worked in a twelve-week rolling maintenance-window schedule.

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| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | | | | | |
| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | | | | | LER NUMBER (8) Year Number Rev. No. 9 4 0 1 2 0 0 | | | PAGE (3) 3 OF 7 | |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | | | | | |

3. On May 22, 1994, workers performed a flush of the WMA-FU-54B deluge station; this flush involved closing FP-V-WMA/21 to inspect and clean the associated overflow line's strainer. The operator did not recall any unusual blockage of the strainer or orifice. It is believed that reclosing FP-V-WMA/21 could have inadvertently damaged the valve further which in turn, could have resulted in increased leakage.

4. On May 31, 1994, a Shift Support Supervisor (SSS) was notified of leakage coming from the filter unit bottom drain. The SSS dispatched an operator who investigated the observed leakage. The operator verified that the associated deep water seal fill valve was not leaking. Next, the operator opened three-quarter inch deluge station drain isolation valve FP-V-WMA/23 (located just downstream of the leaky manual isolation valve) and observed that flow through the filter unit bottom drain stopped. This drain valve was subsequently tagged open to accommodate any additional leakage.

The operator observed minimal leakage from the bottom drain and was unaware of the spring-loaded check valves installed in each of the four individual bottom drains. The operator did not think that the small amount of leakage could affect the associated charcoal filter, and he did not realize that the check valves could trap water in the unit. Although the SSS had initially been contacted about leakage coming from the filter unit bottom drain, as a result of ensuing conversations with the operator, the SSS erroneously concluded that leakage had been stopped from the deluge station drains.

5. The deluge system leakage had exceeded the capacity of the quarter-inch overflow drain line and collected at the bottom of the filter unit. Opening the three-quarter inch drain line precluded additional water from entering the unit, and the unit partially drained until decreasing differential pressure across the bottom drain line check valves allowed these valves to isolate and trap about five inches of water in the bottom of the unit.

Root Cause

The root cause of this event was a leaky deluge supply isolation valve. Leakage exceeded the capacity of the associated quarter-inch overflow drain line. This caused water to fill the deluge supply line, enter the filter unit, collect at its bottom, and render the charcoal filter inoperable.

Missed opportunities for earlier detection of the inoperable charcoal filter contributed to the cause of this event: 1) The system engineer relied on the overflow-line design feature to drain leakage from the isolation valve until it could be replaced under the rolling maintenance schedule; 2) The Work Control Shift Manager who reviewed the associated work request for operability impact did not recognize the potential for the leakage to exceed the capacity of the overflow line and enter the filter unit; thus, he assigned it a lower priority and put it on the twelve-week rolling maintenance schedule; and 3) The operator did not

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| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | | | | | LER NUMBER (8) Year Number Rev. No. 9 4 0 1 2 0 0 | | | PAGE (3) 4 OF 7 | | | | |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | | | | | | | | |

question the effect that the water draining from the filter unit bottom drain might have on the associated charcoal filter. Inadequate communication was another contributing cause of this event: 1) From communication between the operator and the SSS, the SSS erroneously concluded that drainage had been stopped from the deluge station drains, not the filter unit's bottom drain; and 2) Operations did not inform system engineering of the water draining from the filter unit bottom drain.

Further Corrective Action

1. Redundant control room emergency filter unit WMA-FU-54A was inspected and did not contain water. Similar non-safety related system filter units were also inspected and determined to be dry.
2. Operations management conducted a one-on-one discussion with the operator and SSS who investigated the reported leakage to emphasize the lessons learned from this event and issued night orders to the operations staff to emphasize the missed opportunity for earlier detection of water in the filter unit.
3. System engineering management will discuss the lessons learned from this event with the responsible system engineer by August 8, 1994.
4. By August 8, 1994, appropriate procedures will be revised to specify both upstream and downstream deluge supply isolation valves as normally closed, and the three-quarter inch deluge supply drain valve as normally open for both control room emergency filter units and other similar filter units. Given the revised lineups, these procedures will include appropriate guidance for manual deluge system actuation and restoration.
5. This LER will be included in the Operations and Engineering industry events training programs. Work control staff will also attend. This training will emphasize the importance of determining the potential impact of apparent low priority deficiencies on safety-related equipment. Training will be completed by October 15, 1994.

Safety Significance

Control room emergency filter unit WMA-FU-54B consists of a prefilter, a HEPA filter, a charcoal filter, and a fan. In the event of an accident, this unit actuates to protect control room personnel from airborne radioactivity by pressurizing the control room with filtered air drawn from either of two separate, remote, fresh-air intakes.

The charcoal filter is designed to trap and remove the gaseous iodine. Iodine removal efficiency is based on an airstream with no greater than 70 percent relative humidity. Because approximately five inches of water had collected at the bottom of the filter unit, this criteria could not be met and the charcoal filter

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| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | | | | | | | LER NUMBER (8) | | | PAGE (3) | | | | |
| | | | | | | | | Year | Number | | Rev. No. | | | | |
| | | | | | | | | 94 | 01 | 2 | 00 | 5 | OF | 7 | |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | | | | | | | | | |

was not able to perform its safety function. From May 31, 1994, the date water was discovered draining from the bottom of the filter unit, to June 23, 1994, when water was discovered in the filter unit itself, core alterations such as Local Power Range Monitoring system (LPRM) replacement and core restoration transpired. An evaluation is being performed to determine the iodine dose that control room personnel could have received from a hypothetical dropped fuel bundle accident during this time. Since the plant was shut down beginning April 26, 1994, the thyroid dose received by control room personnel from this hypothetical accident would have been reduced by the decay of the radioactive iodine. However, a supplement to this LER will be submitted if this evaluation indicates that control room personnel would have received an iodine dose of safety significance.

Although the WMA-FU-54B filter unit's charcoal filter was inoperable, its fan was still able to pressurize the control room. Redundant radiation monitors sensing the radiation level at each of the two remote intakes (about 180 degrees apart from one another) are provided to warn control room personnel via alarms if radiation exceeds the allowable value. If an intake's allowable value were exceeded, abnormal operating response procedure "Control Room HVAC High Radiation" includes instructions for personnel to switch to the non-alarming intake. This procedure also directs personnel to have Health Physics (HP) sample the control room for airborne contamination and report sample results. Additionally, a centrally-located Area Radiation Monitor (ARM, station 19) and control room radiation indicating switch ARM-RIS-19, located in the front area of the control room, would provide alarm and redundant indication of a radiation hazard within the control room itself. Abnormal operating response procedure "Abnormally High Radiation Levels" covers this accident condition by directing control room personnel to immediately evacuate unnecessary personnel and notify Health Physics (HP) for subsequent aid. A redundant emergency filter unit is also installed to provide the control room with redundant filtering capability.

This event had potential safety significance because the affected charcoal filter would not have been able to perform its function during an accident; however, this significance is mitigated by: 1) By the time water was discovered draining from the bottom of the filter unit, the fuel's radioactive iodine inventory had been decaying for approximately four weeks; 2) Features have been included in the structural design of the control room to minimize potential air infiltration; 3) The filter unit was able to pressurize the control room; 4) Alarms are provided to warn personnel of a radiation hazard in the remote intakes or the control room; and 5) Self Contained Breathing Apparatus (SCBA) is stored in the control room for emergency use.

Similar Events

There were no LERs in which safety-related filter unit deluge system manual supply isolation valves leaked and damaged a charcoal filter.

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| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | | | | | | | | | |
| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | | | | | | | LER NUMBER (8) | | | PAGE (3) | | | | |
| | | | | | | | | Year | Number | | Rev. No. | | | | |
| | | | | | | | | 9 4 | 0 1 2 | 0 0 | 6 | OF | 7 | | |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | | | | | | | | | |

EIIS Information

Text Reference

EIIS Reference

| | <u>System</u> | <u>Component</u> |
|--|---------------|------------------|
| Control Room Emergency Filter Unit | | FLT |
| WMA-FU-54B (54A) | | |
| Deluge Spray Isolation Valve FP-V-WMA/21 | KP | ISV |
| HEPA Filter | | FLT |
| Deluge Station Drain Isolation Valve | KP | ISV |
| FP-V-WMA/23 | | |
| Prefilter | | FLT |
| Fan | | FAN |
| Local Power Range Monitor (LPRM) | IG | |
| Area Radiation Monitor (Station 19) | | MON |
| Radiation Indicating Switch ARM-RIS-19 | | RIS |

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| FACILITY NAME (1) Washington Nuclear Plant - Unit 2 | DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 | LER NUMBER (8) | | | PAGE (3) | | |
| | | Year | Number | Rev. No. | | | |
| | | 94 | 012 | 00 | 7 | OF | 7 |
| TITLE (4) CONTROL ROOM EMERGENCY FILTER WMA-FU-54B INOPERABLE DUE TO LEAKING DELUGE SUPPLY ISOLATION VALVE | | | | | | | |

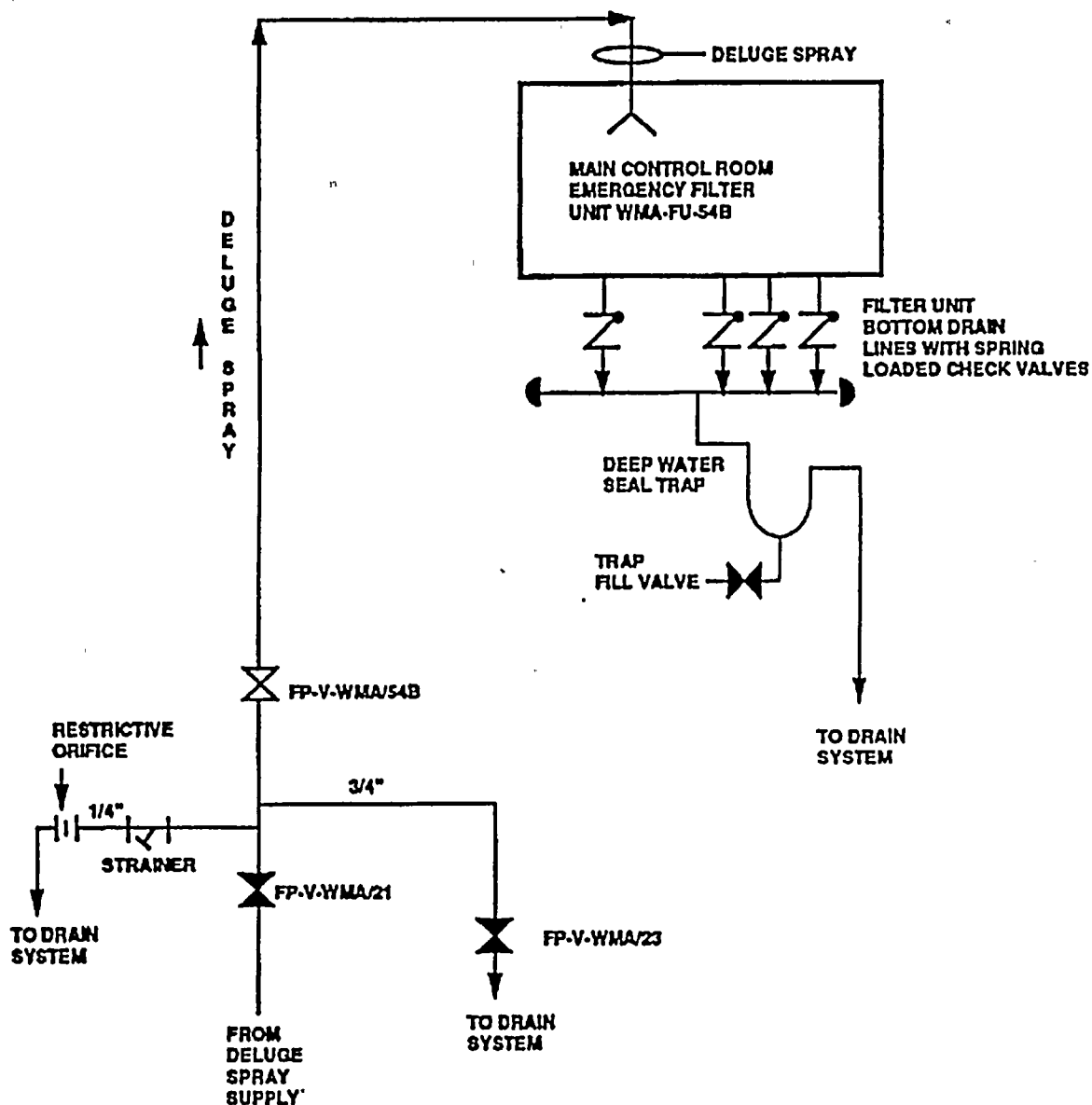


FIGURE 1: MAIN CONTROL ROOM EMERGENCY FILTER UNIT WMA-FU-54B DELUGE SYSTEM