



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W., SUITE 2900  
ATLANTA, GEORGIA 30323-0198

Report Nos.: 50-424/95-20 and 50-425/95-20

Licensee: Georgia Power Company  
P. O. Box 1295  
Birmingham, AL 35201

Docket Nos.: 50-424 and 50-425

License Nos.: NPF-68 and NPF-81

Facility Name: Alvin W. Vogtle Nuclear Plant Units 1 and 2

Inspection Conducted: August 21-24, 1995

Inspector: *R. Moore* 8/31/95  
R. Moore

Date Signed

Approved by: *M. Shymlock* 9-6-95  
M. Shymlock, Chief  
Plant Systems Section  
Engineering Branch  
Division of Reactor Safety

Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted in the area of electrical maintenance (IP 62705). The inspection reviewed the Emergency Diesel Generator (EDG) maintenance and performance between May, 1994, and August, 1995 focussing on potential air quality concerns of the pneumatic protection and control system.

Results:

In the area inspected, violations or deviations were not identified.

Although water was evident on two occasions during this period in several of the 250 psi gage lines of the EDGs' air start system, EDG reliability was not impacted.

Enclosure

## REPORT DETAILS

### 1.0 Persons Contacted

- \*W. Burmeister, Engineering Support Manager
- \*C. Christensen, Safety Audit and Engineering Review Supervisor
- \*M. Hobbs, Instrumentation and Controls Superintendent
- \*P. Kochery, Plant Modifications and Maintenance Engineering Supervisor
- \*J. Liasser, Operations Manager
- \*L. Noblett, Instrumentation and Controls Foreman
- \*M. Sheibani, Nuclear Safety and Compliance Supervisor
- K. Stokes, Systems Engineer
- \*C. Tippins, Nuclear Specialist

Other licensee employees contacted during this inspection included engineers, technicians, craftsmen, and administrative personnel.

#### NRC Personnel

- C. Ogle, Senior Resident Inspector
- \*M. Widmann, Resident Inspector
- \*R. Crljenjak, Branch Chief, Division of Reactor Projects, RII

\*Attended exit meeting

Abbreviations and acronyms are listed in paragraph 4.

### 2.0 Electrical Maintenance (62705)

#### 2.1 Background

In March 1990 and May, 1990, EDGs 1A and 1B experienced failures or problems attributable to malfunctions of the pneumatic protection and control system. This was a 60 psi system supplied via a pressure regulator from the 250 psi air start system. The root cause of the failures was determined to be improper, intermittent operation of the Calcon Jacket Water sensors. Additional failure contributors were system air leaks and inconsistent instrument calibration technique. Moisture content of the pneumatic control system was evaluated as a possible contributor due to air dryer performance problems; however, it was concluded that this was not a contributor to the EDG failures or problems. This issue was reviewed in May, 1994 (NRC Inspection Report Nos.: 50-424,425/94-12).

The purpose of this inspection was to review EDG operating history, maintenance, component calibrations, air quality monitoring, and indications of water in the system to determine if pneumatic control system moisture content has been a problem since 1994. In particular, the review was to determine if EDG reliability had been impacted by existing air quality conditions since 1994. Evidence of moisture problems would include EDG failures or problems attributable to control system malfunctions, EDG component malfunctions due to corrosion or dirt on ports or moving parts, or chronic out of tolerance dew point conditions with identified moisture in the 60 psi system.

## 2.2 EDG Equipment History

The inspector reviewed maintenance work orders (MWOs) and deficiency cards (DCs) from May, 1994 through August, 1995, to determine if equipment history indicated a problem with pneumatic control system air quality. Indicators would include malfunctions of EDG components due to dirt, corrosion, moisture, or particulate on component internals, or EDG failures attributable to malfunctions of the pneumatic protection and control system. The MWOs included documentation of extensive inspections and tests performed in conjunction with the vender during the Unit 1, September, 1994 and Unit 2, February, 1995, refueling outages. The pneumatic protection and control system was functionally tested during these outages. The following MWOs were reviewed:

29403289	29403281	19401372	19401373
19401346	29500127	19400514	19401023
19401333	29403285	29403290	29403288
19402311	19400515	29501359	19400497
19401015	19400496	29403291	29401466
19400490	29401467	19400474	

Eleven of the MWOs replaced malfunctioning EDG components. These malfunctions were primarily due to mechanical failure of the switch, sensor, or gage. There were no indications of dirt, corrosion, moisture, or particulate on component internals. The MWOs did not indicate that air quality was a problem with the pneumatic protection and control system.

The following EDG related DCs were reviewed:

C00029618	C00028110	C00028839	C00029581
C00028152	C00029118	C00030044	C00028604
C00029356	C00029616	C00028728	C00029575
C00029583	C00028785	C00029580	C00029693
C00029649			

Four of the DCs were related to pneumatic control system components. The related cause determinations did not indicate that air quality was a contributor to the component malfunction. The inspector concluded that the EDG related DCs reviewed indicated that air quality of the EDG pneumatic protection and control system was not a problem.

## 2.3 Water in the 250 psi Gage Line

Discussion with the licensee indicated that a small amount of water was noted by a vender in a Unit 2, 250 psi air start system gage line in February, 1995. The water was noted at the vent/test connection between the gage isolation valve and the gage when the test connection cap was removed. This test connection is located upstream of the pressure regulator which supplies 60 psi air for the protection and control system. Physically, the tubing is approximately five feet above the regulator and filter and within the engine control panel enclosure.

This is a dead ended tubing run connecting the gage to the 250 psi portion of the system. Due to its location, the tubing run is not subject to the routine operational flow dynamics of the system. The vender observation was not noted in the vender's documentation of the inspection and test activities in the MWOs (MWOs 29403281 and 29403289). The system engineer indicated that the vender verbally communicated the observation and did not identify a concern related to the water in the gage line.

An NRC inspector observed the licensee perform a moisture check of the 250 psi gage line portion of all EDGs on August 18, 1995. This check was documented on MWOs 29502167 and 19502428. No moisture was evident in the Unit 2 EDG air start gage lines. Moisture was evident on the Unit 1 EDGs' gage lines. Less than 0.5 milliliters (ml) was recovered from EDG 1A right and left bank gage lines. Approximately 1.6 ml was recovered from EDG 1B right bank gage line. The licensee immediately performed a dew point analysis of the 250 psi portion at the receivers and the 60 psi portion within the engine control panel. All dew points were within the tolerance specified by the applicable procedure. The following dew points were determined:

EDG 1A:	Receiver	46.6 °F	
	Engine control panel		16.6°F
EDG 1B:	Receiver	46.7 °F	
	Engine control panel		22.4 °F

The dew point values indicated that the gage line water was not indicative of high moisture content of the protection and control air system.

The licensee performed gage line moisture checks again on the Unit 1 EDGs on August 22, 1995. One to two drops of water were noted on the EDG 1B right bank 250 psi gage line. Due to the limited venting of the gage line on August 18, 1995, the inspector concluded that the drops were residual water. At that time, venting was limited due to possible impact on EDG operability resulting from depressurizing the air start line. Additionally, on August 22, 1995, the licensee performed a moisture check on the 60 psi control air system within the engine control panels. No moisture was detected at the 60 psi gage line or the filter drain which was the system low point. The control panel internal temperature was measured at 93.4 °F and was maintained above 50 °F by a strip heater.

The inspector noted that although moisture was evident in the Unit 2 EDG gage line in February, 1995, there was no moisture evident in August, 1995 at the same location. With the exception of the residual moisture on the EDG 1B, no moisture was evident on the Unit 1 EDGs four days after the water was initially removed. As discussed in paragraph 2.5, there were three occasions since February, 1995, in which the dew point exceeded the specified 50 °F tolerance on Unit 2 EDGs' 250 psi air start systems. Based on the above information the probability was low that

the gage line water was the result of condensation within the 250 psi air system. The system was rarely vented from the gage line location because routine gage calibrations were performed after the system was depressurized for functional testing. Therefore the water could have been in the gage line for an indeterminate time period.

#### 2.4 Calibration

The inspector reviewed the licensee's calibration activity for control system components and pressure gages to determine if these included mechanisms capable of introducing water into the air system. The Calcon Pressure Switch Calibration Procedure, 22983-C, revision 3, specified the use of an air supplied variable pressure source for calibration of the switches. The pressure gage calibration procedure, Bourdon Tube-Type Indicator Calibration Procedure, 22705-C, revision 4, did not specify that the variable pressure source for gage calibration should be air or hydraulic. This is the procedure used for calibration of the 250 psi gages. The inspector concluded that the gage calibration activity provided a potential mechanism for introduction of water into the system.

The licensee's Instrumentation and Control (I&C) staff indicated that the introduction of water into the system via calibration was unlikely because fundamental craft knowledge dictated that air or gas was to be used for air system gage calibration. The MWOs which documented the previous calibrations of these gages listed the measuring and test equipment standards used but did not identify the type of variable pressure source used. The procedures also did not specify that connection tubing should be blown dry prior to use on an air system. Although this also would be considered fundamental craft knowledge, the inspector noted an example in which this action was omitted and resulted in an inaccurate dew point analysis. An analysis performed on September 28, 1994 (MWO 19400085) on the EDG 1B receivers identified a incorrect out-of-tolerance condition due to water in the tubing and test assembly.

#### 2.5 Dew Point Analysis

The inspector reviewed the result of the monthly dew point analyses and observed the performance of the analysis on the EDG 1A receivers. Procedure SCL-00166, EDG Air Start Dryer Maintenance, revision 6, provided guidance for the analysis and established the 50°F dew point tolerance limit. There were five occurrences of an out-of-tolerance measurement between 1994, and August, 1995.

EDG 1A	May 3, 1995
EDG 1B	July 14, 1995
EDG 2A	March 18, 1995 and July 9, 1995
EDG 2B	March 5, 1995

The associated MWOs documented that the required moisture checks were performed and actions were taken to return the dew point within the



specified tolerance. On several of the occurrences a dew point analysis was performed on the 60 psi control air system in addition to the 250 psi air start system. Although the 250 psi system dew point value was above the 50 °F tolerance specification, the dew point in the 60 psi system was within the tolerance specification. The inspector noted that there was no direct correlation between the dates of the discovered out-of-tolerance condition and the date the water was noted in the 250 psi gage line test connection. Observation of dew point analysis demonstrated the craft adhered to the procedure and was familiar with the test equipment.

## 2.6 Conclusion

For the time period between May, 1994, and August, 1995, this inspection identified no EDG failures or problems attributable to malfunction of the pneumatic control and protection system. There has been no EDG component failures in which moisture or air quality was identified as a contributor to the failure or malfunction. There were two occasions in which a small amount of water was noted in the 250 psi air start system at the gage line test connection. The source of this water introduction into the system was indeterminate. The inspector determined that an adverse system condition did not exist due to potential moisture content since 1994. In addition, as determined by this inspection, EDG reliability has not been impacted by air quality conditions of the pneumatic protection and control system.

## 3.0 Exit Meeting

The inspection scope and results were summarized on August 24, 1995, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

## 4.0 Abbreviations and Acronyms

DC	Deficiency card
EDG	Emergency Diesel Generator
°F	Degrees Fahrenheit
I&C	Instrumentation and Controls
MWO	Maintenance Work Order
psi	pounds per square inch