

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9204140325 DOC. DATE: 92/04/06 NOTARIZED: NO DOCKET #
 FACIL: 50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
 AUTH. NAME AUTHOR AFFILIATION
 WEBER, G.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
 BLIND, A.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-003-00: on 920307, sampled but unmonitored liquid
 release occurred w/loss of 120-volt ac power to liquid
 effluent release radiation monitor. Caused by failed trip/
 isolation relay. Design change initiated. W/920406 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR / ENCL / SIZE: 6
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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12612



April 6, 1992

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating Licenses DPR-58
Docket No. 50-315

Document Control Manager:

In accordance with the criteria established by
10 CFR 50.59 entitled Licensee Event Report System, the
following report is being submitted:

92-003-00

Sincerely,

A. A. Blind

A. A. Blind
Plant Manager

/sb

Attachment

c: D. H. Williams, Jr.
A. B. Davis, Region III
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P. A. Barrett
B. F. Henderson
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NRC Resident Inspector
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B. A. Svensson

TE 22

APR 10 1992

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.

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

The principal cause of this event was the failure of the monitor to close the Liquid Waste Release Discharge Isolation Valve, 12-RRV-285, and to trip the running Monitor Tank Pump when the radiation monitor lost AC power. This failure was traced to a failed trip/isolation relay in the monitor. The alarm relay module, battery, battery charging module, and circuit breaker were replaced. A design change was initiated to reduce the load and to improve the transient energy protection on the trip/isolation relay. An Operations' procedure was revised to perform an AC power check prior to a release and a monitor check immediately after release initiation. Compensatory double sampling will be conducted until an Operational Readiness Review of the monitor is completed.

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
DONALD C. COOK NUCLEAR PLANT - UNIT 1	0 5 0 0 0 3 1 5	9 2	- 0 0 3	- 0 0	0 2	OF 0 5

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

Conditions Prior to Occurrence:

Unit 1 in Mode 1 (Power Operation), at 99 percent power.
Unit 2 in Mode 5

Description of Event:

On March 7, 1992, actions were initiated to release liquid waste from Radwaste Liquid Effluent Monitor Tank #3 (Release number L92-020). Prior to beginning the release, the Monitor Tank was sampled by Chemistry personnel in accordance with 12 THP 6020 LAB.037. Operations personnel verified that RRS-1001 was operable in accordance with procedure **12 OHP 4021.006.004. Following preparations to set up for the release through Monitor Tank No. 3, the operator pressed the Alarm Acknowledge button on the front of RRS-1000, located in the Auxiliary Building, to enable the start of the release. The alarm acknowledgement clears the trip functions to allow opening of the Liquid Waste Release Discharge Isolation Valve (EIIS/ISV-WD) (12-RRV-285) so that flow can be initiated. After verifying that all alarms were clear at the monitor, the WDS Operator proceeded to the WDS Panel, a short distance away from the monitor but out of sight of the monitor, to open 12-RRV-285. The valve was opened and the release began at 1533 hours (Control Room Log entry). The release continued until approximately 1600 hours. At 1600 hours, the Waste Disposal System (WDS) Operator returned to the monitor, observed that it appeared to be de-energized, and promptly called the Control Room to request a channel check of the RRS-1001, Radioactive Liquid Disposal Effluent Header Sample Gamma Radiation Detector (EIIS/IL-MON). At this time, it was discovered that RRS-1000, Radioactive Liquid Detector Data Acquisition Module had been in a transmit timeout status since 1531 hours, indicating that the Radiation Monitoring System Control Terminal in the Control Room had lost communication with the monitor. This failure of RRS-1000 should have tripped 12-RRV-285 and any running monitor tank pumps to terminate the release automatically. This did not occur. The release was immediately terminated through operator action.

Technical Specification 3/4.3.3 LCO 3.3.3.9 requires that with a required channel inoperable, releases may continue up to thirty days providing at least two independent samples are analyzed in accordance with Technical Specification 4.11.1.1.1 and at least two qualified individuals verify discharge valving prior to initiating the release, otherwise, suspend releases via this pathway. This specification was not fulfilled from approximately 1533 to 1600 hours for release L92-020.

Cause of Event:

Investigation of this event determined that the root cause of the monitor's inability to isolate the liquid release upon loss of power was the failure of the monitor's trip/isolation relay, AK-3. Upon loss of power to the monitor, the relay is de-energized and the relay's contacts should have opened. This, in turn, should have resulted in tripping the Monitor Tank Pump and isolation

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FACILITY NAME (1) DONALD C. COOK NUCLEAR PLANT - UNIT 1	DOCKET NUMBER (2) 0 5 0 0 0 3 1 5 9 2 - 0 0 3 - 0 0 0 3 OF 0 5	LER NUMBER (6)			PAGE (3)		
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Cause of Event Continued:

of 12-RRV-285. Two factors contributing to this event were: 1) The failure of the backup power source. A backup power source should have allowed the monitor to continue normal operation, including trip functions and monitoring of the release; and 2) The monitor's alarm logic. Alarms signaling the failure or abnormal status of the monitor are short in duration (approximately 7 seconds) and do not require operator acknowledgement. Without the ability to audibly discriminate the transmit timeout (failed monitor) condition from the hi/low flow alarms that occur while setting up release, the operator did not recognize the alarm as indicative of a failed monitor. This increased the duration of the release. Had the operator checked the alarm log printout, the failed status could have been confirmed.

Inspection of the back-up battery revealed that the electrolyte had almost completely evaporated. The battery had recently been added to the Plant's Preventive Maintenance Program, but had not yet come due for service. The back-up battery is not required for proper operation of the monitor, but is only intended to preserve normal functions of the monitor if the AC power to the monitor is interrupted.

The AC power supply is provided from a battery backed critical instrument bus. The power supply switch, which includes an integral overload trip feature, was found in the OFF position. No evidence of an overload condition was found.

Failure of all power in the monitor eliminates all means to maintain the alarm relays energized. The normally open contacts that supply 120 VAC to the auxiliary relays, R18-AUX and R18-AUX1 (EIIS/IL-RLY), should have de-energized, closing the isolation valve 12-RRV-285, tripping the running Monitor Tank Pumps, and providing an alarm on the local WDS panel.

The relay was removed from the monitor. The contacts were found to be in the open position, however, the contact surfaces were pitted and discolored indicating evidence of thermal stress. Localized heating effects are believed to have caused the relay contacts to have fused together. The contact surfaces were apparently broken free from one another as a result of cycling the relay during the troubleshooting evolution.

The AK-3 relay coil is powered from a 12 VDC internal power supply, which in turn, is normally powered from the 120 AC source via a rectifier/filter circuit, or upon loss of AC, the back-up battery. The coil is energized when all the logic inputs to the Alarm Module are high. Any alarm condition will cause logic inputs to go low, which causes an inverter to go high, de-energizing the alarm relay coil. Loss of the +12 VDC source will also de-energize the alarm relay.

Review of vendor literature determined that the AK-3 relay contacts are rated for 2 amps, 115 VAC, and are made of palladium in a cross-bar arrangement. In this application, they close to energize auxiliary relays R18-AUX and

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Cause of Event Continued:

R18-AUX1 (E1IS/IL-RLY). The energy required to energize and de-energize these auxiliary relays, coupled with rapid cyclic alarm states which occur while setting up sample flows, degraded and damaged the normally open contacts of AK-3. The AK-3 relay contacts were intended to switch low power signals. The auxiliary relays normally draw approximately 0.3 amps operating current at 115 VAC, however, transient energies may be an order of magnitude greater. Inspection of the contacts revealed evidence of damage induced by making and breaking against the auxiliary relay loads.

Analysis of Event:

Based on the recorded Monitor Tank release flow rate ($1.07E+2$ gpm), the dilution water flow rate ($8.30E+5$ gpm), and the radioanalytic results of the Monitor Tank being released (3.50 MPC), the actual total MPC value for the release was $4.51E-3$ MPC. Consequently, this event did not have an impact on the health and safety of the public.

Corrective Action:

A Radiation Protection Technician found the breaker located inside the monitor tripped. The technician reset the breaker and re-initialized RRS-1000 on March 7, 1992 at 1625 hours. The Plant Manager directed that compensatory double sampling be initiated. Double samples were taken and the release of the No. 3 monitor tank was reinitiated under Release number L92-021, in accordance with the provision of Technical Specifications.

The backup battery and associated charging module were found deficient and were replaced. All other Technical Specification Radiation Monitor batteries were verified to be within the Preventive Maintenance Program and had been serviced at least once. The required preventive maintenance activities for Unit 1 and Unit 2's Technical Specification Radiation Monitor batteries will be performed during the 1992 outages, prior to unit startup.

The circuit breaker was also replaced. The Operations' procedure for liquid releases through RRS-1000 was revised to ensure that AC power is present prior to a release and to perform a monitor check, which would identify a loss of AC power, immediately after release initiation.

The alarm relay module was replaced.

A Design Change Proposal (MM-309) was written to split the AK-3 contact current load with a set of spare, normally open contacts on the relay, changing out the transient suppression device which is installed across the auxiliary relay coil and rewiring the auxiliary relays. The transient suppression device consists of a metal oxide varistor. The rating of the replacement varistor will be selected to improve the protection provided to AK-3 over that provided by the currently installed varistor. The relay wiring

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Corrective Action Continued:

scheme will be revised to use one of the auxiliary relays to energize the other auxiliary relay. This will further reduce the load on the AK-3 relay contacts. This Design Change will be installed by April 10, 1992. Compensatory double sampling will be conducted until an Operational Readiness Review of the monitor is completed.

A commitment remains open at this time for a previous Licensee Event Report (LER 50-315/91-010), concerning the audible alarm issue. The commitment will be resolved under that LER.

Failed Component Identification:

Liquid Waste Discharge Monitor

Plant Designation: RRS-1000

Manufacturer: Eberline

Installed Design: American Electric Power Service Corporation (AEPSC)

Previous Similar Events:

LER 50-315/91-003

LER 50-315/91-010