

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 4 1 3 1	PAGE (3) 1 OF 0 8
--	--	----------------------

TITLE (4)  
Inoperability Of Diesel Generators Due To A Manufacturer's Design Deficiency

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 4	2 5	8 8	8 8	0 1	9 0	0 6	1 3	8 8	Catawba, Unit 2		0 5 0 0 0 4 1 1 4																																																																																													
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="12">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)</td> </tr> <tr> <td colspan="3">OPERATING MODE (9) 1</td> <td colspan="3">20.402(b)</td> <td colspan="3">20.406(c)</td> <td colspan="3">50.73(a)(2)(iv)</td> <td colspan="3">73.71(b)</td> </tr> <tr> <td colspan="3">POWER LEVEL (10) 1 0 0</td> <td colspan="3">20.406(a)(1)(i)</td> <td colspan="3">50.38(e)(1)</td> <td colspan="3">50.73(a)(2)(v)</td> <td colspan="3">73.71(e)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.406(a)(1)(ii)</td> <td colspan="3">50.46(c)(2)</td> <td colspan="3">50.73(a)(2)(vi)</td> <td colspan="3" rowspan="4"> <input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)                   VOLUNTARY             </td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.406(a)(1)(iii)</td> <td colspan="3">50.73(a)(2)(i)</td> <td colspan="3">50.73(a)(2)(viii)(A)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.406(a)(1)(iv)</td> <td colspan="3">50.73(a)(2)(ii)</td> <td colspan="3">50.73(a)(2)(viii)(B)</td> </tr> <tr> <td colspan="3"></td> <td colspan="3">20.406(a)(1)(v)</td> <td colspan="3">50.73(a)(2)(iii)</td> <td colspan="3">50.73(a)(2)(x)</td> </tr> </table>												THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)												OPERATING MODE (9) 1			20.402(b)			20.406(c)			50.73(a)(2)(iv)			73.71(b)			POWER LEVEL (10) 1 0 0			20.406(a)(1)(i)			50.38(e)(1)			50.73(a)(2)(v)			73.71(e)						20.406(a)(1)(ii)			50.46(c)(2)			50.73(a)(2)(vi)			<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)  VOLUNTARY						20.406(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)						20.406(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)						20.406(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)		
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																																																																																																								
OPERATING MODE (9) 1			20.402(b)			20.406(c)			50.73(a)(2)(iv)			73.71(b)																																																																																												
POWER LEVEL (10) 1 0 0			20.406(a)(1)(i)			50.38(e)(1)			50.73(a)(2)(v)			73.71(e)																																																																																												
			20.406(a)(1)(ii)			50.46(c)(2)			50.73(a)(2)(vi)			<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)  VOLUNTARY																																																																																												
			20.406(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)																																																																																															
			20.406(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)																																																																																															
			20.406(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)																																																																																															

LICENSEE CONTACT FOR THIS LER (12):

NAME Julio G. Torre, Associate Engineer - Licensing	TELEPHONE NUMBER 710 4 317 13 1-18 10 12 1 9
--	---

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
B	DIG	I IX I E C I O I 2 I 3		Y					

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15) MONTH:     DAY:     YEAR:
--	--

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

On April 25, 1988, a Valid Failure of Unit 1 Diesel Generator (D/G) 1A occurred due to a faulty Low Low Lube Oil Pressure Trip (P-3) sensor. Testing of the part showed the calibration to have drifted significantly since installation on the engine 5 days earlier. The failed P-3 was replaced and the D/G was returned to operability following subsequent test runs and a Valid Start. On April 29, 1988, the D/G manufacturer (IMO Delaval Inc.) issued a 10CFR21 report informing the NRC and the appropriate Utilities of the potential defects in components manufactured by California Controls (Calcon), due to reported failures. During subsequent inspection of identical pressure sensors on other Catawba D/Gs, another faulty sensor was found and replaced and two new sensors removed from stock were determined to contain flaws. On May 5, 1988, another Valid Failure of D/G 1A occurred during a start attempt due to P-3 calibration drift. The D/G was returned to operability on May 8, 1988, following replacement of P-3 from a batch delivered by a Calcon representative and a modification to normally supply the D/G pneumatic control system with nitrogen instead of air. The Unit was in Mode 1, Power Operation, at 100% power, when the Valid Failures of D/G 1A occurred. This incident has been attributed to a Design, Manufacturing, Construction/Installation Deficiency. All Catawba affected pressure sensors were replaced between May 11, and May 16, 1988. The design flaw applies only to Calcon Sensor Models B4400, B4401, B4402, and B4403. The health and safety of the public were unaffected by this event.

Duke Power is submitting this report voluntarily for information purposes only.

8806290156 B80613  
PDR ADOCK 05000413  
S PDR

IE22

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 4 1 3 8 8 - 0 1 9 - 0 0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
					0 2	OF 0 8

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

BACKGROUND:

There are two IMO Delaval Model DSRV-16-4 Emergency Diesel Generators (EIIS:DG) (D/Gs) per Unit to supply emergency standby power to the 4160 VAC Essential Auxiliary Power System. The D/Gs are each rated for continuous operation at 5750 KW. Each D/G is designed to attain rated voltage and frequency and to begin accepting load within 11 seconds after receipt of an initiating signal.

The D/G Starting Air (EIIS:LC) (VG) System provides fast start capability for the diesel engines by using high pressure air to roll the D/G until it starts. It also provides a source of compressed air for the various engine pneumatic controls and instrumentation. Each D/G engine is provided with two independent VG trains, each consisting of a compressor (EIIS:CM) and aftercooler (EIIS:CLR), a filter (EIIS:FLT)/dryer (EIIS:DRY) unit, an air receiver (EIIS:RCV), injection lines and valves (EIIS:V), and devices to roll the engine.

The D/G pneumatic control system is provided to accomplish automatic shutdown action to protect the D/G when abnormal conditions are sensed. The automatic shutdown system is a network of vent-on-fault pneumatic devices which are arranged in the various systems on the engine. The venting of such a device is sensed by the pneumatic logic circuitry, and this circuitry then produces a 60 psig pressure signal which operates a cylinder on the engine to shut off fuel delivery.

During test periods, all trip devices are capable of shutting down the D/G. Following an Emergency Start from a Blackout or Loss of Coolant Accident (LOCA), only engine overspeed, generator differential, and low low lube oil pressure trips are allowed to shut down the D/G. The engine overspeed requires two out of two logic while generator differential and low low lube oil pressure (LLLOP) require two out of three coincidence logic to trip the D/G.

The D/G Low Low Lube Oil Pressure Trip device (P-3) is automatically supplied with sensing control air pressure (approximately 60 psig) until approximately 60 seconds (through use of a timer) following a start signal via a pneumatic "OR" gate. Formerly, a shuttle valve was utilized in place of the "OR" gate. During this same time, the three LLLOP sensors will sense increasing engine lube oil pressure on their diaphragms, causing the sensor's vent valves to close and increasing their supply control air pressure. When the timer elapses, the "OR" gate automatically switches sensed control air supply to P-3 from the control air supply/output of the LLLOP sensors. If this air pressure is above the P-3 set pressure the engine will continue to run. Two out of three logic is accomplished by installing orifices in the tubing to each LLLOP sensor control air supply such that continuous venting of one LLLOP sensor cannot reduce sensed control air pressure to below the P-3 setpoint. If sensed control air pressure is below the P-3 setpoint, P-3 will vent its control air supply to atmosphere which will in turn be detected by the decreased control air pressure in the pneumatic logic system, resulting in an automatic engine shutdown.

Each Diesel engine contains one low lube oil pressure sensor, three LLLOP sensors, one P-3 and two turbocharger lube oil pressure sensors. These devices

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 4 1 3 8 8 - 0 1 9 - 0 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
					0 3	OF	0 8

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

are all normally open, two way pressure sensors, Model B4400, manufactured by California Controls (Calcon). The pressure sensors are currently calibrated every 18 months.

The operability of each D/G is demonstrated periodically by conducting an operability periodic test in which the D/G is started and loaded to rated capacity. The acceptance criteria includes starting and reaching rated speed, output frequency and voltage within 11 seconds, and continuing to operate fully loaded for at least one hour. The frequency of testing is based upon the previous test history of the D/Gs.

DESCRIPTION OF INCIDENT:

On August 15, 1986, a D/G 1B Valid Failure occurred during testing. Duke Power Instrumentation and Electrical (IAE) personnel replaced a failed O-ring in the shuttle valve for P-3 to correct the problem.

On November 15, 1986, another D/G 1B Valid Failure occurred when the D/G tripped approximately 2 minutes after the start during testing. IAE personnel discovered and repaired a leak at an orifice in an LLOP sensor's control air tubing. Additionally, the P-3 shuttle valve required cleaning. Following the necessary repairs, the D/G was successfully tested to verify operability.

D/G 1B again experienced a Valid Failure on November 23, 1986, when an automatic trip occurred approximately one minute after starting during a test. IAE personnel traced the problem to an LLOP sensor which was continuously venting control air pressure. Following replacement of the faulty LLOP sensor, D/G 1B operability was verified.

Another Valid Failure of D/G 1B occurred on October 7, 1987, when the D/G tripped during testing. IAE personnel replaced the shuttle valve and P-3, but the D/G still tripped on automatic starts. The shuttle valve and P-3 were again replaced and the D/G accomplished 31 consecutive automatic starts with no trips.

An Invalid Failure of D/G 1A occurred on November 13, 1987 when the D/G tripped 1 minute after a start during testing, following completion of an 18 month mechanical inspection and overhaul. IAE personnel traced the problem to P-3, its shuttle valve, pneumatic logic elements "NOT 18" and "AND 14", and miscellaneous air leaks. Following repairs, thirty consecutive starts of D/G 1A were completed with no further automatic trips.

On December 1, 1987, approximately 70 seconds after starting during Engineered Safeguards Testing, D/G 1B tripped (Valid Failure). The investigation determined that the P-3 shuttle valve was not operating properly. Following repairs to the shuttle valve, the D/G tested satisfactorily. Duke Power Company Design Engineering and the D/G manufacturer determined that a pneumatic "OR" gate would be a more reliable substitute for the shuttle valves. Superior operation of the "OR" gate was verified by testing on D/G 1B. Variation Notices (VNs) CE-1523 and CE-1524 were written to perform this modification on both Unit 1 and Unit 2 D/Gs respectively. By December 17, 1987, the shuttle valves for P-3 on all four D/Gs

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 4 1 3 8 8	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		- 0 1 9	- 0 0 0		4	OF 0 8

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

had been replaced with the pneumatic "OR" gates. (The same P-3 was used with the "OR" gate.)

On January 15, 1988, a Valid Failure of D/G 2B occurred during testing. The trip was found to have been caused by debris and moisture in two of the three LLLOP sensor internals. Following cleaning the sensors, the D/G operability periodic test (PT) was successfully completed.

On March 22, 1988, a Valid Failure of D/G 1A occurred when the D/G tripped approximately one minute after starting during the operability PT. IAE replaced pneumatic logic element "OR 5" because of a slight cut in the diaphragm. D/G 1A operability was verified after 12 successful starts and completion of the operability PT.

On April 12, 1988, D/G 1A again experienced a Valid Failure after starting during the operability PT. IAE personnel discovered one of the three LLLOP sensors vent would periodically fail to close as oil pressure was supplied to the sensor. The other two LLLOP sensors were inspected and showed signs of internal corrosion. All three sensors were subsequently replaced. It is likely that this also caused the Valid Failure of D/G 1A which occurred on March 22, 1988. The operability of D/G 1A was then verified by three successful start attempts.

Also on April 12, 1988, D/G 2B experienced a Valid Failure 77 seconds after starting, while performing surveillance testing. Two LLLOP sensors were discovered to be venting 30 psi above the desired setpoint. These sensors were also found to contain moisture induced internal corrosion. After replacement of the two LLLOP sensors, the D/G performed satisfactorily. The IAE Staff Engineer responsible for the D/Gs contacted IMO Delaval to order spare pressure sensors and to inform them of the problem.

On April 19, 1988, D/G 1A tripped after starting during testing (Valid Failure). P-3 and other automatic trip devices were replaced by IAE personnel, although calibration checks indicated the devices were operating properly. Calibration of the three LLLOP sensors was verified by IAE personnel and the sensors were reinstalled. During subsequent testing, IAE discovered an orifice check valve to be leaking past its seat and replaced it. The D/G was returned to operability following successful completion of the operability PT on April 21, 1988.

On April 21, 1988, IMO Delaval personnel conducted an audit of Calcon's manufacturing facility due to the reported failures of the pressure sensors.

On April 23, 1988, D/G 1A successfully completed the operability .

On April 25, 1988, another Valid Failure of D/G 1A occurred following starting during performance of the operability PT. IAE personnel discovered P-3 to be venting control air pressure with normal D/G parameters. Following recalibration of P-3, the D/G started and ran properly twice. On April 26, 1988, P-3 was replaced by IAE personnel. The D/G was returned to operability on April 27, 1988, after additional testing and successful completion of the operability PT. The D/G also satisfactorily completed the operability PT on April 29, 1988.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 4 1 3 8 8 - 0 1 9 - 0 0 0 5 OF 0 8	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	

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

Also on April 29, 1988, IMO Delaval issued a 10CFR21 report to the NRC and the Utilities owning DSR and DSRV model D/Gs to inform them of the potential defects in components supplied by Calcon. The report was issued as a result of an audit by Delaval of Calcon's manufacturing facility, in which quality assurance concerns were raised.

On April 30, 1988, the LLOP sensors on D/G 2A were replaced by IAE as a precaution. Calibration checks of the old sensors did not reveal any problems.

On May 1, 1988, IAE personnel checked the calibration of the three LLOP sensors on D/G 2B. One sensor was found to be continuously venting and was out of calibration. This sensor was then replaced. During an inspection of two new pressure sensors removed from stock, one was found to contain an odd sized screw, and the other had excess material on the internal vent valve's rubber seat.

On May 5, 1988, another Valid Failure of D/G 1A occurred after starting during performance of the operability PT. During troubleshooting, IAE personnel discovered P-3 to be out of calibration and continuously venting. P-3 was then recalibrated and checked 45 minutes later. The setpoint had drifted from 40 psig to 60 psig during the waiting period. The responsible IAE Staff Engineer then notified the D/G manufacturer of the problem.

Due to the numerous problems with D/G 1A's pneumatic control system, a Nuclear Station Modification (NSM) was initiated to normally supply nitrogen to the control system instead of starting air which was suspected to have caused some of the D/G failures (due to moisture and debris).

On May 7, 1988, an IMO Delaval representative and the Calcon General Manager arrived on site with 12 newly manufactured and tested pressure sensors. IAE personnel calibrated a new sensor and checked calibration repeatability prior to replacement of P-3 on the D/G. The D/G was returned to service on May 8, 1988, following testing of the new nitrogen supply to the pneumatic control system and repeated successful starts.

During his return flight to California on May 8, 1988, the Calcon General Manager realized the probable cause of the sensor failures. Upon return to the manufacturing facility on May 9, 1988, he took the necessary measurements and conducted testing to confirm his hypothesis. The necessary drawing changes were made and modifications to 16 new sensors were initiated.

On May 11, 1988, the IMO Delaval representative and the Calcon General Manager returned to the site with the newly modified sensors. Following calibration, IAE personnel replaced all seven sensors on D/G 1B with the new model. The vendor made the necessary modification to the sensors in stock and to the sensors removed from the D/G, to facilitate replacement of the sensors on the remaining D/Gs.

Following calibration on May 12, 1988, IAE personnel replaced all seven sensors on D/G 1A with the new model.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)		
		YEAR	SEQUENTIAL NUMBER		REVISION NUMBER					
Catawba Nuclear Station, Unit 1	0 5 0 0 0 4 1 3 8 8	-	0	1	9	-	0	0	0 6 OF 0 8	

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

Following calibration on May 13, 1988, the seven sensors on D/G 2B were replaced (by IAE personnel) with new model sensors.

Following calibration on May 16, 1988, IAE personnel replaced all seven sensors on D/G 2A with the new model sensors.

CONCLUSION:

This incident has been attributed to a Design, Manufacturing, Construction/Installation Deficiency. The pressure sensor manufacturer (Calcon) identified the cause of the failures to be a design error which has existed since 1980. Sensors assembled from component parts with tolerances in one extreme would result in the sensing diaphragm being squeezed against the sensing head. On a newly assembled and/or calibrated sensor in this condition, the problem would not appear because the diaphragm will not have time to stretch and adhere to the pressure head. Over time, if sufficient spring pressure is applied to a sensor's diaphragm, it will adhere to the pressure head, increasing the force required to lift it and ultimately closing the internal vent valve. Additionally, when the diaphragm is squeezed against the pressure head, the diaphragm's sensing surface diameter is reduced from 1 1/8 inch to 3/8 inch, requiring a much higher pressure to actuate the valve.

Calcon revised the sensor drawings and modified a sufficient number of the sensors to replace those in use on all Catawba D/Gs. To correct the problem, the vendor machined .030 inches from the inside face of the sensor pressure head. This ensures a gap between the sensing diaphragm and the pressure head. Approximately 40 percent of sensors inspected on site by the Calcon Representative were found to have no gap between the sensing diaphragm and the pressure head (including the three P-3 sensors that caused the last three Valid Failures of D/G 1A). The old model sensors removed from the D/Gs (not yet modified) are being returned to the manufacturer. The design flaw applies only to Calcon Sensor Models B4400, B4401, B4402, and B4403. Only Calcon Model B4400 pressure sensors are utilized at Catawba. Calcon and IMO Delaval are currently working out the details for return of these sensors from other facilities.

The ability to diagnose the cause of the pressure sensor malfunctions was hindered by the nature of the failure mechanism. The design flaw could not be detected by normal calibration techniques, which further complicated analysis of the failures. Numerous personnel changes at Calcon over the past several years may explain the recent high failure rate of the sensors which have been fabricated according to the same specifications since 1980. The Calcon General Manager (recently rehired) is committed to improving the quality of his products and has hired a full time Quality Assurance Inspector.

Station Management has requested that the Duke Power Company Quality Assurance (QA) Vendors Group include Calcon in their periodic surveillance program to verify an adequate QA program has been implemented and is maintained.

It is possible that some of the D/G failures attributed to internal corrosion and debris in the pressure sensors, were actually a result of this design fault.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)  Catawba Nuclear Station, Unit 1	DOCKET NUMBER (2)  0 5 0 0 0 4 1 3 8 8 - 0 1 9 - 0 1 0 0 7 OF 0 8	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (If more space is required, use additional NRC Form 366A 1) (17)

However, most of the failed sensors were discarded, thus preventing reanalysis of the failure mode.

The modification which replaced the shuttle valves with pneumatic "OR" gates was intended to improve D/G reliability. The Duke Power Company General Office Licensing Group recently (March 9, 1988) concluded (after appropriate evaluation) that the shuttle valves were not defective, only possibly misapplied in their use with P-3. Additionally, their failure was considered not to meet the "Significant Safety" criteria of 10CFR21 and was not reported as such.

An NPRDS search was conducted, but no other failures (other than at Catawba) of Calcon Model B4400 pressure sensors have been reported. The recent failures of these sensors at Catawba are NPRDS reportable.

This report identifies all Catawba D/G failures involving pneumatic control system problems which may have, or are known to have been caused by malfunctions of Calcon Model B4400 pressure sensors. With the new sensors (Model B4400B) installed, the reliability of Catawba D/Gs is expected to improve significantly. NSMs 11104 and 20486, to replace the pneumatic emergency trip devices with electronic trip devices are currently scheduled to be completed prior to the end of each Unit's next refueling outage (Unit 1 EOC 3, Unit 2 EOC 2) respectively. NSMs 11149 and 20528, to replace the pneumatic non-emergency trip devices with electronic trip devices are currently scheduled to be completed prior to Unit 1 EOC 4, and Unit 2 EOC 3 refueling outages respectively. These modifications were previously initiated by the origination of Station Problem Reports (SPRs) following prior Valid Failures of Catawba D/Gs due to pneumatic control system malfunctions.

Because of the recent Valid Failures of D/G 1A and the previous failures that were attributed to moisture induced corrosion of the D/G 1A Control Air System components, the NSM to supply the pneumatic control system with dry nitrogen (instead of air from the VG System) was installed. At the time of the NSM installation, the exact D/G 1A failure mechanism was not known. The NSM was intended to either eliminate the problem or to allow ruling out pneumatic control system air quality concerns if the failures continued to occur. Since the cause of the D/G failures was subsequently determined to be the deficient Calcon pressure sensor design and because all D/G pneumatic trip devices will eventually be replaced with electronic trips, the NSMs to provide the three remaining D/Gs with nitrogen supply to the pneumatic control systems are not considered to be necessary and are not currently scheduled to be implemented.

CORRECTIVE ACTION:

SUBSEQUENT

- (1) In each case, components known or suspected to have failed were replaced and testing was conducted to verify D/G operability.
- (2) The root cause of the pressure sensor failures was discovered and a modification was performed to correct the design flaw.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		Catawba Nuclear Station, Unit 1	0 5 0 0 0 4 1 3	8 8 -	0 1 9 -	0 0	0 8

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

- (3) The affected pressure sensors on all Catawba D/Gs were replaced with the modified model.
- (4) Station Management requested that QA Vendors conduct an audit of the Delaval procurement process for Calcon parts.

PLANNED

- (1) NSM 11104 (to replace the Unit 1 D/G pneumatic emergency trip devices with electronic trip devices) will be completed.
- (2) NSM 20486 (to replace the Unit 2 D/G pneumatic emergency trip devices with electronic trip devices) will be completed.
- (3) NSM 11149 (to replace the Unit 1 D/G pneumatic non-emergency trip devices with electronic trip devices) will be completed.
- (4) NSM 20528 (to replace the Unit 2 D/G pneumatic non-emergency trip devices with electronic trip devices) will be completed.
- (5) An audit of the IMO Delaval procurement process for Calcon parts will be conducted and the Delaval QA audit of Calcon will be reviewed for acceptability.

SAFETY ANALYSIS:

During periods of time of D/G inoperability due to malfunctioning components in the pneumatic control systems, the opposite train D/G and off site power were continuously available if needed. Compliance with Technical Specification requirements and time limitations were maintained.

Duke Power Company is submitting this report voluntarily for information purposes only.

The health and safety of the public were not affected by these incidents.

DUKE POWER COMPANY

P.O. BOX 3318  
CHARLOTTE, N.C. 28242

HAL B. TUCKER  
VICE PRESIDENT  
NUCLEAR PRODUCTION

TELEPHONE  
(704) 373-4531

June 13, 1988

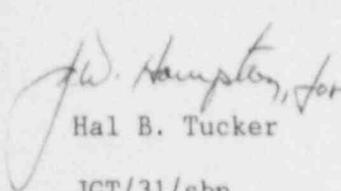
Document Control Desk  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Unit 1  
Docket No. 50-413  
LER 413/88-19

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Licensee Event Report 413/88-19 concerning the inoperability of diesel generators due to a manufacturer's design deficiency. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

  
Hal B. Tucker

JGT/31/sbn

Attachment

xc: Dr. J. Nelson Grace  
Regional Administrator, Region II  
U. S. Nuclear Regulatory Commission  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

M&M Nuclear Consultants  
1221 Avenue of the Americas  
New York, New York 10020

INPO Records Center  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339

American Nuclear Insurers  
c/o Dottie Sherman, ANI Library  
The Exchange, Suite 245  
270 Farmington Avenue  
Farmington, CT 06032

Mr. P. K. Van Doorn  
NRC Resident Inspector  
Catawba Nuclear Station