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ComEd

December 12, 1994

JSPLTR 94-0017

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

Licensee Event Report 94-004-1, Docket 50-249 is being submitted to provide an update on the vendors findings with respect to the root cause.

Sincerely,

J. Stephen Perry
Vice President
BWR Operations

JSP/IR:pt

Enclosure

cc: J. Martin, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Units 2 and 3	05000249	1 OF 6

TITLE (4)
Dresden Unit 3 Inability to Meet Technical Specification 3.9 Limiting Condition for Operation Due to Redundant Emergency Diesel Generators Inoperable

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 NAME	DOCKET NUMBER
02	03	94	94	-- 004 --	01	02	25	94	Dresden 2	05000237
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	099 077

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

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)		73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71(c)
	20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)		OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)	X	50.36(c)(2)		50.73(a)(2)(viii)(A)		
	20.2203(a)(2)(iv)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
	20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Ismael Rivera Jr., System Engineering Ext. 2549	(815) 942-2920

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
X	LC	RG	P070	Y						
X	LA	CLR	E147	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO		09	30	94

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On February 3, 1994 during performance of the High Voltage Rounds, the High Voltage Operator (HVO) discovered that the Unit 2/3 Emergency Diesel Generator (EDG) Air Start System regulator had drifted up, creating a downstream pressure of approximately 245 psig. Attempts to adjust the regulator failed to achieve a pressure setting of 175-190 psig. Upon further inspection of the air start components, it was identified that the air start motors had a nameplate rating of 200 psig. A concern was raised as to the integrity of the airstart motors and other system components downstream of the air regulator which were potentially subjected to an air pressure higher then the nominal range 175-190 psig. The redundant Unit 3 EDG had been inoperable since February 2,1994 at 0902 hours pending an investigation into the cause of a High Crankcase Pressure trip received during the performance of the monthly operability surveillance. The Unit 2/3 EDG was declared inoperable and Unit 3 entered into a 24 hour Limiting Condition for Operation (LCO) and Unit 2 entered into a 7 day LCO.

The root cause of the regulator leak is attributed to improper component selection. The root cause of the High Crankcase Pressure trip is lack of preventative maintenance resulting in water intrusion of the lube oil. The existing regulators will be replaced with the vendor recommended Norgren regulators. The lube oil cooler will be inspected/replaced on a vendor recommended frequency of twelve years.

PLANT and SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor 2527 Mwt rated core thermal power.

EVENT IDENTIFICATION:

Dresden Station Inability to Meet Technical Specification 3.9 Limiting Condition for Operation Due to Redundant Emergency Diesel Generators Inoperable

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 (3) Event Date: 02/03/94 Event Time: 0425

Reactor Mode: N (N) Mode Name: Run Power Level: 99% (77%)

Reactor Coolant System Pressure: 1000 (1001) psig

B. DESCRIPTION OF EVENT:

On February 2, 1994, at 0925 hours, with Unit 2, at 99% rated core power and Unit 3 at 77% rated core power, during the performance of Dresden Operating Surveillance (DOS) 6600-01, Diesel Generator Surveillance Tests, for the Unit 3 Emergency Diesel Generator (EDG) [EK], the Unit 3 EDG tripped on High Crankcase Pressure (HCP) while operating at rated load for three to four minutes. Dresden Station Unit 3 was entered into a 7 day Limiting Condition for Operating (LCO) pending the outcome of the investigation initiated by the System Engineer.

On February 3, 1994, during the performance of the High Voltage Rounds, the High Voltage Operator (HVO) found the Unit 2/3 EDG Air Start System pressure regulator at a reading of 245 psig; the nominal range is 175-190 psig. Attempts at adjusting the pressure failed to achieve a nominal range of 175-190 psig. A visual inspection of the air start motors revealed a rating of 200 psig stamped on the casing of the air start motors. A concern was raised to the integrity of air start motors as well as the other components downstream of the regulator that could have potentially been overpressurized. The Unit 2/3 EDG was declared inoperable at 0425 hours on February 3, 1994, pending an evaluation by System and Site Engineers. Dresden Unit 2 was entered into a 7 day LCO and Dresden Unit 3 entered into a 24 hour LCO due to the Unit 3 EDG being in an inoperable condition.

The pressure regulator was replaced by the Mechanical Maintenance Department (MMD) under work request 24057. Following a thorough operability determination of the air start system by Site Engineering, the Unit 2/3 EDG was declared operable. Dresden Unit 2 was removed off of the 7 day LCO at 1100 hours on February 3, 1994.

Upon a successful operability surveillance following corrective maintenance performed under work request 24087, the Unit 3 EDG was declared operable and Dresden Unit 3 removed off of a 7 day LCO at 1150 hours on February 6, 1994.

C. CAUSE OF EVENT:

This report is submitted in accordance with 10CFR50.36(c)(2), which requires notification when a limiting condition for operation is not met, and 10CFR50.73(a)(2)(i), which requires reporting of a condition prohibited by the plants Technical Specifications.

The root cause of the Unit 3 EDG HCP trip is lack of preventative maintenance resulting in water intrusion of the lubricating oil. As the operating temperature of the EDG increased under load, the small amount of water intrusion heated and eventually flashed to steam causing a pressure in the normally negative pressure (vacuum) crankcase. This phenomenon was observed during the maintenance run that was performed on the evening of February 2, 1994. During this run, the HCP trip was bypassed and the crankcase monitored through the use of a manometer.

The water intrusion occurred in the lube oil cooler which had deteriorated as a result of end of life. The lube oil cooler reached its end of life as a result of a lack of preventative maintenance. The vendor recommended inspection frequency is twelve years. This lube oil cooler is part of the original supplied equipment (approximately 25 years in service). Dresden Station is in the process of implementing the current EMD-PS Owners Group recommended maintenance program which includes lube oil cooler/core inspection/replacement at twelve year frequencies.

MKW Power Systems was contacted to determine the air flow rate required to start an EMD engine. They stated that an average flowrate of 19 standard cubic feet per second (scfs), for units with immersion heaters, would be required through out the 3-5 second cranking cycle. This equates to a flowrate of 1140-1320 scfm.

Parker-Hanninfin was contacted and stated that they did not have any information regarding the maximum flowrate for the current style regulator, at an inlet pressure of 250 psig (max inlet rated pressure). Subsequent flow testing failed to adequately simulate Dresden's application of the current style regulator. However, the test data determined that this type regulator was not optimal for this application due to flow considerations.

Dresden's EDGs currently start at approximately 10.2 seconds, well below the proposed 13 seconds which will be implemented during the next Tech Spec revision. Therefore, an operability issue does not exist with the current regulators. Additionally, the Parker regulators have performed their function but are susceptible to drifting overtime. It appears that the existing regulator is overworked in this application and is the cause of regulator pressure drifting upward.

D. SAFETY ANALYSIS:

The safety significant of this event is considered minimal for the following reasons:

During the period that the Unit 3 EDG was inoperable, the Unit 2/3 EDG was available to provide a source of emergency electrical supply for Dresden Unit 3. At the time that the Unit 2/3 EDG Starting Air System regulator had been observed to have drifted to a pressure reading to 245 psig, the HVO opened the strainer blowdown valve and verified that the pressure under flow conditions was regulated to the required range of 175-190 psig. The reading that was reflected

on the gage was an accumulation of a volume of air. In the event that the Unit 2/3 EDG had been required to start, the air start motors would have been subjected to the regulated air flow of 175-190 psig. Dresden Unit 2 had the dedicated Unit 2 EDG available and operable through the duration of this event.

E. CORRECTIVE ACTIONS:

Immediately following the Unit 3 EDG trip, the System Engineer ensured that an oil sample be taken and sent to the System Material Analysis Department (S.M.A.D.) and requested the Instrument Maintenance Department (IMD) verify the calibration on the Unit 3 EDG Crankcase Pressure Detector (CPT). A visual air box inspection did not reveal any abnormalities. A maintenance run was performed on the Unit 3 EDG along with engine analysis. During this run, the HCP trip was bypassed and the crankcase monitored through the use of a manometer. Initially the EDG was at a vacuum as it reached rated speed, voltage and frequency. Once a load of 2550 KW was applied, a gradual increase of 0.2-0.3 inches of water per minute was observed. The pressure reached a range of 2.7-2.9 inches of water after ten minutes at rated load, at which time a decrease of pressure started to occur. By the time the maintenance run was completed and the EDG unloaded, the crankcase pressure had decreased to 0.4 inches of water. The lube oil wear metals analysis indicated a rise in lead content. However, there were no other wear metals indicative of potential problems. The engine analysis identified cylinder # 10 as potentially producing high volume of blow-by. This initially was believed to be a contributing factor to the crankcase pressure.

During the course of the day, as contingency plans were being developed, an Operations' Supervisor reported that the coolant level had dropped 2-3 inches in the sight glass. S.M.A.D. was contacted and asked if any abnormal water trends had appear in the lube oil analysis. They stated that dissolved water content had risen to 5 times the previous level. It was then that the System Engineer decided to conduct a thorough internal engine inspection and identify the reason for the loss of coolant.

The coolant system was pressurized and the engine inspected for signs of water intrusion. The source of the water intrusion was identified to be in the lube oil cooler. The lower main bearings, liners, pistons and the rest of the engine internals were found to be in satisfactory condition with no signs of water intrusion. The inspection also did not reveal any abnormalities with cylinder #10 and consequently discounted it as a contributing factor to the pressurization of the crankcase. The cylinder exhibited normal wear conditions that were corrected during the 6 year maintenance surveillance in April, 1994. The lube oil cooler was removed and the core replaced. The lube oil cooler was reinstalled and both the lube oil and coolant were freshly replenished.

The removed lube oil cooler core was inspected upon removal and found to have began to deteriorate. The solder used on the core had started to come loose. A sample was sent to S.M.A.D. and confirmed to be of a high lead content. This was identified as the source of the rise in lead content in the lube oil. Dresden Station is in the process of implementing the EMD-PS Owners Group recommended maintenance program which includes a twelve year inspection/replacement frequency on the lube oil cooler. Implementation will consist of a review of appropriate maintenance procedures and revision, if required, which will be complete by November 30, 1994. The Unit 2/3 EDG lube

oil cooler was replaced in February of 1988 as a result of identified external leaks. The Unit 2 EDG lube oil cooler will be replaced during the first available Unit 2 EDG planned maintenance outage following completion of the scheduled Unit 3 refuel outage. In the interim, lube oil analysis will continue to be used to monitor the wear metals for any abnormal trends.

Upon completion of the maintenance activity, a maintenance run was performed at which time the crankcase was verified to be operating at a desired vacuum. The operability run was performed and the Unit 3 EDG declared operable at 1150 hours on February 6, 1994.

Upon discovery of the Unit 2/3 EDG air start system regular overpressurization, the System Engineer was immediately notified. Along with Site Engineering, a thorough operability evaluation was initiated. After discussions with MKW-Power Systems, the authorized nuclear vendor for EMD EDGs, the determination was made that the components downstream of the air regulator which potentially could have been overpressurized, maintained their integrity and operability was not affected. The bases of conclusion is that the vendor indicated that the air start system components are tested at 150% of their rated pressure of 200 psig at the vendor's facility. Furthermore, the pilot solenoid valve is rated at 275 psig. The Unit 2/3 EDG was started to functionally demonstrate the starting capability of the system. Upon successful completion of the starting sequence, the Unit 2/3 EDG was declared operable at 1100 hours on February 2, 1994.

The air regulator has been returned to the vendor for a complete failure analysis. The vendors report on the regulator indicated that there was no failure of any kind with the regulator. They stated that pressure could increase on the downstream side of the regulator due to an increase of heat of the air system, or due to dirt or debris causing air to leak past the seat. A self relieving regulator would vent this pressure, however with a non-relieving regulator, the downstream pressure would increase.

There has been a history of starting air regulator failures for all three EDGs dating back to a Unit 2 EDG event on 9/4/84. The current model air regulator is a non-relieving model which was incorporated as a result of regulator depressurization events that occurred in 1990 and reported in DVR 12-2-90-153. It appears that the conversion to the non-relieving type of regulators eliminated the cause of the 1990 failures, however without the self-relieving feature, the regulator is susceptible to an increase of pressure on the downstream side of the regulator. Therefore, this type of regulator is an inappropriate component for this particular application. The MKW Power Systems recommended component for this application is a Norgren pilot operated regulator. This system is designed for applications that require good pressure regulation, rapid response to changing flow demands, and excellant stability. This component is conceptually similar to that in place at LaSalle Station. Work request have been issued to replace the existing regulators with the Norgrens pending availability of the components. The air regulator had been in service since 10/24/93. The Unit 2 EDG's regulator has been in service since 2/14/93 and the Unit 3 EDG's regulator since 10/17/92, which were replaced as a result of scheduled maintenance and not failures. The air regulators are currently on an operating cycle frequency replacement.

F. PREVIOUS OCCURRENCES:

There are no similar previous licensee events reports of these occurrences.

G. COMPONENT FAILURE DATA:

Manufacturer	Nomenclature	Model Number	Mfg. Part Number
Electro-Motive Division	Lube Oil Cooler	N/A	8366328
Parker	Air Regulator	N/A	08R715L

An NPRDS search did not identify any similar occurrences.