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 AUSTIN, S.W. Tennessee Valley Authority
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SUBJECT: LER 88-007-00: on 880929, overheat of diesel generator 3C due to loss of EECW.

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LICENSEE EVENT REPORT (LER)

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TITLE (4)
OVERHEAT OF DIESEL GENERATOR 3C DUE TO LOSS OF EECW

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	2 9	8 8	8 8	0 0 7	0 0	1 2	2 3	8 8	BROWNS FERRY UNIT 1		0 5 0 0 0 2 5 9
									BROWNS FERRY UNIT 2		0 5 0 0 0 2 6 0

OPERATING MODE (9) **N**

POWER LEVEL (10) **0 0 0**

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 368A)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	INFORMATION
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Steven W. Austin, Engineer, Plant Assessment Section	2 0 5 7 2 9 1 - 3 7 1 8

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

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

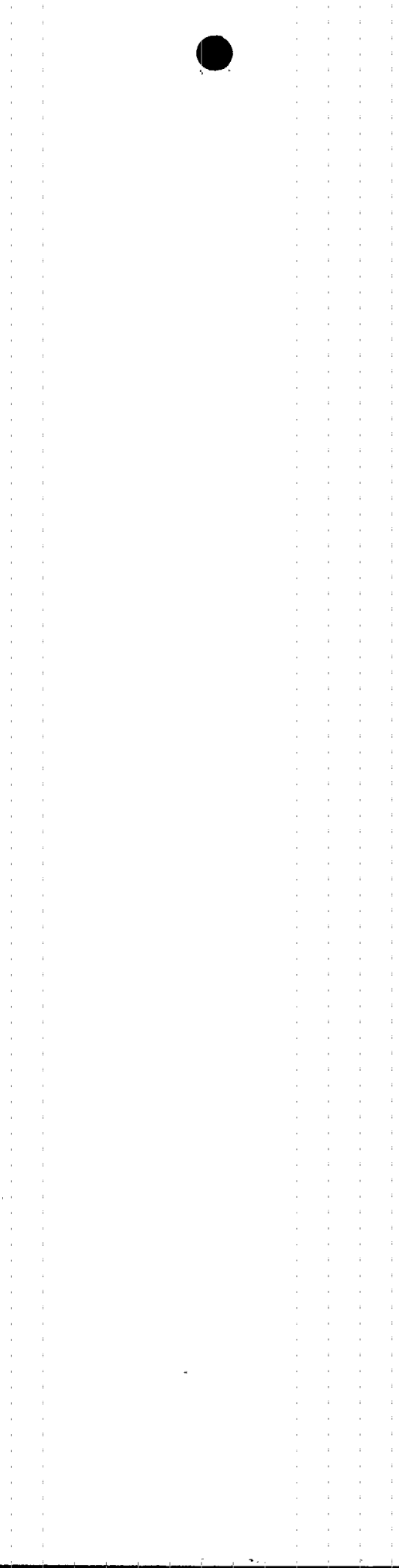
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

This LER is being provided as a voluntary informational report. Browns Ferry units 1, 2, and 3 were defueled during the event. On September 29, 1988, diesel generator (DG) 3C was overheated due to inadvertent isolation of Emergency Equipment Cooling Water (EECW). The event occurred while performing the monthly Surveillance Instruction (SI) on DG operability in conjunction with a SI to hydrostatically test portions of the south EECW header. The SI issued to test portions of the south EECW header inadvertently resulted in a isolation of EECW to all the unit 3 DGs.

The apparent cause of this event was valve misalignment during alignment of the EECW per SI for hydrostatic testing. This SI utilized flow diagrams that are under configuration control (CC). An error on the drawing was discovered when the hydrostatic test was being written and per plant instruction a drawing discrepancy was issued. In the eight months that followed, the error on the CC drawing was not resolved. The untimely implementation the drawing correction is considered the root cause of the event. The immediate corrective action included a pre-performance walkdown of the remaining hydrostatic testing SIs and correction of the flow diagrams. Recurrence control for this problem was a revision to the procedure for processing drawing discrepancies. This procedure now provides a specified overall closure time of various categories for drawing discrepancies.

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

Description of Event

Units 1, 2, and 3 are in an extended outage with all three reactors defueled. This LER is being provided as a voluntary informational report.

On September 20, 1988, the Mechanical Test Section initiated a Surveillance Instruction (SI) to hydrostatically test, under ASME Section XI, portions of the south Emergency Equipment Cooling Water (EECW)(EIIS system code BI) header. This portion of the EECW system supplied cooling water to the shutdown board room chillers, control bay chillers and associated piping. The SI inadvertently isolated the unit 3 diesel generator (DG)(EIIS system code EK) from the north EECW header leaving the south header to supply cooling water to the unit 3 DGs.

On September 26, 1988, the hydrostatic test was started. During this SI the Mechanical Test director could not establish hydrostatic pressure. The test director started investigating the possibility of valves leaking and the test was stopped. On September 29, 1988, in an attempt to further isolate the south EECW header, the south EECW header sectionalizing valve was closed. On that same day a special instruction to calibrate DG C governor was performed. When DG C was started it gave a auto start signal to a south EECW header supply pump. Plant operations assumed the pump was dead headed because of the hydrostatic test configuration and stopped the pump.

On September 29, 1988, 1720 hours, the monthly operability test on DG 3C began. The DG was tied to the 4KV shutdown board (EIIS system code EB) and loaded to 2100 KW. At 1735 hours a "hot diesel generator 3C" alarm was received. Following the unit 3 alarm response procedures, at about 1742 hours the DG was unloaded from the 4KV shutdown board. Upon investigation by the Assistant Shift Operations Supervisor (ASOS), it was discovered that the 3C DG had been isolated when the hydrostatic test procedure closed the north header isolation valves (instead of the south header) to DG 3C. The valves were opened per Shift Operations Supervisor (SOS) instructions establishing flow to the 3C DG. The water temperature and oil cooler temperature was brought to 190° Fahrenheit, and, at about 1753 hours, the 3C DG was stopped. At 1800 hours, flow to the unit 3 DGs through the north EECW header was reestablished. The 3C diesel generator was isolated and placed under a operational hold order until it could be inspected for possible damage. Data taken during the event indicated that the jacket water cooler reached 240° Fahrenheit and the oil cooler reached 220° Fahrenheit.

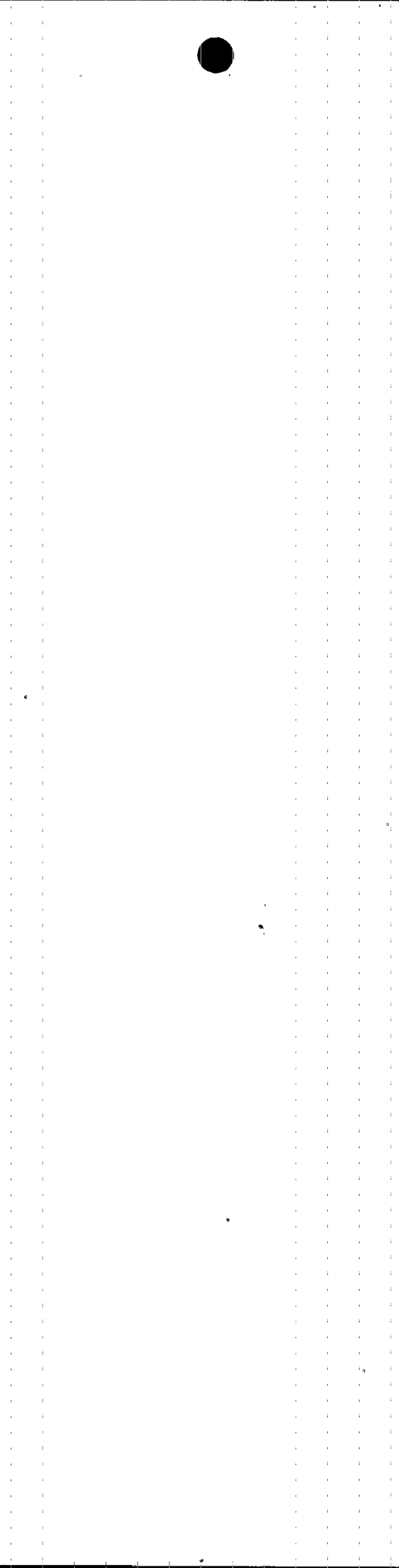
Cause of Event

The apparent cause of this event is that the initial valve lineup for the ASME Section XI testing on the EECW header was incorrect. The root cause of the event was unresolved drawing discrepancies (DD) and inadequate pre-performance walkdown of the procedure. At the time of the event, the hydrostatic test had been in progress since September 20, 1988. The



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

Cause of Event (continued)

hydrostatic SI was developed utilizing configuration control drawings. The drawings depicted the isolation valves to the unit 3 DGs incorrectly. The drawings showed the south isolation valve (3-67-744) on the north header and the north valve (3-67-743) on the south header. Four drawing discrepancies were issued to correct the error on the configuration control drawing (CCD). The hydrostatic test used these drawings to identify the incorrect valve numbers to each of the unit 3 DGs. In March, 1988, the EECW system was given a detailed walkdown during instruction preparation. The portion of the south EECW header to be hydrostatically tested under the SI was exempted from a detailed walkdown because of the March walkdown. The hydrostatic tests are normally developed from the drawings and then field verified. The walkdown performed on this system only verified there were no configuration changes, maintenance or modifications activities or clearances which would prevent performance of the SI. The walkdown did not verify proper valve tagging.

Analysis of Event

All three units were defueled at the time that this event took place. Secondary containment was not being maintained. No low pressure or high pressure injection would be needed. There were no operational activities in progress which could produce a design basis accident requiring the DGs for mitigation purposes. The hydrostatic SI being performed is a 10-year hydrostatic and would not be performed during power operation. If the diesel generators were needed due to loss of offsite power the load would be minimal. A cooling water supply existed for the unit 1 DGs. Therefore, onsite power was available for any contingency that may have developed. The event was significant in that extensive damage could have been sustained to the unit 3 diesel generators. The results of the vendor recommended inspection indicated no impact on operability of the DG. The cooling to the unit 3 DGs was out for several hours and if the plant had lost offsite power during this, the unit 3 DGs could have been damaged. Several processes failed that could have prevented this event.

Configuration Control Drawings (CCD) - This process was initiated to resolve long-standing problems with the as-constructed and as-designed status of the plant. An extensive walkdown of the plant was completed and a major drawing revision program updated plant drawings. There were some errors generated in this major effort. During the same time as the as-constructed/designed walkdowns were being performed modifications and design changes were also in progress.

Drawing Discrepancy (DD) - The DD is utilized to make corrections in CCDs. Due to a backlog and inconsistencies in the DD process it took 8 months to correct the drawing errors associated with this event. The original DD 3-87-0973 submitted 7-21-87 could have resolved the problem but was not incorporated into the drawing until 2-22-88, 7 months later. The second DD 3-88-103 submitted 2-16-88 and incorporated 2-22-88, made the valve numbers incorrect. Two other outstanding DDs were submitted in March 1988, which



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

Analysis of Event (continued)

would have corrected the problem, but were not incorporated into the drawings until after the event. Three of the earlier DDs did not receive a technical and operational review. This indicates that they were not considered by the personnel completing the DD of immediate significance. The one DD (3-88-0103) which did receive a Technical and Operational review was marked "no" for affects operability. The justification stated that this was a drawing correction and not a physical change.

Work Control - Two SIs were allowed to be run concurrently which increased the risk to certain plant equipment. The monthly operability SI for DG 3C was started before completion of the EECW hydrostatic test which authorized isolation of one EECW header to all unit 3 DGs. The procedure isolated one train of cooling water to the diesels and only one error or equipment failure was then necessary to cause a total loss of cooling to the diesels. The performance of these SIs together is procedurally allowed and was not in violation of Technical Specification requirements in the current operating configuration.

Procedure Process - Plant procedures have been in an upgrade process. The hydrostatic test procedures were exempt from this upgrade process because they were scheduled for completion prior to the unit startup. Discussions with the Mechanical Test personnel indicated the only substantial difference would be in formatting the SIs and a pre-performance walkdown. A required walkdown of the system was made several months prior to the event as required for a different hydrostatic SI. Mechanical Test felt another walkdown was not necessary. They believed that the DD issued 8 months earlier had taken care of errors in the configuration control drawings.

Operator Actions - Operators should be alert and aware of obvious abnormalities. The AVO aligning the valves followed the procedure and did not realize that he had inadvertently isolated the unit 3 diesel generators. The AVO did not receive a direct briefing from the test director and his knowledge of the system did not prevent him from isolating the diesel generators. Additionally, there is no flow indication device at the diesel or in the main control room to provide an obvious indication. The annunciator response procedure for this event was followed in a timely manner, however, the rapid heatup rate of a loaded diesel could lead to damage before corrective action is accomplished.

Corrective Action

Operations upon receiving the hot engine alarm, unloaded DG 3C, opened the north EECW header to the diesel generator then stopped the engine. The hydrostatic test on the south EECW header was revised to correct the valving alignment. Hydrostatic SIs are normally updated prior



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Corrective Action (continued)

to performance because the SIs are run so infrequently (once per 10 years). DG 3C engine was inspected per vendor (Morrison/Knudsen) recommendations. An oil sample was sent to TVA central lab as a precaution. The event was discussed with operations personnel to emphasize the need for attention and use of experience to prevent incidents. Changes are to be made to the operating instruction on the diesel generator (DG) to caution the operator to utilize all available indications, and be aware of abnormalities.

On October 20, 1988, Revision 1 to Brown's Ferry Engineering Procedure (BFEP) PI 87-70, "Processing Drawing Discrepancies", was issued. Revision 1 and subsequent revisions apply to those drawing discrepancies for unit 2 primary, critical and secondary drawings and those unit 1, unit 3 and common primary, critical and secondary drawings required for operation of unit 2. Revision 1 became effective on November 4, 1988, and specified overall closure time requirements for various categories of DDs.

DDs against secondary drawings (backlog and new) which do not impact primary or critical drawings and are not a CAQ will be punchlisted per BFEP PI 88-05, "Control of NE Action Items", for evaluation and closure past unit 2 restart.

Operations will review the need for EECW flow indication to each DG and make its recommendations to the plant manager by March 1989.

Previous Similar Events - None

Commitments

The Operations section will revise the Operating Instructions (OIs) on the diesel generators to advise the operators to utilize all available indications, and be aware of abnormalities. This will be incorporated by March 1989.

Operations will review the need for EECW flow indication to each DG and make its recommendations to the plant manager by March 1989.



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TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant
Post Office Box 2000
Decatur, Alabama 35602

DEC 30 1988

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

Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT UNIT 3 - DOCKET
NO. 50-296 - FACILITY OPERATING LICENSE DPR-68 - REPORTABLE OCCURRENCE REPORT
BFRO-50-296/88007

The enclosed report provides details concerning the overheat of diesel generator
3C due to loss of emergency equipment cooling water. This Licensee Event Report
is being provided as a voluntary informational report.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

G. G. Campbell
6- Guy G. Campbell
Plant Manager
Browns Ferry Nuclear Plant

Enclosures
cc (Enclosures):

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NRC Resident Inspector, Browns Ferry Nuclear Plant

